2020 Annual Status Report
Boomsnub/Airco Superfund Site
Hazel Dell, Washington

Prepared for

Messer LLC
200 Somerset Boulevard, Suite 7000
Bridgewater, New Jersey 08807

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, Washington 98121

March 2021
Revision 0
EA Project No. 16113.03

This page intentionally left blank.

CONTENTS

Page
LIST OF FIGURES iii
LIST OF TABLES iv
LIST OF ACRONYMS AND ABBREVIATIONS v
EXECUTIVE SUMMARY ES-1

1. INTRODUCTION 1-1
   1.1 BACKGROUND 1-1
   1.2 PURPOSE 1-5
   1.3 OPERATING OBJECTIVES 1-5
   1.4 ORGANIZATION OF THIS DOCUMENT 1-5

2. REMEDIAL ACTION PROGRESS 2-1
   2.1 SYSTEM OPERATIONS 2-1
      2.1.1 Groundwater Extraction System 2-1
      2.1.2 Groundwater Treatment System 2-2
   2.2 SYSTEM PERFORMANCE 2-2
      2.2.1 Water Treated 2-3
      2.2.2 System Availability 2-3
      2.2.3 Mass Removal 2-3
   2.3 MEETINGS 2-4
   2.4 DELIVERABLES 2-5
   2.5 FIELD EVENTS 2-7
   2.6 PROBLEMS ENCOUNTERED 2-8
   2.7 MISCELLANEOUS 2-8

3. GROUNDWATER MONITORING ACTIVITIES, RESULTS, AND TRENDS 3-1
   3.1 FIELD METHODS 3-1
      3.1.1 Extraction Well Sampling 3-1
      3.1.2 Monitoring Well Sampling 3-1
      3.1.3 Water Level Gauging Program 3-2
   3.2 WELL GROUPINGS 3-2
      3.2.1 Alluvial Aquifer Wells 3-2
      3.2.2 Troutdale Aquifer Wells 3-3
   3.3 CONTAMINANT CONCENTRATIONS AND TRENDS 3-3
      3.3.1 Overview 3-3
      3.3.2 Alluvial Aquifer Wells – TCE and Chromium 3-4
      3.3.3 Troutdale Aquifer Wells – TCE and Chromium 3-9
      3.3.4 Other Detected VOCs 3-10

4. OTHER ACTIVITIES 4-1
   4.1 EASEMENT AGREEMENTS AND RESTRICTIVE COVENANTS 4-1
   4.2 IN-SITU TESTING/TREATMENT 4-1
   4.3 SUSTAINABILITY PRACTICES 4-1

CONTENTS (Continued)

Page

5. ANNUAL ASSESSMENT OF GROUNDWATER SAMPLING 5-1
   5.1 EVALUATION OF CLOSURE MONITORING WELLS 5-1
      5.1.1 Remediation Monitoring Phase 5-2
      5.1.2 Attainment Monitoring Phase 5-3
   5.2 EVALUATION OF SAMPLING FREQUENCY 5-4

6. RECOMMENDATIONS AND PLANNED ACTIVITIES 6-1
   6.1 STATUS OF PREVIOUS RECOMMENDATIONS 2020 6-1
   6.2 RECOMMENDATIONS AND PLANNED ACTIVITIES FOR 2021 6-1

7. REFERENCES 7-1

LIST OF APPENDICES

APPENDIX A: Chain-of-Custody Documentation and Analytical Results Summary for Groundwater Samples

APPENDIX B: Site Groundwater Extraction/Treatment System
- B-1 OU-3 Bi-weekly System Monitoring Checklists
- B-2 OU-3 System Operation Tables
- B-3 OU-3 Mass Removal Tables and Charts
- B-4 OU-3 Reports to the City of Vancouver and Supporting Flow Data

APPENDIX C: Groundwater Purge and Sampling Forms

APPENDIX D: Monthly Data QA/QC Summary of Groundwater Data/Validation Report

APPENDIX E: Chromium Concentrations in Groundwater
- E-1 Chromium Concentrations – Summary Table
- E-2 Chromium Concentrations – By Well Grouping
- E-3 Chromium Concentrations – Individual Wells

APPENDIX F: TCE Concentrations in Groundwater
- F-1 TCE Concentrations – Summary Table
- F-2 TCE Concentrations – By Well Grouping
- F-3 TCE Concentrations – Individual Wells

APPENDIX G: Data for Closure Monitoring
- G-1 Wells Excluded from Closure Monitoring
- G-2 Remediation Monitoring Analysis

APPENDIX H: Northern Plume Monitoring Summary

LIST OF FIGURES

Number	Title
1-1	Site Location Map
1-2	Operable Units and Treatment System, 2020
1-3	Monitoring and Extraction Well Network
1-4	OU-2 Treatment and Monitoring Wells
3-1	Chromium Sampling Results, Fall 2020
3-2	Trichloroethene Sampling Results, Fall 2020
3-3	Alluvial Aquifer Groundwater Contours, Fall 2020
3-4	Troutdale Aquifer Groundwater Contours, Fall 2020
3-5	Extraction and Monitoring Well Groupings
3-6	Chromium Plume Comparison, 1995 vs. 2020
3-7	Trichloroethene Plume Comparison, 1995 vs. 2020
3-8	Wells with Chromium Concentrations Above the Cleanup Level in 2020
3-9	Wells with TCE Concentrations Above the Cleanup Level in 2020
5-1	Status of Closure Monitoring Program Volatile Organic Compounds
5-2	Status of Closure Monitoring Program Chromium
5-3	Wells to be Sampled in 2021

LIST OF TABLES

Number	Title
2-1	2020 Extraction Well Pumping Rates
3-1	Summary of Water Level Gauging Data and Groundwater Surface Elevations—Fall 2020
3-2	Extraction and Monitoring Well Groupings
3-3a	Summary of Chromium and Selected VOC Concentrations in Groundwater Samples—Spring 2020
3-3b	Summary of Chromium and Selected VOC Concentrations in Groundwater Samples—Fall 2020
5-1	Closure Monitoring Program Wells
5-2	Wells and Recommended Sampling Frequencies
5-3	Attainment Monitoring Status
5-4	Summary of 2021 Well Sampling Frequencies

LIST OF ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
BOC	The BOC Group, Inc.
Boomsnub	Boomsnub Corporation
CAS	Chemical Abstract Service
CD	Consent Decree
City	City of Vancouver
COC	Contaminant of concern
DCE	dichloroethene
EA	EA Engineering, Science, and Technology, Inc., PBC
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ft	feet
GWTS	Groundwater Treatment System
IWS	in-well stripping
lb	pound
µg/L	micrograms per liter
MCL	Maximum Contaminant Level
MTCA	Model Toxics Control Act
Messer	Messer LLC
NFS	no further sampling
O&M	operation and maintenance
OU	operable unit
PDB	passive diffusion bag
QA	quality assurance
QASP	Quality Assurance and Sampling Plan
QC	quality control
ROD	Record of Decision

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

Site	Boomsnub/Airco Superfund Site
SVE	soil vapor extraction
TCE	trichloroethene
VOC	volatile organic compound

EXECUTIVE SUMMARY

Introduction

This Annual Status Report summarizes information on activities that took place during 2020 at the Boomsnub/Airco Superfund Site (Site) in Hazel Dell, Washington. EA Engineering, Science, and Technology, Inc., PBC (EA), under contract to Messer LLC (Messer), operated and maintained a Site-wide groundwater extraction and treatment system and completed other EPA-approved remedial activities during 2020. Work at the Site is conducted under a Consent Decree between the U.S. Environmental Protection Agency (EPA) and the BOC Group (herein referred to as Messer)[1], Docket No. CO7-5163FDB, which was entered by the court on 29 June 2007 (EPA 2007).

2020 OU-3 System Operations

During the reporting period, 28,711,478 gallons of groundwater were treated and discharged to the infiltration gallery or used for in-situ treatment. In May 2020, approximately 7,100 gallons of treated groundwater were used for mixing and injection of the in-situ treatment products. All other treated groundwater was discharged to the infiltration gallery during the reporting period. The groundwater extraction and treatment system operated within the performance standards established for the Site.

The treatment system was operational for 8,713.68 hours, or over 99 percent of the reporting period, exceeding the 90 percent requirement of the Consent Decree Routine monitoring of the treatment system influent and effluent was conducted throughout the year and included monthly sampling and analysis of TCE, chromium, and pH. In addition, semiannual site-wide groundwater monitoring was conducted in the Spring 2020 and Fall 2020.

The mass of contaminants removed during the reporting period continued to decline compared to the previous reporting period. This is primarily due to the continuing downward trend in contaminant concentrations in Site groundwater, as reflected in the average influent concentrations of chromium and TCE at the Site over the years.

2020 Annual Screening of Groundwater Monitoring Data

Annual screening of groundwater monitoring data is conducted for each monitoring and extraction well currently sampled. As described in the Closure Plan, dated February 2018 and approved by the EPA on 19 March 2018, site closure will occur when the concentrations of all Site COCs in groundwater monitoring and extraction wells included in the Closure Monitoring Program have reached the Site-specific cleanup levels, as defined in the ROD. The following EPA guidance documents were used to develop the procedures in the Closure Plan to determine when

1 The BOC Group, Inc. (BOC) changed its name to Linde LLC and then, as of 1 March 2019, Linde LLC changed its name to Messer LLC. For ease of reporting, references to Messer in this report include the period of BOC and Linde responsibility prior to March 1, 2019.

the groundwater cleanup levels have been achieved: *Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well* (EPA 2014), and *Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions* (EPA 2013).

Based on the results of the annual screening of groundwater monitoring data through 2020, the following changes to monitoring frequencies were recommended this year:

- Sampling of select wells within the OU-2 source area will be increased to quarterly during 2021 to monitor effectiveness of the in-situ remediation. These wells are AMW-1A, AMW-2A. AMW-12A, AMW-53A, and MW-1A.

- To provide continued monitoring of the in-situ treatment area west of NE St. Johns Road, sampling frequency will be increased to semiannual in Intermediate wells AMW-59, CPU-14, MW-14E (for Cr), MW-20D (for Cr), MW-38, and PZ-39.

- Monitoring frequency for chromium will be increased to quarterly for Proximal wells MW-3A, MW-4A, MW-4B, MW-4C, MW-6A, MW-6B, and MW-9B to monitor the impacts from the GWTS shutdown during 2021, the first-year post-shutdown. After one year, monitoring frequency for these wells will reduce to semiannual in 2022.

- Sampling at wells MMW-63 and MW-41, which were used to monitor the 2008 Toe of Plume pilot study, will be discontinued. These wells are currently remediation complete.

Status of Previous Recommendations for 2020

To meet the operating objectives for OU-2 and OU-3, planned activities for 2020 were recommended in the 2019 Annual Status report (EA 2020d). The status of those planned activities is summarized below:

- **Well Sampling** – Wells were sampled in accordance with the updated sampling schedule.
- **Easement Agreements and Restrictive Covenants** – EA continues to work with the EPA as necessary to obtain the required agreements with non-responsive property owners. EA will continue efforts to obtain agreements as opportunities and need arise.
- **Padden Parkway Business Park** – The property owner was kept informed of activities on the property during 2020 and EA will continue to work with them regarding 2021 real estate development activities.
- **In-Situ Treatments** – In-situ groundwater treatments were completed on 1 August 2020. Analysis of TCE trends shows that in-situ injections have been effective at accelerating TCE mass removal in areas of recalcitrant contamination that had been seeing slowly diminishing effectiveness of the pump and treat remedial action.

- **Northern Plume** – EA continues to work with EPA to develop a strategy for closure of OU-3 wells being impacted by the Northern Plume.

Recommendations and Planned Activities for 2021

Messer recommends shutdown of the GWTS in January of 2021 following review of in-situ remediation performance monitoring data collected in Fall of 2020. Extraction and treatment of the groundwater as the primary remedy for OU-3 has resulted in the removal of a large contaminant mass over its operational period. However, as effective as this remedy has been, its ability to achieve total closure in the intended timeframe is inadequate due to the location of the residual contaminant mass and the hydrogeologic properties of the sediment in which the remaining mass resides. As described in the 2015 Explanation of Significant Differences (EPA 2015), in-situ treatment is an effective and approved alternative method for addressing the remaining residual mass. As described in a technical memorandum dated 23 September 2020 (EA 2020f), in-situ treatment of remaining "hot spots" is planned as the means of addressing residual TCE contamination in the mid-plume and source areas.

Messer recommends additional monitoring for chromium in monitoring wells located around the GWTS post-shutdown. The wells that Messer recommends for monitoring for the duration of the GWTS mothball period are MW-3A, MW-4A, MW-4B, MW-4C, MW-6A, MW-6B, and MW-9B. Additional monitoring in this area will identify any change to the residual chromium plume concentration or configuration in the period between GWTS shutdown and final soil excavation.

Messer plans on sampling on a quarterly basis in 2021. With the GWTS to be shutdown in January 2021, Messer recommends that sampling of monitor wells in the Attainment Monitoring phase of closure monitoring occur on a quarterly basis for the first four events, as described in the Closure Plan (EA 2018). Quarterly QASP Addendums will precede quarterly sampling events.

Messer also recommends decommissioning and removal of the SVE/IWS system located on the Messer Gas Plant property (OU-2). This SVE system is no longer operational, following a successful implementation from 2004 to 2008. The IWS system ceased operation in 2013.

This page intentionally left blank.

1. INTRODUCTION

This Annual Status Report summarizes information on activities that took place during 2020 at the Boomsnub/Airco Superfund Site (Site) in Hazel Dell, Washington. It presents the combined Progress and Groundwater Monitoring Report January – June 2020 and the 2020 Annual Status Report for the Site. Combining these reports was agreed to by the EPA on 28 July 2020.

The results of the Fall 2020 semiannual sampling event, a summary of treatment system operations from July through December 2020, as well as a summary of the well monitoring status for 2020 and recommendations for 2021 are provided. The summary of treatment system operations from January through June 2020 were provided in the Progress and Groundwater Monitoring Report January – June 2020 (EA 2020a).

EA Engineering, Science, and Technology, Inc., PBC (EA), under contract to Messer LLC (Messer), operated and maintained a Site-wide groundwater extraction and treatment system. Work at the Site is conducted under a Consent Decree (CD) between the U.S. Environmental Protection Agency (EPA) and the BOC Group (herein referred to as Messer)[2], Docket No. CO7-5163FDB, which was entered by the court on 29 June 2007 (EPA 2007).

1.1 BACKGROUND

The Site is located just north of the city limits of Vancouver, Washington, as depicted on Figure 1-1. It includes two adjacent facilities, the former Boomsnub Corporation (Boomsnub) chrome plating facility located at 7608 NE 47th Ave, Vancouver, WA and the Messer industrial gas production facility located at 4715 NE 78th St, Vancouver, WA. The Boomsnub Corporation and its predecessor company, Pioneer Plating, conducted chrome plating operations at this location from 1967 until 1994. The Boomsnub corporation is no longer in business and the current legal owner of the former Boomsnub facility is the USEPA. The Messer plant manufactures compressed and liquefied gas products including nitrogen, oxygen, and argon. The plant also stores and distributes other specialty gases such as hydrogen and helium. The facility was built by Air Liquide America Corporation in 1963 and has been in operation since 1964.

In 1987, the Washington State Department of Ecology (Ecology) determined that a plume of chromium-contaminated groundwater was emanating from the Boomsnub facility. While cleanup activities were being conducted at the Boomsnub facility, volatile organic compounds (VOCs) were detected in groundwater samples and were suspected to be coming from the Messer property. Messer began investigating the nature and extent of VOCs in 1991. In June 1994, EPA took over the role of lead regulatory agency from Ecology and in April 1995 the Site was placed on the National Priorities List. The primary constituents of concern at the Site are hexavalent chromium and selected VOCs. Previous studies indicated that almost all chromium in groundwater was hexavalent chromium (ICF Kaiser 1999). For this reason, most historical and

2 The BOC Group, Inc. (BOC) changed its name to Linde LLC and then, as of 1 March 2019, Linde LLC changed its name to Messer LLC. For ease of reporting, references to Messer in this report include the period of BOC and Linde responsibility prior to March 1, 2019.

recent groundwater samples have been analyzed only for total chromium to represent hexavalent chromium. The primary VOC of concern is trichloroethene (TCE), which serves as an indicator of VOC presence at the Site. The chromium and TCE groundwater contaminant plumes overlapped and were commingled downgradient of the source areas. In the 1990s, the plumes were found to extend approximately 4,400 feet (ft) in a west-northwest direction from the sources.

The Site is divided into three operable units (OUs) to manage cleanup activities: OU-1, Boomsnub Soil; OU-2, BOC (Messer) TCE source; and OU-3, Site-wide Groundwater (Figure 1-2). EPA conducted soil removal actions at OU-1 in 1994 and 2001 to remove hexavalent chromium-contaminated soils serving as a source for groundwater contamination. Soil with contamination above clean up levels was left in place underneath and adjacent to buildings and other site structures. Messer has conducted numerous site investigations, conducted a removal action, and operated a VOC source removal system for soil and groundwater on their property.

The highest concentrations of Site contaminants have occurred in a shallow groundwater-bearing zone referred to as the alluvial aquifer. The alluvial aquifer is not used as a municipal water supply, although a limited number of private wells pump from this aquifer. TCE and chromium have been detected, although at considerably lower concentrations, in the deeper groundwater-bearing zone, the Troutdale Aquifer. Chromium has not been detected in the Troutdale Aquifer since 2006. The Troutdale Aquifer serves as a municipal water supply for the City of Vancouver (City) and Clark County. Municipal water supply wells are not located in areas impacted by the chromium or TCE groundwater contaminant plumes.

A groundwater extraction and treatment system (GWTS) is used to capture and treat Site groundwater. The GWTS has been operational since 1990 and was originally constructed along the axis of the chromium plume. Since the initial system was installed, it has been modified, upgraded, and expanded several times to increase pumping and treatment capacity and capabilities, and to increase removal efficiency. The monitoring and extraction well network for the Site is presented on Figure 1-3. In recent years, selected portions of the extraction system have been shut down as the contaminant plumes have decreased in extent.

Chromium is removed from the extracted groundwater using an ion-exchange system. VOCs are removed from the extracted groundwater using air stripping with granular activated carbon treatment of the off-gases. The treatment facility is located on the Boomsnub property. Treated groundwater is discharged to an infiltration gallery located on the Messer property. The infiltration gallery was constructed during September and October 2005 and began receiving water in February 2006 (EA 2006). Prior to construction of the infiltration gallery, the treated groundwater was discharged to the City sanitary sewer system.

The Record of Decision (ROD) identified the remedy for OU-3 as continued groundwater extraction and treatment until groundwater cleanup levels are achieved throughout the groundwater plume (EPA 2000). The remediation goals include the reduction of total chromium in groundwater to 80 micrograms per liter (µg/L) and the reduction of TCE to 5 µg/L. The ROD for the Site, dated February 2000, identified the following groundwater cleanup levels:

Groundwater Cleanup Levels

Contaminant of Concern	CAS Number	Basis	Practical[(a)] Quantitation Limit (µg/L)	Cleanup[(b)] Level (µg/L)
Hexavalent chromium	18540-29-9	MTCA B	5	80
Chromium (total)	7440-47-3	MCL	5	100
Bromodichloromethane	75-27-4	MTCA B	1	1
Carbon tetrachloride	56-23-5	MTCA B	1	1
Dibromochloromethane	124-48-1	MTCA B	1	1
1,2-Dichloroethane	107-06-2	MCL	1	5
1,1-Dichloroethene	75-35-4	MTCA B	1	1
Tetrachloroethene	127-18-4	MCL	1	5
1,1,1-Trichloroethane	71-55-6	MCL	1	200
Trichloroethene	79-01-6	MCL	1	5

NOTES: CAS = Chemical Abstract Service
µg/L = Micrograms per liter
MTCA = Washington State Model Toxics Control Act
MCL = Maximum Contaminant Level

(a) Ecology Implementation Memo No. 3 dated 24 November 1993 (Ecology 1993).
(b) Cleanup level established as the higher of the regulatory level or the practical quantitation limit; see Washington Administrative Code 173-340-700(6) and Ecology Implementation Memo No. 3 dated 24 November 1993.

An Action Memorandum was issued by EPA in September 2001, identifying the requirements for remediation activities for OU-2 (EPA 2001). On 18 September 2002, BOC and EPA entered an Administrative Order on Consent (EPA Docket Number CERCLA 10-2002-0052; EPA 2002), addressing the specific design, construction, and operational requirements for a Non-Time-Critical Removal Action for OU-2 to implement the requirements of the Action Memorandum. Locations of the OU-2 treatment and monitoring wells are shown on Figure 1-4.

On 1 April 2002, the BOC Group (which later became Linde LLC) assumed interim responsibility for the operation and maintenance (O&M) of the GWTS for OU-3. On March 1, 2019, Messer retained responsibility for the remediation at this location as part of acquisition of certain Linde assets. Therefore, Messer continues with O&M of the system.

In October 2002, EPA conducted additional soil characterization activities on the Boomsnub property around the groundwater extraction and treatment system building. The purpose of the work was to identify areas in the shallow soils (15 ft or less deep) with concentrations of chromium above the cleanup levels specified in the ROD. The results of the soil characterization activities were presented in the *Soil Characterization: Groundwater Treatment System Compound* report, finalized in April 2003 (URS Group, Inc. 2003).

In September 2003, Messer began construction of the Non-Time Critical Removal Action at their facility to address the VOC source area (OU-2). The EPA -elected remedial action was a combination of in-well stripping (IWS) and soil vapor extraction (SVE) systems to remove VOCs from both the groundwater and soil beneath the Messer gas plant. The systems became operational in February 2004. The SVE system was operated to treat the vadose zone soil in OU-

2 until 2008, when it was turned off with EPA approval. The IWS system was operated to treat groundwater in OU-2, until it was turned off with EPA approval in August 2013. In 2020 the EPA agreed that the IWS and SVE systems could be decommissioned.

The Toe-of-Plume Pilot Study, an in-situ treatment program, was performed in 2006 to treat an area of recalcitrant chromium and TCE contamination near the original toe of the groundwater contaminant plumes. Chromium and TCE concentrations in the pilot study monitoring wells have remained below the cleanup level since that time, indicating that the treatment was effective.

In 2008, an investigation identified another plume of VOC contamination in groundwater north of the Boomsnub/Airco Plume (OU-3 plume), in the area around well AMW-18 (EA 2008). This offsite plume is referred to as the Northern Plume. In May 2011, EPA and Messer performed a joint investigation of the Northern Plume area to get a better understanding of the source, extent, and concentrations of VOCs in the plume (EA 2011). A new monitoring well (AMW-64) was installed in February 2012, at the request of the EPA, to monitor the Northern Plume northwest of well AMW-18 (EA 2012). The Northern Plume continues to be monitored, along with the OU-3 plume, to evaluate potential impacts to the Site and treatment system, and in accordance with an agreement between Messer and EPA. The EPA does not attribute contamination from the Northern Plume to activities on the Boomsnub or Messer properties. The Work Plan for the 2008 investigation noted that an offsite source of TCE originating from the Permalume property immediately east and upgradient of the Messer gas plant property impacted monitoring well AMW-8A, which is located at the eastern boundary of the Messer Property and is approximately 700 ft northeast of the Boomsnub/Airco Site TCE Source Area (EA 2008). AMW-8A and the Permalume property are located upgradient of Northern Plume well AMW-18, and the results of the AMW-18 Area Investigation support a finding of the Permalume property as the source of the Northern Plume.

In 2015 the EPA issued an Explanation of Significant Differences allowing use of in-situ treatment in addition to the ROD-approved remedial action. An in-situ treatment pilot test (Phase I) was conducted in Fall 2018 just downgradient of TCE Source Group wells AMW-2A and MW-1A and upgradient of Intermediate Group wells MW-18D and MW-18E, to determine the effectiveness of proposed treatments on reducing TCE concentrations. The results of the pilot study showed both treatments were effective in reducing the TCE concentrations in nearby wells. Regenesis PlumeStop® was used in the TCE Source Area and PeroxyChem EHC Plus® was used in the Intermediate Wells area.

Full scale in-situ treatment injections (Phase IIA) were conducted in the Fall of 2019 using PeroxyChem EHC Plus® in the historically mid-plume area where a lithological trough crosses the plume perpendicularly. Approximately 61,920 pounds of this compound were injected into five permeable reactive zones. Additional injections (Phase IIB) were performed in 2020 and included additional injections further downgradient of the Phase IIA injections using additional PeroxyChem EHC Plus® in three permeable reactive zones, as well as within the OU-2 area using Regenesis PlumeStop® in five permeable reactive zones. Performance monitoring of Phase IIA and Phase IIB was performed by sample collection in the Spring and Fall 2020 in select

downgradient wells and will be reported in a separate in-situ treatment report, to be submitted to the EPA in the Spring of 2021.

1.2 PURPOSE

The purpose of this report is to provide an overview of Site activities at OU-2 (TCE source area) and OU-3 (site-wide groundwater) for the reporting period of 1 January through 31 December 2020.

1.3 OPERATING OBJECTIVES

The operating objectives for OU-2, identified in the 2001 Action Memorandum (EPA 2001), include the following:

- Remove VOCs from the vadose zone that may be acting as the source to groundwater.
- Remove VOCs from groundwater on the western portion of the Messer property.
- Halt off-property migration of VOCs in groundwater.

The operating objectives for OU-3 are defined in the ROD (EPA 2000). Activities at the Site are designed to meet the following overall objectives:

- Reduce contaminant migration within the alluvial aquifer (expansion of the plumes).
- Continue mass removal activities designed to restore impacted groundwater to Site-specific cleanup levels.
- Reduce contaminant migration into the Troutdale Aquifer by reducing contamination in the alluvial aquifer.

With the implementation and continued operation of remedial measures discussed in this document, these objectives are, and continue to be, met.

1.4 ORGANIZATION OF THIS DOCUMENT

This report is divided into eight sections and three appendices:

- Section 1 provides the background, purpose, and operating objectives.
- Section 2 summarizes remedial action progress during the reporting period including system operations and monitoring.
- Section 3 provides a discussion of groundwater monitoring results and trends.
- Section 4 summarizes other Site activities conducted during the reporting period.
- Section 5 presents the results of the annual assessment of groundwater monitoring data and provides recommendations, as appropriate, for changes to the well sampling

schedule.

- Section 6 summarizes the status of previously recommended activities for 2020 and presents recommendations and planned activities for 2021.
- Section 7 lists the references cited in this document.
- Appendix A – laboratory chain-of-custody documentation for groundwater samples collected during the Fall 2020 sampling event and the analytical results summary for groundwater samples.
- Appendix B – documentation relative to the OU-3 treatment system operations and monitoring.
- Appendix C – field purge and sampling forms for the Fall 2020 sampling event.
- Appendix D – monthly data quality assurance (QA)/quality control (QC) summary and groundwater data validation report.

Information on chromium and TCE concentrations in groundwater is presented in Appendices E and F, respectively. The information is presented both by well groupings and by individual wells. Appendices E and F are organized in sections, as follows:

- Tables reporting chromium and TCE groundwater concentrations for the last five sampling events are provided in Appendices E-1 and F-1, respectively. Only wells sampled during the 2020 reporting period are included in these tables.
- Graphs showing chromium and TCE concentration trends by well grouping are presented in Appendices E-2 and F-2, respectively. Only wells sampled during the 2020 reporting period are included. These graphs allow a comparison of trends within geographical or hydrogeological groupings. They also allow immediate comparison of concentrations between wells in a grouping and the ability to identify potential outliers.
- Graphs showing chromium and TCE concentrations over time for individual wells are presented in Appendices E-3 and F-3, respectively. Only wells sampled during the 2020 reporting period are included.

Appendix G includes supporting information for the closure monitoring assessment, including a list of wells excluded from closure monitoring, and tables showing the results of the remediation monitoring analysis and attainment monitoring analysis for each contaminant of concern (COC).

Appendix H includes a discussion on the Northern Plume and associated tables and figures. The Northern Plume continues to be monitored, to evaluate potential impacts to the Site and treatment system.

2. REMEDIAL ACTION PROGRESS

This section provides a summary of OU-3 system operations, system performance for the 2020 reporting period, and plume monitoring conducted from 1 July to 31 December 2020. A summary of OU-3 system operations, system performance the Spring reporting period (January through June 2020) is presented in the Spring Progress and Groundwater Monitoring Report (EA 2020a). Monthly influent and effluent sampling of the OU-3 groundwater treatment system was completed in accordance with the Site-specific Quality Assurance and Sampling Plan (QASP; EA 2019). VOCs (EPA Method 8260C) and total chromium (EPA Method 200.7) were analyzed by the project laboratory, ALS Environmental (ALS) in Kelso, Washington. The monthly OU-3 influent/effluent data for the reporting period were reviewed for QA/QC in accordance with the standards established in the Site QASP (EA 2019). A QA/QC summary of the monthly OU-3 influent/effluent data is presented in Appendix D. No significant issues were observed.

2.1 SYSTEM OPERATIONS

Routine system operation details for the 2020 reporting year are presented in the following Sections. System data for the spring reporting period (January through June) is presented in the Spring Progress and Groundwater Monitoring Report (EA 2020a) and system data for the fall reporting period (July through December) is presented in Appendix B of this report. During the reporting period the groundwater extraction and treatment system operated within the performance standards established for the Site.

Influent and effluent samples were collected by EA on 7 July, 3 August, 9 September, 8 October, 3 November, and 4 December 2020. Influent and effluent samples collected January through June 2020 are presented in the Spring Progress and Groundwater Monitoring Report (EA 2020a). A field meter was used to measure the monthly pH readings. Based on the analytical results for these samples, effluent water quality met both the City discharge permit limits and the infiltration gallery discharge limits during the reporting period. Appendix B.2 Table 3 provides a summary of influent and effluent analytical data from the reporting period. It also presents the discharge permit limits and the infiltration gallery discharge limits. The system continued to operate as designed and in compliance with the CD and treatment standards.

2.1.1 Groundwater Extraction System

The extraction well pumping rates were recorded once a month during the reporting period and are recorded in Table 2-1.

Due to the proximity to In-Situ treatment injections, wells MW-14C and MW-14E were shut off indefinitely on 6 October 2019, MW-19D was shut off indefinitely on 14 October2019, and MW-22D was shut off on 21 September 2020.

2.1.2 Groundwater Treatment System

Routine monitoring of the treatment system influent and effluent was conducted throughout the reporting period including monthly sampling and analysis of VOCs, chromium, and pH. Treatment system components are briefly described in the following sections.

2.1.2.1 Ion-Exchange and Air Stripper Systems

In 2020, the ion-exchange system had an annual average chromium removal rate of approximately 87 - 100 percent and the air stripper system had an annual average VOC removal rate of approximately 98 - 100 percent (Appendix B.3, Table 1). Monthly influent and effluent sample concentrations were used to determine approximate chromium and TCE monthly removal rates. Removal rates are calculated based upon a percentage of the influent/effluent concentrations which continue to be either non-detect or an estimated concentration below the method reporting limit. All discharge limits were met.

2.1.2.2 Infiltration Gallery

Treated groundwater from the Site treatment system is discharged back into the alluvial aquifer through an infiltration gallery. The infiltration gallery is located in the southeast corner of the Messer property and is designed to accept treated water at 160 gallons per minute. No modifications or significant repairs were made to the infiltration gallery during the reporting period. TCE and chromium concentrations in effluent discharged to the infiltration gallery during 2020 were consistently below the maximum allowable effluent concentrations of 1.9 µg/L for TCE and 19.2 µg/L for chromium. Effluent monitoring results are provided in the Spring Progress and Groundwater Monitoring Report for the Spring Reporting Period (EA 2020a) and in Appendix B for the Fall Reporting period.

2.2 SYSTEM PERFORMANCE

OU-3 system performance for 2020 is summarized in the following table. Additional details are provided in the Spring Progress and Groundwater Monitoring Report for the Spring Reporting Period (EA 2020a) and in Appendix B for the Fall Reporting period.

OU-3 System Performance Summary, 2020

Month	Hours/Month	Hours of Operation/Month	Availability (percent)	Flow (gallons)
January	744	744	100	3,085,887
February	696	694.53	99.79	2,862,209
March	744	744	100	3,090,940
April	720	720	100	2,939,574
May	744	744	100	2,598,158
June	720	720	100	2,370,415
July	744	744	100	2,438,902
August	744	744	100	2,430,806
September	720	660.10	91.68	1,977,337
October	744	735.05	98.8	1,647,088
November	720	720	100	1,610,102
December	744	744	99.96	1,660,060
2020 Totals	**8,784**	**8713.68**	**99.19**	**28,711,478**

Note: The percent availability includes actual minutes of operation.

2.2.1 Water Treated

During the reporting period, 28,711,478 gallons of groundwater were treated and discharged to the infiltration gallery or used for in-situ treatment. In May 2020, approximately 7,100 gallons of treated groundwater were used for mixing and injection of the in-situ treatment products. All other treated groundwater was discharged to the infiltration gallery. The groundwater extraction and treatment system operated within the performance standards established for the Site.

2.2.2 System Availability

The treatment system was operational for 8,713.68 hours, or over 99 percent of the reporting period, exceeding the 90 percent requirement of the CD. Additional details are provided in the Spring Progress and Groundwater Monitoring Report for the Spring Reporting Period (EA 2020a) and in Appendix B for the Fall Reporting period.

2.2.3 Mass Removal

Table 1 in Appendix B.3 presents cumulative chromium and TCE removed in 2020, along with monthly influent data and flow. Based on measured influent and effluent concentrations and the total monthly treatment system flow, 8.4 pounds (lbs) of chromium and 1 lb of TCE were removed by the groundwater extraction and treatment system during 2020. This brings the cumulative total mass of chromium and TCE removed to approximately 22,487 lbs and 2,240 lbs, respectively, since initiating operations in 1990. There is a continuing downward trend in influent contaminant concentrations in Site groundwater which reflects in a lower removal rate year after year as shown on Figure B.3-1 in Appendix B.3.

2.3 MEETINGS

Due to the COVID-19 pandemic, the 11 March 2020 Annual EPA meeting was the only meeting held physically and was conducted at EA's office with out-of-state participants joining remotely. All other meetings in 2020 were remotely conducted on a videoconference platform.

- **11 March 2020** – Annual site meeting. Attendees: David Sordi and Philipp Sieber (Messer); Jonathan Williams and Lee Thomas (EPA); Jonathan Reeve and Jil Frain (EA). Reviewed performance and monitoring results from 2019, discussed further injections planned for 2020.
- **29 May 2020** – Attendees: David Sordi and Philipp Sieber (Messer); Jonathan Williams and Lee Thomas (EPA); Jonathan Reeve and Jil Frain (EA). Discussed initiation of attainment monitoring, possible future reporting requirements, the Troutdale Aquifer, and the future of the groundwater treatment system.
- **9 July 2020** – Attendees: David Sordi and Philipp Sieber (Messer); Jonathan Williams and Lee Thomas (EPA); Jonathan Reeve and Jil Frain (EA). Discussed Regenesis injections of PlumeStop in Area of Concern (AOC)-1, a possible EPA site visit, the protectiveness of the existing monitoring well network for the Troutdale Aquifer, and chromium concentrations in the vicinity of the groundwater extraction and treatment system (GWTS). The EPA concurred with future reporting requirements being a single Semiannual Report submitted at the same time as the previous Spring Semiannual Progress and Groundwater Monitoring Report, and an Annual Report. The EPA also agreed to temporarily move MW-21D and MW-38 into the Northern Plume monitoring and reimbursement program. If rising TCE concentrations reverse as a result of treatment or plume realignment, those wells will be reassessed for return to the Boomsnub monitoring program. Additionally, the EPA agreed that Messer could begin attainment monitoring in steady-state areas wells that have achieved Remediation Complete and are On Hold. The EPA further agreed that Messer could dismantle the SVE/IWS system located at the Messer plant, which has been unused since 2013 and will provide no further benefit. After the meeting, the EPA emailed written agreement to these operational changes.
- **28 July 2020** – Attendees: David Sordi and Philipp Sieber (Messer); Jonathan Williams and Lee Thomas (EPA); Jonathan Reeve and Jil Frain (EA). Presented and discussed historical trend data for chromium in MW-6A, further discussed the Troutdale Aquifer monitoring well network, and discussed the creation of a GANTT chart to detail future site operations post GWTS shutdown.
- **18 August 2020** – Attendees: David Sordi and Philipp Sieber (Messer); Jonathan Williams, Tim Maley and Lee Thomas (EPA); Jonathan Reeve and Jil Frain (EA). Presented and discussed an analysis of residual chromium concentrations at MW-6A, in the context of responding to an EPA comment on the Annual Report.
- **9 September 2020** – Attendees: David Sordi and Philipp Sieber (Messer); Jonathan Williams and Tim Maley (EPA); Jonathan Reeve and Jil Frain (EA). Discussed remedial

infrastructure conflict with developer designs at the Acero Padden Apartment Complex Development, Annual Report comment responses, a cross section of groundwater prepared by EA through the Boomsnub property prepared by EPA request, and the proposed GWTS shutdown as detailed in a memorandum sent to the EPA on 2 September 2020 (Revision 1 sent 23 September 2020, EA 2020f). EPA agreed with Messer's proposed approach to shut down extraction well MW-22D and decommission Containment Vault CV-11 for the Acero Padden Apartment Complex, as these were no longer needed for treatment due to the recent in-situ injections.

- **23 September 2020** – Attendees: David Sordi and Philipp Sieber (Messer); Jonathan Williams and Tim Maley (EPA); Jonathan Reeve and Jil Frain (EA). Discussed soil and groundwater chromium contamination on the Boomsnub property, the extent of the Troutdale Aquifer well network, and whether any future work investigation will need to be conducted in the Troutdale Aquifer.
- **19 October 2020** – Attendees: David Sordi and Philipp Sieber (Messer); Jonathan Williams and Tim Maley (EPA); Jonathan Reeve and Jil Frain (EA). Presented EPA-requested cross section of residual chromium in vadose zone soils and excavations that occurred on the Boomsnub Property, discussed a possible update to the groundwater contaminant transport model in the area of the Boomsnub property, and how shutting off the GWTS would affect chromium beneath the Boomsnub property. EPA indicated that they agree with the GTWS shutdown approach proposed in the 23 September 2020 Memorandum (EA 2020f).
- **10 November 2020** – Attendees: David Sordi and Philipp Sieber (Messer); Jonathan Williams and Tim Maley (EPA); Jonathan Reeve and Jil Frain (EA). Discussed Padden Parkway development by PacTrust, and potential conflicts with remedial system infrastructure.
- **16 December 2020** – Attendees: David Sordi and Philipp Sieber (Messer); Jonathan Williams and Tim Maley (EPA); Jonathan Reeve and Jil Frain (EA). Presented performance monitoring data from the October 2020 sampling event, showing favorable conditions as a result of in-situ injections. Discussed results with the EPA and agreed to prepare maps of results by EPA request. Informed EPA of plan to shut down the GWTS on 7 January 2021 (Shutdown did occur on 3 January 2021).

2.4 DELIVERABLES

The following deliverables were submitted between January and December 2020.

- **15 January 2020** – QASP Addendum for Phase IIA In-Situ Treatment Sampling (EA 2020b) submitted to the EPA.
- **16 January 2020** – October through December 2019 Self-Monitoring Report was submitted to the City.
- **15 January 2020** – Notification letters for the Phase IIA in-situ treatment sampling event were mailed to the property owners.

- **27 February 2020** – Progress and Groundwater Monitoring Report, July – December 2019 was submitted to the EPA.
- **7 February 2020** – 2019 Dangerous Waste Report was submitted to Ecology.
- **23 February 2020** – Spring 2020 QASP Addendum (EA 2020c) was submitted to EPA.
- **6 March 2020** – 2019 Annual Status Report (EA 2020d) was submitted to EPA.
- **2 April 2020** – Notification letters for the Spring 2020 sampling event were mailed to the property owners.
- **17 April 2020** – Notification letters for the Phase IIB in-situ event were mailed to the property owners.
- **23 April 2020** – January through March 2020 Self-Monitoring Report was submitted to the City.
- **29 June 2020** – Notification letter for the Phase II in-situ event on Clark County property was mailed to the property owner.
- **13 July 2020** – April through June 2020 Self-Monitoring Report was submitted to the City.
- **21 August 2020** – Progress and Groundwater Monitoring Report, January – June 2020 was submitted to EPA.
- **26 August 2020** – Fall 2020 QASP Addendum (EA 2020e) was submitted to EPA.
- **2 October 2020** – Notification letters for the Fall 2020 sampling event were mailed to the property owners.
- **23 October 2020** – July through September 2020 Self-Monitoring Report was submitted to the City.

The following deliverables are anticipated for submittal during the next reporting period (January through December 2021):

- **7 January 2021** – Winter 2021 QASP Addendum submitted to EPA.
- **31 January 2021** – October – December 2020 Self-Monitoring Report to be submitted to the City.
- **1 March 2021** – Spring 2021 QASP Addendum to be submitted to EPA.
- **1 March 2021** – Dangerous Waste Report to be submitted to Ecology.
- **15 March 2021** – In-Situ Injections Report to be submitted to EPA.
- **1 April 2021** – 2020 Annual Status Report to be submitted to EPA (Per approval from EPA, Annual Status Report will be combined with Fall Progress and Monitoring Report for 2021 and future reports).

- **2 April 2021** – Notification letters for the Spring 2021 sampling event to be mailed to the property owners.
- **30 April 2021** – January – March 2021 Self-Monitoring Report to be submitted to the City.
- **25 May 2021** – Summer 2021 QASP Addendum to be submitted to EPA.
- **30 July 2021** – April – June 2021 Self-Monitoring Report to be submitted to the City.
- **25 July 2021** – Notification letters for the Summer 2021 sampling event to be mailed to the property owners.
- **18 August 2021** – Fall 2021 QASP Addendum to be submitted to EPA.
- **21 August 2021** – Semiannual Report, January – June 2020 to be submitted to EPA.
- **25 September 2021** – Notification letters for the Fall 2021 sampling event to be mailed to the property owners.
- **30 October 2021** – July – September 2021 Self-Monitoring Report to be submitted to the City.
- **28 November 2021** – Winter 2022 QASP Addendum to be submitted to EPA.
- **28 December 2021** – Notification letters for the Winter 2022 sampling event to be mailed to the property owners.

2.5 FIELD EVENTS

The following are field events that occurred during the year, excluding routine O&M tasks:

- **21 January 2020** – In-situ Phase IIA performance monitoring sampling event.
- **21-23 April 2020** – Spring groundwater sampling event.
- **4 May 2020 – 1 August 2020** – Phase IIB in-situ permeable reactive zone injections.
- **19-22 October 2020** – Fall groundwater sampling event.

The following are field events are anticipated to occur during the next reporting period (January through December 2021,): excluding routine O&M tasks:

- **1-5 February 2021** – Winter groundwater sampling event.
- **19-23 April 2021** – Spring groundwater sampling event.
- **13-17 July 2021** – Summer groundwater sampling event.
- **19-23 October 2021** – Fall groundwater sampling event.

2.6 PROBLEMS ENCOUNTERED

No problems were encountered with the remedial system during the July through December 2020 reporting period. Problems encountered during the January through June 2020 timeframe are discussed in the Progress and Groundwater Monitoring Report, January—June 2020 (EA 2020a).

2.7 MISCELLANEOUS

The following miscellaneous items were addressed during the July through December reporting period, miscellaneous items for the January through June 2020 timeframe are discussed in the Progress and Groundwater Monitoring Report, January—June 2020 (EA 2020a).:

- **4-22 May 2020** – Phase IIB in-situ treatment injections of PeroxyChem EHC Plus® were conducted in AOC-2. Turned off Extraction Well MW-20D due to proximity to in-situ injection locations; the well will remain off permanently.
- **7 July 2020 – 1 August 2020** – Phase IIB in-situ treatment injections were conducted in AOC-1, on the Messer and Boomsnub properties, as well as the county right of way for NE 47th Avenue. The injections were performed by EA subcontractor Regenesis using their PlumeStop® product.
- **28 July 2020** – Received approval from EPA to move to a single Semiannual Report delivered at the same time of year as prior Spring Semiannual Progress and Monitoring Reports, and an Annual Report, as shutdown of the GWTS eliminates the future need for progress reporting. The Semiannual Report will discuss winter and spring sampling results, and the Annual Report will discuss summer and fall sampling results previously reported in the Fall Semiannual Progress and Monitoring Report, in addition to the typical annual analyses and discussion provided in the Annual Report.
- **21-29 September 2020** – Extraction Well MW-22D was turned off, the pipes connecting to containment vault CV-11 were drained, and the discharge conveyance lines were then pressure grouted by EA subcontractor Stratus Corporation. The containment vault was then removed by the Acero Padden Apartment Complex developer. The decommissioning and removal effort were necessary for the construction of a right turn lane for eastbound NE 78th Street into a new road that will serve as the entrance to the development. The EPA agreed to these system modifications, as noted in Section 2.3.
- **2 October 2020** – EA subcontractor Stratus modified the final elevation of CPU-12 to meet the final grade of the asphalt parking area developed over it for the Acero Padden Apartment Complex development. The new top of casing elevation was surveyed by the developer as 272.36 ft above mean sea level.
- **29 October and 17 November 2020** – Messer, EA, and PacTrust discussed PacTrust's real estate development plans for their Padden Parkway property. This property is in the Intermediate Well Group area, and draft development plans overlap several site monitoring wells and pipeline infrastructure. As PacTrust's development of the property

was described as a phased approach spanning several years, initial focus was placed on the western half of the property. Three wells currently or historically associated with the Boomsnub/Airco Superfund Site overlapped with building footprints on the first (western) half of the property. These wells are CPU-14, CPU-10, and CPU-2. Of those three, only CPU-14 is in the Closure Plan for monitoring. Conceptual plans for integrating CPU-14 into the building design were discussed with PacTrust and shared with the EPA. In December of 2020 EA began working with Clark Public Utilities to gain approval to modify the surface monument of CPU-14 as necessary to integrate the monitoring well into the building design. Based on EPA feedback, Messer has requested from PacTrust design parameters on a stormwater retention pond in their design. PacTrust indicated they will share those parameters when calculations are completed during a subsequent design milestone.

.

This page intentionally left blank

3. GROUNDWATER MONITORING ACTIVITIES, RESULTS, AND TRENDS

This section presents the concentration trends observed in groundwater since 1995 with a focus on data collected during the calendar year. Sampling activities were conducted in accordance with the EPA-approved Site-specific QASP (EA 2019) and the EPA-approved QASP Addendum for the Spring 2020 (EA 2020c) and Fall 2020 (EA 2020e) Semiannual Sampling Events. These documents are referred to as the Site QASP and the Fall 2020 QASP Addendum, respectively. Wells sampled during the fall event and their corresponding analytical results are shown on Figures 3-1 and 3-2.

3.1 FIELD METHODS

This section provides a discussion of methods used for field data collection activities.

3.1.1 Extraction Well Sampling

Six active Site extraction wells (MW-6B, MW-10B, MW-10C, MW-20D, MW-22D, and PW-1B) were sampled during the Spring 2020 sampling event and four active Site extraction wells (MW-6B, MW-10B, MW-10C, and PW-1B) were sampled during the Fall 2020 sampling event. Extraction wells are equipped with 3-inch diameter submersible pumps with operating flow rates ranging from 0.5 to 17.4 gallons per minute. Samples from the extraction wells were collected from sampling spigots located at the wellheads. At actively pumping extraction wells, the spigots were opened, and the flow rate was adjusted to less than 0.5 liter per minute prior to measuring field water quality parameters and collecting samples. The field parameters measured consisted of pH, specific conductivity, temperature, dissolved oxygen, turbidity, and oxidation-reduction potential. Groundwater purge and sampling forms are included in the Spring 2020 Progress and Groundwater Monitoring Report (EA 2020a) and in Appendix C for Fall 2020. Samples collected from the extraction wells were analyzed for VOCs and total chromium. Samples collected from the extraction wells in Spring 2020 are discussed further in the Spring Progress and Groundwater Monitoring Report (EA 2020a).

3.1.2 Monitoring Well Sampling

Groundwater samples from monitoring wells were collected using passive diffusion bag (PDB) samplers or via dedicated or non-dedicated pumps. The field parameters measured included pH, specific conductivity, temperature, dissolved oxygen, turbidity, and oxidation-reduction potential.

For wells sampled using PDB samplers, the PDBs were deployed at least 14 days in advance of sample collection. Measurement of field parameters is not required when sampling from PDB samplers, as agreed on by EPA (EA 2019). PDB samplers are used to sample wells that require only analysis, VOCs and the samples were submitted for laboratory analysis of VOCs only. No biofilms were observed on PDB samplers.

For monitoring wells sampled via a dedicated pump (stationed permanently in the well) or a non-dedicated pump, the flow rate was adjusted to 0.5 liter per minute or less than prior to measuring field water quality parameters and collecting samples. For wells that run dry during water quality stabilization (micropurging) or during sampling due to low groundwater levels, the monitoring well was allowed to sit for approximately 24 hours and the first recharge water was collected via submersible pump or bailer for analytical sampling.

3.1.3 Water Level Gauging Program

A round of water level measurements was obtained from accessible monitoring and extraction wells during the Fall 2020 sampling event. Water level measurements for the Spring 2020 sampling event were reported in the Progress and Groundwater Monitoring Reported January through June 2020 (EA 2020a). The water levels were measured to the nearest 0.01 ft relative to the top of the well casing using an electronic water level indicator. Water level measurements were collected while the extraction system was actively pumping to evaluate groundwater flow across the site under drawdown conditions. A summary of the water level data is provided in Table 3-1 and groundwater contours are presented on Figures 3-3 and 3-4.

3.2 WELL GROUPINGS

To facilitate analysis of contaminant concentrations across the Site, the wells are grouped by aquifer and geographical location and are presented on Figure 3-5, and wells within each grouping are summarized in Table 3-2. All wells except those identified as Troutdale Aquifer wells are screened within or slightly below the alluvial aquifer.

3.2.1 Alluvial Aquifer Wells

3.2.1.1 Upgradient Wells

The Upgradient wells are located near the upgradient (eastern) site boundary and sampled for VOCs every two years. These wells are on a biennial sampling schedule and were sampled in 2019 and were, therefore, not sampled during the 2020 reporting year.

3.2.1.2 TCE Source Wells

The TCE Source wells are located on the western half of the Messer property (Figure 3-5), near the historical TCE-impacted soil. A source removal system was previously operated in this area. These wells are typically sampled for VOCs only, as part of the OU-2 monitoring program, as these wells are upgradient of the chromium source area.

3.2.1.3 Proximal Wells

The Proximal wells are located west of the maintenance building (former machine shop) on the Boomsnub property and east of NE St. Johns Road (Figure 3-5). These wells are proximal to the chromium source.

All four extraction wells that remained active in Fall 2020 (MW-6B, MW-10B, MW-10C, and PW-1B) are located in this group.

3.2.1.4 Intermediate Wells

The Intermediate wells are located west of NE St. Johns Road, north and south of NE 78th Street (Figure 3-5). Extraction well MW-20D was active during the Spring 2020 sampling event, but MW-20D was off during the Fall 2020 sampling event. Due to the proximity to in-situ treatment injections, extraction well MW-20D was shut off on 5 May 2020. The extraction well is shut off indefinitely.

3.2.1.5 Church of God Wells

The Church of God wells are located north of NE 78th Street between the west side of the Clark County sports field complex and the western Church of God property line (Figure 3-5). One extraction well MW-22D was actively pumping in the Spring 2020 but was shut off prior the Fall 2020 sampling event.

3.2.2 Troutdale Aquifer Wells

The Troutdale Aquifer serves as a municipal water supply for the City and Clark County. Groundwater samples were collected for VOC analysis from three Troutdale Aquifer wells, including the Bennett private well, during the 2020 reporting period. No Troutdale well has had an exceedance above the chromium MCL since 2006, and after a decade of annual sampling returning chromium results below the MCL, chromium sampling ceased in 2018.

3.3 CONTAMINANT CONCENTRATIONS AND TRENDS

3.3.1 Overview

The following is a discussion of the overall remedial system configuration and how it is performing. The following subsections describe trends for each well grouping. The extent of impacted groundwater in the alluvial aquifer, as determined from groundwater sampling data obtained in 1995 and in Fall 2020, is presented on Figure 3-6 for chromium and on Figure 3-7 for TCE (OU-3 plume). These figures illustrate that groundwater remedial actions have been effective in mass removal and in reducing the footprints of both the chromium and TCE plumes. Figure 3-7 shows TCE from the Northern Plume and TCE from the OU-3 plume in different shades. The reduction in size and concentration of the OU-3 plume from 2019 to 2020 illustrates that in-situ injections have been effective at accelerating TCE mass removal in areas of recalcitrant contamination that had been seeing slowly diminishing effectiveness of the pump and treat remedial action.

Chromium and TCE concentrations detected in groundwater during sampling in 2020 are presented in Appendices E-1 and F-1, respectively. Wells with 2020 groundwater sampling

results exceeding the Site cleanup levels of 80 µg/L for chromium and 5 µg/L TCE are highlighted red on Figures 3-8 and 3-9, respectively.

3.3.2 Alluvial Aquifer Wells – TCE and Chromium

3.3.2.1 TCE Source Area Wells

Five wells were sampled for TCE during the Spring 2020 sampling event, and three wells were sampled for TCE during the Fall 2020 sampling event.

TCE
During the 2020 reporting period, TCE concentrations remained above the 5 µg/L cleanup level in groundwater samples collected from both wells that were sampled in Spring and Fall. The following table presents the results from the last five sampling events for comparison.

TCE Source Area Well TCE Concentrations, in µg/L

Well	Spring 2019	Fall 2019	Spring 2020	Fall 2020
AMW-1A	**23**	--	**9.2**	--
AMW-2A	**4.8**	**12 J**	**37**	--
AMW-4A	--	**0.5 U**	--	**0.5 U**
AMW-12A	**21**	**21**	**20**	**12**
AMW-53A	**13**	**15**	**11**	**19**
MW-1A	**6.1**	**15**	0.77	--

Note:
U Analyte not detected above the specified reporting limit.
Results shown in **blue bold** exceed the established cleanup level of 5 µg/L.
-- Not Analyzed

Since the IWS system was turned off in August 2013, groundwater samples from the TCE Source Area have been collected to monitor for changes/rebound in VOC concentrations.

During the reporting period the TCE concentration remained above the cleanup level in wells AMW-12A and AMW-53A; however, concentrations in well AMW-12A have been on a slow decreasing trend since Fall 2011. TCE concentrations in well AMW-53A have been generally increasing since Spring 2016. Historical TCE concentrations in wells in this area tend to fluctuate (Appendix F).

3.3.2.2 Proximal Wells

The Proximal Wells are proximal to the chromium source and nine wells were sampled in this area. All four extraction wells in this group (MW-6B, MW-10B, MW-10C, and PW-1B) were actively pumping when they were sampled during both the Spring and Fall 2020 sampling events.

Chromium

During the 2020 reporting period, chromium concentrations were below the 80 µg/L cleanup level in groundwater samples collected from four of the eight wells sampled for chromium, as presented in the following table.

Proximal Well Chromium Concentrations, in µg/L

Well	Fall 2019	Fall 2020
MW-2A	**292**	**601**
MW-4A	**371**	**556**
MW-4B	**366**	**318**
MW-6A	**128**	**149**
MW-6B	12.2	14.9
MW-10B	30.2	32.1
MW-10C	61.7	57.9
PW-1B	28.7	31.9

Notes:
Results shown in **blue bold** exceed the established cleanup level of 80 µg/L.
Wells shown in **bold** are extraction wells.
-- Not Analyzed

Wells MW-2A, MW-4A, MW-4B, and MW-6A had concentrations above the 80 µg/L cleanup level in both the 2019 and 2020 reporting periods. Chromium concentrations in wells MW-2A and MW-4A increased substantially and will continue to be monitored. Groundwater samples from wells MW-4A and MW-4B continue to exhibit some of the highest concentrations of chromium in groundwater at the Site and consistently remain above the cleanup level. However, concentration fluctuations are typical in these wells. Historically, groundwater from wells in the Proximal area have had large fluctuations in chromium concentrations and results from the sampling event were within the normal range of fluctuations (Appendix E). No trends have been noted in the fluctuating chromium concentrations measured in the proximal wells related to GWTS operational adjustments, nor are any indicators of changing plume behavior noted in the trend data provided in Appendix E. Shutdown of the GWTS is proposed for January 2021, as in-situ treatments are implemented as an alternative to the pump and treat strategy. After GWTS shutdown, additional quarterly monitoring of chromium concentrations in the proximal well group is proposed to effectively monitor for changes in the geometry or concentration of the residual chromium plume. After GWTS shutdown, the return of steady state groundwater conditions will allow for expanded attainment monitoring for monitoring wells located near currently active extraction wells and the GWTS infiltration gallery.

When the GWTS is shutdown, it will be kept in a dormant, but ready-to-operate, state (i.e., mothballed) for the duration of the attainment monitoring period. While chromium trends in the proximal well field show that the GWTS is now ineffective at further reducing chromium concentrations, mothballing of the system will provide an additional option for treatment should monitoring show expansion of the chromium plume after shutdown. When attainment monitoring has concluded in the proximal well field, the GWTS building, and air stripper pad

will be removed as part of treatment system decommissioning and chromium-contaminated soil that exists beneath impervious surfaces of the GWTS will be excavated.

TCE

During the 2020 reporting period, TCE concentrations were below the 5 µg/L cleanup level in groundwater samples collected from 7 of the 9 wells sampled for TCE, as presented in the following table.

Proximal Well TCE Concentrations, in µg/L

Well	Spring 2019	Fall 2019	Spring 2020	Fall 2020
MW-2B	--	1.1	--	2.5
MW-4A	--	3.9	--	1.8
MW-6A	--	0.5 U	--	0.5 U
MW-6B	--	2.8	--	4.2
MW-7B	--	4.2	--	**6.3**
MW-9C	--	2.9	--	1.2
MW-10B	**8.3**	**6.8**	**7.4**	**8.9**
MW-10C	--	1.3	--	1.3
PW-1B	--	2.4	--	2.2

Notes:
U Analyte not detected above the specified reporting limit.
Results shown in **blue bold** exceed the established cleanup level of 5 µg/L.
Wells shown in **bold** are extraction wells.
-- Not Analyzed

The TCE concentration in well MW-10B has remained above the cleanup level but has been on an overall decreasing trend. The TCE concentration in well MW-7B has fluctuated above and below the cleanup level since 2014. Historically, TCE concentrations in groundwater samples from this area have been on a decreasing trend (Appendix F).

3.3.2.3 Intermediate Wells

None of the extraction wells in this area were actively pumping during the Fall 2020 sampling event. One extraction well in this area (MW-20D) was actively pumping during the Spring 2020 sampling event; however, MW-20D was shut off prior to the Fall 2020 sampling event. Due to the proximity to in-situ treatment injections, wells MW-14C and MW-14E were shut off on 16 October 2019, well MW-19D was shut off on 14 October 2019, and well MW-20D was shut off on 8 May 2020. With EPA approval, all four wells have been shut off indefinitely. By the Fall 2020 sampling event, all sampled wells in the Intermediate Well Group were in the vicinity of or downgradient of a permeable reactive zone. The effects of a permeable reactive zone take time to materialize due to both groundwater travel time and the pace of geochemical activity, so the time since injection is important to note for these wells. The MW-18 cluster is downgradient of pilot injections conducted in 2018, AMW-59, MW-14, and MW-19 are downgradient or in the vicinity of Phase IIA injections conducted in October 2019, and MW-38, MW-20D, and PZ-39 are downgradient or in the vicinity of Phase IIB injections conducted in May of 2020. MW-40 is

also downgradient of Phase IIB injections but is located further downgradient from a barrier than comparable monitoring wells.

Chromium

During the 2020 reporting period, chromium concentrations were below the 80 µg/L cleanup level in groundwater samples collected from 8 of 10 wells sampled, as presented in the following table.

Intermediate Well Chromium Concentrations, in µg/L

Well	Spring 2019	Fall 2019	January 2020	Spring 2020	Fall 2020
AMW-59	--	--	70.9	**100**	19.2
MW-14C	--	48.1	62.9	73.8	10.2
MW-14E	--	27.5	38.1	54.4	**173**
MW-18D	51.3	74.2	46.4	**89.8**	15.8
MW-18E	11.2	69.2	--	8.4 U	2.9 J
MW-19D	**85.5**	**87.5**	**119**	**171**	38.4
MW-20D	--	48.8	--	--	59.9
MW-38	--	--	--	--	4.7J
MW-40	--	51.6	--	--	**103**
PZ-39	--	--	--	--	3.2 J

Note:
Wells shown in **bold** are extraction wells. The four extraction wells are shut off indefinitely.
Results shown in **blue bold** exceed the established cleanup level of 80 µg/L.
-- Not Analyzed

The chromium concentration in well AMW-59 was above the cleanup level in Spring 2020 for the first time since the well was first sampled in January 2005 but dropped below the cleanup level again in Fall 2020. The chromium concentration in well MW-14E was above the cleanup level in Fall 2020 for the first time since Spring 2006, and the chromium concentration in well MW-40 was above the cleanup level in Fall 2020 for the first time since 2011.The chromium concentration in well. MW-19D dropped below the cleanup level in Fall 2020, for the first time since Fall 2018. Well MW-18E was sampled in 2019, for the first time since Fall 2011, to evaluate the effectiveness of the Phase I in-situ treatment injections conducted just upgradient of this well. Fluctuations in chromium concentrations in all wells in the intermediate group wells are likely related to the effects of treatment, as well as hydraulic changes that occurred after pumping from well MW-18D was shut off in 2018. Evaluation of chromium trends downgradient of injections appears to show that these chromium fluctuations are transient and the fluctuations ebb with time. Historically, chromium concentrations in groundwater samples from wells in this area continue an overall decreasing trend (Appendix E).

TCE

TCE concentrations were below the 5 µg/L groundwater cleanup level in 6 of the 10 wells sampled in this area, as presented in the following table.

OU-3 Intermediate Well TCE Concentrations, in µg/L

Well	Spring 2019	Fall 2019	January 2020	Spring 2020	Fall 2020
AMW-59	--	**45**	**41**	**14**	4.1
AMW-60	--	0.5 UJ	--	--	0.4 J
CPU-14	--	**5.1**	--	--	3.7
MW-14C	**6.9**	**5.9**	3.9	2.6	2.4
MW-14E	**43**	**39**	**6.7**	**9.6**	**9.2**
MW-18D	2.2	2.9	4.8	3	3.1
MW-18E	1.8	0.7	--	0.25 J	0.24 J
MW-19D	**18**	**15**	3.5	4.3	**45**
MW-20D	**20**	**18**	--	**17**	**12**
PZ-39	--	**33**	--	--	**42**

Note:
J Estimated concentration.
Wells shown in **bold** are extraction wells. The four extraction wells are shut off indefinitely.
Results shown in **blue bold** exceed the established cleanup level of 5 µg/L.
-- Not Analyzed

The TCE concentration dropped below the cleanup level in well AMW-59 in January 2020 for the first time since January 1995 when the well was first monitored. In wells MW-14E, MW-20D, and PZ-39, TCE concentrations have consistently remained above the cleanup level. The concentrations in PZ-39 have increased over the past three sampling events (Fall 2018, 2019 and 2020). The TCE concentration in well CPU-14 dropped back below the cleanup level in Fall 2020; it has been fluctuating around the cleanup level since 2010. TCE concentrations in wells MW-18D and MW-18E dropped below the cleanup level for the first time in Spring 2019 and remained below during the 2020 reporting period. TCE concentrations in well MW-19D significantly increased from below the cleanup level in Spring 2020 (4.3 µg/L) to above the cleanup level in Fall 2020 (45 µg/L). This result appears to be an anomaly and will continued to be monitored. An in-situ treatment Phase I reductive dechlorination pilot test with activated carbon was conducted in Fall 2018 upgradient of these wells and was effective in reducing the TCE concentrations. However, Historically, TCE concentrations in groundwater samples from wells in this area (not impacted by the Northern Plume) have been on a decreasing trend (Appendix F).

3.3.2.4 Church of God Wells

Extraction well MW-22D was actively pumping during both the Spring 2020 sampling event; however, the extraction well was turned off in September 2020 and was not pumping during the Fall 2020 sampling event.

Chromium

During the reporting period chromium was not detected above the 80 µg/L cleanup level in groundwater from any of the two wells sampled for chromium, as shown in the following table.

Church of God Well Chromium Concentrations, in µg/L

Well	Fall 2019	Fall 2020
CPU-12	8 J	7 J
MW-22D	17.9	66.7

Note:
J Estimated concentration.
Wells shown in **bold** are extraction wells. Extraction well MW-22D was turned off on 21 September 2020 and was not active during Fall sampling.
-- Not Analyzed

TCE

During the reporting period, TCE concentrations in groundwater were below the 5 µg/L cleanup level in groundwater from one of the two wells sampled, as presented in the following table.

Church of God Well TCE Concentrations, in µg/L

Well	Fall 2019	Fall 2020
AMW-61	**6.9**	**6.2**
MW-22D	1.5	1.6

Note:
J Estimated concentration.
Wells shown in **bold** are extraction wells. Extraction well MW-22D was turned off on 21 September 2020 and was not active during Fall sampling.
Results shown in **blue bold** exceed the established cleanup level of 5 µg/L.
-- Not Analyzed

Historically, TCE concentrations in samples collected from wells in this area have been on an overall decreasing trend (Appendix F). TCE concentrations were above the 5 µg/L cleanup level in the groundwater sample collected from well AMW-61. The TCE concentrations in this well, screened in the silty zone at the bottom of the alluvial aquifer, fluctuate but have remained above the cleanup level since Fall 2013.

3.3.3 Troutdale Aquifer Wells – TCE and Chromium

Groundwater samples for VOC analysis were collected from three Troutdale Aquifer wells, including the Bennett private well, during the 2020 reporting period. No Troutdale wells were sampled for chromium during the 2020 reporting period.

TCE

During the 2020 reporting period, TCE concentrations were below the 5 µg/L cleanup level in two of the three wells sampled in Fall 2020, as presented in the following table.

Troutdale Aquifer Well TCE Concentrations, in µg/L

Well	Fall 2019	Fall 2020
AMW-24	**6.5**	**5.7**
BENNETT	--	1.3
MW-33	--	3.5

Notes:
Results shown in **blue bold** exceed the established cleanup level of 5 µg/L.

TCE concentrations in groundwater from well AMW-24 have been consistently decreasing but remain above the cleanup level. The TCE concentration in groundwater from the Bennett private well had historically fluctuated above and below the cleanup level but has remained below since Spring 2016 (Appendix F). The TCE concentration in Troutdale well MW-33 dropped below the cleanup level in Fall 2018 for the first time since monitoring began in Spring 1998 and remained below the cleanup level in Fall 2020.

3.3.4 Other Detected VOCs

TCE is a primary COC for the site but is not the only VOC present. Routinely detected other VOCs include: tetrachloroethene; trichlorofluoromethane; 1,1,1-trichloroethane; 1,1-dichloroethene (DCE); bromodichloromethane; and cis-1,2-DCE. Results for these compounds for samples collected in Spring 2020 in relation to Site cleanup levels, are summarized in Tables 3-3a and discussed in the Spring Progress and Groundwater Monitoring Report (EA 2020a). Results for these compounds for samples collected in Fall 2020, in relation to Site cleanup levels, are summarized in Table 3-3b. 1,1-DCE was detected at concentrations exceeding the cleanup level of 1 µg/L in four Intermediate wells (AMW-59, AMW-60, MW-19, and PZ-39). Cis-1,2-DCE was also detected exceeding the cleanup level of 1 µg/L in wells AMW-24, AMW-59, MW-18D and MW-19D. Rising concentrations of cis-1,2-DCE is a product of effective reductive dichlorination from the in-situ groundwater treatments. No other VOCs exceeded the cleanup levels during the Fall 2020 sampling.

Wells AMW-59 and AMW-60 had concentrations of 1,1-DCE above the cleanup level but TCE concentrations well were below the cleanup level. Many of the other VOC detections are coincident with TCE detections; however, low level non-TCE detections were reported in several wells that have TCE concentrations below the cleanup level (Tables 3-3a and 3-3b).

4. OTHER ACTIVITIES

4.1 EASEMENT AGREEMENTS AND RESTRICTIVE COVENANTS

EA, on behalf of Messer, has pursued easement agreements and restrictive covenants for non-Messer owned properties, as required by Sections 25 and 26 of the CD (EPA 2007). Properties which include Site infrastructure but for which Messer has been unable to negotiate easement agreements include the following:

Easement Agreements Needed

Property Owner	Parcel Number	Reason Agreement Needed
Clark County	144505-000 and various un-numbered	Wells, vaults, pipelines
Gaither Family II LLC	144492-000	Well CPU-12
Holtgrieve Estate	144718-000	Wells, vaults, pipelines
Xylem LLC	099630-000	Well MW-33

Further progress toward gaining easement agreements and restrictive covenants from non-responsive property owners is pending EPA assistance. Information on the location of these properties was shared with the EPA in a 28 May 2020 presentation. The lack of easement agreements on the properties listed above did not hinder Messer's ability to conduct site work on the affected properties in 2020.

4.2 IN-SITU TESTING/TREATMENT

An in-situ pilot test was conducted in two locations in 2018 and is referred to as Phase 1 of injections. Phase II was the full-scale implementation of the injections tested during Phase 1 and was split across two years; 2019 injections were named Phase IIA, and 2020 injections were named Phase IIB. Performance monitoring for the Phase IIA injections was conducted in Winter, Spring, and Fall 2020. The 2020 Phase IIB injections took place over two field events; a series of injections in May in the vicinity of the intermediate wells that extended the permeable reactive zones begun during Phase IIA in this mid plume area, and a series of injections in July that emplaced permeable reactive zones in the TCE Source Area. As detailed in the In-Situ Treatment Plan (EA 2020b) extraction wells downgradient of injection rows were turned off to safeguard against ingestion of product by the extraction and treatment system. This effected the shutdown of extraction well MW-20D in May 2020. Initial performance monitoring samples to assess the effectiveness of the injections were collected from select wells downgradient of Phase IIB injections in Fall 2020, concurrent with O&M fall sample collection. A full report of in-situ treatments will be provided separately and will be submitted in Spring of 2021.

4.3 SUSTAINABILITY PRACTICES

Messer and EA have a commitment to sustainable practices. In the office and in the field, attempts are made to reduce, reuse, and recycle whenever possible. In addition, the following monitoring and O&M activities are in place:

- Using PDBs or dedicated pumps for groundwater sampling wherever possible to eliminate the use of disposable tubing and decontamination solutions.

Using the infiltration gallery to discharge treated groundwater from the OU-3 treatment system back into the alluvial aquifer instead of to the sanitary sewer, eliminating the processing of millions of gallons per year of clean water through the city sewage treatment plant.

5. ANNUAL ASSESSMENT OF GROUNDWATER SAMPLING

This section summarizes the annual assessment of the groundwater sampling results and sampling frequency for the Site. The purpose of this assessment is to determine if any changes should be made to the well monitoring schedule. To this end, the assessment includes two primary tasks: (1) evaluation of the status of wells included in the Closure Monitoring Program, specifically with regards to progress toward completion of remediation and attainment monitoring; and (2) evaluation of recommended changes to the well sampling frequencies.

5.1 EVALUATION OF CLOSURE MONITORING WELLS

The procedures used to evaluate groundwater monitoring data for wells included in the Closure Monitoring Program are based on the Site closure requirements described in the Closure Plan, Revision 3 for the Site (EA 2018), which incorporates EPA suggestions and recent EPA guidance, as discussed below.

As described in the Closure Plan, site closure will occur when the concentrations of all Site COCs in groundwater monitoring and extraction wells included in the Closure Monitoring Program have reached the Site-specific cleanup levels, as defined in the ROD. The following EPA guidance documents were used to develop the procedures in the Closure Plan to determine when the groundwater cleanup levels have been achieved:

- *Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well* (EPA 2014)
- *Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions* (EPA 2013).

Site closure will occur in two phases: (1) remediation monitoring will be performed to determine when remediation is complete (Section 5.1.1); and (2) attainment monitoring will be performed to confirm COC concentrations are expected to remain below the cleanup levels in the future (Section 5.1.2). The Site will be closed once all Closure Monitoring Program wells have reached attainment for all COCs.

Table 5-1 lists the wells included in the Closure Monitoring Program for the Site, as presented in the Closure Plan (EA 2018) and updated with wells which were impacted by the Northern Plume after completion of the Closure Plan, namely MW-21D and MW-38. Wells not required to be a part of closure monitoring are listed in Appendix G-1. These wells include wells that have never had COC concentrations greater than the cleanup levels and wells impacted by the Northern Plume.

The sections below present the results of annual screening to evaluate whether VOCs and/or chromium concentrations in groundwater from Closure Monitoring Program wells at the Site have met the requirements for remediation monitoring complete and/or attainment monitoring complete.

5.1.1 Remediation Monitoring Phase

The remediation monitoring phase refers to the phase of the remedy where remedial activities are being implemented to reach groundwater cleanup levels. Once the cleanup levels have been met decisions can be made regarding shutting off pumps in nearby extraction wells, in preparation for attainment monitoring. With the shutdown of the groundwater extraction and treatment system, the areas considered under active remediation are the OU-2 source area, and the area of the site between NE St. John's Road and MW-22D for the period 1 January to 21 September 2020, and between NE St. John's Road and MW-10B for the period 21 September to 31 December 2020.

The most recent four data points from each Closure Monitoring Program well were evaluated to assess whether remediation monitoring is complete for each COC in each well, in accordance with the Closure Plan (EA 2018a) and EPA guidance (EPA 2014). Remediation monitoring is considered complete for wells where all COCs have been either non-detect or reported at levels below the cleanup levels for the most recent four consecutive sampling events. These wells may be considered for decreased sampling frequency until ready to enter the attainment monitoring phase.

If certain COCs meet their cleanup levels during four consecutive sampling events in a given well but other COCs are reported at concentrations above cleanup levels during one or more of the four sampling events, then remediation monitoring is considered complete for the COCs that have been below cleanup levels for four events. A decision may be made to remove the COCs that are below the cleanup levels from the monitoring program for wells fitting this scenario.

Factors used in evaluating the status of the closure monitoring wells are presented in Table 5-2. In the table, wells are presented by well groupings to demonstrate what is happening in specific areas of the plume. Columns titled "Remediation Monitoring Phase Complete?" in Table 5-2 show the results of the analysis based on the most recent four data points for TCE, all VOCs, and chromium. Columns titled "Never Exceeded Cleanup Level?" indicate wells where no exceedance has been reported for VOCs or for chromium. Generally, COCs that have never exceeded cleanup levels in a well are excluded from the Closure Monitoring Program.

Summary data are provided in Table 5-2 for TCE and chromium, the primary COCs at the Site. However, as indicated in the table, for a few wells, remediation monitoring is incomplete due to other VOCs reported at concentrations exceeding cleanup levels. Data for the other Site COCs are included in Appendix G-2.

Closure Monitoring Program wells that are currently undergoing remediation monitoring and wells for which remediation monitoring is complete are shown on Table 5-1 and Figures 5-1 and 5-2 for VOCs and chromium, respectively. Note that wells classified as "Remediation Phase Complete" (yellow-shaded) on the figures are not yet ready for attainment monitoring, due to active remediation nearby, and therefore are not yet included as part of the attainment monitoring program.

Per the Closure Plan, more than four data points may be required to document the completion of remediation monitoring in some cases, if statistical analysis is required to evaluate a mixture of COC concentrations above and below the cleanup levels from recent sampling events. However, statistical analysis was not performed as part of this annual assessment. Rather, wells with any exceedances of the cleanup level over the last four sampling events were considered, for the purposes of this assessment, to require additional remediation monitoring.

5.1.2 Attainment Monitoring Phase

The attainment monitoring phase is intended to confirm that COC concentrations will remain at or below the cleanup levels in the future. In accordance with EPA guidance, the attainment monitoring phase for each well will not begin until after the remediation monitoring phase is complete for the well and the groundwater in the vicinity is no longer impacted by active remediation.

With the shutdown of the groundwater extraction and treatment system in 2021, attainment monitoring can begin in areas of the site not impacted by extraction but will remain on hold in areas undergoing remediation by in-situ treatment. Wells within Toe of Plume and Church of God Area, except for MW-22D, are not impacted by treatment and are thus able to continue attainment monitoring.

Table 5-1 summarizes which of the closure monitoring wells/COCs currently meet the requirements for the initiation of attainment monitoring: (1) remediation monitoring is complete and (2) no active remediation is occurring in the vicinity. (Impact from the infiltration gallery is defined by the alluvial aquifer contours, which currently indicates impacts from infiltration gallery cease at the western property boundary.

Cleanup attainment will be measured using eight data points, in accordance with EPA guidance (EPA 2014). As with the remediation monitoring, the attainment monitoring phase evaluation is conducted separately for each COC at each well. If the eight consecutive attainment monitoring results are either non-detect or below the cleanup level for one or more COCs in a given well, then attainment monitoring will be considered complete for that well/COC(s).

Table 5-3 provides a list of wells in the closure monitoring program, and for wells that have reached attainment monitoring, the status of that monitoring is summarized, based on an evaluation of VOC and chromium concentrations reported from the last eight sampling events. This evaluation indicates that 15 wells meet the requirements for attainment monitoring for both VOCs and chromium (or are excluded from closure monitoring for one of the COCs). Attainment monitoring is complete for 11 of those wells.

Closure Monitoring Program wells that are currently undergoing attainment monitoring and wells for which attainment monitoring is complete are shown on Table 5-3 and Figures 5-1 and 5-2 for VOCs and chromium, respectively.

Similar to remediation monitoring, statistical analysis may be used to assess completion of attainment monitoring; however, no statistical analyses were conducted for this report.

5.2 EVALUATION OF SAMPLING FREQUENCY

As part of the annual assessment, the current sampling frequency for each well is evaluated and, if appropriate, revised. When proposing a revised sampling frequency for a well, the following factors were considered: the current sampling frequency; the use of the well at the Site; and, for closure monitoring wells, whether remediation monitoring and/or attainment monitoring is complete for VOCs and/or chromium. These factors are summarized in Table 5-2. Additionally, a review of graphs of historical TCE and chromium concentrations in each well sampled during 2020 (presented in Appendices E and F) was performed during the evaluation of recommended sampling frequencies for 2021.

Wells to be sampled in 2021 are included on Figure 5-3. Recommended sampling frequencies for 2021 are included in Table 5-2 and summarized in Table 5-4. Factors that may yield recommended changes in sampling frequency for Closure Monitoring Program wells include the following:

- In most cases, sampling from monitoring wells that meet the requirements for remediation but not attainment monitoring complete for VOCs and/or chromium will be temporarily discontinued, until attenuation monitoring begins for each well. The designation for these wells is “On Hold” to signify that sampling of these wells for attenuation monitoring will occur in future years. These wells will remain available for future sampling, if needed, and then for attainment monitoring.
- Wells for which attainment monitoring is complete and for which sampling is not required for other purposes are designated for NFS, as no further sampling of these wells is recommended.
- Wells within active areas of in-situ remediation may have increased monitoring frequency to monitor the effectiveness of the remediation.

Generally, changes in sampling frequency are not recommended for Northern Plume wells or infiltration gallery wells. Four infiltration gallery wells are sampled biennially. Five Northern Plume wells are monitored semiannually for VOCs, and one additional well (AMW-23) is sampled annually for VOCs to monitor the approach of the Northern Plume (Tables 5-2 and 5-4).

Sampling of select wells within the OU-2 source area has been increased to quarterly during 2021 to monitor effectiveness of the remediation. These wells are AMW-1A, AMW-2A. AMW-12A, AMW-53A, and MW-1A.

To provide continued monitoring of the in-situ treatment area west of NE St. Johns Road, sampling frequency was increased to semiannual in Intermediate wells AMW-59, CPU-14, MW-14E (for Cr), MW-20D (for Cr), MW-38, and PZ-39.

Monitoring frequency for chromium was increased to quarterly for Proximal wells MW-3A, MW-4A, MW-4B, MW-4C, MW-6A, MW-6B, and MW-9B to monitor the impacts from the GWTS shutdown during 2021, the first-year post-shutdown. After one year, monitoring frequency for these wells will reduce to semiannual.

Sampling at wells MMW-63 and MW-41, which were used to monitor the 2008 Toe of Plume pilot study, will be discontinued. These wells are currently remediation complete.

Changes to sampling frequencies are recommended based on the results of the annual assessment. Well sampling frequency recommendations for 2021 are provided in Table 5-2 and summarized in Table 5-4.

This page intentionally left blank.

6. RECOMMENDATIONS AND PLANNED ACTIVITIES

The following sections summarize the status of activities recommended for 2020, as well as recommendations and planned activities for 2021.

6.1 STATUS OF PREVIOUS RECOMMENDATIONS 2020

To meet the operating objectives for OU-2 and OU-3, planned activities for 2020 were recommended in the 2019 Annual Status report (EA 2020d). The status of those planned activities is summarized below:

- **Well Sampling** – Wells were sampled in accordance with the updated sampling schedule.
- **Easement Agreements and Restrictive Covenants** – EA continues to work with the EPA as necessary to obtain the required agreements with non-responsive property owners. EA will continue efforts to obtain agreements as opportunities and need arise.
- **Padden Parkway Business Park** – The property owner was kept informed of activities on the property during 2020 and EA will continue to work with them regarding 2021 real estate development activities.
- **In-Situ Treatments** – In-situ groundwater treatments were completed on 1 August 2020.
- **Northern Plume** – EA continues to work with EPA to develop a strategy for closure of OU-3 wells being impacted by the Northern Plume.

6.2 RECOMMENDATIONS AND PLANNED ACTIVITIES FOR 2021

With EPA approval of the GWTS shutdown approach outlined in a 23 September 2020 Memorandum (EA 2020f), Messer recommends, and is planning on, shutdown of the GWTS in January of 2021 following review of performance monitoring data collected in Fall of 2020. Extraction and treatment of the groundwater as the primary remedy for OU-3 has resulted in the removal of a large contaminant mass over its operational period. However, as effective as this remedy has been, its ability to achieve total closure in the intended timeframe is inadequate due to the location of the residual contaminant mass and the hydrogeologic properties of the sediment in which the remaining mass resides. As described in the 2015 Explanation of Significant Differences (EPA 2015), in-situ treatment is an effective and approved alternative method for addressing the remaining residual mass. As described in a technical memorandum dated 23 September 2020 (EA 2020f), in-situ treatment of remaining “hot spots” is planned as the means of addressing residual TCE contamination in the mid-plume and source areas.

While it is technically outside the reporting period (1 January to 31 December 2020) of this Annual Report, given the close proximity to the reporting period and its relation to 2020 reported events, there is informative reporting value in additionally disclosing that on 3 January 2021, the system shut off due to a heavy rain event triggering a failsafe shutdown in flooded containment vaults. The system remained off through the planned shutoff date of 7 January 2021 as

containment vaults were pumped dry. The system was turned on again for a brief period on 15 January 2021 to verify restored functionality of all system components and collect influent/effluent samples for the City sewer discharge permit (required for any month the system operates). Following this system check and sample collection, the system was turned off, drained, and winterized. The Groundwater Treatment System (GWTS) will remain in this state to maintain a state of readiness, should regular monitoring of chromium concentrations around the treatment system building indicate migration of chromium in response to which the EPA elects to reactivate the system. If the system remains unused, it will be decommissioned when the well network that it services have concluded attainment monitoring.

Messer recommends additional monitoring for chromium in monitoring wells located around the GWTS post-shutdown. The wells that Messer recommends for monitoring for the duration of the GWTS mothball period are MW-3A, MW-4A, MW-4B, MW-4C, MW-6A, MW-6B, and MW-9B. Chromium concentrations in monitoring wells adjacent to the GWTS (such as MW-6A) have not been positively impacted by the GWTS for a period approaching 15 years (EA 2020f), the GWTS will need to be removed and the contaminated residual soil excavated to achieve chromium cleanup levels in the affected monitoring wells in the vicinity of the GWTS. Additional monitoring in this area will identify any change to the residual chromium plume concentration or configuration in the period between GWTS shutdown and final soil excavation.

Messer plans on sampling on a quarterly basis in 2021. With the GWTS shutdown having occurred in January 2021, Messer recommends sampling for monitor wells in the Attainment Monitoring phase of closure monitoring occur on a quarterly basis for the first four events, as described in the Closure Plan (EA 2018). Quarterly QASP Addendums will precede quarterly sampling events.

Messer recommends decommissioning and removal of the SVE/IWS system located on the Messer Gas Plant property (OU-2). This SVE system is no longer operational, following a successful implementation from 2004 to 2008. The IWS system ceased operation in 2013.

7. REFERENCES

EA Engineering, Science, and Technology, Inc., PBC (EA). 2006. Construction Report, BOC Infiltration Gallery, Boomsnub/Airco Superfund Site, Hazel Dell, Washington. February.

EA. 2008. AMW-18 Area Investigation Report, Boomsnub/Airco Superfund Site, Hazel Dell, Washington. August.

EA. 2011. Northern Plume Investigation Report, Hazel Dell, Washington, Revision 1. December.

EA. 2012. Work Plan, Monitoring Well Installation and Sampling in the Northern Plume Area Hazel Dell, Washington, Revision 1. January.

EA. 2018. Closure Plan, Boomsnub/Airco Superfund Site, Hazel Dell, Washington. Revision 3. February.

EA. 2019. Quality Assurance and Sampling Plan, Revision 2, Boomsnub/Airco Superfund Site, Hazel Dell, Washington. February.

EA. 2020a. Progress and Groundwater Monitoring Report, January—June 2020. Boomsnub/Airco Superfund Site, Hazel Dell, Washington. August.

EA. 2020b. QASP Addendum for Phase IIA In-Situ Treatment Sampling, Boomsnub/Airco Superfund Site, Hazel Dell, Washington. January.

EA. 2020c. QASP Addendum for the Spring 2020 Semiannual Sampling Event, Boomsnub/Airco Superfund Site, Hazel Dell, Washington, Revision 1. February.

EA. 2020d. 2019 Annual Status Report for the Boomsnub/Airco Superfund Site, Hazel Dell, Washington. Revision 0. March.

EA. 2020e. QASP Addendum for the Fall 2020 Semiannual Sampling Event, Boomsnub/Airco Superfund Site, Hazel Dell, Washington. August.

EA. 2020f. Technical Memorandum, Boomsnub/Airco Superfund Site, Proposed Treatment System Shutdown Plan, Revision 1. Letter to J. Williams, EPA, dated 23 September 2020.

Washington State Department of Ecology (Ecology) 1993. Ecology Implementation Memo No. November

U.S. Environmental Protection Agency (EPA). 2000. EPA, Region 10, Record of Decision. Boomsnub/Airco Superfund Site, Hazel Dell, Washington. February.

EPA. 2001. Action Memorandum for OU-2. Boomsnub/Airco Superfund Site, Hazel Dell, Washington. September.

EPA. 2002. Administrative Order on Consent. EPA Docket Number CERCLA 10-2002-0052. September.

EPA. 2007. Consent Decree between the BOC Group, Inc. and the United States of America, Docket Number C07-5163FDB.

EPA. 2013. Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions. OSWER 9355.0-129. 25 November.

EPA. 2014. Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well. OSWER 9283.1-44. August.

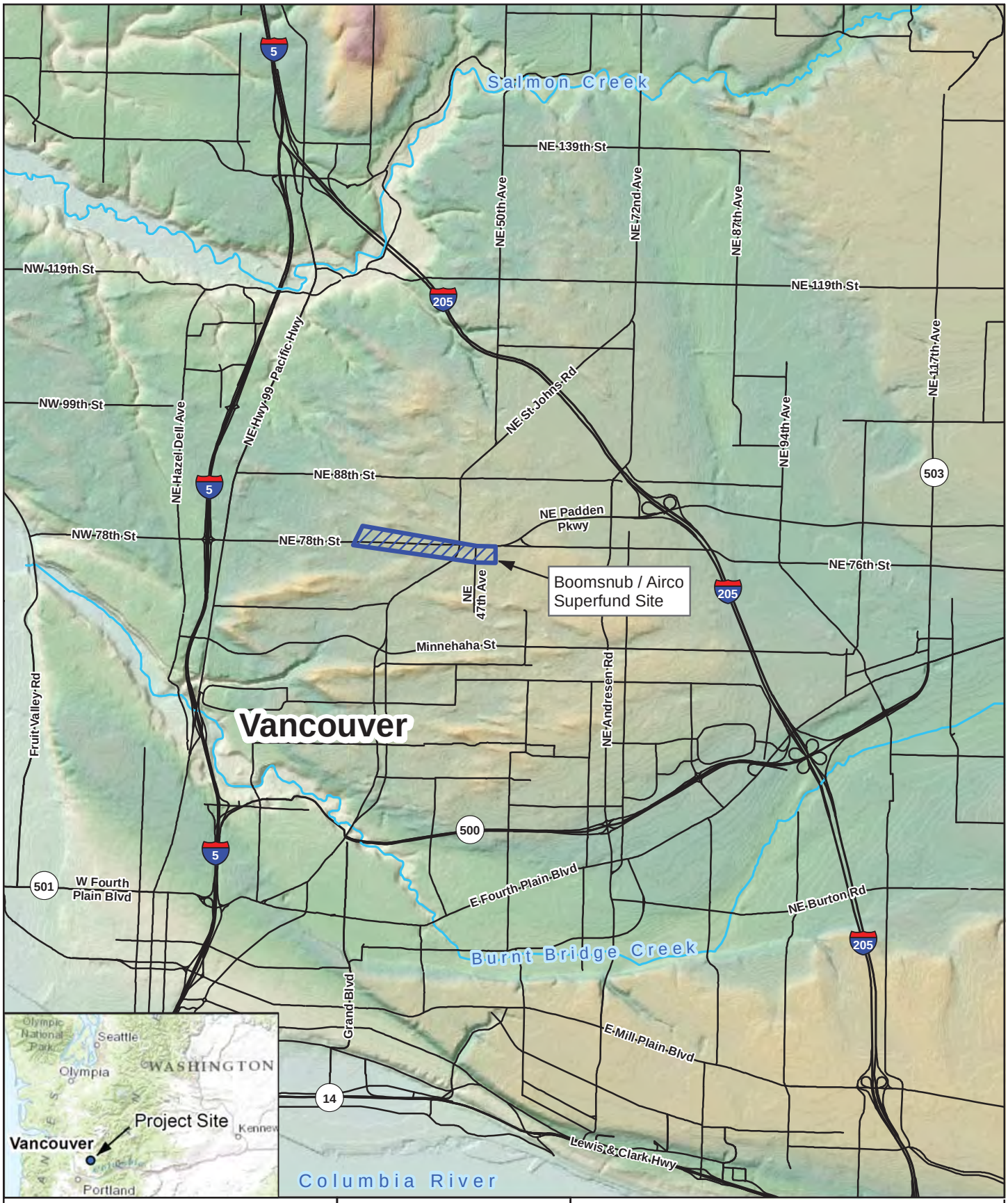
EPA 2015. Explanation of Significant Differences for the Boomsnub/Airco Superfund Site, Hazel Dell, Washington. Clark County. September.

ICF Kaiser. 1999. Remedial Investigation Report. Boomsnub/Airco Superfund Site, Hazel Dell, Washington. March.

URS Group, Inc. 2003. Soil Characterization: Groundwater Treatment System Compound. Boomsnub/Airco Superfund Site, Hazel Dell, Washington. April.

Figures

This page intentionally left blank.



EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

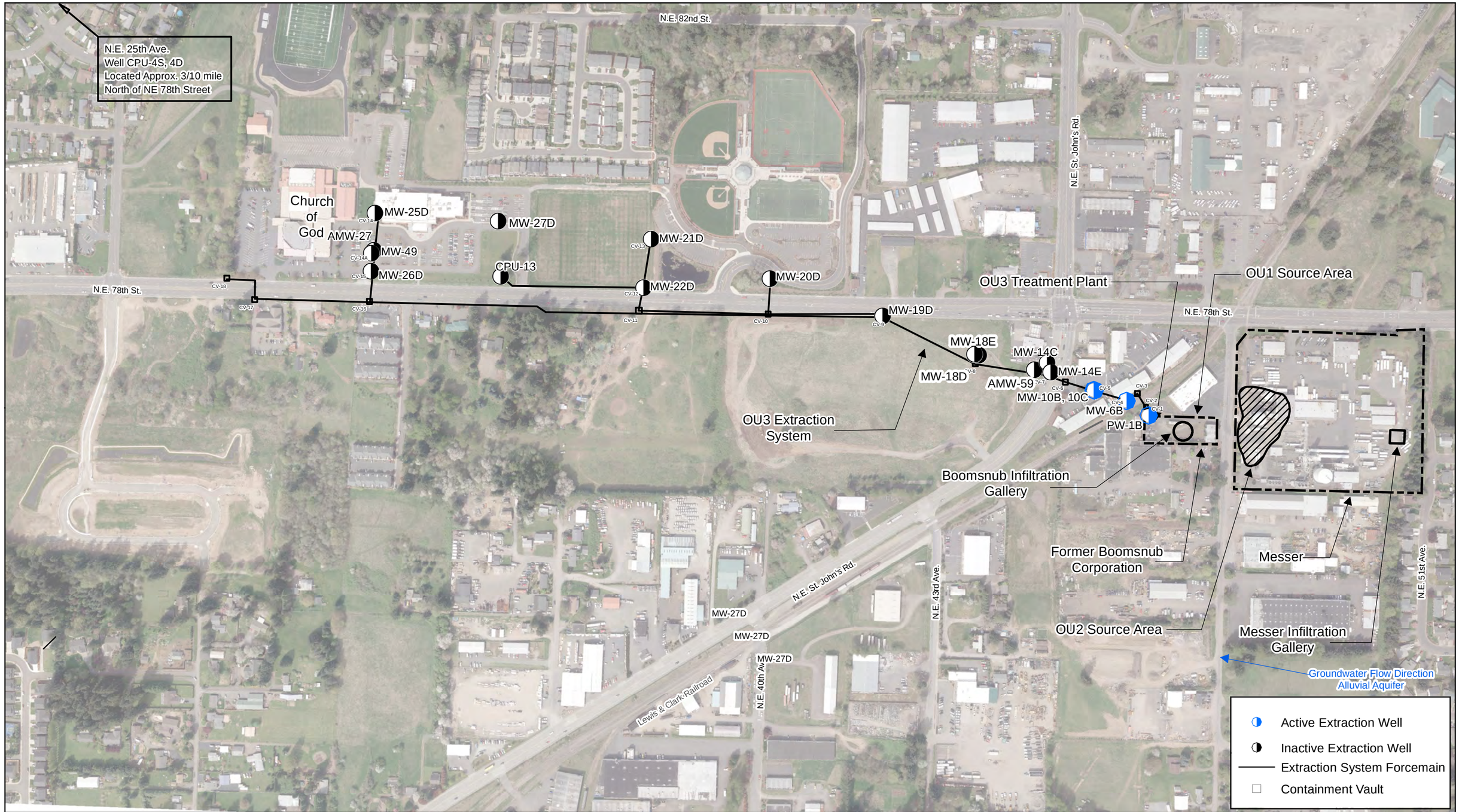
Miles
0 0.5 1

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

FIGURE 1-1
SITE LOCATION MAP

EA Project No. 1611303
File Name: Fig_1_Site_Location



EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

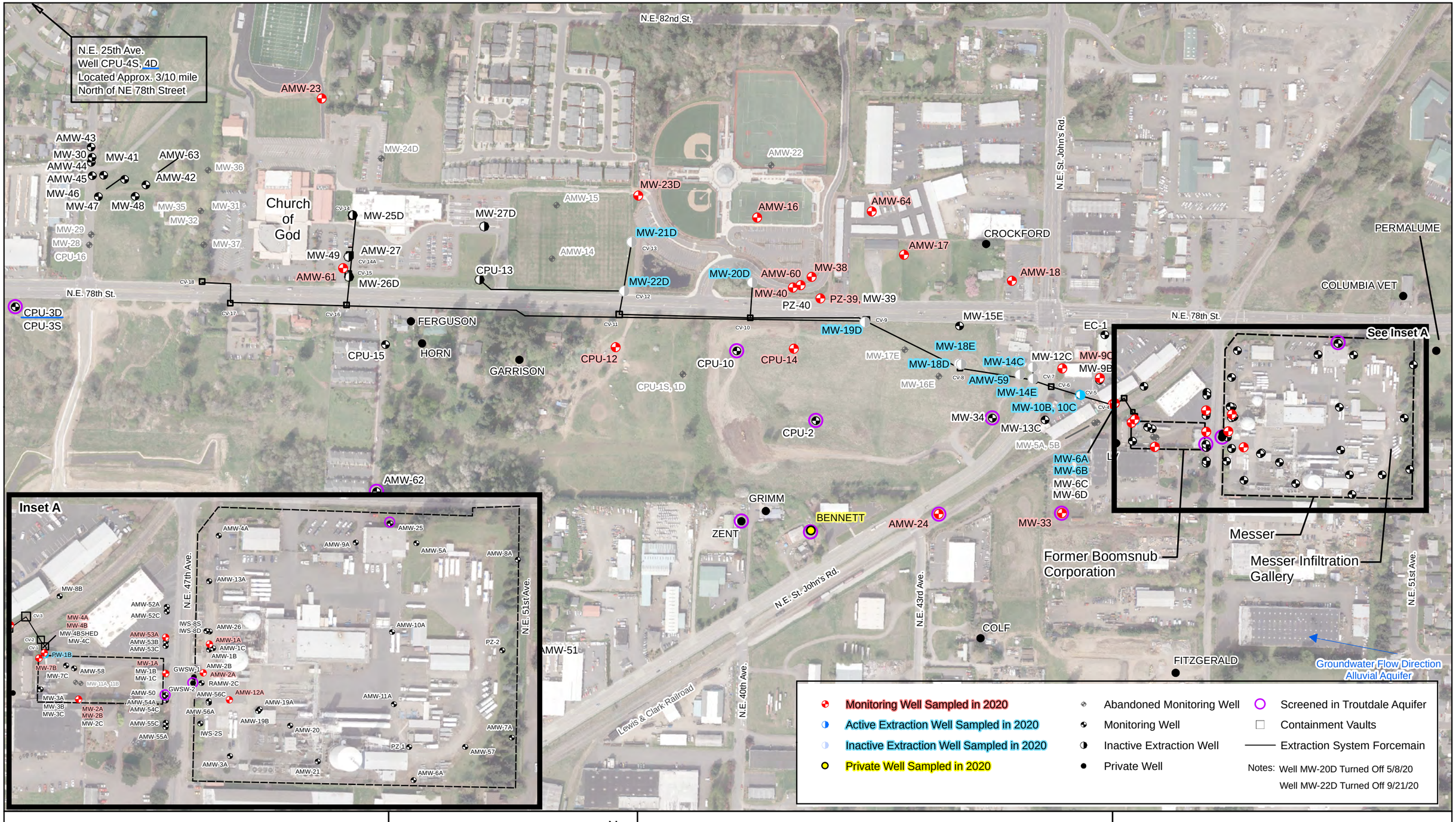
Feet
0 175 350 700

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_1_2_OU_Treatment_2020.mxd
File Name: Fig_1_2_OU_Treatment_2020

FIGURE 1-2
OPERABLE UNITS AND TREATMENT SYSTEM
2020

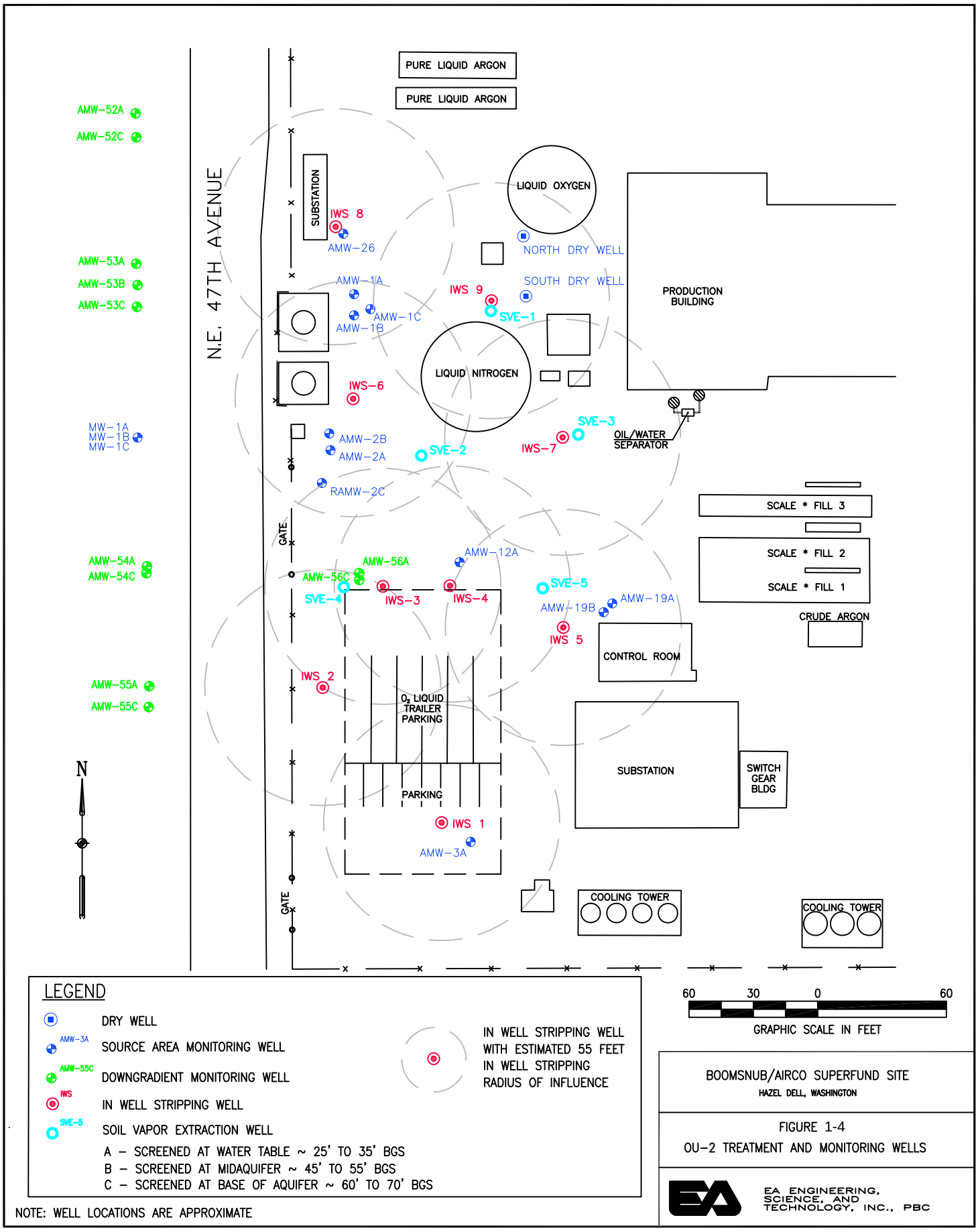


EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_1_3_Well_Network_2020.mxd
File Name: Fig_1_3_Well_Network_2020

FIGURE 1-3
MONITORING AND EXTRACTION WELL NETWORK



NOTE: WELL LOCATIONS ARE APPROXIMATE

BOOMSNUB/AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

FIGURE 1-4
OU-2 TREATMENT AND MONITORING WELLS

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

MW-21D
14.6

MW-22D
66.7

MW-38
4.7 J

PZ-39
3.2J

MW-40
103

MW-10C
57.9

MW-10B
32.1

MW-18D
15.8

MW-18E
2.9J

MW-6A
149

MW-6B
14.9

MW-14C
10.2

MW-20D
59.9

CPU-12
7.0J

MW-19D
38.4

AMW-59
19.2

AMW-12A
8.4U

MW-14E
173

MW-4A
556

MW-4B
318

MW-2A
601

PW-1B
31.9

Monitoring Well Location
with Chromium Concentration (µg/L)
Exceeding Site Cleanup Level

MW-40
103

Monitoring Well Location
with Chromium Concentration (µg/L)
Not Exceeding Site Cleanup Level

MW-20D
59.9

Extraction Well Pipeline

Notes:

1) Only wells sampled for chromium in Fall 2020 are shown.

2) The site-specific cleanup level for chromium is 80 micrograms per liter (µg/L).

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.

Groundwater Flow Direction
Alluvial Aquifer

Feet
0 175 350 700

N

EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_3_1_CR_Results_Fall20.mxd
File Name: Fig_3_1_CR_Results_Fall20

FIGURE 3-1
ALLUVIAL AQUIFER
CHROMIUM SAMPLING RESULTS
FALL 2020

AMW-23*
0.5U

MW-23D*
83

AMW-16*
23

AMW-64*
7.1

MW-21D*
0.31J

MW-20D
12

MW-38*
12

AMW-17*
55

AMW-61
6.2

MW-22D
1.6

AMW-18*
16

MW-6A
0.5U

MW-6B
4.2

MW-4A
1.8

MW-9C
1.2

PW-1B
2.2

MW-7B
6.3

AMW-53A
19

AMW-60
0.4J

PZ-39
42

CPU-14
3.7

MW-19D
45

MW-18D
3.1

MW-18E
0.24J

AMW-59
4.1

MW-14C
2.4

MW-10B
8.9

MW-14E
9.2

MW-10C
1.3

AMW-12A
12

MW-2B
2.5

Groundwater Flow Direction
Alluvial Aquifer

Monitoring Well Location with TCE Concentration (µg/L) Exceeding Site Cleanup Level in OU3 Plume
MW-20D 12

Monitoring Well Location with TCE Concentration (µg/L) Exceeding Site Cleanup Level in Northern Plume
MW-23D 83

Monitoring Well Location with TCE Concentration (µg/L) Not Exceeding Site Cleanup Level
MW-22D
1.5

Extraction Well Pipeline

Notes:

1) Only wells sampled for TCE in Fall 2020 are shown.

2) The site-specific cleanup level for TCE is 5 micrograms per liter (µg/L).

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.

U = Analyte not detected above the specified reporting limit.

* Wells impacted by the offsite Northern Plume.

EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

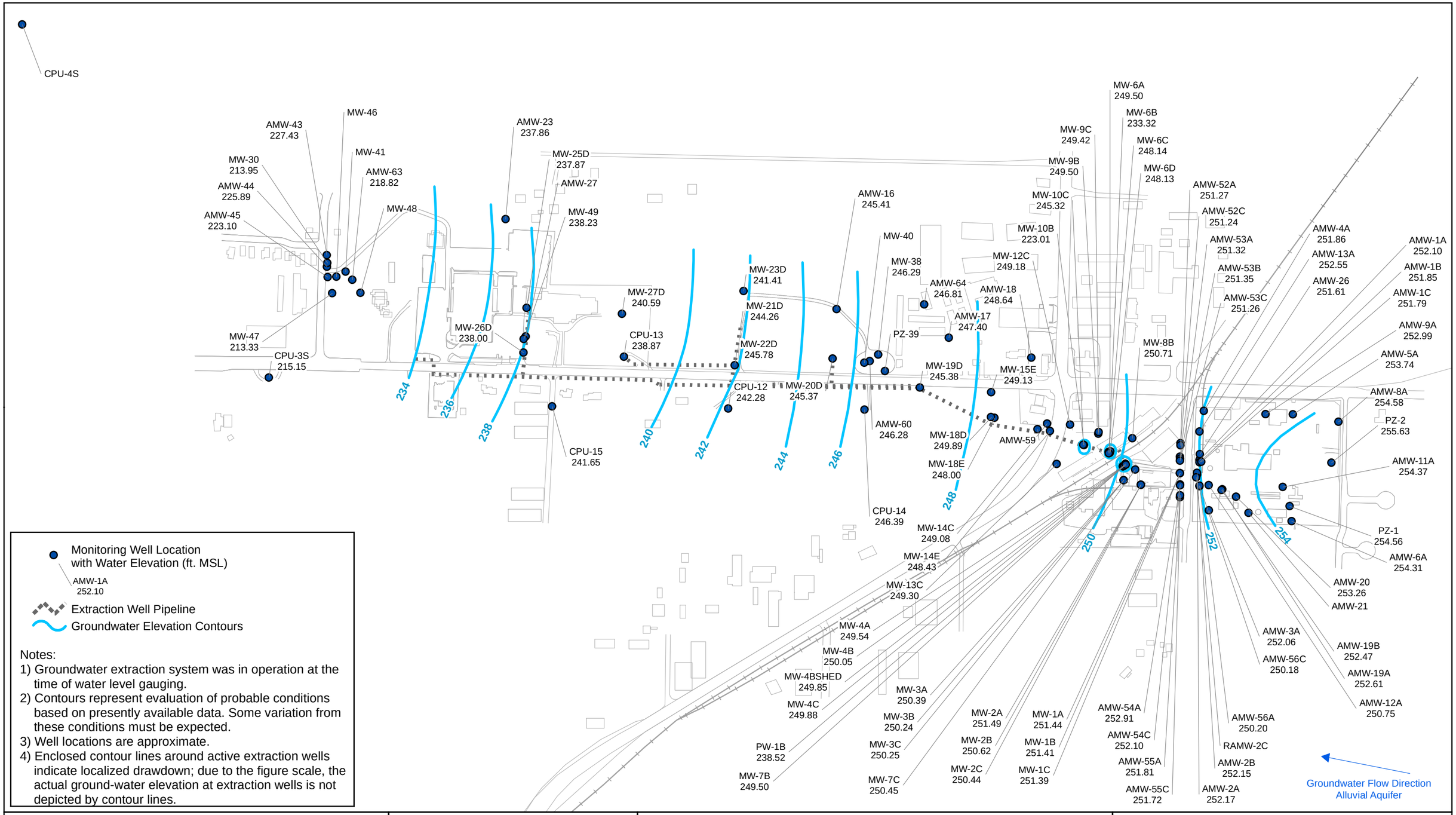
Feet
0 175 350 700

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_3_2_TCE_Results_Fall20.mxd
File Name: Fig_3_2_TCE_Results_Fall20

FIGURE 3-2
ALLUVIAL AQUIFER
TRICHLOROETHENE SAMPLING RESULTS
FALL 2020



Monitoring Well Location
with Water Elevation (ft. MSL)

AMW-1A
252.10

Extraction Well Pipeline

Groundwater Elevation Contours

Notes:

1) Groundwater extraction system was in operation at the time of water level gauging.
2) Contours represent evaluation of probable conditions based on presently available data. Some variation from these conditions must be expected.
3) Well locations are approximate.
4) Enclosed contour lines around active extraction wells indicate localized drawdown; due to the figure scale, the actual ground-water elevation at extraction wells is not depicted by contour lines.

EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

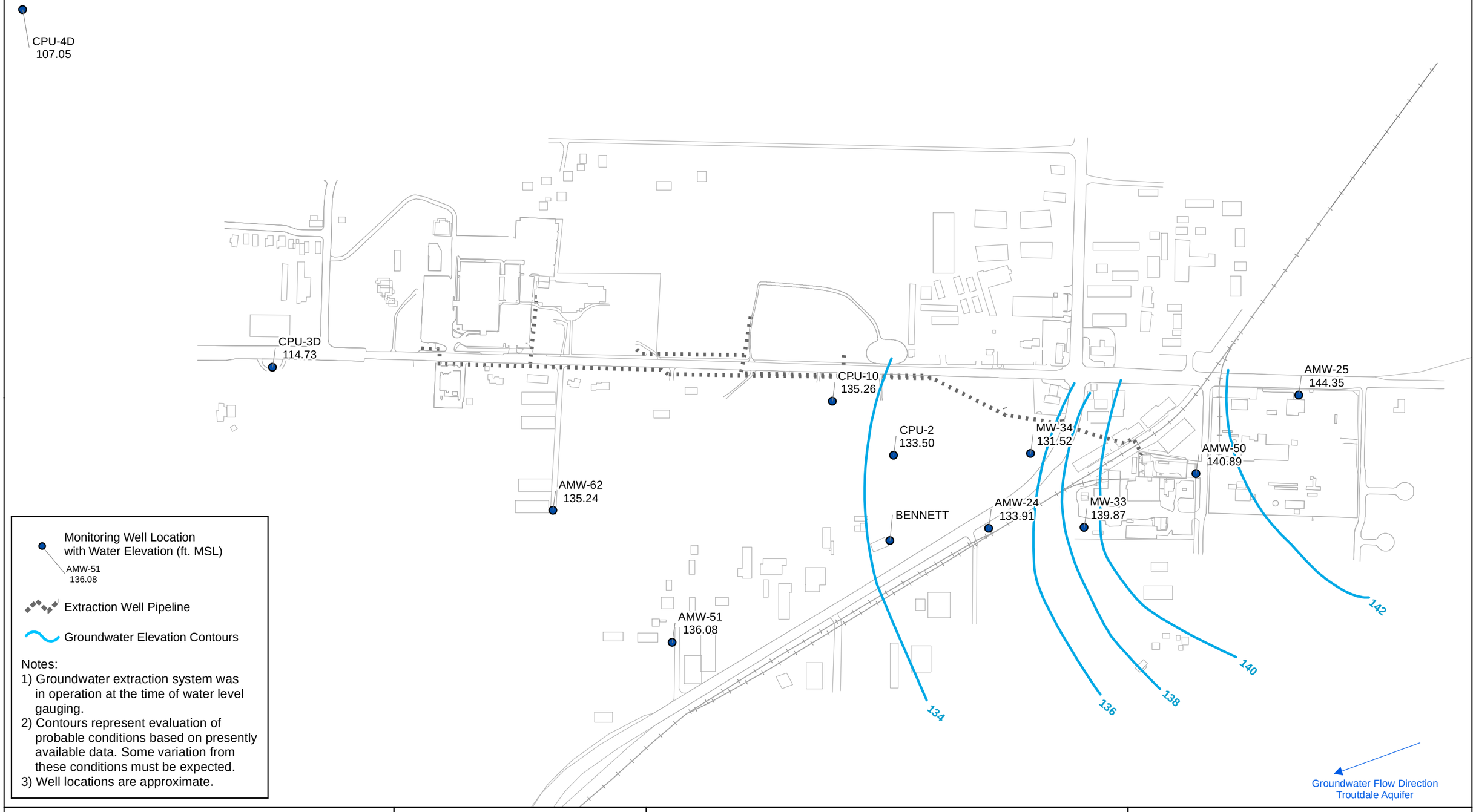
Feet
0 225 450 900

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_3_3_GW_Alluvial_Fall20.mxd
File Name: Fig_3_3_GW_Alluvial_Fall20

FIGURE 3-3
ALLUVIAL AQUIFER GROUNDWATER CONTOURS
FALL 2020

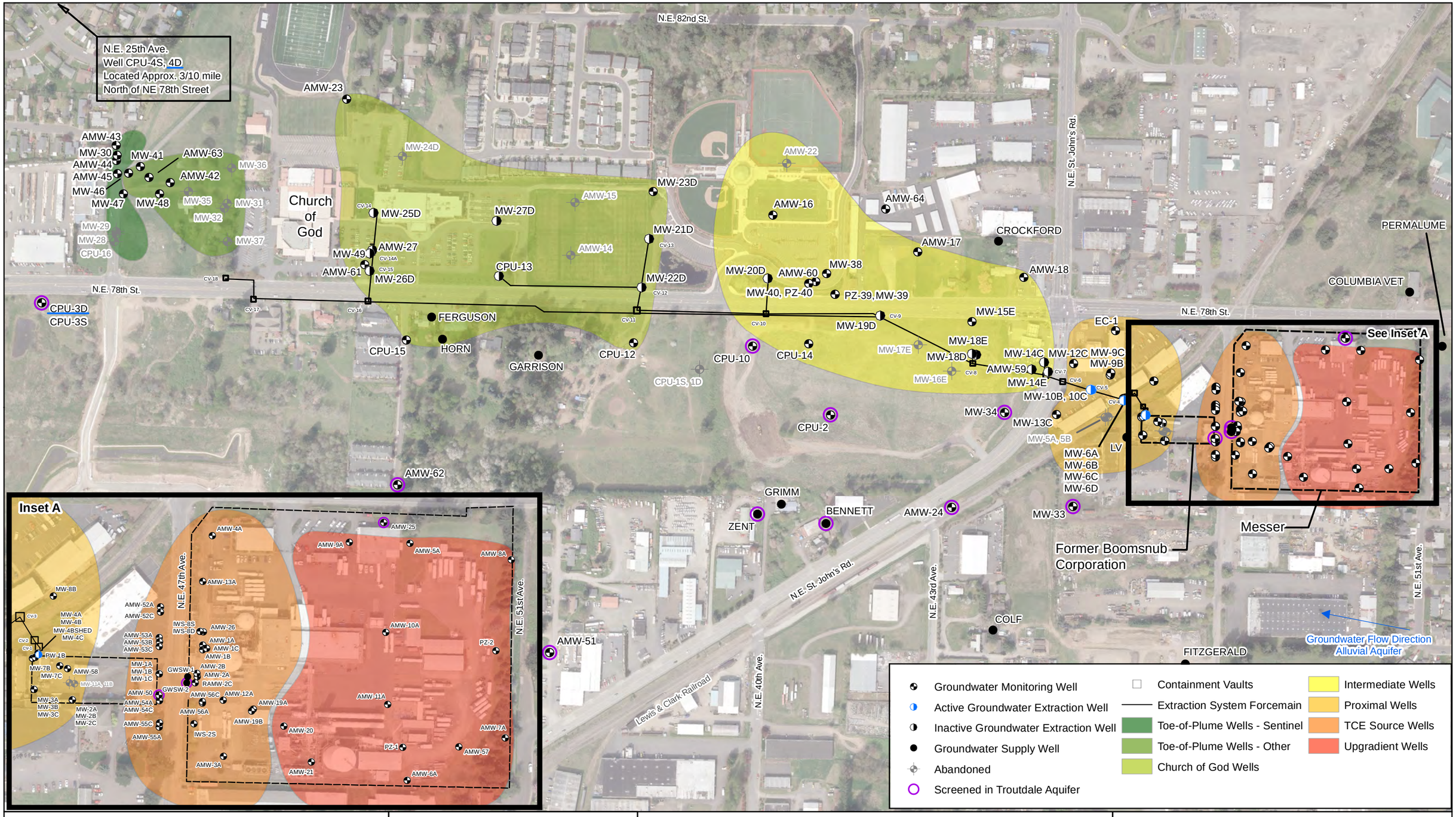


EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_3_4_GW_Troutdale_Fall20 (1).mxd
File Name: Fig_3_4_GW_Troutdale_Fall20 (1)

FIGURE 3-4
TROUTDALE AQUIFER GROUNDWATER CONTOURS
FALL 2020



EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

Feet
0 175 350 700

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_3_5_Well_Groupings.mxd
File Name: Fig_3_5_Well_Groupings

FIGURE 3-5
EXTRACTION AND MONITORING
WELL GROUPINGS

1995

Groundwater Flow Direction
Alluvial Aquifer

2020

Extraction Well Pipeline

Chromium Concentration Contours

- 80 - 250 µg/L
- 250 - 500 µg/L
- 500 - 1,500 µg/L
- 1,500 - 5,000 µg/L
- 5,000 - 10,000 µg/L
- 10,000 - 20,000 µg/L
- >20,000 µg/L

Note:
Contours represent evaluation of probable conditions based on presently available data. Some variations from these conditions must be expected.

EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

Feet
0 200 400 800

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_3_6_CR_Plume.mxd
File Name: Fig_3_6_CR_Plume

FIGURE 3-6
CHROMIUM PLUME COMPARISON
1995 VS. 2020

1995

2020

Groundwater Flow Direction
Alluvial Aquifer

Extraction Well Pipeline

TCE Concentration Contours

Boomsnub/Airco OU-3 Plume

- 5 - 25 µg/L
- 25 - 100 µg/L
- 100 - 500 µg/L
- 500 - 1,000 µg/L
- 1,000 - 2,000 µg/L
- > 2,000 µg/L

Northern Plume

- 25 - 100 µg/L
- 5 - 25 µg/L
- Plume Overlap Area
- Wells Impacted by the Northern Plume

Notes:
- Contours represent evaluation of probable conditions based on presently available data. Some variations from these conditions must be expected.

EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

Feet
0 200 400 800

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_3_7_TCE_Plume.mxd
File Name: Fig_3_7_TCE_Plume

FIGURE 3-7
TRICHLOROETHENE PLUME COMPARISON
1995 VS. 2020

N.E. 25th Ave.
Well CPU-4S, 4D
Located Approx. 3/10 mile
North of NE 78th Street

N.E. 82nd St.
N.E. St. John's Rd.
N.E. 78th St.
N.E. 47th Ave.
N.E. 51st Ave.
N.E. 43rd Ave.
N.E. 40th Ave.
N.E. St. John's Rd.
Lewis & Clark Railroad

AMW-23
AMW-43
MW-30
MW-41
AMW-63
AMW-44
AMW-45
AMW-42
MW-46
MW-47
MW-48
MW-36
MW-35
MW-31
MW-32
MW-29
MW-28
CPU-16
MW-37
MW-24D
Church of God
MW-25D
MW-27D
AMW-15
AMW-14
AMW-27
MW-49
AMW-61
MW-26D
CPU-13
CV-18
CV-17
CV-16
CV-15
CV-14A
CV-14
CV-13
CV-12
CV-11
CV-10
CV-9
CV-8
CV-7
CV-6
CV-5
CV-4
CPU-3D
CPU-3S
FERGUSON
HORN
CPU-15
GARRISON
CPU-12
CPU-1S, 1D
CPU-10
CPU-14
CPU-2
MW-23D
MW-21D
MW-22D
MW-20D
AMW-60
MW-38
MW-40
PZ-39
MW-39
PZ-40
MW-19D
MW-17E
MW-16E
MW-18E
MW-18D
AMW-59
MW-14C
MW-12C
MW-9C
MW-9B
MW-14E
MW-10B
MW-10C
MW-34
MW-13C
MW-5A, 5B
MW-6A
MW-6B
MW-6C
MW-6D
MW-33
AMW-22
AMW-16
AMW-64
AMW-17
CROCKFORD
AMW-18
MW-15E
EC-1
PERMALUME
COLUMBIA VET
See Inset 'A'
Messer
Former Boomsnub Corporation
AMW-24
GRIMM
BENNETT
ZENT
AMW-62
AMW-51
COLF
FITZGERALD
Groundwater Flow Direction
Alluvial Aquifer

Inset A
AMW-4A
AMW-25
AMW-9A
AMW-5A
AMW-8A
AMW-13A
MW-8B
AMW-52A
AMW-52C
MW-4A
MW-4B
MW-4BSHED
MW-4C
IWS-8S
IWS-8D
AMW-26
AMW-10A
AMW-53A
AMW-53B
AMW-53C
AMW-1A
AMW-1C
AMW-1B
PZ-2
PW-1B
MW-7B
MW-7C
AMW-58
MW-1A
MW-1B
MW-1C
GWSW-1
AMW-2B
AMW-2A
RAMW-2C
MW-11A, 11B
GWSW-2
AMW-50
AMW-54A
AMW-54C
AMW-56C
AMW-12A
MW-3A
MW-3B
MW-3C
MW-2A
MW-2B
MW-2C
AMW-56A
AMW-19A
AMW-19B
AMW-11A
AMW-55C
AMW-55A
IWS-2S
AMW-20
AMW-7A
PZ-1
AMW-57
AMW-3A
AMW-21
AMW-6A

Groundwater well with chromium concentration above the cleanup level of 80 µg/L during sampling in 2020
Groundwater well with chromium concentration below the cleanup level of 80 µg/L during sampling in 2020
Groundwater Monitoring Well
Groundwater Extraction Well
Groundwater Supply Well
Abandoned Monitoring Well
Screened in Troutdale
Containment Vaults
Extraction System Forcemain

EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

Feet
0 175 350 700
N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_3_8_CR_Concentration_2020.mxd
File Name: Fig_3_1_CR_Concentration_2020

FIGURE 3-8
WELLS WITH CHROMIUM CONCENTRATIONS ABOVE THE CLEANUP LEVEL IN 2020

N.E. 25th Ave.
Well CPU-4S, 4D
Located Approx. 3/10 mile
North of NE 78th Street

N.E. 82nd St.

AMW-23
AMW-43
MW-30
AMW-44
MW-41
AMW-63
AMW-45
AMW-42
MW-46
MW-47
MW-48
MW-24D
MW-36
MW-35
MW-31
MW-32
MW-29
MW-28
CPU-16
MW-37
Church of God
MW-25D
MW-27D
AMW-15
AMW-22
MW-23D
AMW-16
AMW-64
MW-21D
AMW-17
CROCKFORD
N.E. St. John's Rd.
PERMALUME
AMW-27
MW-49
AMW-61
MW-26D
CPU-13
AMW-14
MW-22D
MW-20D
AMW-60
MW-38
AMW-18
COLUMBIA VET
N.E. 78th St.
CPU-3D
CPU-3S
MW-40
PZ-40
PZ-39
MW-39
MW-15E
EC-1
FERGUSON
MW-19D
MW-18E
MW-18D
MW-14C
MW-12C
MW-9C
MW-9B
CPU-15
HORN
CPU-12
CPU-10
CPU-14
MW-17E
AMW-59
MW-14E
MW-10B
MW-10C
GARRISON
CPU-1S, 1D
MW-16E
MW-34
MW-13C
CPU-2
MW-5A, 5B
MW-6A
MW-6B
MW-6C
MW-6D
MW-33
AMW-62
GRIMM
ZENT
BENNETT
AMW-24
Messer
Former Boomsnub Corporation
N.E. St. John's Rd.
N.E. 43rd Ave.
N.E. 51st Ave.
COLF
AMW-51
FITZGERALD
Groundwater Flow Direction
Alluvial Aquifer
Lewis & Clark Railroad
N.E. 40th Ave.

See Inset 'A'

Inset A

AMW-4A
AMW-25
AMW-9A
AMW-5A
AMW-8A
AMW-13A
N.E. 47th Ave.
N.E. 51st Ave.
MW-8B
AMW-52A
AMW-52C
MW-4A
MW-4B
MW-4BSHED
MW-4C
AMW-53A
AMW-53B
AMW-53C
IWS-8S
IWS-8D
AMW-26
AMW-10A
PZ-2
AMW-1A
AMW-1C
AMW-1B
PW-1B
MW-7B
MW-7C
AMW-58
MW-1A
MW-1B
MW-1C
GWSW-1
AMW-2B
AMW-2A
RAMW-2C
MW-11A, 11B
GWSW-2
AMW-50
AMW-54A
AMW-54C
AMW-12A
AMW-56C
AMW-19A
AMW-11A
MW-3A
MW-3B
MW-3C
MW-2A
MW-2B
MW-2C
AMW-56A
AMW-19B
AMW-55C
AMW-55A
IWS-2S
AMW-20
AMW-7A
PZ-1
AMW-57
AMW-3A
AMW-21
AMW-6A

Groundwater Well with TCE concentration above the cleanup level of 5 µg/L during sampling in 2020

Groundwater Well with TCE concentration below the cleanup level of 5 µg/L during sampling in 2020

Groundwater Monitoring Well
Groundwater Extraction Well
Groundwater Supply Well
Abandoned Monitoring Well

Wells Impacted by the Northern Plume

Screened in Troutdale
Containment Vaults
Extraction System Forcemain

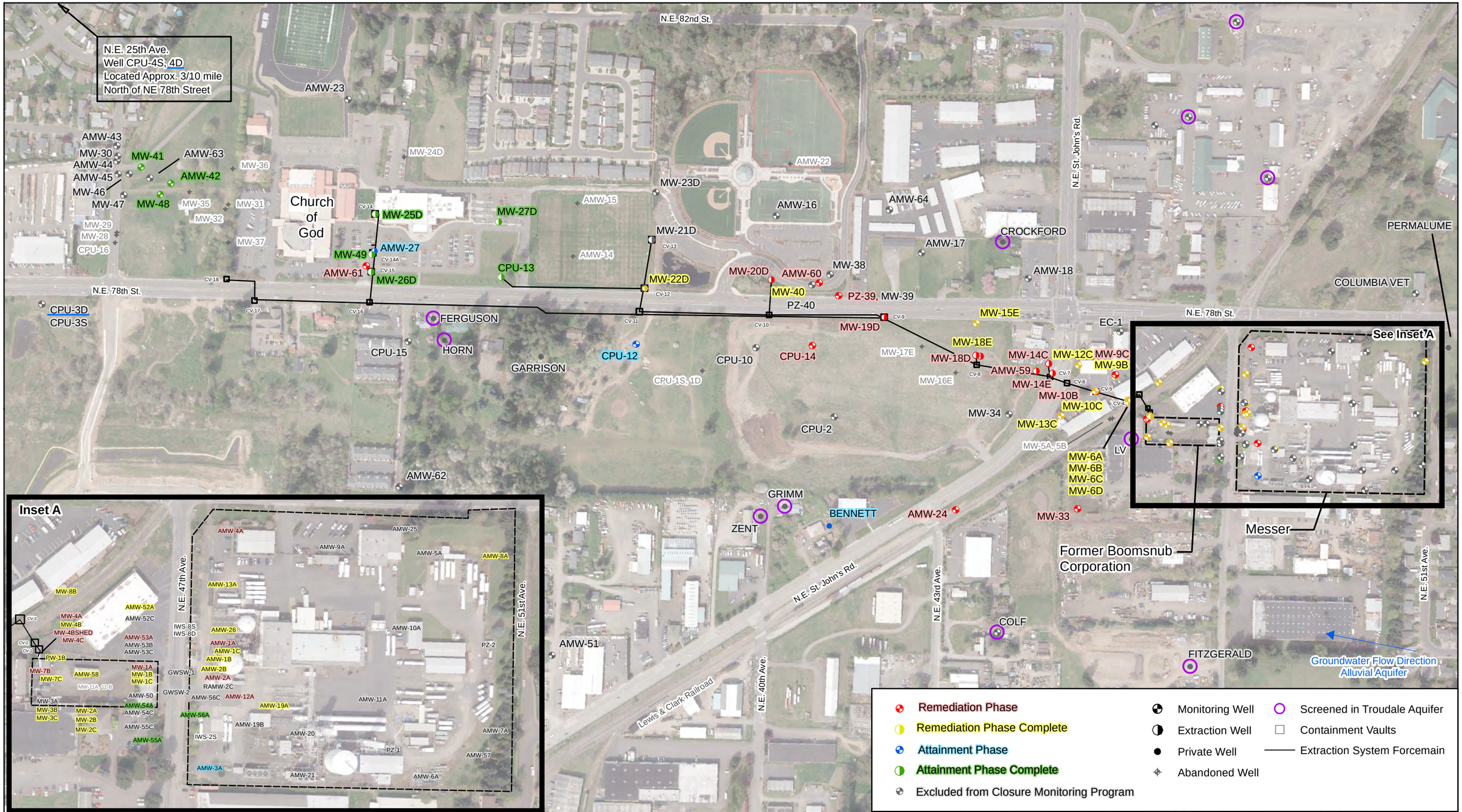
EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

Feet
0 175 350 700
N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_3_9_TCE_Concentration_2020.mxd
File Name: Fig_3_9_TCE_Concentration_2020

FIGURE 3-9
WELLS WITH TCE CONCENTRATIONS
ABOVE THE CLEANUP LEVEL IN 2020



EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

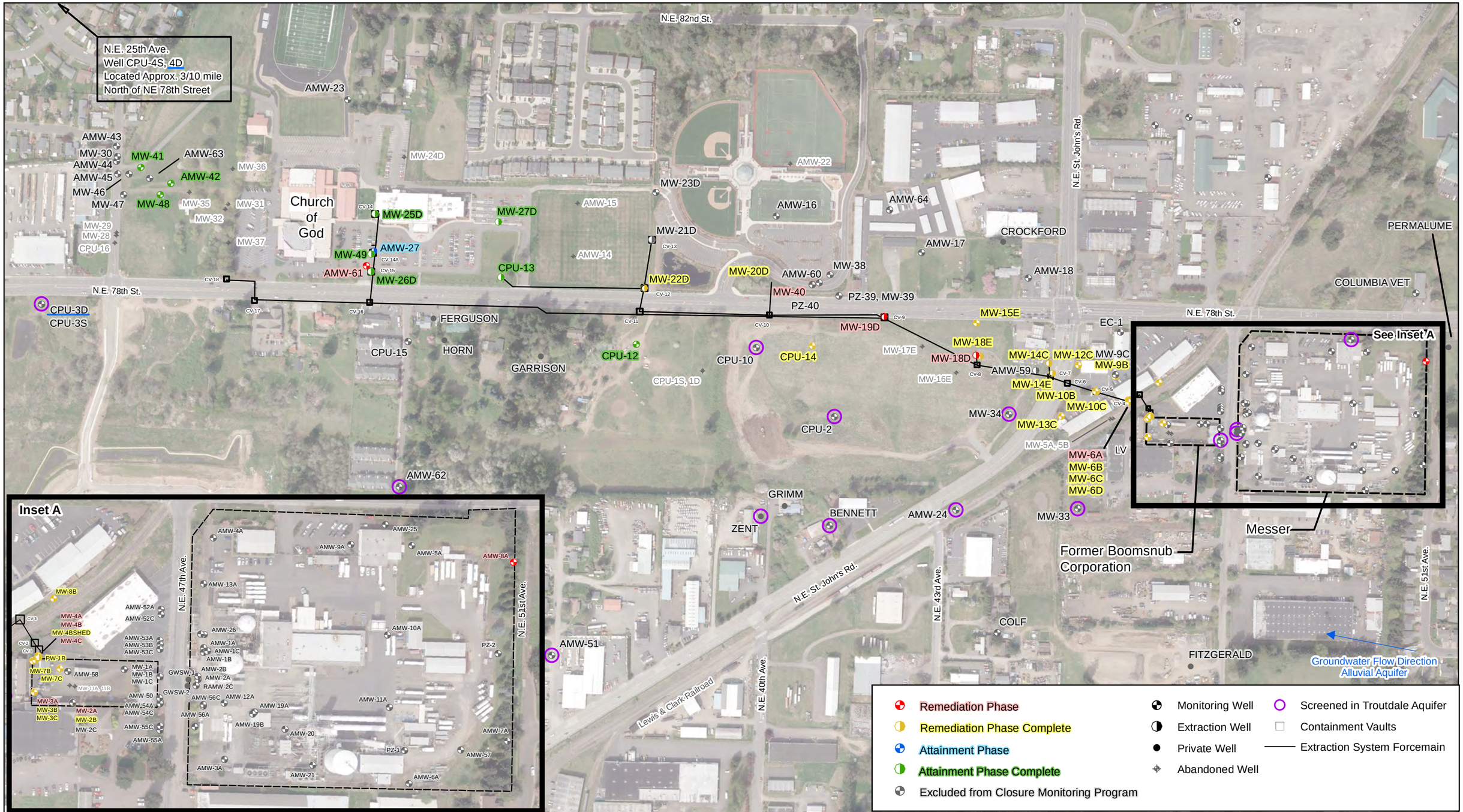
Feet
0 175 350 700

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_5_1_Closure_Mon_VOCs_2020.mxd
File Name: Fig_5_1_Closure_Mon_VOCs_2020

FIGURE 5-1
STATUS OF CLOSURE MONITORING PROGRAM
VOLATILE ORGANIC COMPOUNDS



EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

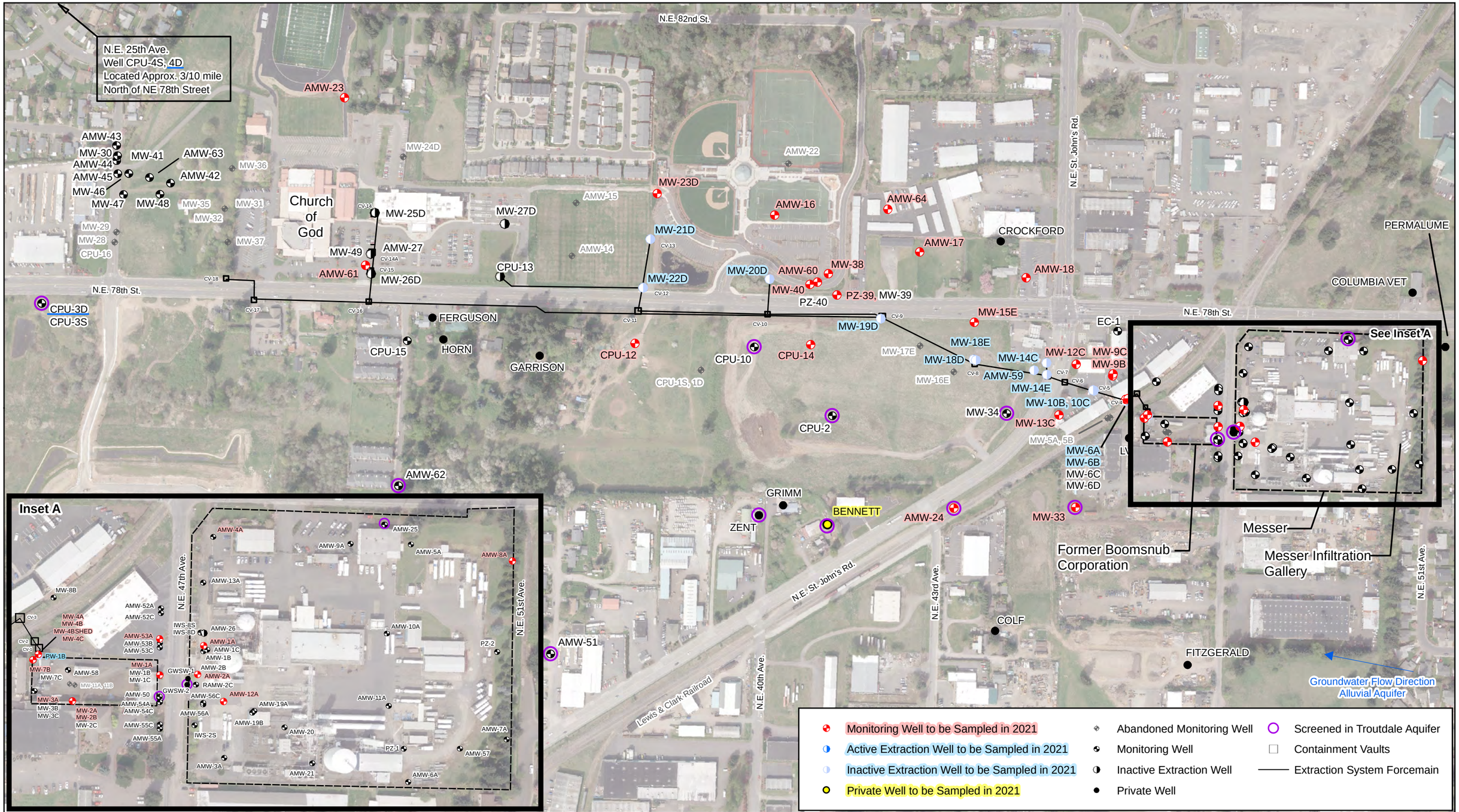
Feet
0 175 350 700

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_5_2_Closure_Mon_CR_2020 (1).mxd
File Name: Fig_5_2_Closure_Mon_CR_2020 (1)

FIGURE 5-2
STATUS OF CLOSURE MONITORING PROGRAM
CHROMIUM



EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

Feet
0 175 350 700

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_5_3_Sample_Plan_2020.mxd
File Name: Fig_5_3_Sample_Plan_2020

FIGURE 5-3
WELLS TO BE SAMPLED IN 2021

Tables

This page intentionally left blank.

TABLE 2-1. 2020 EXTRACTION WELL PUMPING RATES

Flow Rates (gpm)												
Well ID	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
MW-6B	6.4	6.4	6.4	5.0	4.2	4.2	4.8	4.8	off	4.8	10	4.4
MW-10B	10.2	10.2	10.3	10.2	10.2	10	10.2	10.3	off	10.3	12	10.5
MW-10C	12.5	12.5	12.4	12	12	12	12.1	12	off	12	4.8	12
MW-14C	off	off	off	off	off	off	off	off	off	off	off	off
MW-14E	off	off	off	off	off	off	off	off	off	off	off	off
MW-19D	off	off	off	off	off	off	off	off	off	off	off	off
MW-20D	15.6	15.6	15.4	15.4	off	off	off	off	off	off	off	off
MW-21D	off	off	off	off	off	off	off	off	off	off	off	off
MW-22D	16.9	16.9	16.8	17	17	17	16.5	17.5	off	off	off	off
PW-1B	11.6	11.6	11.6	11.4	11.4	11.4	12	11.5	off	11.5	11.1	11.5
Total	**69.2**	**73.2**	**72.9**	**71**	**54.8**	**54.6**	**56.7**	**56.1**	**0**	**38.6**	**37.9**	**38.4**

Notes:
Due to the proximity to In-Situ treatment injections, wells MW-14C and MW-14Ewere shut off indefinitely on 16 October 2019, MW-19D was shut off indefinitely on 14 October2019, and MW-22D was shut off on 21 September 2020.
Pumping of extraction well MW-21D was stopped on 22 June 2018, with EPA approval, to minimize drawing the Northern Plume into the well.
The system and wells were all off during routine reporting period September 2020.
gpm = gallons per minute

Table 3-1. Summary of Water Level Gauging Data and Groundwater Surface Elevations—Fall 2020

Well ID	Well Type	Total Depth (ft btoc)	Top of Screen (ft btoc)	Bottom of Screen (ft btoc)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
AMW-1A	M	34.83	24.56	34.56	10	284.09	31.99	254.40
AMW-1B	M	56.49	46.49	56.49	10	284.11	32.26	254.29
AMW-1C	M	79.00	69	79	10	284.06	32.27	254.23
AMW-2A	M	34.51	24.51	34.51	10	284.03	31.86	254.18
AMW-2B	M	59.00	47	57	10	284.11	31.46	254.17
AMW-3A	M	34.00	24.5	34.5	10	283.92	31.86	254.95
AMW-4A	M	34.20	23.9	33.9	10	283.74	31.88	254.00
AMW-5A	M	34.60	24.5	34.5	10	284.14	30.40	256.06
AMW-6A	M/D	33.90	24	34	10	284.56	30.25	256.96
AMW-7A	M/D	34.09	24.25	34.25	10	285.02	29.55	258.56
AMW-8A	M	34.50	24.5	34.5	10	285.49	30.91	256.89
AMW-9A	M	34.50	24.5	34.5	10	283.92	30.93	255.39
AMW-10A	M/D	31.50	21	31	10	284.01	27.44	256.57
AMW-11A	M/D	33.84	23.5	33.5	10	283.21	28.84	257.17
AMW-12A	M	34.55	24.35	34.35	10	283.74	32.99	254.66
AMW-13A	M	34.30	23.8	33.8	10	283.88	31.33	254.87
AMW-16	M	91.28	81.13	91.13	10	266.11	20.70	247.12
AMW-17	M/D	90.38	81	91	10	260.42	12.92	249.81
AMW-18	M	103.65	92.65	102.65	10	278.8	30.16	250.68
AMW-19A	M	35.25	25	35	10	283.94	31.33	254.09
AMW-19B	M	54.50	44.5	54.5	10	283.97	31.50	253.98
AMW-20	M	35.00	25	35	10	283.69	30.43	255.66
AMW-23	M	85.00	75	85	10	278.26	40.40	239.85
AMW-24	M/D	200.00	190	200	10	264.72	130.81	134.20
AMW-25	M/D	225.00	215	225	10	282.94	138.59	145.25
AMW-26	M/D	34.50	24.2	34.2	10	283.02	31.41	253.72
AMW-43	M/D	85.00	72	85	13	247.71	30.28	234.62
AMW-44	M/D	81.00	71	81	10	247.82	31.93	236.75
AMW-45	M/D	77.00	67	77	10	244.87	31.77	234.59

Table 3-1. Summary of Water Level Gauging Data and Groundwater Surface Elevations—Fall 2020

Well ID	Well Type	Total Depth (ft btoc)	Top of Screen (ft btoc)	Bottom of Screen (ft btoc)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
AMW-50	M/D	195.19	185.19	195.19	10	282.78	141.89	150.85
AMW-51	M/D	195.70	185.7	195.7	10	258.44	122.36	124.96
AMW-52A	M	34.55	24.55	34.55	10	280.4	29.13	253.53
AMW-52C	M	73.63	63.63	73.63	10	280.38	29.14	253.50
AMW-53A	M	32.63	22.33	32.33	10	281.05	29.73	253.60
AMW-53B	M	54.55	44.55	54.55	10	281.2	29.85	253.59
AMW-53C	M	74.21	64.21	74.21	10	281.41	30.15	253.59
AMW-54A	M	34.30	24.3	34.3	10	283.31	30.40	253.80
AMW-54C	M	74.74	64.74	74.74	10	283.12	31.02	253.58
AMW-55A	M	30.83	20.83	30.83	10	282.11	30.30	253.82
AMW-55C	M	68.45	58.45	68.45	10	282.71	30.99	253.66
AMW-56A	M	35.24	25.24	35.24	10	283.67	33.47	254.45
AMW-56C	M	67.40	57.4	67.4	10	283.67	33.49	254.41
AMW-58	M	114.73	109.43	114.43	5	280.08	61.69	220.60
AMW-59	M/D	140.04	134.74	139.74	5	269.37	22.25	250.12
AMW-60	M	109.50	104.2	109.2	5	266.45	20.17	247.57
AMW-61	M	97.16	91.86	96.86	5	273.78	89.78	227.69
AMW-62	M/D	196.03	185.73	195.73	10	258.66	123.42	125.16
AMW-63	M	86.43	76.13	86.13	10	257.42	38.60	233.65
AMW-64	M	98.70	88.4	98.4	10	266.13	19.32	248.78
BENNETT	Private	197.00	180	180		260	132.68	127.32
CPU-2	M	197.2	186.2	196.2	10	259.57	126.07	134.85
CPU-3S	M	72.72	65.72	70.72	5	246.77	31.62	232.45
CPU-3D	M/D	219.38	212.38	217.38	5	246.77	33.04	113.83
CPU-4S	M	69.30	62.3	67.3	5	234.1	14.53	219.57
CPU-4D	M	210.00	203	208	5	234.05	130.57	103.48
CPU-10	M	198.22	186.9	196.9	10	261.24	125.98	131.40
CPU-12	M	72.20	61.12	71.12	10	275.23	32.95	244.45
CPU-13	E	82.70	71.7	81.7	10	278.99	40.12	242.83

Table 3-1. Summary of Water Level Gauging Data and Groundwater Surface Elevations—Fall 2020

Well ID	Well Type	Total Depth (ft btoc)	Top of Screen (ft btoc)	Bottom of Screen (ft btoc)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
CPU-14	M	71.43	60.43	70.43	10	257.56	11.17	248.45
CPU-15	M	89.49	78.49	88.49	10	275.87	34.22	243.14
MW-1A	M	38.56	28.27	38.27	10	285.49	34.05	253.69
MW-1B	M	59.79	54.49	59.49	5	285.47	34.06	253.70
MW-1C	M	77.44	72.14	77.14	5	285.45	34.06	253.64
MW-2A	M	37.39	32.09	37.09	5	282.57	31.80	252.95
MW-2B	M	57.94	52.64	57.64	5	282.49	31.87	252.82
MW-2C	M	86.94	81.64	86.64	5	282.43	31.99	252.58
MW-3A	M	32.70	22.3	32.3	10	280.21	29.82	252.51
MW-3B	M	56.69	51.39	56.39	5	280.33	30.09	252.88
MW-3C	M	83.69	78.39	83.39	5	280.35	30.10	252.32
MW-4A	M	37.70	26.8	36.8	10	280.3	30.76	252.37
MW-4B	M	44.80	39.7	44.7	5	280.15	30.10	252.31
MW-4BSHED	M	58.20	52.9	57.9	5	280.47	30.62	252.00
MW-4C	M	80.00	74.7	79.7	5	279.9	30.02	252.02
MW-6A	M	31.50	18.25	28.25	10	278.77	29.27	251.99
MW-6B	E	59.00	45.75	55.75	10	273.32	40.00	233.51
MW-6C	M	84.80	71.55	81.55	10	278.65	30.51	251.61
MW-6D	M	113.70	100.45	110.45	10	278.9	30.77	251.51
MW-7B	M	57.70	47	57	10	280.02	30.52	251.69
MW-7C	M	80.50	69	79	10	279.94	29.49	252.61
MW-8B	M	60.00	46.9	56.9	10	280.7	29.99	252.40
MW-9B	M	58.00	44.9	54.9	10	275.42	25.92	251.50
MW-9C	M	76.50	65	75	10	275.44	26.02	251.42
MW-10B	E	61.50	48	58	10	273.24	50.23	230.64
MW-10C	E	81.50	70	80	10	273.25	27.93	243.05
MW-12C	M	82.71	71.2	81.2	10	274.31	25.13	246.21
MW-13C	M	76.53	65.03	75.03	10	271.97	22.67	251.41
MW-14C	E	81.50	70	80	10	271.22	22.14	251.24

Table 3-1. Summary of Water Level Gauging Data and Groundwater Surface Elevations—Fall 2020

Well ID	Well Type	Total Depth (ft btoc)	Top of Screen (ft btoc)	Bottom of Screen (ft btoc)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
MW-14E	E	126.00	115	125	10	268.95	20.52	250.31
MW-15E	M	107.23	96.22	106.22	10	265.73	56.60	250.08
MW-18D	E	94.40	73.4	93.4	20	262.74	12.85	252.58
MW-18E	M	123.57	112.69	122.69	10	261.77	13.77	250.18
MW-19D	E	82.20	76.2	91.2	15	257.98	12.60	247.47
MW-20D	E	87.00	76	86	10	269.43	24.06	211.08
MW-21D	E	67.00	64.4	74.4	10	265.98	21.72	246.14
MW-22D	E	65.20	54	64	10	269.02	23.24	223.47
MW-23D	M	88.10	71.86	86.86	15	265.33	23.92	245.12
MW-25D	E	79.05	67.85	77.85	10	272.13	34.26	240.95
MW-26D	E	94.20	83	93	10	272.86	34.86	240.11
MW-27D	M	71.20	65.07	75.07	10	273.23	32.64	242.09
MW-30	M/D	63.00	51	61	10	246.75	32.80	235.37
MW-33	M/D	215.00	205	215	10	272.55	132.68	140.77
MW-34	M/D	205	195	205	10	267.33	129.08	147.23
MW-38	M	81.90	76.92	81.92	5	263.92	17.63	247.14
MW-41	E/M	81.7	71.7	81.7	10	253.08	31.88	NM
MW-46	E/M	80.3	70	80	10	247.79	30.22	NM
MW-47	M/D	83.00	72.7	82.7	10	246.39	33.06	236.52
MW-49	E	81.50	71.2	81.2	10	271.68	33.45	240.35
PW-1B	E	58.00	48	58	10	276.56	38.04	241.23
PZ-1	PZ	38.79	23.79	38.79	15	284.15	29.59	257.39
PZ-2	PZ	42.97	27.97	42.97	15	286.54	30.38	257.79

Table 3-1. Summary of Water Level Gauging Data and Groundwater Surface Elevations—Fall 2020

NOTES :

Water levels were measured on 22 October 2020.
Groundwater surface elevation is determined by subtracting the depth to water from the top-of-casing elevation.

btoc	=	Below top of casing.
E	=	Extraction well.
E/M	=	Extraction well (inactive) with pump pulled; sampled using monitoring well techniques.
ft	=	Feet.
M	=	Monitoring well.
M/D	=	Monitoring well with dedicated pump.
MSL	=	Mean sea level.
NA	=	Not applicable.
NM	=	Not measured.
PZ	=	Piezometer.
TOC	=	Top of casing.

Table 3-2. Extraction and Monitoring Well Groupings

Well Group	AMW Wells	MW Wells	Other Wells
Upgradient	AMW-6A AMW-7A AMW-8A AMW-10A AMW-11A		
TCE Source (OU-2)	**AMW-1A** **AMW-2A** AMW-3A **AMW-4A** **AMW-12A** AM-19A AMW-26 **AMW-53A** AMW-54A AMW-56A	**MW-1A**	
Proximal		**MW-2A** **MW-2B** MW-3A MW-3C **MW-4A** **MW-4B** MW-4BSHED MW-4C **MW-6A** **MW-6B** MW-6C MW-6D **MW-7B** **MW-9C** **MW-10B** **MW-10C** MW-12C MW-13C	**PW-1B**
Intermediate	**AMW-59** **AMW-60**	**MW-14C** **MW-14E** MW-15E **MW-18D** **MW-18E** **MW-19D** **MW-20D** **MW-40**	**CPU-14** **PZ-39**
Northern Plume	**AMW-16** **AMW-17** **AMW-18** **AMW-23** **AMW-64**	**MW-23D** **MW-38** **MW-21D**	
Church of God	**AMW-61**	**MW-22D**	CPU-12
Toe of Plume	AMW-63 AMW-44	MW-41	
Troutdale Aquifer	**AMW-24**	**MW-33**	**Bennett**

NOTES:
- Wells shown in **bold** and shaded were sampled during the 2020 Reporting year.
- Only wells being sampled as part of the current monitoring plan (EA 2018a) are listed on this table (and does not include wells where sampling is on hold).
- Northern Plume wells include those currently impacted by the off-site Northern Plume.
- AMW wells were installed by Messer LLC.
- MW wells were installed by the U.S. Environmental Protection Agency or Washington Department of Ecology.
- CPU wells were installed by Clark Public Utilities.

Table 3-3a. Summary of Chromium and Selected VOC Concentrations in Groundwater Samples—Spring 2020

Well Group	Well	Sampling Event	Chromium	TCE	PCE	CFC-11	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	BDCM
Church of God Wells	MW-21D	Spring 2020	NA	**7.1**	0.5 U	0.12 J	0.21 J	0.47 J	0.23 J	0.5 U
Intermediate Plume Wells	AMW-59	January 2020	70.9	**41**	0.5 U	0.5 U	0.5 U	**4.6**	6.8	0.5 U
	AMW-59	Spring 2020	**100**	**14**	0.5 U	0.5 U	0.5 U	**2.3**	12	0.5 U
	MW-14C	January 2020	62.9	3.9	0.44 J	0.5 U	0.5 U	0.5 U	0.5 U	0.28 J
	MW-14C	Spring 2020	73.8	2.6	0.47 J	0.12 J	0.1 J	0.5 U	0.16 J	0.83
	MW-14E	January 2020	38.1	**6.7**	0.35 J	0.5 U	0.5 U	0.34 J	0.07 J	0.5 U
	MW-14E	Spring 2020	54.4	**9.6**	0.88	0.5 U	0.5 U	0.49 J	0.15 J	0.5 U
	MW-18D	January 2020	47.9	4.8	0.53	0.5 U	0.5 U	0.08 J	2.4	0.5 U
	MW-18D	Spring 2020	**89.8**	3	0.57	0.5 U	0.5 U	0.09 J	1.2	0.5 U
	MW-18E	Spring 2020	8.4 U	0.25 J	0.5 U	0.5 U	0.5 U	0.15 J	1.3	0.5 U
	MW-19D	January 2020	**119***	3.5	0.56	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	MW-19D	Spring 2020	**171**	4.3	0.96	0.5 U	0.5 U	0.5 U	0.5 U	0.16 J
	MW-20D	Spring 2020	NA	**17**	0.67	0.5 U	0.5 U	0.85	0.21 J	0.5 U
Northern Plume Well	AMW-16	Spring 2020	NA	**28**	0.5 U	0.5 U	0.22 J	0.27 J	0.5 U	0.5 U
	AMW-17	Spring 2020	NA	**57**	0.25 J	0.5 U	0.18 J	0.1 J	0.5 U	0.5 U
	AMW-18	Spring 2020	NA	**16**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	AMW-23	Spring 2020	NA	0.16 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	AMW-64	Spring 2020	NA	**7.5**	0.11 J	0.5 U	0.1 J	0.5 U	0.5 U	0.5 U
	MW-23D	Spring 2020	NA	**110**	0.5 U	0.5 U	0.83	**1.1**	0.15 J	0.5 U
Proximal Source Wells	MW-10B	Spring 2020	NA	**7.4**	0.7	0.5 U	0.5 U	0.08 J	0.5 U	0.5 U
TCE Source Wells	AMW-12A	Spring 2020	NA	**20**	0.43 J	1.8	0.4 J	0.11 J	0.17 J	0.5 U
	AMW-1A	Spring 2020	NA	**9.2**	0.33 J	16	1.2	0.18 J	0.13 J	0.5 U
	AMW-2A	Spring 2020	NA	**37**	0.96	6.2	1.3	0.32 J	0.54	0.5 U
	AMW-53A	Spring 2020	NA	**11**	0.87	11	1.3	0.48 J	0.27 J	0.5 U
	MW-1A	Spring 2020	NA	4.8	0.77	0.35 J	0.5 U	0.5 U	0.5 U	0.5 U
Cleanup or Guidance Level			80	5	5	2,400	200	1	70	1

NOTES:

Only commonly detected VOCs are included in this table
Results are in micrograms per liter (µg/L).
Results in **blue bold** exceed the established cleanup or guidance level for the compound.
The concentrations listed in the table are the maximum of the primary and duplicate samples (as applicable).
1,1,1-TCA = 1,1,1-Tricholoroethane
1,1-DCE = 1,1-Dichloroethene
BDCM = Bromodichloromethane.
CFC-11 = Trichlorofluoromethane.
Cis-1,2-DCE = cis-1,2-Dichloroethene.
E = The result is an estimated concentration because the value exceeded the instrument calibration range.
J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit**.**
NA = The sample was not analyzed for the specified compound.
PCE = Tetrachloroethene.
TCE = Trichloroethene.
U = Analyte not detected above the specified reporting limit.
* = Filtered sample, unfiltered sample result 398 (µg/L).

Table 3-3b. Summary of Chromium and Selected VOC Concentrations in Groundwater Samples — Fall 2020

Well Group	Well	Chromium	TCE	PCE	CFC-11	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	BDCM
Church of God Wells	AMW-61	NA	6.2	2.2	0.5 U	0.5 U	0.18 J	0.5 U	0.5 U
	CPU-12	7 J	NA	NA	NA	NA	NA	NA	NA
	MW-22D	66.7	1.6	1.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Intermediate Plume Wells	AMW-59	19.2	4.1	0.5 U	0.5 U	0.5 U	1.2	23	0.5 U
	AMW-60	NA	0.4 J	0.5 U	0.5 U	0.5 U	2.6	0.83	0.5 U
	CPU-14	NA	3.7	0.10 J	0.5 U	0.13 J	0.11 J	0.5 U	0.5 U
	MW-14C	10.2	2.4	0.48 J	0.5 U	0.5 U	0.5 U	0.5 U	0.25 J
	MW-14E	173	9.2	1.6	0.5 U	0.1 J	0.1 J	0.14 J	0.5 U
	MW-18D	15.8	3.1	0.48 J	0.5 U	0.5 U	0.5U	2.1	0.5 U
	MW-18E	2.9 J	0.24 J	0.5 U	0.5 U	0.5 U	0.08 J	0.5	0.5 U
	MW-19D	38.4	45	1.9	0.5 U	0.5 U	1.3	3.5	0.5 U
	MW-20D	59.9	12	0.9	0.5 U	0.5 U	0.17 J	0.5 U	0.5 U
	MW-40	103	NA	NA	NA	NA	NA	NA	NA
	PZ-39	3.2 J	42	0.68	1.9	0.61	2.8	0.57	0.5 U
Northern Plume Wells	AMW-16	NA	23	0.5 U	0.5 U	0.29 J	0.22 J	0.5 U	0.5 U
	AMW-17	NA	55	0.25 J	0.5 U	0.11 J	0.5 U	0.5 U	0.5 U
	AMW-18	NA	16	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	AMW-23	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	AMW-64	NA	7.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	MW-21D	14.6	0.31 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	MW-23D	NA	83	0.5 U	0.5 U	0.61	0.91	0.5 U	0.5 U
	MW-38	4.7 J	12	0.57	0.2 J	0.5 U	0.32 J	0.5 U	0.5 U
TCE Source Wells	AMW-4A	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5U	0.5 U
	AMW-12A	8.4 U	12	0.41 J	2.5	0.57	0.5 U	0.15 J	0.5 U
	AMW-53A	NA	19	1.2	32	3.7	0.69	0.34 J	0.5 U

Table 3-3b. Summary of Chromium and Selected VOC Concentrations in Groundwater Samples — Fall 2020

Well Group	Well	Chromium	TCE	PCE	CFC-11	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	BDCM
Proximal Source Wells	**MW-10B**	32.1	**8.9**	0.71	0.5 U	0.5 U	0.08 J	0.5 U	0.5 U
	MW-10C	57.9	1.3	0.44 J	1.3	0.5 U	0.5 U	0.5 U	0.13 J
	MW-2A	**601**	NA	NA	NA	NA	NA	NA	NA
	MW-2B	NA	2.5	0.3 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	MW-4A	**556**	1.8	0.44 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	MW-4B	**318**	NA	NA	NA	NA	NA	NA	NA
	MW-6A	**149**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	MW-6B	14.9	4.2	0.4 J	2	0.31 J	0.5 U	0.13 J	0.5 U
	MW-7B	NA	**6.3**	0.63	1.1	0.19 J	0.5 U	0.19 J	0.5 U
	MW-9C	NA	1.2	0.6	1.9	0.14 J	0.5 U	0.5 U	0.5 U
	PW-1B	31.9	2.2	0.29 J	0.27 J	0.5 U	0.5 U	0.5 U	0.5 U
Troutdale Wells	AMW-24	NA	**5.7**	0.1 J	0.28 J	0.11 J	0.5 U	**1.1**	0.5 U
	BENNETT	NA	1.3	0.5 U	0.5 U	0.5 U	0.5 U	0.25 J	0.5 U
	MW-33	NA	3.5	0.13 J	0.5 U	0.5 U	0.29 J	0.66	0.5 U
Cleanup or Guidance Level		80	5	5	2,400	200	1	1	70

NOTES:

Only commonly detected VOCs are included in this table
Active extraction wells shown are in **bold.** Well MW-20D was turned off 8 May 2020. Well MW-22D was turned off 21 September 2020.
Results are in micrograms per liter (µg/L).
Results in **blue bold** exceed the established cleanup or guidance level for the compound.
The concentrations listed in the table are the maximum of the primary and duplicate samples (as applicable).

1,1,1-TCA	=	1,1,1-Tricholoroethane
1,1-DCE	=	1,1-Dichloroethene
BDCM	=	Bromodichloromethane.
CFC-11	=	Trichlorofluoromethane.
Cis-1,2-DCE	=	cis-1,2-Dichloroethene.
J	=	The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.
NA	=	The sample was not analyzed for the specified compound.
PCE	=	Tetrachloroethene.
TCE	=	Trichloroethene.
U	=	Analyte not detected above the specified reporting limit.

TABLE 5-1. CLOSURE MONITORING PROGRAM WELLS

Well Name	No longer Impacted by Treatment System/Under Steady State Conditions ? [1]	Remediation Phase Complete for VOCs?	VOCs Not Completing Remediation Phase (# needed)	Currently Ready for Attainment Monitoring of VOCs?	Remediation Phase Complete for Chromium?	Currently Ready for Attainment Monitoring of Chromium?
Upgradient						
AMW-8A	No	NA		No	No	NA
TCE Source Area [2]						
AMW-1A	No	No	Trichloroethylene (4)	No	NA	NA
AMW-1B	No	Yes		No	NA	NA
AMW-1C	No	Yes		No	NA	NA
AMW-2A	No	No	Trichloroethylene (4)	No	NA	NA
AMW-2B	No	Yes		No	NA	NA
AMW-3A	Yes	Yes		Yes	NA	NA
AMW-4A	Yes	No	Bromodichloromethane (2)	No	NA	NA
AMW-12A	No	No	Trichloroethylene (4)	No	NA	NA
AMW-13A	No	Yes		No	NA	NA
AMW-19A	No	Yes		No	NA	NA
AMW-26	No	Yes		No	NA	NA
AMW-52A	No	Yes		No	NA	NA
AMW-53A	No	No	Trichloroethylene (4)	No	NA	NA
AMW-54A	Yes	Yes		Yes	NA	NA
AMW-55A	Yes	Yes		Yes	NA	NA
AMW-56A	Yes	Yes		Yes	NA	NA
MW-1A	No	No	Trichloroethylene (3)	No	NA	NA
MW-1B	No	Yes		No	NA	NA
MW-1C	No	Yes		No	NA	NA
Proximal						
AMW-58	No	Yes		No	NA	NA [3]
MW-2A	No	Yes		No	No	No
MW-2B	No	Yes		No	Yes	No
MW-2C	No	Yes		No	NA	NA [3]
MW-3A	No	NA		NA [3]	No	No
MW-3B	No	Yes		No	Yes	No
MW-3C	No	Yes		No	Yes	No
MW-4A	No	Yes		No	No	No
MW-4B	No	Yes		No	No	No
MW-4BSHED	No	No	Trichloroethylene (1)	No	Yes	No
MW-4C	No	Yes		No	Yes	No
MW-6A	No	Yes		No	No	No
MW-6B	No	Yes		No	Yes	No
MW-6C	No	Yes		No	Yes	No

TABLE 5-1. CLOSURE MONITORING PROGRAM WELLS

Well Name	No longer Impacted by Treatment System/Under Steady State Conditions ? [1]	Remediation Phase Complete for VOCs?	VOCs Not Completing Remediation Phase (# needed)	Currently Ready for Attainment Monitoring of VOCs?	Remediation Phase Complete for Chromium?	Currently Ready for Attainment Monitoring of Chromium?
MW-6D	No	Yes		No	Yes	No
MW-7B	No	No	Trichloroethylene (4)	No	Yes	No
MW-7C	No	Yes		No	Yes	No
MW-8B	No	Yes		No	Yes	No
MW-9B	No	Yes		No	Yes	No
MW-9C	No	No	Trichloroethylene (1)	No	NA	NA [3]
MW-10B	No	No	Trichloroethylene (4)	No	Yes	No
MW-10C	No	Yes		No	Yes	No
MW-12C	No	Yes		No	Yes	No
MW-13C	No	Yes		No	Yes	No
PW-1B	No	Yes		No	Yes	No
Intermediate						
AMW-59	No	No	1,1-Dichloroethylene (4), Trichloroethylene (2)	No	NA	NA [3]
AMW-60	No	No	1,1-Dichloroethylene (4)	No	NA	NA [3]
CPU-14	No	No	Trichloroethylene (3)	No	Yes	No
MW-14C	No	No	Trichloroethylene (1)	No	Yes	No
MW-14E	No	No	1,1-Dichloroethylene (4), Trichloroethylene (1)	No	Yes	No
MW-15E	No	Yes		No	Yes	No
MW-18D	No	Yes		No	No	No
MW-18E	No	Yes		No	Yes	No
MW-19D	No	No	Trichloroethylene (4)	No	No	No
MW-20D	No	No	1,1-Dichloroethylene (1), Trichloroethylene (4)	No	Yes	No
MW-40	No	Yes		No	No	No
PZ-39	No	No	1,1-Dichloroethylene (4), Trichloroethylene (4)	No	NA	NA [3]
Church of God						
AMW-27	Yes	Yes		Yes	Yes	Yes
AMW-61	Yes	No	Trichloroethylene (4)	No	No	No
CPU-12	Yes	Yes		Yes	Yes	Yes
CPU-13	Yes	Yes		Yes	Yes	Yes
MW-22D	No	Yes		No	Yes	No
MW-25D	Yes	Yes		Yes	Yes	Yes
MW-26D	Yes	Yes		Yes	Yes	Yes
MW-27D	Yes	Yes		Yes	Yes	Yes
MW-49	Yes	Yes		Yes	Yes	Yes
Toe of Plume						

TABLE 5-1. CLOSURE MONITORING PROGRAM WELLS

Well Name	No longer Impacted by Treatment System/Under Steady State Conditions ? (1)	Remediation Phase Complete for VOCs?	VOCs Not Completing Remediation Phase (# needed)	Currently Ready for Attainment Monitoring of VOCs?	Remediation Phase Complete for Chromium?	Currently Ready for Attainment Monitoring of Chromium?
AMW-42	Yes	Yes		Yes	Yes	Yes
MW-41	Yes	Yes		Yes	Yes	Yes
MW-48	Yes	Yes		Yes	NA	NA [3]
Troutdale						
AMW-24	Yes	No	Trichloroethylene (4)	No	NA	NA [3]
BENNETT	Yes	Yes		Yes	NA	NA [3]
MW-33	Yes	No	Trichloroethylene (1)	No	NA	NA [3]

Notes:

Table 5-4 presents attainment status for wells currently in attainment monitoring.

COC = Contaminant of Concern identified for the Site

NA = Not Applicable

VOC = Volatile organic compound

(1) Implies the well is no longer influenced by nearby extraction wells or by discharge to the infiltration gallery, and that groundwater at the well has achieved post-remediation steady-state conditions, and is not undergoing in-situ remediation.

(2) Chromium is not a contaminant of concern (COC) for TCE Source Area wells

(3) Designated as NA since contaminant(s) never exceeded cleanup level.

Per the Closure Monitoring Plan, the determination of whether Remediation Phase is Complete is based on analysis of the most recent four samples for each COC.

Shaded cells indicate wells ready for attainment monitoring

TABLE 5-2. WELLS AND RECOMMENDED SAMPLING FREQUENCIES

Well Name	Well Type	TCE Annual Evaluation (Last 4 Samples)								Never Exceeded Cleanup Level for VOCs?	Chromium Annual Evaluation (Last 4 Samples)							Never Exceeded Cleanup Level for Cr?	2020 Sampling Frequency [1]		2021 Sampling Frequency Recommendations and When Sampled Next[2]		Well Use / Rationale for Recommendation
		Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Consecutive Samples < Cleanup Goal	Remediation Monitoring Phase Complete for TCE? [3]	Remediation Phase Complete for all VOCs? [3]		Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Consecutive Samples < Cleanup Goal	Remediation Monitoring Phase Complete for Chromium? [3]		VOCs	Cr	VOCs	Cr	
Closure Monitoring Program Wells																							
Upgradient Wells																							
AMW-8A	M	10/2014	10/2019	0.22	0.46	0.32	4	YES	YES		04/1995	10/1995	U	U	U	2	NA		Biennial 2021	NA	Biennial 2021	NA	TCE background well
TCE Source Wells																							
AMW-1A	M	10/2018	04/2020	9.20	46.00	9.20	None	NO	NO										Semiannual	NA	**Quarterly**	NA	OU-2 well; well cluster. Increased monitoring for 2021 to assess progress of in-situ remediation.
AMW-1B	M	01/2009	10/2010	0.45	0.51	0.45	4	YES	YES										On Hold	NA	On Hold	NA	OU-2 well; remediation monitoring complete
AMW-1C	M	10/2007	10/2009	U	U	U	4	YES	YES										On Hold	NA	On Hold	NA	OU-2 well; remediation monitoring complete
AMW-2A	M	10/2018	04/2020	4.80	37.00	37.00	None	NO	NO										Semiannual	NA	**Quarterly**	NA	OU-2 well; well cluster. Increased monitoring for 2021 to assess progress of in-situ remediation.
AMW-2B	M	10/2012	10/2015	0.34	0.41	0.41	4	YES	YES										On Hold	NA	On Hold	NA	OU-2 well; well cluster - remediation monitoring complete
AMW-3A	M	10/2015	10/2019	0.53	0.72	0.63	4	YES	YES										On Hold	NA	On Hold	NA	OU-2 well; remediation monitoring complete for VOCs
AMW-4A	M	10/2017	10/2020	U	0.11	U	4	YES	NO										Annual	NA	Annual	NA	OU-2 well; remediation monitoring for VOCs
AMW-12A	M	04/2019	10/2020	12.00	21.00	12.00	None	NO	NO										Semiannual	NA	**Quarterly**	NA	OU-2 well; remediation monitoring for VOCs. Increased monitoring for 2021 to assess progress of in-situ remediation.
AMW-13A	M	10/2012	10/2015	0.17	0.26	0.26	4	YES	YES										On Hold	NA	On Hold	NA	OU-2 well; remediation monitoring complete
AMW-19A	M	10/2013	10/2017	1.10	1.40	1.30	4	YES	YES										Every 5 years 2022	NA	Every 5 years 2022	NA	OU-2 boundary well
AMW-26	M	10/2010	10/2017	0.24	4.30	4.30	4	YES	YES										Every 5 years 2022	NA	Every 5 years 2022	NA	OU-2 boundary well
AMW-52A	M	10/2012	10/2015	U	0.32	0.32	4	YES	YES										On Hold	NA	On Hold	NA	OU-2 well; remediation monitoring complete
AMW-53A	M	05/2019	10/2020	11.00	19.00	19.00	None	NO	NO										Semiannual	NA	**Quarterly**	NA	OU-2 well; remediation monitoring for VOCs. Increased monitoring for 2021 to assess progress of in-situ remediation.
AMW-54A	M	10/2013	10/2017	1.80	3.00	2.10	4	YES	YES										Every 5 years 2022	Every 5 years 2022	Every 5 years 2022	Every 5 years 2022	OU-2 boundary well; remediation and attainment monitoring complete
AMW-55A	M	10/2012	10/2015	1.00	1.30	1.00	4	YES	YES										NFS	NA	NFS	NA	OU-2 well; remediation and attainment monitoring complete
AMW-56A	M	10/2013	10/2017	1.70	3.70	3.70	4	YES	YES										Every 5 years 2022	NA	Every 5 years 2022	NA	OU-2 boundary well; remediation and attainment monitoring complete
MW-1A	M	10/2018	04/2020	4.80	65.00	4.80	1	NO	NO										Semiannual	NA	**Quarterly**	NA	OU-2 well; remediation monitoring for VOCs. Increased monitoring for 2021 to assess progress of in-situ remediation.
MW-1B	M	10/2006	10/2009	U	0.29	0.28	4	YES	YES										On Hold	NA	On Hold	NA	OU-2 well; remediation monitoring complete; well cluster
MW-1C	M	10/2006	10/2009	U	U	U	4	YES	YES										On Hold	NA	On Hold	NA	OU-2 well; remediation monitoring complete; well cluster
Proximal Wells																							
AMW-58	M	10/2006	10/2012	U	1.90	0.10	4	YES	YES		04/2006	10/2010	2.60	34.70	3.60	4	NA	X	On Hold	NA	On Hold	NA	Remediation monitoring complete for VOCs; Cr never exceeded cleanup level
MW-2A	M	10/2011	10/2016	1.70	1.90	1.70	4	YES	YES		10/2017	10/2020	40.40	601.00	601.00	None	NO		On Hold	Annual	On Hold	Annual	Well cluster - remediation monitoring for Cr; remediation monitoring complete for VOCs.
MW-2B	M	10/2017	10/2020	1.10	2.50	2.50	4	YES	YES		10/2002	10/2009	U	9.60	9.60	4	YES		Annual	On Hold	Annual	On Hold	Well cluster - remediation monitoring complete
MW-2C	M	10/2002	10/2009	0.36	3.30	0.36	4	YES	YES		10/2002	10/2009	U	11.60	U	4	NA	X	On Hold	NA	On Hold	NA	Well cluster - remediation monitoring complete for TCE; Cr never exceeded cleanup level
MW-3A	M	05/2004	10/2008	0.23	0.91	0.23	4	NA	NA	X	10/2014	10/2019	63.60	149.00	105.00	None	NO		NA	Biennial 2021	NA	**Quarterly**	Well cluster - remediation monitoring for Cr; VOCs never exceeded cleanup level. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-3B	M	10/2010	10/2016	1.40	2.00	1.40	4	YES	YES		10/2002	10/2009	U	10.40	U	4	YES		On Hold	On Hold	On Hold	On Hold	Well cluster - remediation monitoring complete
MW-3C	M	10/2004	10/2019	1.00	3.80	1.00	4	YES	YES		05/1995	10/2004	4.40	7.65	6.10	4	YES		On Hold	On Hold	On Hold	On Hold	Well cluster - not optimal depth; remediation monitoring complete for VOCs and Cr
MW-4A	M	10/2017	10/2020	1.80	3.90	1.80	4	YES	YES		10/2017	10/2020	226.00	556.00	556.00	None	NO		Annual	Annual	Annual	**Quarterly**	Well cluster - not optimal depth; remediation monitoring for VOCs and Cr. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-4B	M	10/2011	10/2016	3.10	4.60	3.10	4	YES	YES		10/2017	10/2020	318.00	561.00	318.00	None	NO		On Hold	Annual	On Hold	**Quarterly**	Well cluster - remediation monitoring complete for VOCs; remediation monitoring for Cr. Increasing frequency of Cr monitoring to measure impacts of system shut down.

TABLE 5-2. WELLS AND RECOMMENDED SAMPLING FREQUENCIES

Well Name	Well Type	TCE Annual Evaluation (Last 4 Samples)								Never Exceeded Cleanup Level for VOCs?	Chromium Annual Evaluation (Last 4 Samples)							Never Exceeded Cleanup Level for Cr?	2020 Sampling Frequency [1]		2021 Sampling Frequency Recommendations and When Sampled Next[2]		Well Use / Rationale for Recommendation
		Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Consecutive Samples < Cleanup Goal	Remediation Monitoring Phase Complete for TCE? [3]	Remediation Phase Complete for all VOCs? [3]		Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Consecutive Samples < Cleanup Goal	Remediation Monitoring Phase Complete for Chromium? [3]		VOCs	Cr	VOCs	Cr	
MW-4BShed	M	10/2004	10/2019	1.50	5.20	1.50	3	NO	NO		04/2013	10/2018	46.00	68.30	46.00	4	YES		Biennial 2021	On Hold	Biennial 2021	On Hold	Well cluster - remediation monitoring complete for Cr; remediation monitoring for VOCs
MW-4C	M	10/2009	10/2019	1.70	3.80	1.70	4	YES	YES		10/2009	10/2019	41.60	68.70	68.70	4	YES		On Hold	On Hold	On Hold	**Quarterly**	Well cluster - not optimal depth; remediation monitoring complete for VOCs and Cr. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-6A	M	10/1997	10/2020	U	U	U	4	YES	YES		10/2017	10/2020	20.10	149.00	149.00	None	NO		Annual	Annual	Annual	**Quarterly**	Well cluster - not optimal depth; remediation monitoring complete for VOCs, remediation monitoring for Cr. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-6B	E	10/2017	10/2020	2.10	4.20	4.20	4	YES	YES		10/2017	10/2020	8.70	14.90	14.90	4	YES		Annual	Annual	Annual	**Quarterly**	Extraction well - inactive; remediation monitoring complete (also well cluster, previously most impacted). Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-6C	M	10/2009	10/2019	U	0.54	0.35	4	YES	YES		10/2002	10/2009	U	22.90	U	4	YES		On Hold	On Hold	On Hold	On Hold	Well cluster - not optimal depth; remediation monitoring complete for Cr and VOCs
MW-6D	M	10/2009	10/2019	U	4.30	1.80	4	YES	YES		05/1999	10/2009	6.10	29.80	29.80	4	YES		On Hold	On Hold	On Hold	On Hold	Well cluster - not optimal depth; remediation monitoring complete for Cr and VOCs
MW-7B	M	10/2017	10/2020	3.10	6.30	6.30	None	NO	NO		04/1995	10/2009	U	72.60	U	4	YES		Annual	On Hold	Annual	On Hold	Well cluster - adjacent to MW-4 cluster; remediation monitoring complete for Cr
MW-7C	M	05/1995	10/2009	0.18	3.00	0.18	4	YES	YES		05/1995	10/2009	6.50	13.50	12.30	4	YES		On Hold	On Hold	On Hold	On Hold	Well cluster - remediation monitoring complete
MW-8B	M	10/2010	10/2017	1.80	3.30	1.80	4	YES	YES		05/1999	10/2008	U	13.00	7.30	4	YES		On Hold	On Hold	On Hold	On Hold	Remediation monitoring complete
MW-9B	M	10/2012	10/2017	2.00	3.70	2.00	4	YES	YES		10/1999	10/2008	U	25.30	3.60	4	YES		On Hold	On Hold	On Hold	**Quarterly**	Well cluster - previously most TCE impacted; Remediation monitoring complete. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-9C	M	10/2017	10/2020	1.20	5.80	1.20	3	NO	NO		10/1997	10/2009	4.10	65.40	65.40	4	NA	X	Annual	NA	Annual	NA	Well cluster - not optimum depth; remediation monitoring for VOCs; Cr never exceeded cleanup level
MW-10B	E	04/2019	10/2020	6.80	8.90	8.90	None	NO	NO		10/2017	10/2020	25.20	32.10	32.10	4	YES		Semiannual	Annual	Semiannual	Annual	Extraction well - inactive (also well cluster); remediation monitoring complete for Cr
MW-10C	E	10/2017	10/2020	1.20	1.30	1.30	4	YES	YES		10/2017	10/2020	53.60	62.30	57.90	4	YES		Annual	Annual	Annual	Annual	Extraction well - inactive (also well cluster); remediation monitoring complete
MW-12C	M	10/2014	10/2019	0.63	0.89	0.63	4	YES	YES		10/2007	10/2010	U	4.50	U	4	YES		Biennial 2021	On Hold	Biennial 2021	On Hold	TCE Plume boundary; remediation monitoring complete for VOCs and Cr
MW-13C	M	10/2016	10/2019	2.20	3.70	2.50	4	YES	YES		10/2007	10/2010	27.50	35.40	27.50	4	YES		Biennial 2021	On Hold	Biennial 2021	On Hold	TCE Plume boundary; remediation monitoring complete for VOCs and Cr
PW-1B	E	10/2017	10/2020	2.20	3.70	2.20	4	YES	YES		10/2017	10/2020	25.10	31.90	31.90	4	YES		Annual	Annual	Annual	Annual	Extraction well - inactive; remediation monitoring complete
Intermediate Wells																							
AMW-59	E/O	10/2019	10/2020	4.10	45.00	4.10	1	NO	NO		10/2009	10/2020	U	100.00	19.20	1	NA	X	Semiannual	NA	Semiannual	**Semiannual**	Plume area - silt well; remediation monitoring for VOCs and Cr. Increased frequency to monitor in-situ performance.
AMW-60	M	10/2017	10/2020	U	0.40	0.40	4	YES	NO		11/2004	10/2009	U	23800.00	2.10	3	NA	X	Annual	NA	Annual	NA	Silt well, remediation monitoring for VOCs, Cr never exceeded cleanup level
CPU-14	M	10/2017	10/2020	3.70	5.10	3.70	1	NO	NO		10/2012	04/2015	U	53.60	U	4	YES		Annual	On Hold	**Semiannual**	On Hold	Plume boundary; remediation monitoring for VOCs, remediation monitoring complete for Cr
MW-14C	E/M[4]	10/2019	10/2020	2.40	5.90	2.40	3	NO	NO		10/2019	10/2020	10.20	73.80	10.20	4	YES		Semiannual	Annual	Semiannual	Annual	Extraction well - inactive, (also well cluster); remediation monitoring for VOCs, remediation monitoring complete for Cr
MW-14E	E/M[4]	10/2019	10/2020	6.70	39.00	9.20	None	NO	NO		10/2019	10/2020	27.50	173.00	173.00	None	NO		Semiannual	Annual	Semiannual	**Semiannual**	Extraction well - inactive, (also well cluster); remediation monitoring for VOCs and Cr
MW-15E	M	10/2015	10/2019	1.40	2.50	1.40	4	YES	YES		10/2002	10/2008	3.30	17.30	3.30	4	YES		Biennial 2021	On Hold	Biennial 2021	On Hold	Remediation monitoring complete; monitoring potential Northern Plume impacts, but none noted to date
MW-18D	E/M	10/2019	10/2020	2.90	4.80	3.10	4	YES	YES		10/2019	10/2020	15.80	89.80	15.80	1	NO		Semiannual	Semiannual	Semiannual	Semiannual	Extraction well - inactive; remediation monitoring for VOCs and Cr
MW-18E	E/O	04/2019	10/2020	0.24	1.80	0.24	4	YES	YES		04/2019	10/2020	U	69.20	2.90	4	YES		Semiannual	On Hold	Semiannual	On Hold	Plume area - remediation monitoring for VOCs, remediation monitoring complete for Cr
MW-19D	E/M[4]	10/2019	10/2020	3.50	45.00	45.00	None	NO	NO		10/2019	10/2020	38.40	171.00	38.40	1	NO		Semiannual	Semiannual	Semiannual	Semiannual	Extraction well - inactive, remediation monitoring for VOCs, Cr
MW-20D	E	04/2019	10/2020	12.00	20.00	12.00	None	NO	NO		10/2017	10/2020	40.70	59.90	59.90	4	YES		Semiannual	Annual	Semiannual	**Semiannual**	Extraction well - inactive; remediation monitoring for VOCs, remediation monitoring complete for Cr. Increased frequency to monitor in-situ performance.
MW-38	M	10/2017	10/2020	9.50	28.00	12.00	None	NO	NO		10/2020	10/2020	4.70	4.70	4.70	1	NA		Annual	NA	**Semiannual**	NA	Northern Plume monitring well
MW-40	M	10/2008	10/2019	0.30	1.20	0.30	4	YES	YES		10/2017	10/2020	33.50	103.00	103.00	None	NO		On Hold	Annual	On Hold	Annual	Remediation monitoring for Cr, remediation monitoring complete for VOCs

TABLE 5-2. WELLS AND RECOMMENDED SAMPLING FREQUENCIES

Well Name	Well Type	TCE Annual Evaluation (Last 4 Samples)								Never Exceeded Cleanup Level for VOCs?	Chromium Annual Evaluation (Last 4 Samples)							Never Exceeded Cleanup Level for Cr?	2020 Sampling Frequency [1]		2021 Sampling Frequency Recommendations and When Sampled Next[2]		Well Use / Rationale for Recommendation
		Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Consecutive Samples < Cleanup Goal	Remediation Monitoring Phase Complete for TCE? [3]	Remediation Phase Complete for all VOCs? [3]		Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Consecutive Samples < Cleanup Goal	Remediation Monitoring Phase Complete for Chromium? [3]		VOCs	Cr	VOCs	Cr	
PZ-39	M	10/2017	10/2020	19.00	42.00	42.00	None	NO	NO		10/1999	10/2020	U	11.00	3.20	4	NA	X	Annual	NA	**Semiannual**	**Semiannual**	Monitoring for Northern Plume impacts; VOC concentrations decreasing; Cr never exceeded cleanup level. Increased frequency to monitor in-situ performance.
Church of God Wells																							
AMW-27	E/M	04/2015	10/2016	3.00	4.20	3.00	4	YES	YES		01/2013	10/2014	U	15.80	U	4	YES		On Hold	NFS	On Hold	NFS	Plume area - silt well; remediation monitoring for VOCs and Cr
AMW-61	M	10/2017	10/2020	5.10	7.40	6.20	None	NO	NO		11/2004	10/2017	17.30	1410.00	39.70	3	NO		Annual	Every 5 years 2022	Annual	**Annual**	Silt well, remediation monitoring for VOCs and Cr
CPU-12	M	10/2015	10/2019	2.20	2.90	2.90	4	YES	YES		10/2017	10/2020	3.30	8.00	7.00	4	YES		Biennial 2021	Annual	Biennial 2021	Annual	Plume boundary; remediation monitoring for VOCs, remediation monitoring complete for Cr
CPU-13	E/O	04/2013	10/2014	0.92	1.20	0.94	4	YES	YES		04/2013	10/2014	25.30	54.80	45.70	4	YES		NFS	NFS	NFS	NFS	Extraction well - inactive, (also well cluster); remediation monitoring for VOCs, remediation monitoring complete for Cr
MW-21D	E/O	04/2019	10/2020	0.31	15.00	0.31	1	NO	NO		10/2017	10/2020	6.10	14.60	14.60	4	YES		Semiannual	Annual	Semiannual	Annual	Extraction well - not pumping as of June 2018; remediation monitoring complete for Cr; remediation monitoring for VOCs; monitor TCE for **Northern Plume** impacts
MW-22D	E	10/2017	10/2020	1.50	1.70	1.60	4	YES	YES		10/2017	10/2020	13.50	66.70	66.70	4	YES		Annual	Annual	**Semiannual**	**Semiannual**	Inactive extraction well. Monitoring for impacts from insitu treatment.
MW-25D	E/O	10/2012	10/2014	1.30	3.00	1.70	4	YES	YES		10/2012	10/2014	2.70	6.30	6.30	4	YES		NFS	NFS	NFS	NFS	Former extraction well; remediation and attainment monitoring complete. No further sampling.
MW-26D	E/O	10/2012	10/2014	0.35	2.10	0.35	4	YES	YES		10/2012	10/2014	7.00	38.60	11.40	4	YES		NFS	NFS	NFS	NFS	Former extraction well; remediation and attainment monitoring complete. No further sampling.
MW-27D	E/M	10/2011	10/2014	0.63	1.50	1.50	4	YES	YES		10/2011	10/2014	U	12.20	U	4	YES		NFS	NFS	NFS	NFS	Former extraction well; remediation and attainment monitoring complete. No further sampling.
MW-49	E/O	10/2012	10/2014	1.10	1.70	1.60	4	YES	YES		10/2012	10/2014	9.30	12.20	12.20	4	YES		NFS	NFS	NFS	NFS	Former extraction well; remediation and attainment monitoring complete. No further sampling.
Toe Wells																							
AMW-42	M	10/2009	10/2014	0.65	1.30	0.65	4	YES	YES		10/2009	10/2014	U	21.30	U	4	YES		NFS	NFS	NFS	NFS	Remediation monitoring for Cr, remediation monitoring complete for VOCs
MW-31	E	10/2008	10/2012	0.20	0.36	0.26	4	YES	YES		10/2008	10/2012	8.10	12.90	11.40	4	YES		NFS	NFS	NFS	NFS	Monitoring for Northern Plume impacts; VOC concentrations decreasing; Cr never exceeded cleanup level
MW-35	E/M	10/2015	04/2017	3.00	3.70	3.60	4	YES	YES		10/2012	04/2015	U	29.30	U	4	YES		NFS	NFS	NFS	NFS	Decommissioned 2017
MW-41	E/M	10/2010	10/2017	U	U	U	4	YES	YES		10/2010	10/2017	U	U	U	4	YES		Every 5 years 2022	Every 5 years 2022	**Discontinue**	**Discontinue**	Attainment monitoring complete for TCE and Cr. EPA request for sampling every 5 years to support Toe-of-Plume Pilot Study.
MW-48	M	10/2006	10/2009	U	U	U	4	YES	YES		10/2006	10/2009	4.00	35.00	35.00	4	NA	X	NFS	NA	NFS	NA	Remediation and attainment monitoring complete; Cr never exceeded cleanup level
Troutdale Wells																							
AMW-24	M/D	10/2017	10/2020	5.70	7.80	5.70	None	NO	NO		10/2011	10/2014	3.50	13.60	13.60	4	NA	X	Annual	NA	Annual	NA	Troutdale well - TCE impacted; Cr never exceeded cleanup level
MW-33	M/D	10/2017	10/2020	3.50	5.10	3.50	3	NO	NO		10/2011	10/2014	1.90	3.20	2.20	4	NA	X	Annual	NA	Annual	NA	Troutdale well - TCE impacted; Cr never exceeded cleanup level
BENNETT	Other	10/2017	10/2020	0.90	1.70	1.30	4	YES	YES		10/2014	04/2017	U	U	U	4	NA	X	Annual	NA	Annual	NA	Troutdale well - remediation monitoring complete for TCE; Cr never exceeded cleanup level
Wells Excluded from Closure Monitoring Program																							
Northern Plume Wells																							
AMW-16	M	04/2019	10/2020	23.00	39.00	23.00	0	NA	NA									X	Semiannual	NA	Semiannual	NA	Northern Plume monitoring well
AMW-17	M/D	04/2019	10/2020	48.00	66.00	48.00	0	NA	NA									X	Semiannual	NA	Semiannual	NA	Northern Plume monitoring well
AMW-18	M	04/2019	10/2020	16.00	20.00	16.00	0	NA	NA									X	Semiannual	NA	Semiannual	NA	Northern Plume monitoring well
AMW-23	M	10/2019	10/2020	U	U	U	4	NA	NA									X	Annual	NA	Annual	NA	Northern Plume monitoring well
AMW-64	M	04/2019	10/2020	7.10	11.00	7.10	0	NA	NA									X	Semiannual	NA	Semiannual	NA	Northern Plume monitoring well
MW-23D	M	04/2019	10/2020	83.00	150.00	83.00	0	NA	NA										Semiannual	NA	Semiannual	NA	Northern Plume monitoring well
Toe Wells																							
AMW-63	M	10/2009	10/2017	U	U	U	4	NA	NA	X	10/2009	10/2017	-	-	-	-	NA	X	Every 5 years 2022	Every 5 years 2022	**Discontinue**	**Discontinue**	TCE and Cr below cleanup levels. EPA request for sampling every 5 years to support Toe-of-Plume Pilot Study.
Infiltration Gallery Wells																							
AMW-6A	M/D	10/2014	10/2019	0.10	0.26	0.10	4	YES	YES	X	10/2014	10/2019	3.60	10.50	10.50	4	YES	X	Biennial 2021	Biennial 2021	Biennial 2021	Biennial 2021	Infiltration gallery monitoring well-discontinue after 2021 event
AMW-7A	M/D	10/2014	10/2019	U	0.21	U	4	YES	YES	X	10/2014	10/2019	0.70	2.10	2.10	4	YES	X	Biennial 2021	Biennial 2021	Biennial 2021	Biennial 2021	Infiltration gallery monitoring well-discontinue after 2021 event

TABLE 5-2. WELLS AND RECOMMENDED SAMPLING FREQUENCIES

Well Name	Well Type	TCE Annual Evaluation (Last 4 Samples)								Never Exceeded Cleanup Level for VOCs?	Chromium Annual Evaluation (Last 4 Samples)							Never Exceeded Cleanup Level for Cr?	2020 Sampling Frequency [1]		2021 Sampling Frequency Recommendations and When Sampled Next[2]		Well Use / Rationale for Recommendation
		Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Consecutive Samples < Cleanup Goal	Remediation Monitoring Phase Complete for TCE? [3]	Remediation Phase Complete for all VOCs? [3]		Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Consecutive Samples < Cleanup Goal	Remediation Monitoring Phase Complete for Chromium? [3]		VOCs	Cr	VOCs	Cr	
AMW-10A	M/D	10/2014	10/2019	U	0.14	U	4	YES	YES	X	10/2014	10/2019	3.70	8.30	5.70	4	YES	X	Biennial 2021	Biennial 2021	Biennial 2021	Biennial 2021	Infiltration gallery monitoring well-discontinue after 2021 event
AMW-11A	M/D	10/2014	10/2019	U	0.27	U	4	YES	YES	X	10/2014	10/2019	1.20	3.80	3.80	4	YES	X	Biennial 2021	Biennial 2021	Biennial 2021	Biennial 2021	Infiltration gallery monitoring well-discontinue after 2021 event

NOTES:

The rationale for changing wells from NFS (2016 recommendation) to "On Hold" or "Every 5 Years" is presented in Section 5.

Bold text indicates changes in 2021 for recommendations for sampling frequency.

[1] The 2020 sampling frequencies shown are those recommended in the 2019 Annual Status Report for the Boomsnub/Airco Superfund Site.

[2] A summary of all 2021 recommended sampling frequencies is provided in Table 5-4.

[3] The "Remediation Monitoring Phase is Completed" determinations are per EPA Guidance (EPA 2013) based on the most recent four sample data points for each COC. The remediation monitoring phase is completed when the last four sample concentrations are lower than the cleanup level.

[4] The pumps in wells MW-14C and MW14E were turned off and removed on 10/16/2019; and the pump in well MW-19D was turned off and removed 10/14/2019.

COC = Contaminant of Concern.
Cr = Chromium.
E = Extraction well.
E/M = Extraction well with pump pulled; now sampled as a monitoring well.
E/O = Extraction well with pump turned off; pump is turned on for sampling.
EPA = U.S. Environmental Protection Agency.
M = Monitoring well.
M/D = Monitoring well with dedicated pump installed.
NA = Not applicable.
NFS = No further sampling (closure monitoring complete, or for a well excluded from closure monitoring, further sampling determined to be unnecessary)
TCE = Trichloroethene.
U = Analyte not detected above the reporting limit.
= Indicates a change in sampling frequency.
µg/L = Micrograms per liter.
VOC = Volatile organic compound.
X = Never exceeded cleanup level

Biennial sampling (every 2 years) - these wells will be sampled next in Fall 2021.
Every 5 years - these wells will be sampled next in Fall 2022.
On Hold - sampling on hold pending attainment monitoring; no sampling planned for 2021.
Wells not included in the Closure Monitoring Program and not determined to require sampling for another purpose have been deleted from this table.
Where no entries are present for one of the two constituents (TCE or Cr) for a given well, that constituent is not a COC for and has not been sampled in the well.
TCE summary data are presented as a representation of all VOCs.

TABLE 5-3. ATTAINMENT MONITORING STATUS

Well Name	Ready for Attainment Monitoring?	Attainment Phase Complete for VOCs?	VOCs Not Completing Attainment Phase (# Results needed)	Attainment Phase Complete for Chromium? (# Results Needed)
Upgradient				
AMW-8A	No			NA
TCE Source Area [(2)]				
AMW-1A	No			NA
AMW-1B	No			NA
AMW-1C	No			NA
AMW-2A	No			NA
AMW-2B	No			NA
AMW-3A	**Yes**	No	Bromodichloromethane (4) Chlorodibromomethane (4)	NA
AMW-4A	No			NA
AMW-12A	No			NA
AMW-13A	No			NA
AMW-54A	**Yes**	**Yes**		NA
AMW-55A	**Yes**	**Yes**		NA
AMW-56A	**Yes**	**Yes**		NA
MW-1A	No			NA
MW-1B	No			NA
MW-1C	No			NA
Proximal				
AMW-58	No			
MW-4A	No			
MW-4B	No			
MW-4BSHED	No			
MW-4C	No			
MW-6A	No			
MW-6B	No			
MW-6C	No			
MW-6D	No			
MW-7B	No			
MW-7C	No			
MW-8B	No			
MW-9B	No			
MW-9C	No			
MW-10B	No			
MW-10C	No			
MW-12C	No			
MW-13C	No			
PW-1B	No			

Intermediate				
AMW-59	No			
AMW-60	No			
CPU-14	No			
MW-14C	No			
MW-14E	No			
MW-15E	No			
MW-18D	No			
MW-18E	No			
MW-19D	No			
MW-20D	No			
MW-40	No			
PZ-39	No			
Church of God				
AMW-27	**Yes**	No	Trichloroethene (2)	4
AMW-61	No			
CPU-12	**Yes**	No	Trichloroethene (2)	Yes
CPU-13	**Yes**	**Yes**		**Yes**
MW-22D	No			
MW-25D	**Yes**	**Yes**		**Yes**
MW-26D	**Yes**	**Yes**		**Yes**
MW-27D	**Yes**	**Yes**		**Yes**
MW-49	**Yes**	**Yes**		**Yes**
Toe of Plume				
AMW-42	**Yes**	**Yes**		**Yes**
MW-41	**Yes**	**Yes**		**Yes**
MW-48	**Yes**	**Yes**		**Yes**
Troutdale				
AMW-24	No			
BENNETT	**Yes**	No	Trichloroethene (3)	NA
MW-33	No			

Notes:

[a] Chromium is not a COC for TCE Source Area wells.

Well names in bold have completed attainment monitoring

Per the Closure Monitoring Plan, the determination of whether Attainment Phase is complete is based on analysis of the most recent eight samples for each contaminant of concern.

NA = Not applicable

VOC = Volatile organic compound

TABLE 5-4. SUMMARY OF 2021 WELL SAMPLING FREQUENCIES

Well Name	Recommendation							Rationale for Recommendation
	Well Type	Quarterly	Semi-annual	Annual	Biennial[a]	Every 5 Years[b]	On Hold[c]	
Closure Monitoring Program Wells								
Upgradient Wells								
AMW-8A	M				VOCs			TCE background well
TCE Source Wells								
AMW-1A	M	VOCs, DO/ORP						OU-2 well; well cluster. Increased monitoring for 2021 to assess progress of in-situ remediation.
AMW-1B	M						VOCs	OU-2 well; remediation monitoring complete
AMW-1C	M						VOCs	OU-2 well; remediation monitoring complete
AMW-2A	M	VOCs, DO/ORP						OU-2 well; well cluster. Increased monitoring for 2021 to assess progress of in-situ remediation.
AMW-2B	M						VOCs	OU-2 well; well cluster - remediation monitoring complete
AMW-3A	M						VOCs	OU-2 well; remediation monitoring complete
AMW-4A	M			VOCs				OU-2 well; remediation monitoring complete Cr but not for VOCs
AMW-12A	M	VOCs, DO/ORP						OU-2 well; remediation monitoring for VOCs. Increased monitoring for 2021 to assess progress of in-situ remediation.
AMW-13A	M						VOCs	OU-2 well; remediation monitoring complete
AMW-19A	M					VOCs		OU-2 boundary well
AMW-26	M					VOCs		OU-2 boundary well
AMW-52A	M						VOCs	OU-2 well; remediation monitoring complete
AMW-53A	M	VOCs, DO/ORP						OU-2 well; remediation monitoring for VOCs. Increased monitoring for 2021 to assess progress of in-situ remediation.
AMW-54A	M					X		OU-2 boundary well; remediation and attainment monitoring complete
AMW-55A	M							OU-2 well; remediation and attainment monitoring complete
AMW-56A	M					VOCs		OU-2 well - well cluster; remediation and attainment monitoring completefor VOCs
MW-1A	M	VOCs, DO/ORP						OU-2 well; remediation monitoring for VOCs. Increased monitoring for 2021 to assess progress of in-situ remediation.
MW-1B	M						VOCs	OU-2 well; remediation monitoring complete; well cluster
MW-1C	M						VOCs	OU-2 well; remediation monitoring complete; well cluster
Proximal Wells								
AMW-58	M						VOCs	Remediation monitoring complete for VOCs; Cr never exceeded cleanup level
MW-2A	M			Cr			VOCs	Well cluster - remediation monitoring for Cr; remediation monitoring complete for VOCs.
MW-2B	M			VOCs			Cr	Well cluster - remediation monitoring complete
MW-2C	M						VOCs	Well cluster - remediation monitoring complete for TCE; Cr never exceeded cleanup level
MW-3A	M	Cr						Well cluster - remediation monitoring for Cr; VOCs never exceeded cleanup level. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-3B	M						X	Well cluster - remediation monitoring complete

TABLE 5-4. SUMMARY OF 2021 WELL SAMPLING FREQUENCIES

Well Name	Recommendation							Rationale for Recommendation
	Well Type	Quarterly	Semi-annual	Annual	Biennial[a]	Every 5 Years[b]	On Hold[c]	
MW-3C	M						X	Well cluster - not optimal depth; remediation monitoring complete for VOCs and Cr
MW-4A	M	Cr		VOCs				Well cluster - not optimal depth; remediation monitoring for VOCs and Cr. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-4B	M	Cr					VOCs	Well cluster - remediation monitoring complete for VOCs; remediation monitoring for Cr. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-4BSHED	M				VOCs		Cr	Well cluster - remediation monitoring complete for Cr; remediation monitoring for VOCs
MW-4C	M	Cr					VOCs	Well cluster - not optimal depth; remediation monitoring complete for VOCs and Cr. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-6A	M	Cr		VOCs				Well cluster - not optimal depth; remediation monitoring complete for VOCs, remediation monitoring for Cr. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-6B	E	Cr		VOCs				Extraction well - inactive; remediation monitoring complete (also well cluster, previously most impacted). Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-6C	M						X	Well cluster - not optimal depth; remediation monitoring complete for Cr and VOCs
MW-6D	M						X	Well cluster - not optimal depth; remediation monitoring complete for Cr and VOCs
MW-7B	M			VOCs			Cr	Well cluster - adjacent to MW-4 cluster; remediation monitoring complete for Cr
MW-7C	M						X	Well cluster - remediation monitoring complete
MW-8B	M						X	Remediation monitoring complete

TABLE 5-4. SUMMARY OF 2021 WELL SAMPLING FREQUENCIES

Well Name	Recommendation							Rationale for Recommendation
	Well Type	Quarterly	Semi-annual	Annual	Biennial[a]	Every 5 Years[b]	On Hold[c]	
MW-9B	M	Cr					VOCs	Well cluster - previously most TCE impacted; Remediation monitoring complete. Increasing frequency of Cr monitoring to measure impacts of system shut down.
MW-9C	M			VOCs				Well cluster - not optimum depth; remediation monitoring for VOCs; Cr never exceeded cleanup level
MW-10B	E		VOCs	Cr				Extraction well - inactive (also well cluster); remediation monitoring complete for Cr
MW-10C	E			X				Extraction well - inactive (also well cluster); remediation monitoring complete
MW-12C	M				VOCs		Cr	TCE Plume boundary; remediation monitoring complete for VOCs and Cr
MW-13C	M				VOCs		Cr	TCE Plume boundary; remediation monitoring complete for VOCs and Cr
PW-1B	E			X				Extraction well - inactive; remediation monitoring complete
Intermediate Wells								
AMW-59	E/O		X, I					Plume area - silt well; remediation monitoring for VOCs and Cr. Increased frequency to monitor in-situ performance.
AMW-60	M			VOCs				Silt well, remediation monitoring for VOCs, Cr never exceeded cleanup level
CPU-14	M		VOCs				Cr	Plume boundary; remediation monitoring for VOCs, remediation monitoring complete for Cr
MW-14C	E/M[d]		VOCs, I	Cr				Extraction well - inactive, (also well cluster); remediation monitoring for VOCs, remediation monitoring complete for Cr
MW-14E	E/M[d]		X, I					Extraction well - inactive, (also well cluster); remediation monitoring for VOCs and Cr
MW-15E	M				VOCs		Cr	Remediation monitoring complete; monitoring potential Northern Plume impacts, but none noted to date
MW-18D	E/M		X, I					Extraction well - inactive; remediation monitoring for VOCs and Cr
MW-18E	E/O		VOCs				Cr	Plume area - remediation monitoring for VOCs, remediation monitoring complete for Cr
MW-19D	E/M[d]		X, I					Extraction well - inactive, remediation monitoring for VOCs, Cr
MW-20D	E		X, I					Extraction well - inactive; remediation monitoring for VOCs, remediation monitoring complete for Cr. Increased frequency to monitor in-situ performance.
MW-38	M		VOCs					Plume area - silt well; remediation monitoring for VOCs
MW-40	M			Cr			VOCs	Remediation monitoring for Cr, remediation monitoring complete for VOCs
PZ-39	M		X, I					Monitoring for Northern Plume impacts; VOC concentrations decreasing; Cr never exceeded cleanup level. Increased frequency to monitor in-situ performance.
Church of God Wells								
AMW-27	E/M						VOCs	Extraction well - inactive; remediation monitoring complete for VOCs & Cr

TABLE 5-4. SUMMARY OF 2021 WELL SAMPLING FREQUENCIES

Well Name	Recommendation							Rationale for Recommendation
	Well Type	Quarterly	Semi-annual	Annual	Biennial[a]	Every 5 Years[b]	On Hold[c]	
AMW-61	M			X				Silt well, remediation monitoring for VOCs and Cr
CPU-12	M			Cr	VOCs			Plume boundary; remediation monitoring for VOCs, remediation monitoring complete for Cr
CPU-13	E/O							Extraction well - inactive, (also well cluster); remediation monitoring for VOCs, remediation monitoring complete for Cr
MW-21D	E/O		VOCs, I	Cr				Extraction well - not pumping as of June 2018; remediation monitoring complete for Cr; remediation monitoring for VOCs; monitor TCE for **Northern Plume** impacts
MW-22D	E		X					Inactive extraction well. Monitoring for impacts from insitu treatment.
MW-25D	E/O							Former extraction well; remediation and attainment monitoring complete. No further sampling.
MW-26D	E/O							Former extraction well; remediation and attainment monitoring complete. No further sampling.
MW-27D	E/M							Former sentinel well; remediation and attainment monitoring complete. No further sampling.
MW-49	E/O							Former extraction well; remediation and attainment monitoring complete. No further sampling.
Toe Wells								
AMW-42	M							Remediation monitoring for Cr, remediation monitoring complete for VOCs
MW-41	E/M							Attainment monitoring complete for TCE and Cr. EPA request for sampling every 5 years to support Toe-of-Plume Pilot Study.
MW-48	M							Closure monitoring; remediation monitoring complete

TABLE 5-4. SUMMARY OF 2021 WELL SAMPLING FREQUENCIES

Well Name	Recommendation							Rationale for Recommendation
	Well Type	Quarterly	Semi-annual	Annual	Biennial[a]	Every 5 Years[b]	On Hold[c]	
Troutdale Wells								
AMW-24	M/D			VOCs				Troutdale well - TCE impacted; Cr never exceeded cleanup level
MW-33	M/D			VOCs				Troutdale well - TCE impacted; Cr never exceeded cleanup level
BENNETT	Other			VOCs				Troutdale well - remediation monitoring complete for TCE; Cr never exceeded cleanup level
Wells Excluded from Closure Monitoring Program								
Northern Plume Wells								
AMW-16	M		VOCs					Northern Plume monitoring well
AMW-17	M/D		VOCs					Northern Plume monitoring well
AMW-18	M		VOCs					Northern Plume monitoring well
AMW-23	M			VOCs				New Northern Plume monitoring well
AMW-64	M		VOCs					Northern Plume monitoring well
MW-23D	M		VOCs					Northern Plume monitoring well
Toe Wells								
AMW-63	M					X		TCE and Cr never exceeded cleanup levels. EPA request for sampling every 5 years to support Toe-of-Plume Pilot Study.
Infiltration Gallery Wells								
AMW-6A	M/D				X			Infiltration gallery monitoring well
AMW-7A	M/D				X			Infiltration gallery monitoring well
AMW-10A	M/D				X			Infiltration gallery monitoring well
AMW-11A	M/D				X			Infiltration gallery monitoring well

(Note that TCE and Cr are on different sampling schedules in a number of wells.)

Notes:

Wells to be sampled once in 2021.
Wells to be sampled twice in 2021.
Wells to be sampled 4 times in 2021

Wells excluded from the Closure Monitoring Program have been deleted from this table.

[a] Biennial sampling (every 2 years) - these wells will be sampled next in Fall 2021.

[b] Every 5 years - these wells will be sampled next in Fall 2022.

[c] On Hold - sampling on hold pending attainment monitoring; no sampling planned for 2021.

[d] The pumps in wells MW-14C and MW14E were turned off and removed on 10/16/2019; and the pump in well MW-19D was turned off and removed 10/14/2019.

Cr	= Chromium	E	= Extraction well
EPA	= U.S. Environmental Protection Agency	E/M	= Extraction well with pump pulled; now sampled as a monitoring well
TCE	= Trichlorethene		
VOC	= Volatile organic compound	M	= Monitoring well
X	= Cr and VOCs	M/D	= Monitoring well with dedicated pump installed
I	= Includes collection of perfomance monitoring parameters for in-situ treatment		
E/O	= Extraction well with pump turned off; pump is turned on for sampling.		

Appendix A

Chain-of-Custody Documentation and Analytical Results Summary for Groundwater Samples

This page intentionally left blank.

CHAIN OF CUSTODY

K2009501

Laboratory Information

Address: 1317 South 13th Ave., Kelso, WA 98626

Phone #: 360-577-7222 POC: Mark Harris

COC #	Cooler # 1 of 1
Lab Quote #	Lab Job #:

Client / Reporting Information

Company Name	EA Engineering, Science, and Technology, Inc., PBC
Address	2200 6th Ave., Suite 707
City / State / Zip	Seattle / WA / 98121
Project Contact	Jonathan Reeve and per contract
Phone #	206-452-5358
Samplers's Name/Signature	Phil Ehrman

Project Information

Project Name	Boomsnub Northern Plume 2020
Street	
City / State	Hazel Dell / WA
Project #	1524099.1/1524098.5
Email	jreeve@eaest.com, lwood@eaest.com, asmith@eaeast.com, and rread@eaeast.com
Purchase Order #	TBD - reference project # in invoice if no PO

Matrix Codes

W - Water
GW - Ground Water
SW - Surface Water
SO - Soil
OI - Oil
WP - Wipe
LIQ - Non-aqueous Liquid
AIR
DW - Drinking Water (Perchlorate Only)

Lab Sample ID	Sample ID	Collection Date	Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	H3PO4	NaHSO4	MEOH	NONE	Metals / 6010c	Dissolved Iron / 6010c	Anions / 300.0	TOC / SM 5310C	DOC / SM 5310C	COD / SM 5220C	Volatile Fatty Acids / ALS SOP Organic Acids	Dissolved Gases / RSK 175	VOC/8260C	Total Chromium/6010C	Hexavalent Chromium/SM3500-CRB - 24 hr HOLD	Dissolved Chromium/6010C	Notes
	2043-027	20-Oct-2020	9:36	PE	GW	14	6		2	3	1			2	X	X	X	X	X	X	X	X	X		X	X	
	2043-028	20-Oct-2020	9:41	PE	GW	3	3																X				
	2043-018	20-Oct-2020	9:50	RR	GW	40	18		6	9	3			4	X	X	X	X	X	X	X	X	X	X	X		MS/MSD (excluding Hex-Chrome)
	2043-029	20-Oct-2020	9:36	PE	W	4	4															X	X				TRIP BLANK

Turnaround Time (Business days): standard

Standard per contract

Data Deliverable Information: EDD per contract

Comments / Remarks: Please bill VOC/Total Chromium/Hexavalent Chromium to 1524098.5. Please bill all other parameters to 1524099.1

Sample Custody must be documented below each time samples change possession.

	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 Relinquished by Sampler:	10/22/20 1045	1 KMorrow ALS 10/20/20 1120	2		2
3 Relinquished by:		3	4		4
5 Relinquished by:		5	On Ice Y / N	Trip Blank Y / N	Cooler Temp.
			Labels Match Coc? Y / N		____ oC

CHAIN OF CUSTODY

K2095560

Laboratory Information

Address: 1317 South 13th Ave., Kelso, WA 98626

Phone #: 360-577-7222 POC: Mark Harris

COC #	Cooler #___ of ___
Lab Quote #	Lab Job #:

Client / Reporting Information

Company Name	EA Engineering, Science, and Technology, Inc., PBC
Address	2200 6th Ave., Suite 707
City / State / Zip	Seattle / WA / 98121
Project Contact	Jonathan Reeve and per contract
Phone #	206-452-5358
Samplers's Name/Signature	

Project Information

Project Name	Boomsnub Northern Plume 2020
Street	
City / State	Hazel Dell / WA
Project #	1524099.1/1524098.5
Email	jreeve@eaest.com, lwood@eaest.com, asmith@eaeast.com, and rread@eaeast.com
Purchase Order #	TBD - reference project # in invoice if no PO

Matrix Codes

W - Water
GW - Ground Water
SW - Surface Water
SO - Soil
OI - Oil
WP - Wipe
LIQ - Non-aqueous Liquid
AIR
DW - Drinking Water (Perchlorate Only)

Lab Sample ID	Sample ID	Collection: Date	Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	H3PO4	NaHSO4	MEOH	NONE	Analytical Information: Metals / 6010C	Dissolved Iron / 6010C	Anions / 300.0	TOC / SM 5310C	DOC / SM 5310C	COD / SM 5220C	Volatile Fatty Acids / ALS SOP Organic Acids	Dissolved Gases / RSK 175	VOC/8260C	Chromium/6010C	Notes
	2043-020	20-Oct-2020	12:30	RR	GW	13	6		2	3	1			1	X	X	X	X	X	X	X	X	X		6010C (metals/chromium) sample filtered due to turbidity
	2043-022	20-Oct-2020	13:45	RR	GW	13	6		2	3	1			1	X	X	X	X	X	X	X	X	X	X	6010C (metals/chromium) sample filtered due to turbidity
	2043-026	20-Oct-2020	16:45	RR	GW	6	6															X	X		
	2043-035	21-Oct-2020	9:10	RR	GW	7			2	3	1			1	X	X	X	X	X	X	X			X	
	2043-024	20-Oct-2020	14:25	RR	GW	13	6		2	3	1			1	X	X	X	X	X	X	X	X	X	X	
	2043-030	20-Oct-2020	12:02	PE	GW	13	6		2	3	1			1	X	X	X	X	X	X	X	X	X	X	
	2043-031	20-Oct-2020	13:27	PE	GW	13	6		2	3	1			1	X	X	X	X	X	X	X	X	X	X	
	2043-032	20-Oct-2020	14:54	PE	GW	13	6		2	3	1			1	X	X	X	X	X	X	X	X	X	X	
	2043-038	21-Oct-2020	10:20	PE	GW	13	6		2	3	1			1	X	X	X	X	X	X	X	X	X	X	
	2043-036	20-Oct-2020	12:02	PE	W	4	4															X	X		TRIP BLANK

Turnaround Time (Business days): standard

STANDARD TAT PER CONTRACT

Data Deliverable Information: EDD per contract

Comments / Remarks:
Please bill VOC/Chromium to 1524098.5.
Please bill all other parameters to 1524099.1

Sample Custody must be documented below each time samples change possession.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	Richard Read	10/21/20 12:45	1	2	10/21/20 1535	2 ALS (@LAB)
3	Relinquished by:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
			3	4		4
5	Relinquished by:	Date Time:	Received By:	On Ice Y / N	Trip Blank Y / N	Cooler Temp.
			5	Labels Match Coc? Y / N		____ °C

ALS Environmental

CHAIN OF CUSTODY
112657

001

SR#_____

COC Set 1 of 1

COC#_____

1317 South 13th Ave. Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

K 2009621

Project Name	Boomsnub Northern Plan
Project Number	1524097
Project Manager	Jonathan Reeve
Company	EA Engineering
Address	2200 6th Ave. Suite 707 Seattle, WA 98121
Phone #	206-452-5358
email	jreeve@eaest.com
Sampler Signature	
Sampler Printed Name	Phil Ehrman

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	48H: 300.0 / NO3	14D: 8260C / VOC FP	14D: ALS SOP / ORGANIC_ACIDS	14D: RSK 175 / Gases	14D: SM 2320 B / Alkalinity Titr	28D: 300.0 / Chloride	28D: 300.0 / SO4	28D: 9060 / TOC D	28D: 9060 / TOC T	28D: SM 2340 C / Hard Titr T	28D: SM 5220 C / COD T	180D: 6010C / Metals T	1	2	3	4	5	Remarks
1. 2043-007		10/19/20	1058	GW	3		X																
2. 2043-013		10/19/20	1139	GW	3		X																
3. 2043-025		10/19/20	1502	GW	3		X																
4. 2043-011		10/19/20	1124	GW	3		X																
5. 2043-005		10/19/20	1047	GW	3		X																
6. 2043-001		10/19/20	1019	GW	3		X																
7. 2043-050		10/19/20	1000	FB GW	2		X																
8.																							
9.																							
10.																							

Report Requirements

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. CLP Like Summary (no raw data)

___ IV. Data Validation Report

X V. EDD

Invoice Information

P.O.#_____

Bill To:_____

Turnaround Requirements

___ 24 hr. ___ 48 hr.

___ 5 Day

X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments: Send copy of results to lwood@eaest.com, asmith@eaest.com, rread@eaest.com

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: Phil Ehrman	Printed Name: ALS	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm: 10/22/20 1402	Firm	Firm	Firm	Firm
Date/Time: 10/22/20 1300	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

ALS Environmental

CHAIN OF CUSTODY
112657

001

SR#

COC Set 1 of 3

COC#

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name: Boomsnub	Project Number: 1524098.5
Project Manager: Jonathan Reeve	
Company: EA Engineering	
Address: 2200 6th Ave, Suite 707 Seattle WA 98121	
Phone #: 206-452-5358	email: jreeve@eanest.com
Sampler Signature:	Sampler Printed Name: Phil Ehrman

L2009673

CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix	NUMBER OF CONTAINERS	48H: 300.0 / NO3	14D: 8260C / VOC FP	14D: ALS SOP / ORGANIC_ACIDS	14D: RSK 175 / Gases	14D: SM 2320 B / Alkalinity Titr	28D: 300.0 / Chloride	28D: 300.0 / SO4	28D: 9060 / TOC D	28D: 9060 / TOC T	28D: SM 2340 C / Hard Titr T	28D: SM 5220 C / COD T	180D: 6010C / Metals T	F	2	3	4	5	Remarks
1. 2043-041		10/21/20	1250	GW	4		X										X						
2. 2043-014		10/19/20	1440	GW	4		X										X						
3. 2043-034		10/20/20	1636	GW	4		X										X						
4. 2043-042		10/21/20	1206	GW	4		X										X						
5. 2043-046		10/21/20	1411	GW	4		X										X						
6. 2043-044		10/21/20	1211	GW	4		X										X						
7. 2043-047		10/21/20	1416	GW	3		X																
8. 2043-043		10/21/20	1255	GW	12		X										X						MS/MSD
9. 2043-004		10/19/20	1045	GW	4		X										X						
10. 2043-006		10/19/20	1055	GW	4		X										X						

Report Requirements

- ___ I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- ___ III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- X V. EDD

Invoice Information

P.O.#

Bill To:

Turnaround Requirements

___ 24 hr. ___ 48 hr.
X 5 Day Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments: Send copy of results to lwood@eanest.com, asmith@eanest.com, rread@eanest.com.

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature:	Signature:	Signature	Signature	Signature	Signature
Printed Name: Phil Ehrman	Printed Name: ALS	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm: 10/22/20 1400	Firm	Firm	Firm	Firm
Date/Time: 10/22/20 1305	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

ALS Environmental

CHAIN OF CUSTODY
112657

001

SR#_____

COC Set 2 of 3

COC#_____

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name: Boonsnub	Project Number: 1524098.5
Project Manager: Jonathan Reeve	
Company: EA Engineering	
Address: 2200 6th Ave Suite 707 Seattle WA 98121	
Phone #: 206-452-5359	email: jreeve@eaest.com
Sampler Signature:	Sampler Printed Name: Phil Ehrman

CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix	NUMBER OF CONTAINERS	48H: 300.0 / NO3	14D: 8260C / VOC FP	14D: ALS SOP / ORGANIC_ACIDS	14D: RSK 175 / Gases	14D: SM 2320 B / Alkalinity Titr	28D: 300.0 / Chloride	28D: 300.0 / SO4	28D: 9060 / TOC D	28D: 9060 / TOC T	28D: SM 2340 C / Hard Titr T	28D: SM 5220 C / COD T	180D: 6010C / Metals T	T	D	B	A	F	Remarks
1. 2043-008		10/19/20	1105	GW	4		X										X						
2. 2043-012		10/19/20	1435	GW	4		X										X						
3. 2043-062		10/19/20	1015	GW	12		X										X						MS/MSD
4. 2043-045		10/21/20	1555	GW	1												X						
5. 2043-039		10/21/20	1125	GW	1												X						
6. 2043-010		10/19/20	1225	GW	1												X						
7. 2043-016		10/19/20	1525	GW	1												X						
8. 2043-033		10/20/20	1530	GW	3		X																
9. 2043-040		10/20/20	1125	GW	9		X																MS/MSD
10. 2043-004		10/19/20	1110	GW	3		X																

K2009623

Report Requirements

- ___ I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- ___ III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- X V. EDD

Invoice Information

P.O.#_____

Bill To:_____

Turnaround Requirements

___ 24 hr. ___ 48 hr.
X 5 Day Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments: Send copy of results to lwad@eaest.com, asmith@eaest.com, rread@eaest.com.

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other_____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature:	Signature:	Signature	Signature	Signature	Signature
Printed Name: Phil Ehrman	Printed Name: AL	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm: 10/22/20 1400	Firm	Firm	Firm	Firm
Date/Time: 10/22/20 1305	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

ALS Environmental

CHAIN OF CUSTODY
112657

001

SR#

COC Set 3 of 3

COC#

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name	Boom Snub
Project Number:	152409B.5
Project Manager	Jonathan Reeve
Company	EA Engineering
Address	2200 6th Ave Suite 707 Seattle WA 98121
Phone #	206-452-5358
email	jreeve@eaest.com
Sampler Signature	
Sampler Printed Name	Phil Ehrman

K2009623

CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix	NUMBER OF CONTAINERS	48H 300.0 / NO3	14D 8260C / VOC FP	14D ALS SOP / ORGANIC_ACIDS	14D RSK 175 / Gases	14D SM 2320 B / Alkalinity Tltr	28D 300.0 / Chloride	28D 300.0 / SO4	28D 9060 / TOC D	28D 9060 / TOC T	28D SM 2340 C / Hard Tltr T	28D SM 5220 C / COD T	180D 3010C / Metals T	1	2	3	4	5	Remarks
1. 2043-015	~~10~~ PE	10/19/20	1158	GW	3		X																
2. 2043-037		10/21/20	1025	GW	3		X																
3. 2043-048		10/21/20	1557	GW	3		X																
4. 2043-017		10/19/20	1211	GW	3		X																
5. 2043-019		10/19/20	1225	GW	3		X																
6. 2043-021		10/19/20	1332	GW	3		X																
7. 2043-023		10/19/20	1441	GW	3		X																
8. 2043-003		10/19/20	1031	GW	3		X																
9. 2043-049		10/21/20	1722	GW	3		X																
10. 2043-51		10/19/20	1000	W	2		X																

Report Requirements

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. CLP Like Summary (no raw data)

___ IV. Data Validation Report

X V. EDD

Invoice Information

P.O.#

Bill To:

Turnaround Requirements

___ 24 hr. ___ 48 hr.

X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments: Send copy of results to lwood@eaest.com, asmith@eaest.com, rread@eaest.com

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: Phil Ehrman	Printed Name: ACS	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm: 10/22/20 1400	Firm	Firm	Firm	Firm
Date/Time: 10/22/20 1300	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

ALS Environmental

CHAIN OF CUSTODY
87369

004

SR# K2100478

COC Set 1 of 1

COC#

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name: Boomsnub	Project Number: 1611303.001
Project Manager: Jonathan Reeve	
Company: EA Engineering	
Address: 2200 6th Ave, Suite 707 Seattle, WA 98121	
Phone #: (206) 452-5°	email: jreeve@eaest.com
Sampler Signature: Richard Read	Sampler Printed Name: Rick READ

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	0H SM 4500-H+ B / pH	14D 8260C / VOC FP	180D 200.7 / Metals T	1	2	3	4	5	Remarks
1. INF-011521		1/15/21	10:00	H_2O	4		X	X						
2. EFF-011521		↓	10:08	↓	4		X	X						
3. TB-011521		↓	10:12	↓	2		X							
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Report Requirements

- ___ I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- X III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- X V. EDD

Invoice Information

P.O.#

Bill To:

Turnaround Requirements

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

VOCs - 8260c
Total Metals - Cr

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other_____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Richard Read	Signature: K Moore	Signature	Signature	Signature	Signature
Printed Name: Rick READ	Printed Name:	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm: ALS	Firm	Firm	Firm	Firm
Date/Time: 1/18/21 9:00	Date/Time: 1/18/21 1250	Date/Time	Date/Time	Date/Time	Date/Time

Groundwater Analysis

Sample Name AMW-4A Sampling Method PDB

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-033

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	0.23	J	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-12A

Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-026

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
RSK 175	ETHANE	0.60	U	ug/l	74-84-0
RSK 175	ETHYLENE	1.0	U	ug/l	74-85-1
RSK 175	METHANE	1.3	U	ug/l	74-82-8
SW8260C	1,1,1-TRICHLOROETHANE	0.57		ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	2.5		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.15	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.41	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	12		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-12A

Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-026

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
E300.0	CHLORIDE	5.51		mg/l	16887-00-6
E300.0	NITRATE AS NITROGEN	1.08		mg/l	14797-55-8
E300.0	SULFATE	11.0		mg/l	14808-79-8
HPLC-OA	Acetic Acid	1.0	U	mg/l	64-19-7
HPLC-OA	Butyric Acid	2.0	U	mg/l	107-92-6
HPLC-OA	Lactic Acid	1.0	U	mg/l	50-21-5
HPLC-OA	PROPIONIC ACID	1.0	U	mg/l	79-09-4
HPLC-OA	PYRUVIC ACID	0.50	U	mg/l	127-17-3
SM5220C	Chemical Oxygen Demand	65		mg/l	COD
SM5310C	Dissolved Organic Carbon	1.18		mg/l	DOC
SM5310C	TOTAL ORGANIC CARBON	0.79		mg/l	TOC
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	18200		ug/l	7440-70-2
SW6010C	CHROMIUM	8.4	U	ug/l	7440-47-3
SW6010C	IRON	416		ug/l	7439-89-6
SW6010C	MAGNESIUM	6730		ug/l	7439-95-4
SW6010C	MANGANESE	25.7		ug/l	7439-96-5

Groundwater Analysis

Sample Name AMW-16 Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-007

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.29	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.22	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	23		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-17 Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-013

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.11	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.25	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	55		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-18 Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-025

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	16		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-23 Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-001

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-24 Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-048

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.11	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.28	J	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	1.1		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.10	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	5.7		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-53A
Sampling Method LOW-FLOW
Sample Date 10/21/2020
Sample Type N
Sample ID 2043-037

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	3.7		ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.69		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	32		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.34	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	1.2		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	19		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-59 Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-027

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
E300.0	CHLORIDE	18.0		mg/l	16887-00-6
E300.0	NITRATE AS NITROGEN	0.10	U	mg/l	14797-55-8
E300.0	SULFATE	2.27		mg/l	14808-79-8
HPLC-OA	Acetic Acid	3.4		mg/l	64-19-7
HPLC-OA	Butyric Acid	2.0	U	mg/l	107-92-6
HPLC-OA	Lactic Acid	1.0	U	mg/l	50-21-5
HPLC-OA	PROPIONIC ACID	1.0	U	mg/l	79-09-4
HPLC-OA	PYRUVIC ACID	0.50	U	mg/l	127-17-3
RSK 175	ETHANE	2.1		ug/l	74-84-0
RSK 175	ETHYLENE	1.4		ug/l	74-85-1
RSK 175	METHANE	12000		ug/l	74-82-8
SM3500CRB	CHROMIUM (HEXAVALENT COMP	0.050	U	mg/l	18540-29-9
SM5220C	Chemical Oxygen Demand	101		mg/l	COD
SM5310C	Dissolved Organic Carbon	10.6		mg/l	DOC
SM5310C	TOTAL ORGANIC CARBON	15.5		mg/l	TOC
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	83100		ug/l	7440-70-2
SW6010C	CHROMIUM	18.2		ug/l	7440-47-3
SW6010C	CHROMIUM	19.2		ug/l	7440-47-3

Groundwater Analysis

Sample Name AMW-59 Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-027

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	IRON	40200		ug/l	7439-89-6
SW6010C	IRON	39000		ug/l	7439-89-6
SW6010C	MAGNESIUM	32600		ug/l	7439-95-4
SW6010C	MANGANESE	1900		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	1.1		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	22		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.40	J	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	3.1		ug/l	79-01-6

Groundwater Analysis

Sample Name AMW-59 Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-027

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	VINYL CHLORIDE	1.7		ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-59-DUP Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type FD

Sample ID 2043-028

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	1.2		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	23		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.41	J	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	4.1		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	1.9		ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-60 Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-009

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	2.6		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.83		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.40	J	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	8.4		ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-61 Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-003

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.18	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	2.2		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	6.2		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name AMW-64 Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-011

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	7.1		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name BENNETT Sampling Method GRAB

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-040

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.25	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	1.3		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name CPU-12 Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-045

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	39100		ug/l	7440-70-2
SW6010C	CHROMIUM	7.0	J	ug/l	7440-47-3
SW6010C	IRON	423		ug/l	7439-89-6
SW6010C	MAGNESIUM	22600		ug/l	7439-95-4
SW6010C	MANGANESE	6.4		ug/l	7439-96-5

Groundwater Analysis

Sample Name CPU-14 Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-015

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.13	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.11	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.10	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	3.7		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name GP-05 Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-049

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.12	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.65		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-2A Sampling Method LOW-FLOW

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-010

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	14700		ug/l	7440-70-2
SW6010C	CHROMIUM	601		ug/l	7440-47-3
SW6010C	IRON	11	J	ug/l	7439-89-6
SW6010C	MAGNESIUM	5010		ug/l	7439-95-4
SW6010C	MANGANESE	0.2	J	ug/l	7439-96-5

Groundwater Analysis

Sample Name MW-2B

Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-021

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.30	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	2.5		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-4A

Sampling Method LOW-FLOW

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-012

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	17800		ug/l	7440-70-2
SW6010C	CHROMIUM	543		ug/l	7440-47-3
SW6010C	IRON	1040		ug/l	7439-89-6
SW6010C	MAGNESIUM	6160		ug/l	7439-95-4
SW6010C	MANGANESE	18.1		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.37	J	ug/l	127-18-4

Groundwater Analysis

Sample Name MW-4A

Sampling Method LOW-FLOW

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-012

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	1.8		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-4A-DUP Sampling Method LOW-FLOW

Sample Date 10/19/2020

Sample Type FD

Sample ID 2043-014

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	18500		ug/l	7440-70-2
SW6010C	CHROMIUM	556		ug/l	7440-47-3
SW6010C	IRON	2050		ug/l	7439-89-6
SW6010C	MAGNESIUM	6430		ug/l	7439-95-4
SW6010C	MANGANESE	34.6		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.44	J	ug/l	127-18-4

Groundwater Analysis

Sample Name MW-4A-DUP Sampling Method LOW-FLOW

Sample Date 10/19/2020

Sample Type FD

Sample ID 2043-014

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	1.8		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-4B

Sampling Method LOW-FLOW

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-016

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	17100		ug/l	7440-70-2
SW6010C	CHROMIUM	318		ug/l	7440-47-3
SW6010C	IRON	18	J	ug/l	7439-89-6
SW6010C	MAGNESIUM	5250		ug/l	7439-95-4
SW6010C	MANGANESE	0.5	J	ug/l	7439-96-5

Groundwater Analysis

Sample Name MW-6A Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-042

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	16100		ug/l	7440-70-2
SW6010C	CHROMIUM	149		ug/l	7440-47-3
SW6010C	IRON	129		ug/l	7439-89-6
SW6010C	MAGNESIUM	5130		ug/l	7439-95-4
SW6010C	MANGANESE	9.4		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4

Groundwater Analysis

Sample Name MW-6A Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-042

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-6A-DUP Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type FD

Sample ID 2043-044

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	15700		ug/l	7440-70-2
SW6010C	CHROMIUM	148		ug/l	7440-47-3
SW6010C	IRON	128		ug/l	7439-89-6
SW6010C	MAGNESIUM	5010		ug/l	7439-95-4
SW6010C	MANGANESE	9.2		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4

Groundwater Analysis

Sample Name MW-6A-DUP Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type FD

Sample ID 2043-044

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-6B Sampling Method EXTRACTION

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-004

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	15300		ug/l	7440-70-2
SW6010C	CHROMIUM	14.9		ug/l	7440-47-3
SW6010C	IRON	21	U	ug/l	7439-89-6
SW6010C	MAGNESIUM	6950		ug/l	7439-95-4
SW6010C	MANGANESE	1.1	U	ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.31	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	2.0		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.13	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.40	J	ug/l	127-18-4

Groundwater Analysis

Sample Name MW-6B Sampling Method EXTRACTION

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-004

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	4.2		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-7B

Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-019

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.19	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	1.1		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.19	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	0.18	J	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.63		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	6.3		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-9C Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-017

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.14	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	1.9		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.60		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	1.2		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-10B Sampling Method EXTRACTION

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-006

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	18100		ug/l	7440-70-2
SW6010C	CHROMIUM	32.1		ug/l	7440-47-3
SW6010C	IRON	21	U	ug/l	7439-89-6
SW6010C	MAGNESIUM	8690		ug/l	7439-95-4
SW6010C	MANGANESE	1.1	U	ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.080	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.71		ug/l	127-18-4

Groundwater Analysis

Sample Name MW-10B Sampling Method EXTRACTION

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-006

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	8.9		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-10C

Sampling Method EXTRACTION

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-008

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	17600		ug/l	7440-70-2
SW6010C	CHROMIUM	57.9		ug/l	7440-47-3
SW6010C	IRON	21	U	ug/l	7439-89-6
SW6010C	MAGNESIUM	7680		ug/l	7439-95-4
SW6010C	MANGANESE	0.3	J	ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.13	J	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	1.3		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.44	J	ug/l	127-18-4

Groundwater Analysis

Sample Name MW-10C

Sampling Method EXTRACTION

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-008

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	1.3		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-14C Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-031

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
E300.0	CHLORIDE	7.01		mg/l	16887-00-6
E300.0	NITRATE AS NITROGEN	4.34	*	mg/l	14797-55-8
E300.0	SULFATE	19.0		mg/l	14808-79-8
HPLC-OA	Acetic Acid	1.0	U	mg/l	64-19-7
HPLC-OA	Butyric Acid	2.0	U	mg/l	107-92-6
HPLC-OA	Lactic Acid	1.0	U	mg/l	50-21-5
HPLC-OA	PROPIONIC ACID	1.0	U	mg/l	79-09-4
HPLC-OA	PYRUVIC ACID	0.50	U	mg/l	127-17-3
RSK 175	ETHANE	1.4		ug/l	74-84-0
RSK 175	ETHYLENE	1.0	U	ug/l	74-85-1
RSK 175	METHANE	750		ug/l	74-82-8
SM5220C	Chemical Oxygen Demand	51		mg/l	COD
SM5310C	Dissolved Organic Carbon	0.84		mg/l	DOC
SM5310C	TOTAL ORGANIC CARBON	0.50	U	mg/l	TOC
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	22500		ug/l	7440-70-2
SW6010C	CHROMIUM	10.2		ug/l	7440-47-3
SW6010C	IRON	14	J	ug/l	7439-89-6
SW6010C	MAGNESIUM	10100		ug/l	7439-95-4

Groundwater Analysis

Sample Name MW-14C Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-031

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	MANGANESE	305		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.25	J	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.48	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	2.4		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-14E

Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-030

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
E300.0	CHLORIDE	5.33		mg/l	16887-00-6
E300.0	NITRATE AS NITROGEN	2.50	*	mg/l	14797-55-8
E300.0	SULFATE	31.1		mg/l	14808-79-8
HPLC-OA	Acetic Acid	1.0	U	mg/l	64-19-7
HPLC-OA	Butyric Acid	2.0	U	mg/l	107-92-6
HPLC-OA	Lactic Acid	1.0	U	mg/l	50-21-5
HPLC-OA	PROPIONIC ACID	1.0	U	mg/l	79-09-4
HPLC-OA	PYRUVIC ACID	0.50	U	mg/l	127-17-3
RSK 175	ETHANE	0.60	U	ug/l	74-84-0
RSK 175	ETHYLENE	1.0	U	ug/l	74-85-1
RSK 175	METHANE	2.8		ug/l	74-82-8
SM5220C	Chemical Oxygen Demand	4	J	mg/l	COD
SM5310C	Dissolved Organic Carbon	0.70		mg/l	DOC
SM5310C	TOTAL ORGANIC CARBON	0.16	J	mg/l	TOC
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	29600		ug/l	7440-70-2
SW6010C	CHROMIUM	173		ug/l	7440-47-3
SW6010C	IRON	57		ug/l	7439-89-6
SW6010C	MAGNESIUM	10900		ug/l	7439-95-4

Groundwater Analysis

Sample Name MW-14E

Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-030

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	MANGANESE	353		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.10	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.10	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.14	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	1.6		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	9.2		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-18D Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-022

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
E300.0	CHLORIDE	4.34		mg/l	16887-00-6
E300.0	NITRATE AS NITROGEN	0.94		mg/l	14797-55-8
E300.0	SULFATE	12.8		mg/l	14808-79-8
HPLC-OA	Acetic Acid	1.0	U	mg/l	64-19-7
HPLC-OA	Butyric Acid	2.0	U	mg/l	107-92-6
HPLC-OA	Lactic Acid	1.0	U	mg/l	50-21-5
HPLC-OA	PROPIONIC ACID	1.0	U	mg/l	79-09-4
HPLC-OA	PYRUVIC ACID	0.50	U	mg/l	127-17-3
RSK 175	ETHANE	4.2		ug/l	74-84-0
RSK 175	ETHYLENE	1.0	U	ug/l	74-85-1
RSK 175	METHANE	14000		ug/l	74-82-8
SM5220C	Chemical Oxygen Demand	55		mg/l	COD
SM5310C	Dissolved Organic Carbon	0.47	J	mg/l	DOC
SM5310C	TOTAL ORGANIC CARBON	0.43	J	mg/l	TOC
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	18900		ug/l	7440-70-2
SW6010C	CHROMIUM	15.8		ug/l	7440-47-3
SW6010C	IRON	849		ug/l	7439-89-6
SW6010C	MAGNESIUM	9080		ug/l	7439-95-4

Groundwater Analysis

Sample Name MW-18D Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-022

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	MANGANESE	535		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	2.1		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.48	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	3.1		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-18E

Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-020

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
E300.0	CHLORIDE	10.2		mg/l	16887-00-6
E300.0	NITRATE AS NITROGEN	0.10	U,*	mg/l	14797-55-8
E300.0	SULFATE	0.83		mg/l	14808-79-8
HPLC-OA	Acetic Acid	1.0	U	mg/l	64-19-7
HPLC-OA	Butyric Acid	2.0	U	mg/l	107-92-6
HPLC-OA	Lactic Acid	1.0	U	mg/l	50-21-5
HPLC-OA	PROPIONIC ACID	1.0	U	mg/l	79-09-4
HPLC-OA	PYRUVIC ACID	0.50	U	mg/l	127-17-3
RSK 175	ETHANE	5.2		ug/l	74-84-0
RSK 175	ETHYLENE	2.3		ug/l	74-85-1
RSK 175	METHANE	24000		ug/l	74-82-8
SM5220C	Chemical Oxygen Demand	134		mg/l	COD
SM5310C	Dissolved Organic Carbon	1.78		mg/l	DOC
SM5310C	TOTAL ORGANIC CARBON	2.95		mg/l	TOC
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	97700		ug/l	7440-70-2
SW6010C	CHROMIUM	2.9	J	ug/l	7440-47-3
SW6010C	IRON	9460		ug/l	7439-89-6
SW6010C	MAGNESIUM	27300		ug/l	7439-95-4

Groundwater Analysis

Sample Name MW-18E

Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-020

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	MANGANESE	1210		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.080	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.18	J	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.24	J	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	1.1		ug/l	75-01-4

Groundwater Analysis

Sample Name MW-19D Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-018

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
E300.0	CHLORIDE	6.51		mg/l	16887-00-6
E300.0	NITRATE AS NITROGEN	1.25		mg/l	14797-55-8
E300.0	SULFATE	9.73		mg/l	14808-79-8
HPLC-OA	Acetic Acid	91		mg/l	64-19-7
HPLC-OA	Butyric Acid	32		mg/l	107-92-6
HPLC-OA	Lactic Acid	1.0	U	mg/l	50-21-5
HPLC-OA	PROPIONIC ACID	11		mg/l	79-09-4
HPLC-OA	PYRUVIC ACID	0.50	U	mg/l	127-17-3
RSK 175	ETHANE	4.0		ug/l	74-84-0
RSK 175	ETHYLENE	2.2		ug/l	74-85-1
RSK 175	METHANE	1200		ug/l	74-82-8
SM3500CRB	CHROMIUM (HEXAVALENT COMP	0.050	U	mg/l	18540-29-9
SM5220C	Chemical Oxygen Demand	166		mg/l	COD
SM5310C	Dissolved Organic Carbon	69.9		mg/l	DOC
SM5310C	TOTAL ORGANIC CARBON	68.4		mg/l	TOC
SW6010C	ARSENIC	29		ug/l	7440-38-2
SW6010C	CALCIUM METAL	96800		ug/l	7440-70-2
SW6010C	CHROMIUM	38.4		ug/l	7440-47-3
SW6010C	IRON	5510		ug/l	7439-89-6

Groundwater Analysis

Sample Name MW-19D Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-018

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	IRON	3750		ug/l	7439-89-6
SW6010C	MAGNESIUM	25300		ug/l	7439-95-4
SW6010C	MANGANESE	3450		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	1.3		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	3.5		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	0.15	J	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	1.9		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	1.1		ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	45		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-20D

Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-032

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
E300.0	CHLORIDE	4.42		mg/l	16887-00-6
E300.0	NITRATE AS NITROGEN	1.61	*	mg/l	14797-55-8
E300.0	SULFATE	17.3		mg/l	14808-79-8
HPLC-OA	Acetic Acid	1.0	U	mg/l	64-19-7
HPLC-OA	Butyric Acid	2.0	U	mg/l	107-92-6
HPLC-OA	Lactic Acid	1.0	U	mg/l	50-21-5
HPLC-OA	PROPIONIC ACID	1.0	U	mg/l	79-09-4
HPLC-OA	PYRUVIC ACID	0.50	U	mg/l	127-17-3
RSK 175	ETHANE	0.60	U	ug/l	74-84-0
RSK 175	ETHYLENE	1.0	U	ug/l	74-85-1
RSK 175	METHANE	1.3	U	ug/l	74-82-8
SM5220C	Chemical Oxygen Demand	4	J	mg/l	COD
SM5310C	Dissolved Organic Carbon	0.55		mg/l	DOC
SM5310C	TOTAL ORGANIC CARBON	0.21	J	mg/l	TOC
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	41300		ug/l	7440-70-2
SW6010C	CHROMIUM	59.9		ug/l	7440-47-3
SW6010C	IRON	25	J	ug/l	7439-89-6
SW6010C	MAGNESIUM	15800		ug/l	7439-95-4

Groundwater Analysis

Sample Name MW-20D

Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-032

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	MANGANESE	96.4		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.17	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.90		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	12		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-21D Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-034

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	20	J	ug/l	7440-38-2
SW6010C	CALCIUM METAL	15300		ug/l	7440-70-2
SW6010C	CHROMIUM	14.6		ug/l	7440-47-3
SW6010C	IRON	5540		ug/l	7439-89-6
SW6010C	MAGNESIUM	2480		ug/l	7439-95-4
SW6010C	MANGANESE	143		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4

Groundwater Analysis

Sample Name MW-21D Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-034

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.31	J	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-22D

Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-046

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	45300		ug/l	7440-70-2
SW6010C	CHROMIUM	66.7		ug/l	7440-47-3
SW6010C	IRON	861		ug/l	7439-89-6
SW6010C	MAGNESIUM	13300		ug/l	7439-95-4
SW6010C	MANGANESE	543		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	1.3		ug/l	127-18-4

Groundwater Analysis

Sample Name MW-22D

Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-046

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	1.6		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-22D-DUP Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type FD

Sample ID 2043-047

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	1.3		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	1.5		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-23D Sampling Method PDB

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-005

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.61		ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.91		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	83		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-33 Sampling Method LOW-FLOW

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-023

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.29	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.66		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.13	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	3.5		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-38 Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-043

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	22400		ug/l	7440-70-2
SW6010C	CHROMIUM	4.7	J	ug/l	7440-47-3
SW6010C	IRON	342		ug/l	7439-89-6
SW6010C	MAGNESIUM	13100		ug/l	7439-95-4
SW6010C	MANGANESE	6.8		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.32	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.20	J	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.57		ug/l	127-18-4

Groundwater Analysis

Sample Name MW-38 Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-043

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	12		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name MW-40 Sampling Method LOW-FLOW

Sample Date 10/21/2020

Sample Type N

Sample ID 2043-039

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	20900		ug/l	7440-70-2
SW6010C	CHROMIUM	103		ug/l	7440-47-3
SW6010C	IRON	513		ug/l	7439-89-6
SW6010C	MAGNESIUM	8840		ug/l	7439-95-4
SW6010C	MANGANESE	35.4		ug/l	7439-96-5

Groundwater Analysis

Sample Name PW-1B

Sampling Method EXTRACTION

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-002

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	15300		ug/l	7440-70-2
SW6010C	CHROMIUM	31.9		ug/l	7440-47-3
SW6010C	IRON	21	U	ug/l	7439-89-6
SW6010C	MAGNESIUM	6530		ug/l	7439-95-4
SW6010C	MANGANESE	1.8		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.27	J	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.29	J	ug/l	127-18-4

Groundwater Analysis

Sample Name PW-1B

Sampling Method EXTRACTION

Sample Date 10/19/2020

Sample Type N

Sample ID 2043-002

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	2.2		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name PZ-39 Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-038

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
E300.0	CHLORIDE	4.44		mg/l	16887-00-6
E300.0	NITRATE AS NITROGEN	1.50	*	mg/l	14797-55-8
E300.0	SULFATE	18.1		mg/l	14808-79-8
HPLC-OA	Acetic Acid	1.0	U	mg/l	64-19-7
HPLC-OA	Butyric Acid	2.0	U	mg/l	107-92-6
HPLC-OA	Lactic Acid	1.0	U	mg/l	50-21-5
HPLC-OA	PROPIONIC ACID	1.0	U	mg/l	79-09-4
HPLC-OA	PYRUVIC ACID	0.50	U	mg/l	127-17-3
RSK 175	ETHANE	0.60	U	ug/l	74-84-0
RSK 175	ETHYLENE	0.36		ug/l	74-85-1
RSK 175	METHANE	0.73		ug/l	74-82-8
SM5220C	Chemical Oxygen Demand	10	U	mg/l	COD
SM5310C	Dissolved Organic Carbon	0.71		mg/l	DOC
SM5310C	TOTAL ORGANIC CARBON	0.56		mg/l	TOC
SW6010C	ARSENIC	7	J	ug/l	7440-38-2
SW6010C	CALCIUM METAL	77800		ug/l	7440-70-2
SW6010C	CHROMIUM	3.2	J	ug/l	7440-47-3
SW6010C	IRON	14	J	ug/l	7439-89-6
SW6010C	MAGNESIUM	20200		ug/l	7439-95-4

Groundwater Analysis

Sample Name PZ-39 Sampling Method LOW-FLOW

Sample Date 10/20/2020

Sample Type N

Sample ID 2043-038

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	MANGANESE	101		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.61		ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	2.8		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	1.9		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.57		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.68		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	42		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name RINSATE

Sampling Method GRAB

Sample Date 10/21/2020

Sample Type RB

Sample ID 2043-041

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	57		ug/l	7440-70-2
SW6010C	CHROMIUM	8.4	U	ug/l	7440-47-3
SW6010C	IRON	45		ug/l	7439-89-6
SW6010C	MAGNESIUM	18.1		ug/l	7439-95-4
SW6010C	MANGANESE	2.3		ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4

Groundwater Analysis

Sample Name RINSATE

Sampling Method GRAB

Sample Date 10/21/2020

Sample Type RB

Sample ID 2043-041

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name RINSATE MW-18D Sampling Method GRAB

Sample Date 10/20/2020

Sample Type RB

Sample ID 2043-024

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
E300.0	CHLORIDE	0.19	J	mg/l	16887-00-6
E300.0	NITRATE AS NITROGEN	0.10	U	mg/l	14797-55-8
E300.0	SULFATE	0.21	J	mg/l	14808-79-8
HPLC-OA	Acetic Acid	1.0	U	mg/l	64-19-7
HPLC-OA	Butyric Acid	2.0	U	mg/l	107-92-6
HPLC-OA	Lactic Acid	1.0	U	mg/l	50-21-5
HPLC-OA	PROPIONIC ACID	1.0	U	mg/l	79-09-4
HPLC-OA	PYRUVIC ACID	0.50	U	mg/l	127-17-3
RSK 175	ETHANE	0.60	U	ug/l	74-84-0
RSK 175	ETHYLENE	1.0	U	ug/l	74-85-1
RSK 175	METHANE	2.9		ug/l	74-82-8
SM5220C	Chemical Oxygen Demand	51		mg/l	COD
SM5310C	Dissolved Organic Carbon	0.97		mg/l	DOC
SM5310C	TOTAL ORGANIC CARBON	0.24	J	mg/l	TOC
SW6010C	ARSENIC	21	U	ug/l	7440-38-2
SW6010C	CALCIUM METAL	207		ug/l	7440-70-2
SW6010C	CHROMIUM	8.4	U	ug/l	7440-47-3
SW6010C	IRON	42	U	ug/l	7439-89-6
SW6010C	MAGNESIUM	21.0		ug/l	7439-95-4

Groundwater Analysis

Sample Name RINSATE MW-18D Sampling Method GRAB

Sample Date 10/20/2020

Sample Type RB

Sample ID 2043-024

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW6010C	MANGANESE	1.5	J	ug/l	7439-96-5
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name TRIPBLANK-01 Sampling Method Grab

Sample Date 10/20/2020

Sample Type TB

Sample ID 2043-029

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
RSK 175	ETHANE	0.60	U	ug/l	74-84-0
RSK 175	ETHYLENE	1.0	U	ug/l	74-85-1
RSK 175	METHANE	1.3	U	ug/l	74-82-8
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	0.34	J	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	0.22	J	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name TRIPBLANK-02 Sampling Method Grab

Sample Date 10/20/2020

Sample Type TB

Sample ID 2043-036

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
RSK 175	ETHANE	0.60	U	ug/l	74-84-0
RSK 175	ETHYLENE	1.0	U	ug/l	74-85-1
RSK 175	METHANE	1.3	U	ug/l	74-82-8
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	0.39	J	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name TRIPBLANK-03 Sampling Method Grab

Sample Date 10/19/2020

Sample Type TB

Sample ID 2043-050

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis

Sample Name TRIPBLANK-04 Sampling Method Grab

Sample Date 10/19/2020

Sample Type TB

Sample ID 2043-051

Analytic Method	Analyte	Result	Qualifiers	Unit	Cas Number
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPROPANE	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	0.42	J	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Appendix B

Site Groundwater Extraction/Treatment System

This page intentionally left blank.

Appendix B-1

OU-3 Bi-weekly System Monitoring Checklists

This page intentionally left blank.

Name: Rick Read **Date:** 07/15/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.038		
Primary	0.002	2	5%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration** 7.00, 4.00

Location:	pH
Well Field	5.98
Pre-IX	6.02
IX Effluent	6.05
Final Discharge	7.96

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	55		
Well Field Influent	54	85776432	16:21
IX Influent Flow Meter	55	58626225	16:17
AS Influent Flow Meter	55	10819225	16:18
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	28
Air Stripper	26

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	60
Pre-Carbon Air Temperature (F^o)	78

Maintenance:

Replace Bag Filter?	Yes ☐	No ☒	Leaks/Notes?	
Drain Compressor?	Yes ☒	No ☐		
Replace Canister Filters?	Yes ☐	No ☒		
Lube Pump Motors?	Yes ☐	No ☒		
Inspect Infiltration Galleries?	Yes ☒	No ☐		

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	36
20 Micron 30 inch	30
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes
INF-070720	ALS	7/7/20	8260C, T.Cr
EFF-070720	ALS	7/7/20	8260C, T.Cr
TB-070720	ALS	7/7/20	8260C, T.Cr

Final Disharge pH at Time of Sampling: 7.96

Comments:

Name: Rick Read **Date:** 07/31/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.038		
Primary	0.002	2	5%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration** 7.00, 4.00

Location:	pH
Well Field	5.98
Pre-IX	6.02
IX Effluent	6.05
Final Discharge	7.96

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	55		
Well Field Influent	54	86962205	10:30
IX Influent Flow Meter	55	58759882	10:28
AS Influent Flow Meter	55	11354325	10:27
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	28
Air Stripper	26

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	68
Pre-Carbon Air Temperature (F^o)	82

Maintenance:

Replace Bag Filter?	Yes ☐	No ☒	Leaks/Notes?	
Drain Compressor?	Yes ☒	No ☐		
Replace Canister Filters?	Yes ☐	No ☒		
Lube Pump Motors?	Yes ☐	No ☒		
Inspect Infiltration Galleries?	Yes ☒	No ☐		

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	36
20 Micron 30 inch	30
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes

Final Disharge pH at Time of Sampling: 7.97

Comments:

Name: Rick Read **Date:** 08/15/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.038		
Primary	0.002	2	5%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration** 7.00, 4.00

Location:	pH
Well Field	5.98
Pre-IX	6.02
IX Effluent	6.05
Final Discharge	7.96

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells			
Well Field Influent	54	88209619	16:28
IX Influent Flow Meter	54	58891381	16:25
AS Influent Flow Meter	54	12216984	16:26
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	28
Air Stripper	26

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	60
Pre-Carbon Air Temperature (F^o)	78

Maintenance:

			Leaks/Notes?
Replace Bag Filter?	Yes ☐	No ☒	
Drain Compressor?	Yes ☒	No ☐	
Replace Canister Filters?	Yes ☐	No ☒	
Lube Pump Motors?	Yes ☐	No ☒	
Inspect Infiltration Galleries?	Yes ☒	No ☐	

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	36
20 Micron 30 inch	30
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes
INF-080320	ALS	8/3/20	8260C, T.Cr
EFF-080320	ALS	8/3/20	8260C, T.Cr
TB-080320	ALS	8/3/20	8260C, T.Cr

Final Disharge pH at Time of Sampling: 8.00

Comments:

Name: Rick Read **Date:** 08/31/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.038		
Primary	0.002	2	5%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration** 7.00, 4.00

Location:	pH
Well Field	5.98
Pre-IX	6.01
IX Effluent	6.04
Final Discharge	7.98

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells			
Well Field Influent		89313178	16:27
IX Influent Flow Meter		59027905	16:52
AS Influent Flow Meter		12438419	16:50
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	28
Air Stripper	26

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	62
Pre-Carbon Air Temperature (F^o)	81

Maintenance:

			Leaks/Notes?
Replace Bag Filter?	Yes ☐	No ☒	
Drain Compressor?	Yes ☒	No ☐	
Replace Canister Filters?	Yes ☐	No ☒	
Lube Pump Motors?	Yes ☐	No ☒	
Inspect Infiltration Galleries?	Yes ☒	No ☐	

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	36
20 Micron 30 inch	30
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes

Final Disharge pH at Time of Sampling: 7.97

Comments:

Name: Rick Read **Date:** 09/15/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.038		
Primary	0.002	2	5%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration** 7.00, 4.00

Location:	pH
Well Field	5.98
Pre-IX	6.01
IX Effluent	6.04
Final Discharge	7.98

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells			
Well Field Influent	54	90369102	13:05
IX Influent Flow Meter	54	59146167	13:03
AS Influent Flow Meter	54	12891940	13:04
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	28
Air Stripper	26

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	60
Pre-Carbon Air Temperature (F^o)	80

Maintenance:

			Leaks/Notes?
Replace Bag Filter?	Yes ☐	No ☒	
Drain Compressor?	Yes ☒	No ☐	
Replace Canister Filters?	Yes ☐	No ☒	
Lube Pump Motors?	Yes ☐	No ☒	
Inspect Infiltration Galleries?	Yes ☒	No ☐	

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	36
20 Micron 30 inch	30
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes
INF-090920	ALS	9/9/20	8260C, T.Cr
EFF-090920	ALS	9/9/20	8260C, T.Cr
TB -090920	ALS	9/9/20	8260C

Final Disharge pH at Time of Sampling: 7.98

Comments:

Name: Rick Read **Date:** 09/30/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent			
Primary			
Secondary			
Final Discharge			

System pH Measurements During Inspection:

Location:	Initial Calibration pH	Final Calibration pH
Well Field		
Pre-IX		
IX Effluent		
Final Discharge		

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	0		
Well Field Influent	0	91226791	17:08
IX Influent Flow Meter	0	59242359	17:05
AS Influent Flow Meter	0	13269981	17:06
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	
Air Stripper	

TCE Concentrations:

Location:	TCE (ppm)
Air Stripper Effluent	
Post Primary	
Final Discharge	

Capsulhelic Gauge (In. H_2O)

Pre-Heater Air Temperature (F^o)

Pre-Carbon Air Temperature (F^o)

Maintenance:

Replace Bag Filter?	Yes ☐	No ☒	Leaks/Notes?
Drain Compressor?	Yes ☒	No ☐	
Replace Canister Filters?	Yes ☐	No ☒	
Lube Pump Motors?	Yes ☐	No ☒	
Inspect Infiltration Galleries?	Yes ☒	No ☐	

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	36
20 Micron 30 inch	30
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes

Final Disharge pH at Time of Sampling:

Comments:

MW-22 shut off on 9/21/20 to drain pipe line between CV-10 and CV-13.

Treatment system was off during what would have been the end of September bi weekly inspection.

Name: Rick Read **Date:** 10/16/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.040		
Primary	0.003	2	8%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration** 7.00, 4.00

Location:	pH
Well Field	6.00
Pre-IX	6.02
IX Effluent	6.06
Final Discharge	7.99

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells			
Well Field Influent	38	91884666	14:30
IX Influent Flow Meter	38	59326438.5	14:27
AS Influent Flow Meter	38	13610345.5	14:28
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	
Air Stripper	

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	< 1.0	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	58
Pre-Carbon Air Temperature (F^o)	72

Maintenance:

Replace Bag Filter?	Yes ☐	No ☒	Leaks/Notes?	
Drain Compressor?	Yes ☒	No ☐		
Replace Canister Filters?	Yes ☐	No ☒		
Lube Pump Motors?	Yes ☒	No ☐		
Inspect Infiltration Galleries?	Yes ☒	No ☐		

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	22
20 Micron 30 inch	26
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes
INF-100820	ALS	10/8/20	8260c, T.Cr
EFF-100820	ALS	10/8/20	8260c, T.Cr
TB-100820	ALS	10/8/20	8260c

Final Disharge pH at Time of Sampling: 7.99

Comments:

Treatment system was down on 10/01/20 due to a bad relay untill 10:01

Name: Rick Read **Date:** 10/30/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.040		
Primary	0.003	2	8%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration** 7.00, 4.00

Location:	pH
Well Field	5.99
Pre-IX	6.02
IX Effluent	6.05
Final Discharge	7.98

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells			
Well Field Influent	37	92723516	13:57
IX Influent Flow Meter	37	59410518	13:54
AS Influent Flow Meter	37	13950710	13:55
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	28
Air Stripper	26

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	< 1.0	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	58
Pre-Carbon Air Temperature (F^o)	72

Maintenance:

Replace Bag Filter?	Yes ☐	No ☒	Leaks/Notes?	
Drain Compressor?	Yes ☒	No ☐		
Replace Canister Filters?	Yes ☐	No ☒		
Lube Pump Motors?	Yes ☒	No ☐		
Inspect Infiltration Galleries?	Yes ☒	No ☐		

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	22
20 Micron 30 inch	26
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes

Final Disharge pH at Time of Sampling:

Comments:

Name: Rick Read **Date:** 11/18/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.040		
Primary	0.003	2	8%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration**

Location:	pH
Well Field	5.99
Pre-IX	6.03
IX Effluent	6.05
Final Discharge	7.99

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells			
Well Field Influent	37	93699021	16:50
IX Influent Flow Meter	37	59519695	16:46
AS Influent Flow Meter	37	14266246	16:47
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	28
Air Stripper	26

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	< 1.0	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	58
Pre-Carbon Air Temperature (F^o)	68

Maintenance:

Replace Bag Filter?	Yes ☐	No ☒	Leaks/Notes?	
Drain Compressor?	Yes ☒	No ☐		
Replace Canister Filters?	Yes ☒	No ☐		
Lube Pump Motors?	Yes ☒	No ☐		
Inspect Infiltration Galleries?	Yes ☒	No ☐		

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	22
20 Micron 30 inch	26
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes
INF-110320	ALS	11/3/20	8260c, T.Cr
EFF-110320	ALS	11/3/20	8260c, T.Cr
TB-110320	ALS	11/3/20	8260c

Final Disharge pH at Time of Sampling: 7.99

Comments:

Name: Rick Read **Date:** 11/30/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.040		
Primary	0.003	2	8%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration**

Location:	pH
Well Field	6.00
Pre-IX	6.04
IX Effluent	6.07
Final Discharge	7.99

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells			
Well Field Influent	37	94305412	15:57
IX Influent Flow Meter	37	59587841	15:55
AS Influent Flow Meter	37	14408707	15:54
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	28
Air Stripper	26

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	< 1.0	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	56
Pre-Carbon Air Temperature (F^o)	70

Maintenance:

Replace Bag Filter?	Yes ☐	No ☒	Leaks/Notes?	
Drain Compressor?	Yes ☒	No ☐		
Replace Canister Filters?	Yes ☐	No ☒		
Lube Pump Motors?	Yes ☒	No ☐		
Inspect Infiltration Galleries?	Yes ☒	No ☐		

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	22
20 Micron 30 inch	26
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes

Final Disharge pH at Time of Sampling:

Comments:

Name: Rick Read **Date:** 12/15/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.040		
Primary	0.003	2	8%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration** 7.00, 4.00

Location:	pH
Well Field	6.00
Pre-IX	6.05
IX Effluent	6.07
Final Discharge	7.97

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells			
Well Field Influent	37	95065399	15:00
IX Influent Flow Meter	37	59672922	14:57
AS Influent Flow Meter	37	14602275	14:58
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	28
Air Stripper	26

TCE Concentrations: ;00 14:57

Location:	TCE (ppm)	
Air Stripper Effluent	< 1.0	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	56
Pre-Carbon Air Temperature (F^o)	68

Maintenance:

Replace Bag Filter?	Yes ☐	No ☒	Leaks/Notes?
Drain Compressor?	Yes ☒	No ☐	
Replace Canister Filters?	Yes ☐	No ☒	
Lube Pump Motors?	Yes ☐	No ☒	
Inspect Infiltration Galleries?	Yes ☐	No ☒	

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	22
20 Micron 30 inch	26
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes
INF-120420	ALS	12/4/20	8260c, T.Cr
EFF-120420	ALS	12/4/20	8260c, T.Cr
TB-120420	ALS	12/4/20	8260c

Final Disharge pH at Time of Sampling: 7.99

Comments:

Name: Rick Read **Date:** 12/31/20

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.040		
Primary	0.003	2	8%
Secondary	ND	3	
Final Discharge	ND		

System pH Measurements During Inspection:

Initial Calibration 7.00, 4.00 **Final Calibration** 7.00, 4.00

Location:	pH
Well Field	5.98
Pre-IX	6.03
IX Effluent	6.06
Final Discharge	7.99

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells			
Well Field Influent	37	95870070	11:10
IX Influent Flow Meter	37	59762732	11:05
AS Influent Flow Meter	37	14812993	11:06
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	28
Air Stripper	26

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	< 1.0	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	
Pre-Heater Air Temperature (F^o)	58
Pre-Carbon Air Temperature (F^o)	70

Maintenance:

			Leaks/Notes?
Replace Bag Filter?	Yes ☐	No ☒	
Drain Compressor?	Yes ☒	No ☐	
Replace Canister Filters?	Yes ☐	No ☒	
Lube Pump Motors?	Yes ☐	No ☒	
Inspect Infiltration Galleries?	Yes ☒	No ☐	

Inventory:

	Quantity
Gloves	6
Drums Empty 55-gal	5
Super sacks	4
Bag Filters	0
Canister Filters	
10 Micron 29.25 inch	0
10 Micron 30 inch	0
20 Micron 29.25 inch	22
20 Micron 30 inch	26
75 Micron 30 inch	0

Monthly Sampling:

Location	Lab	Date	Analytes

Final Disharge pH at Time of Sampling:

Comments:

Appendix B-2

OU-3 System Operation Tables

This page intentionally left blank.

APPENDIX B.2 - TABLE 1A
OU-3 JULY 2020 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
07/01/20	78,954	24.00	100.00%
07/02/20	78,903	24.00	100.00%
07/03/20	78,857	24.00	100.00%
07/04/20	78,839	24.00	100.00%
07/05/20	78,810	24.00	100.00%
07/06/20	78,902	24.00	100.00%
07/07/20	78,864	24.00	100.00%
07/08/20	78,773	24.00	100.00%
07/09/20	78,803	24.00	100.00%
07/10/20	78,665	24.00	100.00%
07/11/20	78,743	24.00	100.00%
07/12/20	78,936	24.00	100.00%
07/13/20	78,907	24.00	100.00%
07/14/20	78,796	24.00	100.00%
07/15/20	78,663	24.00	100.00%
07/16/20	78,623	24.00	100.00%
07/17/20	78,686	24.00	100.00%
07/18/20	78,594	24.00	100.00%
07/19/20	78,473	24.00	100.00%
07/20/20	78,290	24.00	100.00%
07/21/20	78,387	24.00	100.00%
07/22/20	78,488	24.00	100.00%
07/23/20	78,765	24.00	100.00%
07/24/20	78,881	24.00	100.00%
07/25/20	78,811	24.00	100.00%
07/26/20	78,549	24.00	100.00%
07/27/20	78,451	24.00	100.00%
07/28/20	78,448	24.00	100.00%
07/29/20	78,354	24.00	100.00%
07/30/20	78,258	24.00	100.00%
07/31/20	78,429	24.00	100.00%
Subtotals	**2,438,902**	**744.00**	**100.00%**

Daily Breakdown		**Vancouver Permit Limits[3]**
Average Daily Flow (gallons)	78,674	230,400
Maximum Daily Flow (gallons)	78,954	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	3261	
Average Daily Flow (hundreds of cubic feet)	105	

Notes:

[1] gpd = gallons per day to the infiltration gallery.

[2] Based on minutes of operation as reported by data logger.

[3] Only applies if water is being discharged to the City of Vancouver sewer.

APPENDIX B.2 - TABLE 1B
OU-3 AUGUST 2020 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
08/01/20	78,534	24.00	100.00%
08/02/20	78,509	24.00	100.00%
08/03/20	78,425	24.00	100.00%
08/04/20	78,493	24.00	100.00%
08/05/20	78,485	24.00	100.00%
08/06/20	78,635	24.00	100.00%
08/07/20	78,630	24.00	100.00%
08/08/20	78,585	24.00	100.00%
08/09/20	78,545	24.00	100.00%
08/10/20	78,561	24.00	100.00%
08/11/20	78,582	24.00	100.00%
08/12/20	78,617	24.00	100.00%
08/13/20	78,506	24.00	100.00%
08/14/20	78,440	24.00	100.00%
08/15/20	78,306	24.00	100.00%
08/16/20	78,255	24.00	100.00%
08/17/20	78,140	24.00	100.00%
08/18/20	78,260	24.00	100.00%
08/19/20	78,259	24.00	100.00%
08/20/20	78,255	24.00	100.00%
08/21/20	78,173	24.00	100.00%
08/22/20	78,254	24.00	100.00%
08/23/20	78,408	24.00	100.00%
08/24/20	78,310	24.00	100.00%
08/25/20	78,286	24.00	100.00%
08/26/20	78,409	24.00	100.00%
08/27/20	78,318	24.00	100.00%
08/28/20	78,328	24.00	100.00%
08/29/20	78,446	24.00	100.00%
08/30/20	78,452	24.00	100.00%
08/31/20	78,399	24.00	100.00%
Subtotals	**2,430,806**	**744.00**	**100.00%**

Daily Breakdown		**Vancouver Permit Limits[3]**
Average Daily Flow (gallons)	78,413	230,400
Maximum Daily Flow (gallons)	78,635	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	3250	
Average Daily Flow (hundreds of cubic feet)	105	

Notes:

[1] gpd = gallons per day to the infiltration gallery.

[2] Based on minutes of operation as reported by data logger.

[3] Only applies if water is being discharged to the City of Vancouver sewer.

APPENDIX B.2 - TABLE 1A
OU-3 SEPTEMBER 2020 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
09/01/20	78,316	24.00	100.00%
09/02/20	56,501	17.28	72.01%
09/03/20	32,074	9.76	40.68%
09/04/20	79,107	24.00	100.00%
09/05/20	79,283	24.00	100.00%
09/06/20	79,281	24.00	100.00%
09/07/20	79,180	24.00	100.00%
09/08/20	79,149	24.00	100.00%
09/09/20	78,980	24.00	100.00%
09/10/20	79,092	24.00	100.00%
09/11/20	79,175	24.00	100.00%
09/12/20	79,217	24.00	100.00%
09/13/20	79,175	24.00	100.00%
09/14/20	79,104	24.00	100.00%
09/15/20	79,065	24.00	100.00%
09/16/20	79,193	24.00	100.00%
09/17/20	79,144	24.00	100.00%
09/18/20	79,016	24.00	100.00%
09/19/20	78,893	24.00	100.00%
09/20/20	79,078	24.00	100.00%
09/21/20	70,180	24.00	100.00%
09/22/20	53,600	24.00	100.00%
09/23/20	53,596	24.00	100.00%
09/24/20	53,425	24.00	100.00%
09/25/20	53,496	24.00	100.00%
09/26/20	53,616	24.00	100.00%
09/27/20	53,671	24.00	100.00%
09/28/20	53,574	24.00	100.00%
09/29/20	20,160	9.05	37.73%
09/30/20	0	0.00	0.00%
Subtotals	**1,977,337**	**660.10**	**91.68%**

Daily Breakdown		**Vancouver Permit Limits[3]**
Average Daily Flow (gallons)	65,911	230,400
Maximum Daily Flow (gallons)	79,283	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	2643	
Average Daily Flow (hundreds of cubic feet)	88	

Notes:

[1] gpd = gallons per day to the infiltration gallery.

[2] Based on minutes of operation as reported by data logger.

[3] Only applies if water is being discharged to the City of Vancouver sewer.

APPENDIX B.2 - TABLE 1D
OU-3 OCTOBER 2020 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
10/01/20	33,139	15.05	62.71%
10/02/20	53,947	24.00	100.00%
10/03/20	53,758	24.00	100.00%
10/04/20	53,678	24.00	100.00%
10/05/20	53,662	24.00	100.00%
10/06/20	53,603	24.00	100.00%
10/07/20	53,585	24.00	100.00%
10/08/20	53,580	24.00	100.00%
10/09/20	53,625	24.00	100.00%
10/10/20	53,869	24.00	100.00%
10/11/20	53,788	24.00	100.00%
10/12/20	53,716	24.00	100.00%
10/13/20	53,966	24.00	100.00%
10/14/20	53,983	24.00	100.00%
10/15/20	53,953	24.00	100.00%
10/16/20	53,858	24.00	100.00%
10/17/20	53,859	24.00	100.00%
10/18/20	53,875	24.00	100.00%
10/19/20	53,837	24.00	100.00%
10/20/20	53,822	24.00	100.00%
10/21/20	53,843	24.00	100.00%
10/22/20	53,891	24.00	100.00%
10/23/20	53,880	24.00	100.00%
10/24/20	53,858	24.00	100.00%
10/25/20	53,862	24.00	100.00%
10/26/20	53,900	24.00	100.00%
10/27/20	53,825	24.00	100.00%
10/28/20	53,768	24.00	100.00%
10/29/20	53,746	24.00	100.00%
10/30/20	53,696	24.00	100.00%
10/31/20	53,715	24.00	100.00%
Subtotals	**1,647,088**	**735.05**	**98.80%**

Daily Breakdown		**Vancouver Permit Limits[3]**
Average Daily Flow (gallons)	53,132	230,400
Maximum Daily Flow (gallons)	53,983	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	2202	
Average Daily Flow (hundreds of cubic feet)	71	

Notes:

[1] gpd = gallons per day; gpm = gallons per minute

[2] Based on minutes of operation as reported by data logger

[3] Only applies if water is being discharged to the City of Vancouver sewer.

APPENDIX B.2 - TABLE 1E
OU-3 NOVEMBER 2020 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
11/01/20	53,701	24.00	100.00%[4]
11/02/20	53,671	24.00	100.00%
11/03/20	53,594	24.00	100.00%
11/04/20	53,533	24.00	100.00%
11/05/20	53,413	24.00	100.00%
11/06/20	53,517	24.00	100.00%
11/07/20	53,672	24.00	100.00%
11/08/20	53,728	24.00	100.00%
11/09/20	53,788	24.00	100.00%
11/10/20	53,732	24.00	100.00%
11/11/20	53,704	24.00	100.00%
11/12/20	53,631	24.00	100.00%
11/13/20	53,641	24.00	100.00%
11/14/20	53,685	24.00	100.00%
11/15/20	53,657	24.00	100.00%
11/16/20	53,674	24.00	100.00%
11/17/20	53,666	24.00	100.00%
11/18/20	53,683	24.00	100.00%
11/19/20	53,703	24.00	100.00%
11/20/20	53,736	24.00	100.00%
11/21/20	53,747	24.00	100.00%
11/22/20	53,763	24.00	100.00%
11/23/20	53,745	24.00	100.00%
11/24/20	53,720	24.00	100.00%
11/25/20	53,703	24.00	100.00%
11/26/20	53,677	24.00	100.00%
11/27/20	53,715	24.00	100.00%
11/28/20	53,655	24.00	100.00%
11/29/20	53,631	24.00	100.00%
11/30/20	53,619	24.00	100.00%
Subtotals	**1,610,102**	**720.00**	**100.00%**

Daily Breakdown		**Vancouver Permit Limits[3]**
Average Daily Flow (gallons)	53,670	230,400
Maximum Daily Flow (gallons)	53,788	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	2153	
Average Daily Flow (hundreds of cubic feet)	72	

Notes:

[1] gpd = gallons per day; gpm = gallons per minute

[2] Based on minutes of operation as reported by data logger

[3] Only applies if water is being discharged to the City of Vancouver sewer.

[4] Daylight Savings time ended November 1.

APPENDIX B.2 - TABLE 1F
OU-3 DECEMBER 2020 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
12/01/20	53,635	24.00	100.00%
12/02/20	53,656	24.00	100.00%
12/03/20	53,599	24.00	100.00%
12/04/20	53,584	24.00	100.00%
12/05/20	53,553	24.00	100.00%
12/06/20	53,476	24.00	100.00%
12/07/20	53,477	24.00	100.00%
12/08/20	53,480	24.00	100.00%
12/09/20	53,379	24.00	100.00%
12/10/20	53,331	24.00	100.00%
12/11/20	53,403	24.00	100.00%
12/12/20	53,400	24.00	100.00%
12/13/20	53,506	24.00	100.00%
12/14/20	53,427	24.00	100.00%
12/15/20	53,326	24.00	100.00%
12/16/20	53,284	24.00	100.00%
12/17/20	53,387	24.00	100.00%
12/18/20	53,438	24.00	100.00%
12/19/20	53,331	24.00	100.00%
12/20/20	53,285	24.00	100.00%
12/21/20	53,221	24.00	100.00%
12/22/20	53,673	24.00	100.00%
12/23/20	53,704	24.00	100.00%
12/24/20	53,807	24.00	100.00%
12/25/20	53,816	24.00	100.00%
12/26/20	53,754	24.00	100.00%
12/27/20	53,787	24.00	100.00%
12/28/20	53,820	24.00	100.00%
12/29/20	53,888	24.00	100.00%
12/30/20	53,899	24.00	100.00%
12/31/20	53,735	24.00	100.00%
Subtotals	**1,660,060**	**744.00**	**100.00%**

Daily Breakdown		**Vancouver Permit Limits[3]**
Average Daily Flow (gallons)	53,550	230,400
Maximum Daily Flow (gallons)	53,899	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	2219	
Average Daily Flow (hundreds of cubic feet)	72	

Notes:

[1] gpd = gallons per day; gpm = gallons per minute

[2] Based on minutes of operation as reported by data logger

[3] Only applies if water is being discharged to the City of Vancouver sewer.

APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES, BOOMSNUB/AIRCO SUPERFUND SITE

TABLE 2A - JULY 31, 2020

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	12.0	8123250	14:36
MW-6B	Active	4.8	5852800	14:56
MW-10B	Active	10.2	5278550	14:52
MW-10C	Active	12.1	755580	14:53
MW-14C	Off	10/17/19		
MW-14E	Off	10/17/19		
MW-19D	Off	10/14/19		
MW-20D	Off	05/08/20		
MW-21D	Off	06/01/18		
MW-22D	Active	17.6	575477	14:45
CPU-13	Off	05/2013		
AMW-59	Off	10/2006		
MW-18D	Off	08/16/18		
MW-18E	Off	10/2006		
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		

Notes:

APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES, BOOMSNUB/AIRCO SUPERFUND SITE

TABLE 2B - AUGUST 31, 2020

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	11.5	8643250	15:52
MW-6B	Active	4.8	6045290	16:20
MW-10B	Active	10.3	5738190	16:14
MW-10C	Active	12.0	1300300	16:13
MW-14C	Off	10/17/19		
MW-14E	Off	10/17/19		
MW-19D	Off	10/14/19		
MW-20D	Off	05/08/20		
MW-21D	Off	06/01/18		
MW-22D	Active	17.5	681600	15:59
CPU-13	Off	05/2013		
AMW-59	Off	10/2006		
MW-18D	Off	08/16/18		
MW-18E	Off	10/2006		
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		

Notes:

APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES, BOOMSNUB/AIRCO SUPERFUND SITE

TABLE 2C - SEPTEMBER 30, 2020

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active			
MW-6B	Active			
MW-10B	Active			
MW-10C	Active			
MW-14C	Off	10/17/19		
MW-14E	Off	10/17/19		
MW-19D	Off	10/14/19		
MW-20D	Off	05/08/20		
MW-21D	Off	06/01/18		
MW-22D	Off	09/21/20		
CPU-13	Off	05/2013		
AMW-59	Off	10/2006		
MW-18D	Off	08/16/18		
MW-18E	Off	10/2006		
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		

Notes: System and wells were all off during routine reporting period.

APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES, BOOMSNUB/AIRCO SUPERFUND SITE

TABLE 2D - OCTOBER 30, 2020

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	11.5	9596760	14:00
MW-6B	Active	4.8	6378870	14:16
MW-10B	Active	10.3	6585360	14:13
MW-10C	Active	12.0	3299380	14:14
MW-14C	Off	10/17/19		
MW-14E	Off	10/17/19		
MW-19D	Off	10/14/19		
MW-20D	Off	05/08/20		
MW-21D	Off	06/01/18		
MW-22D	Off	09/21/20		
CPU-13	Off	05/2013		
AMW-59	Off	10/2006		
MW-18D	Off	08/16/18		
MW-18E	Off	10/2006		
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		

Notes:

APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES, BOOMSNUB/AIRCO SUPERFUND SITE

TABLE 2E - NOVEMBER 27, 2020

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	11.1	110630	15:41
MW-6B	Active	10.0	704700	15:45
MW-10B	Active	12.0	2844230	15:46
MW-10C	Active	4.8	6557160	15:49
MW-14C	Off	10/17/19		
MW-14E	Off	10/17/19		
MW-19D	Off	10/14/19		
MW-20D	Active	05/08/20		
MW-21D	Off	06/01/18		
MW-22D	Active	09/21/20		
CPU-13	Off	05/2013		
AMW-59	Off	10/2006		
MW-18D	Off	08/16/18		
MW-18E	Off	10/2006		
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		

Notes:

APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES, BOOMSNUB/AIRCO SUPERFUND SITE

TABLE 2F - DECEMBER 31, 2020

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	11.5	616190	14:33
MW-6B	Active	4.4	6736170	14:46
MW-10B	Active	10.5	156450	14:42
MW-10C	Active	12.0	3386820	14:41
MW-14C	Off	10/17/19		
MW-14E	Off	10/17/19		
MW-19D	Off	10/14/19		
MW-20D	Off	05/08/20		
MW-21D	Off	06/01/18		
MW-22D	Off	09/21/20		
CPU-13	Off	05/2013		
AMW-59	Off	10/2006		
MW-18D	Off	08/16/18		
MW-18E	Off	10/2006		
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		

Notes:

APPENDIX B.2 - TABLE 3
JULY THROUGH DECEMBER 2020

OU-3 MONTHLY SYSTEM SAMPLING ANALYTICAL RESULTS
BOOMSNUB/AIRCO SUPERFUND SITE

Location	Sample Number	Sampling Date	TCE (µg/L)	PCE (µg/L)	Total Chromium (µg/L)	pH	
						pH	Field Reading Date
Permit #2014-04 Discharge Limits			**330**		**7,220**	**5.5 to 10**	
Infiltration Gallery Discharge Limits			**1.9**		**19**		
July 2020							
Influent	INF-070720	7/7/2020	5.4	0.5	31.2	6.02	7/15/2020
Effluent	EFF-070720	7/7/2020	0.5 U	0.5 U	8.4 U	7.96	7/15/2020
Trip Blank	TB-070720	7/7/2020	0.5 U	0.5 U	NA	NA	NA
August 2020							
Influent	INF-080320	8/3/2020	2.9	0.54 J	31.3	6	8/31/2020
Effluent	EFF-080320	8/3/2020	0.5U	0.5 U	8.4 U	7.98	8/31/2020
Trip Blank	TB-080320	8/3/2020	0.5 U	0.5 U	NA	NA	NA
September 2020							
Influent	INF-090920	9/9/2020	3	0.49 J	32.2	6.01	9/15/2020
Effluent	EFF-090920	9/9/2020	0.5 U	0.5 U	8.4 U	7.95	9/15/2020
Trip Blank	TB-090920	9/9/2020	0.5 U	0.5 U	NA	NA	NA
October 2020							
Influent	INF-100820	10/8/2020	3.2	0.43 J	36	6.02	10/30/2020
Effluent	EFF-100820	10/8/2020	0.5 U	0.5 U	8.4 U	7.98	10/30/2020
Trip Blank	TB-100820	10/8/2020	0.5 U	0.5 U	NA	NA	NA
November 2020							
Influent	INF-110320	11/3/2020	3.5	0.44 J	36.8	6.03	11/15/2020
Effluent	EFF-110320	11/3/2020	0.5 U	0.5 U	8.4 U	7.99	11/15/2020
Trip Blank	TB-110320	11/3/2020	0.5 U	0.5 U	NA	NA	NA
December 2020							
Influent	INF-120420	12/4/2020	4	0.51 J	36.8	6.0-35	12/31/2020
Effluent	EFF-120420	12/4/2020	0.5 U	0.5 U	8.4 U	7.99	12/31/2020
Trip Blank	TB-120420	12/4/2020	0.5 U	NA	NA	NA	NA

Notes: .

J - result is an estimated concentration that is less then the Method Reporting Limit but is greater than or equal to the Method Detection Limit.

µg/L - micrograms per liter

NA - not analyzed

PCE - tetrachloroethene

TCE - trichloroethene

U - analyte not detected above specified reporting limit

Appendix B-3

OU-3 Mass Removal Tables and Charts

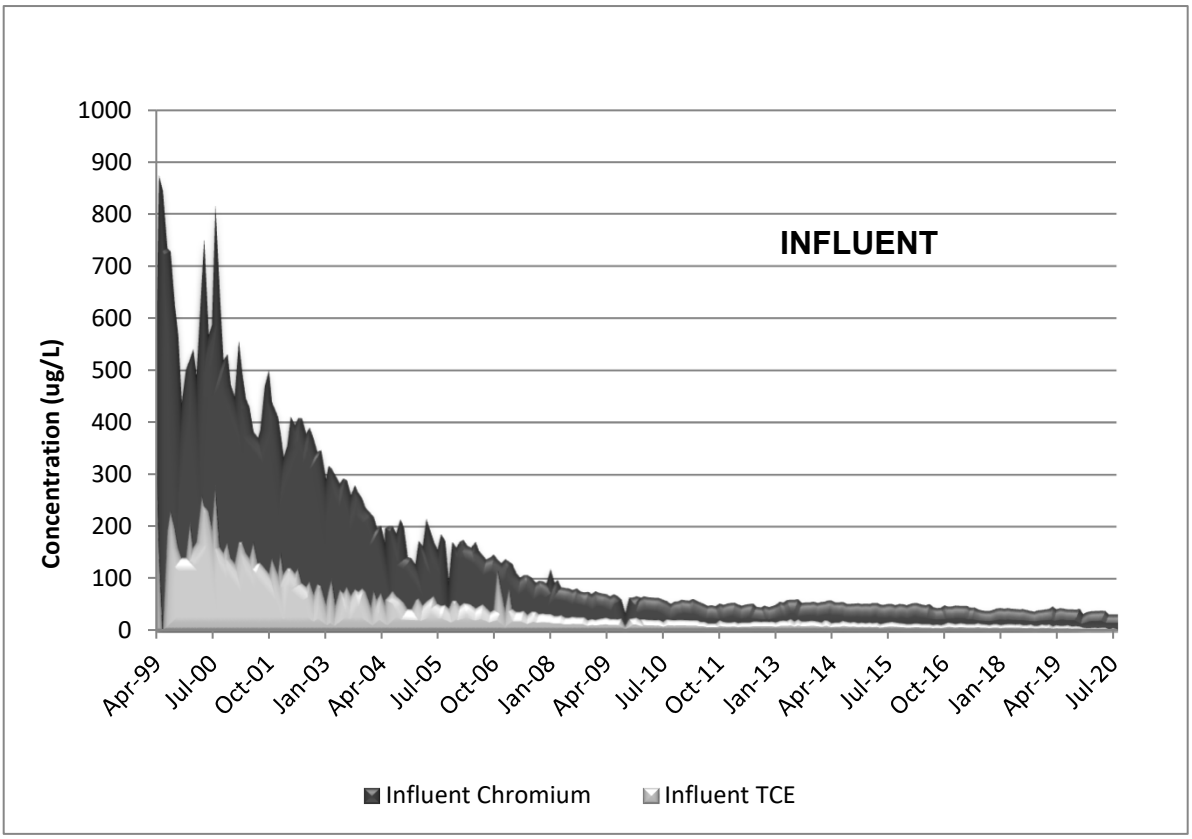
This page intentionally left blank.

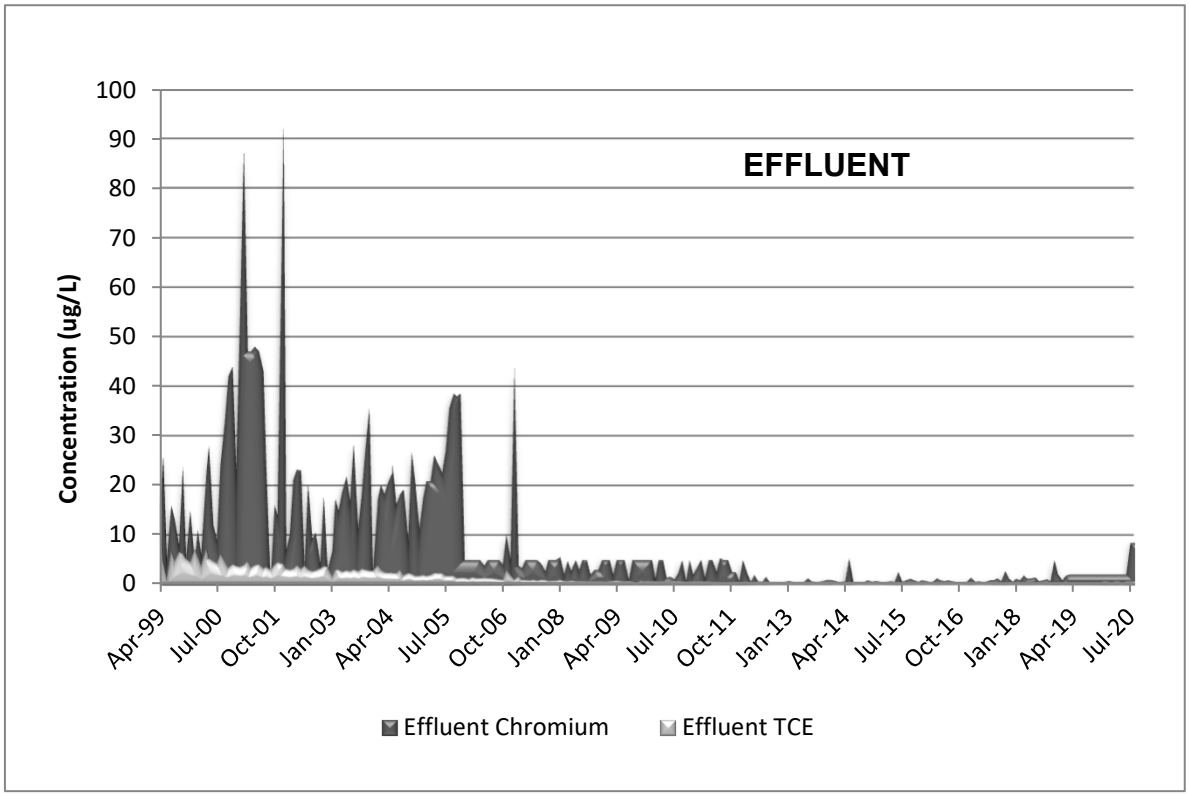
APPENDIX B.3 - TABLE 1
OU-3 CHROMIUM AND TCE MASS REMOVAL ESTIMATION
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Monthly Flow (Gallons)	Influent Chromium (ug/L)	Influent TCE (ug/L)	Monthly Chromium Removal (lbs)	Monthly TCE Removal (lbs)	Cumulative Chromium Removed (lbs)	Cumulative TCE Removed (lbs)
1990 to 1995[1]						13,751.0	
1995 to May 1999[1]						20,538.0	
1990 to 1999[1]							1,645.7
Ave. Jun-Dec 1999	5,303,734	634.4	160.7	27.9	7.2	20,733.6	1,696.3
Ave. for 2000	5,429,513	593.4	197.5	27.0	8.9	21,057.0	1,803.6
Ave. for 2001	5,482,077	450.6	139.2	20.7	6.4	21,305.7	1,879.9
Ave. for 2002	5,587,227	379.0	102.1	17.7	4.8	21,518.0	1,937.3
Ave. for 2003	6,279,889	281.8	74.7	14.7	3.9	21,694.7	1,984.1
Ave. for 2004	6,463,796	194.1	59.8	10.5	3.2	21,820.2	2,022.8
Ave. for 2005	6,213,535	165.5	54.8	8.6	2.8	21,923.2	2,056.8
Ave. for 2006	6,409,175	153.8	55.8	8.2	3.0	22,022.0	2,092.2
Ave. for 2007	6,366,615	108.7	40.1	5.7	2.1	22,090.9	2,117.3
Ave. for 2008	6,547,878	84.2	26.3	4.6	1.4	22,146.3	2,134.6
Ave. for 2009	6,628,721	64.6	22.3	3.6	1.2	22,189.7	2,149.4
Ave. for 2010	6,835,587	60.5	20.8	3.5	1.2	22,230.8	2,163.6
Ave. for 2011	6,585,675	54.0	17.5	3.0	1.0	22,266.5	2,175.2
Ave. for 2012	6,868,867	49.4	16.8	2.8	1.0	22,300.8	2,186.8
Ave. for 2013	5,566,626	56.1	19.1	2.6	0.9	22,332.0	2,197.4
Ave. for 2014	5,466,047	54.5	17	2.5	0.8	22,361.8	2,206.6
Ave. for 2015	5,471,175	51.3	15	2.3	0.7	22,389.9	2,214.9
Ave. for 2016	5,474,936	48.8	13.2	2.2	0.6	22,416.7	2,222.1
Ave. for 2017	5,595,195	43.5	13	2.0	0.6	22,440.7	2,229.4
Jan-18	5,686,640	43.9	11	2.1	0.5	22,442.8	2,229.9
Feb-18	5,136,129	42.7	12	1.8	0.5	22,444.6	2,230.4
Mar-18	5,654,944	43.7	13	2.1	0.6	22,446.7	2,231.1
Apr-18	5,493,023	42.4	13	1.9	0.6	22,448.7	2,231.6
May-18	5,690,489	41.9	12	2.0	0.6	22,450.6	2,232.2
Jun-18	5,392,921	41.0	13	1.8	0.6	22,452.5	2,232.8
Jul-18	5,302,102	42.1	11	1.9	0.5	22,454.4	2,233.3
Aug-18	4,932,325	39.8	11	1.6	0.5	22,456.0	2,233.7
Sep-18	4,413,403	38.0	12	1.4	0.4	22,457.4	2,234.2
Oct-18	4,533,790	37.0	10	1.4	0.4	22,458.8	2,234.6
Nov-18	4,361,354	39.5	9.6	1.4	0.3	22,460.2	2,234.9
Dec-18	4,463,485	39.9	12	1.5	0.4	22,461.7	2,235.4
Jan-19	4,413,928	41.3	11	1.5	0.4	22,463.2	2,235.8
Feb-19	3,933,978	42.3	12	1.4	0.4	22,464.6	2,236.2
Mar-19	3,934,035	46.5	8.3	1.5	0.3	22,466.2	2,236.4
Apr-19	4,388,532	41.2	11	1.5	0.4	22,467.7	2,236.8
May-19	4,498,487	43.6	10	1.6	0.4	22,469.3	2,237.2
Jun-19	4,305,498	42.7	9.6	1.5	0.3	22,470.8	2,237.6
Jul-19	4,394,334	41.3	11.0	1.5	0.4	22,472.4	2,238.0
Aug-19	4,401,675	41.4	8.6	1.5	0.3	22,473.9	2,238.3
Sep-19	4,238,615	40.5	8.9	1.4	0.3	22,475.3	2,238.6
Oct-19	3,694,136	42.7	8.4	1.3	0.3	22,476.6	2,238.9
Nov-19	2,954,631	32.2	6.3	0.8	0.2	22,477.4	2,239.0
Dec-19	3,044,436	35.6	5.6	0.9	0.1	22,478.3	2,239.1
Jan-20	3,085,887	37.4	5.4	1.0	0.1	22,479.3	2,239.3
Feb-20	2,964,380	38.3	5.9	0.9	0.1	22,480.2	2,239.4
Mar-20	3,090,940	38.3	5.4	1.0	0.1	22,481.2	2,239.6
Apr-20	2,939,574	38.6	6.3	0.9	0.2	22,482.2	2,239.7
May-20	2,598,158	37.9	6.3	0.8	0.1	22,483.0	2,239.9
Jun-20	2,370,415	31.2	3.0	0.6	0.1	22,483.6	2,239.9
Jul-20	2,438,902	31.2	2.8	0.6	0.1	22,484.3	2,240.0
Aug-20	2,430,806	31.3	2.9	0.6	0.1	22,484.9	2,240.0
Sep-20	1,977,337	32.2	3.0	0.5	0.0	22,485.4	2,240.1
Oct-20	1,647,088	36.0	3.2	0.5	0.0	22,485.9	2,240.1
Nov-20	1,610,102	36.8	3.5	0.5	0.0	22,486.4	2,240.2
Dec-20	1,660,060	36.8	4.0	0.5	0.1	22,486.9	2,240.2

Notes:
June 1999 through March 2002 data provided by URS
Shaded area represents data from the Fall sampling event.
[1] - Provided by ICF Kaiser
lbs = pounds
ug/L = micrograms per liter

FIGURE B.3-1. MASS REMOVAL OVER TIME





Appendix B-4

OU-3 Reports to the City of Vancouver and Supporting Flow Data

This page intentionally left blank.

EA Engineering, Science, and Technology, Inc., PBC

2200 Sixth Avenue, Suite 707
Seattle, Washington 98121
Telephone: 206-452-5350
Fax: 206-443-7646
www.eaest.com

20 January 2021
16113.03 LN1717

Mr. Nick Imbery
Industrial Pretreatment Coordinator
City of Vancouver
Marine Park Engineering Office
P.O. Box 1995
Vancouver, Washington 98668-1995

Subject: Semi-Annual Self-Monitoring Report – 30 January 2021
Boomsnub/Airco Superfund Site
Hazel Dell, Washington

Dear Mr. Imbery:

On behalf of Messer LLC, we are submitting the Semi-Annual Self-Monitoring Report for the Boomsnub/Airco Superfund Site, prepared in accordance with the City of Vancouver Industrial Wastewater Discharge Permit 2019-06. The time period covered includes October through December 2020. Flow data are being reported from the flow meter on the air stripper. During the reporting period, all discharges were made to the infiltration gallery on Messer property.

Effluent samples were collected by EA Engineering, Science, and Technology, Inc., PBC on October 8, November 3 and December 4, 2020. ALS Environmental, located in Kelso, Washington, is our analytical laboratory. The analytical data for each monthly sampling event are included, along with the case narrative, sample Chain-of-Custody forms, and a list of data qualifiers. The pH values reported were based on bi-monthly field pH readings. The results indicate that concentrations of trichloroethene and chromium in effluent are lower than effluent discharge limits.

Please let me know if you have any questions regarding the enclosed information.

Sincerely,

Jonathan Reeve, LHG
Project Manager

JR/lw
cc: Dave Sordi
Philipp Sieber

Enclosures: City of Vancouver Semi-Annual Self-Monitoring Report
List of Data Qualifiers
Laboratory Case Narratives, Chain of Custody forms, and Analytical Results

Industrial Wastewater Discharge Monitoring Report

CITY OF Vancouver WASHINGTON

Industrial Pretreatment
P.O. Box 1995
Vancouver, WA 98668
Office: 360-487-7130
Fax: 360- 487-7139

Industry Name: **Messer (Boomsnub Airco Superfund)** Permit Number: 2019-06

Report Due Date (check one): □ April 30 □ July 30 □ October 30 ■ **January 31**

Sample Collection Date: _____

Parameter	Result	Daily Maximum Limit	Monthly Average	Instantaneous Maximum	Reporting Frequency	Sample Type
Flow, Daily Max Month #1 - October	0	230,400 gpd	NA	NA	Quarterly	Recording
Flow, Daily Max Month #2 - November	0	230,400 gpd	NA	NA	Quarterly	Recording
Flow, Daily Max Month #3 – December	0	230,400 gpd	NA	NA	Quarterly	Recording
pH, Max	7.99	5.5 to 10.0 S.U.	NA	NA	Quarterly	Grab
pH, Min	7.98	5.5 to 10.0 S.U.	NA	NA	Quarterly	Grab
Max/Ave Total Chromium Month #1 - October	0.0084 U mg/l	7.22 mg/l	0.572 mg/l	14.44 mg/l	Quarterly	Composite
Max/Ave Total Chromium Month #2 - November	0.0084 U mg/l	7.22 mg/l	0.572 mg/l	14.44 mg/l	Quarterly	Composite
Max/Ave Total Chromium Month #3 - December	0.003 J mg/l	7.22 mg/l	0.572 mg/l	14.44 mg/l	Quarterly	Composite
Trichloroethylene Month #1 - October	0.0005 U mg/l	0.33 mg/l	NA	NA	Quarterly	Grab
Trichloroethylene Month #2 - November	0.0005 U mg/l	0.33 mg/l	NA	NA	Quarterly	Grab
Trichloroethylene Month #3 - December	0.0005 U mg/l	0.33 mg/l	NA	NA	Quarterly	Grab
Chromium VI*	NA	4.28 mg/l	NA	8.56 mg/l	Quarterly	Composite

* Chromium VI results required if Messer discharges IX/AS treatment system wastewater to City sanitary sewer for a period of ten (10) consecutive days or more.

General Certification Statement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Representative Sampling Certification Statement

"I certify under penalty of law that the sample(s) collected by Messer LLC or its agent for the purpose of compliance monitoring was collected in accordance with 40 CFR 136 and represents the character of wastewater discharged to the city treatment system."



Signature	Project Coordinator *Title*	January 18th, 2021 *Date*

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

October 8, 2020
Laboratory Analytical Results

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub
Sample Matrix: Water

Service Request: K2009035
Date Received: 10/08/2020

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

Three water samples were received for analysis at ALS Environmental on 10/08/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

No significant anomalies were noted with this analysis.

Approved by _____ Date 10/22/2020

ALS Environmental

CHAIN OF CUSTODY
87369

004

SR# K2609035

COC Set 1 of 1

COC#

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name: Boomsnub	Project Number: 152409 8.01
Project Manager: Jonathan REEVE	
Company: EA Engineering	
Address: 2200 6th Ave, Suite 707, Seattle, WA 98121	
Phone #: 206-452-5350	email: jreeve@eaest.com
Sampler Signature: Richard Read	Sampler Printed Name: Rick READ

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	0H	14D	180D	1	2	3	4	5	Remarks
						SM 4500-H+ B / pH	B260C / VOC FP	200.7 / Metals T						
1. INF-100820		10/8/20	9:15	H_2O	3		X	X						
2. EFF-100820		↓	9:30	↓	3		X	X						
3. TB-100820		↓	9:25	↓	2		X							
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Report Requirements

- ___ I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- X III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- X V. EDD

Invoice Information

P.O.#

Bill To:

Turnaround Requirements

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

VOCs - 8260c
Total Metals - Cr

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Richard Read	Signature: RMonro	Signature	Signature	Signature	Signature
Printed Name: Rick READ	Printed Name: JACS	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm: 10/8/2012	Firm	Firm	Firm	Firm
Date/Time: 10/8/20 9:40	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

PM MH

Cooler Receipt and Preservation Form

Client Boomshub Service Request K20 1200 9035

Received: 10/8/20 Opened: 10/8/20 By: [illegible] Unloaded: 10/8/20 By: [illegible]

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? _____
   If present, were custody seals intact? (Y) N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA (Y) N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y (N)
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA (Y) N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number (NA)	Filed
8.1	—	IR02	87369	—	—		

6. Packing material: *Inserts* *(Baggies)* *(Bubble Wrap)* *Gel Packs* *(Wet Ice)* *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
8. Were samples received in good condition (unbroken) NA (Y) N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA (Y) N
10. Did all sample labels and tags agree with custody papers? NA (Y) N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA (Y) N
14. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: _____

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009035
Project:	Boomsnub/1524098.01	**Date Collected:**	10/08/20 09:15
Sample Matrix:	Water	**Date Received:**	10/08/20 10:30
Sample Name:	INF-100820	**Basis:**	NA
Lab Code:	K2009035-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	**36.0**	ug/L	8.4	2.1	1	10/15/20 16:31	10/13/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009035
Project:	Boomsnub/1524098.01	**Date Collected:**	10/08/20 09:20
Sample Matrix:	Water	**Date Received:**	10/08/20 10:30
Sample Name:	EFF-100820	**Basis:**	NA
Lab Code:	K2009035-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	ND U	ug/L	8.4	2.1	1	10/15/20 16:52	10/13/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009035
Project:	Boomsnub/1524098.01	**Date Collected:**	10/08/20 09:15
Sample Matrix:	Water	**Date Received:**	10/08/20 10:30
Sample Name:	INF-100820	**Units:**	ug/L
Lab Code:	K2009035-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	10/16/20 18:40	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/16/20 18:40	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	10/16/20 18:40	
Dibromochloromethane	ND	U	0.50	0.14	1	10/16/20 18:40	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/16/20 18:40	
1,1-Dichloroethene	ND	U	0.50	0.080	1	10/16/20 18:40	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/16/20 18:40	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	10/16/20 18:40	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/16/20 18:40	
Methylene Chloride	ND	U	2.0	0.10	1	10/16/20 18:40	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/16/20 18:40	*
Tetrachloroethene (PCE)	**0.43**	**J**	0.50	0.099	1	10/16/20 18:40	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/16/20 18:40	
Trichloroethene (TCE)	**3.2**		0.50	0.10	1	10/16/20 18:40	
Trichlorofluoromethane (CFC 11)	**0.66**		0.50	0.12	1	10/16/20 18:40	
Vinyl Chloride	ND	U	0.50	0.075	1	10/16/20 18:40	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	90	68 - 117	10/16/20 18:40	
Dibromofluoromethane	95	73 - 122	10/16/20 18:40	
Toluene-d8	102	65 - 144	10/16/20 18:40	

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009035
Project:	Boomsnub/1524098.01	**Date Collected:**	10/08/20 09:20
Sample Matrix:	Water	**Date Received:**	10/08/20 10:30
Sample Name:	EFF-100820	**Units:**	ug/L
Lab Code:	K2009035-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/16/20 19:01	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/16/20 19:01	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/16/20 19:01	
Dibromochloromethane	ND U	0.50	0.14	1	10/16/20 19:01	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/16/20 19:01	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/16/20 19:01	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/16/20 19:01	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/16/20 19:01	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/16/20 19:01	
Methylene Chloride	ND U	2.0	0.10	1	10/16/20 19:01	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/16/20 19:01	*
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	10/16/20 19:01	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/16/20 19:01	
Trichloroethene (TCE)	ND U	0.50	0.10	1	10/16/20 19:01	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/16/20 19:01	
Vinyl Chloride	ND U	0.50	0.075	1	10/16/20 19:01	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	94	68 - 117	10/16/20 19:01	
Dibromofluoromethane	96	73 - 122	10/16/20 19:01	
Toluene-d8	107	65 - 144	10/16/20 19:01	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009035
Project:	Boomsnub/1524098.01	**Date Collected:**	10/08/20 09:25
Sample Matrix:	Water	**Date Received:**	10/08/20 10:30
Sample Name:	TB-100820	**Units:**	ug/L
Lab Code:	K2009035-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	10/16/20 19:21	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/16/20 19:21	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	10/16/20 19:21	
Dibromochloromethane	ND	U	0.50	0.14	1	10/16/20 19:21	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/16/20 19:21	
1,1-Dichloroethene	ND	U	0.50	0.080	1	10/16/20 19:21	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/16/20 19:21	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	10/16/20 19:21	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/16/20 19:21	
Methylene Chloride	**0.24**	**J**	2.0	0.10	1	10/16/20 19:21	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/16/20 19:21	*
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	10/16/20 19:21	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/16/20 19:21	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	10/16/20 19:21	
Trichlorofluoromethane (CFC 11)	ND	U	0.50	0.12	1	10/16/20 19:21	
Vinyl Chloride	ND	U	0.50	0.075	1	10/16/20 19:21	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	68 - 117	10/16/20 19:21	
Dibromofluoromethane	91	73 - 122	10/16/20 19:21	
Toluene-d8	106	65 - 144	10/16/20 19:21	

November 3, 2020
Laboratory Analytical Results

Client: EA Engineering, Science, and Technology (EAEST) **Service Request:** K2010073
Project: Boomsnub **Date Received:** 11/03/2020
Sample Matrix: Water

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

Three water samples were received for analysis at ALS Environmental on 11/03/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

Method 8260, 11/09/2020: The following analytes were flagged as outside the control criterion for Continuing Calibration Verification (CCV) MS13\1109F004.D: Carbon Tetrachloride and Dibromochloromethane. In accordance with the EPA Method, 80% or more of the CCV analytes must have passed within 20% of the true value. The remaining analytes are allowed a 40% difference as per the ALS SOP. The CCV met these criteria. No further corrective action was required.

Approved by _____ Date 11/20/2020

ALS Environmental

CHAIN OF CUSTODY
87369

004

SR#_____

COC Set 1 of 1

COC#_____

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

K20100073

Project Name: Boomsnub	Project Number: 1527098.01
Project Manager: Jonathan REEVE	
Company: EA Engineering	
Address: 2200 6th Ave, Suite 707, Seattle, WA 98121	
Phone #: (206) 452-5350	email: jreeve@eaest.com
Sampler Signature: Richard Read	Sampler Printed Name: Rick READ

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	0H: SM 4500-H+ B / pH	14D: 8260C / VOC FP	180D: 200.7 / Metals T	1	2	3	4	5	Remarks
1. INF-110320		11/3/20	8:05	H2O			X	X						
2. EFF-110320		↓	8:10	↓			X	X						
3. TB-110320		↓	8:15	↓			X							
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Report Requirements

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

X III. CLP Like Summary (no raw data)

___ IV. Data Validation Report

X V. EDD

Invoice Information

P.O.#_____

Bill To:_____

Turnaround Requirements

___ 24 hr. ___ 48 hr.

___ 5 Day

X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

VOCs - 8260C
Total Metals - Cr

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other_____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Richard Read	Signature:	Signature	Signature	Signature	Signature
Printed Name: RICK READ	Printed Name:	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm:	Firm	Firm	Firm	Firm
Date/Time: 11/3/20 9:00	Date/Time: 11/3/20 1210	Date/Time	Date/Time	Date/Time	Date/Time

PM MH

Cooler Receipt and Preservation Form

Client Boomsnub Service Request K20 10073

Received: 11/3/20 Opened: 11/3/20 By: [illegible] Unloaded: 11/3/20 By: [illegible]

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* (*Courier*) *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 1 front
   If present, were custody seals intact? (Y) N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA (Y) N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA (Y) N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. (NA) Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number (NA)	Filed
6.7	—	IR01	87369				

6. Packing material: (*Inserts*) *Baggies* *Bubble Wrap* *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
8. Were samples received in good condition (unbroken) NA (Y) N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA (Y) N
10. Did all sample labels and tags agree with custody papers? NA (Y) N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA (Y) N
14. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: _____

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2010073
Project:	Boomsnub/1524098.01	**Date Collected:**	11/03/20 08:05
Sample Matrix:	Water	**Date Received:**	11/03/20 12:10
Sample Name:	INF-110320	**Basis:**	NA
Lab Code:	K2010073-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	**36.8**	ug/L	8.4	2.1	1	11/12/20 12:26	11/10/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2010073
Project:	Boomsnub/1524098.01	**Date Collected:**	11/03/20 08:10
Sample Matrix:	Water	**Date Received:**	11/03/20 12:10
Sample Name:	EFF-110320	**Basis:**	NA
Lab Code:	K2010073-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	ND U	ug/L	8.4	2.1	1	11/12/20 12:29	11/10/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2010073
Project:	Boomsnub/1524098.01	**Date Collected:**	11/03/20 08:05
Sample Matrix:	Water	**Date Received:**	11/03/20 12:10
Sample Name:	INF-110320	**Units:**	ug/L
Lab Code:	K2010073-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	11/09/20 20:07	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/09/20 20:07	*
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	11/09/20 20:07	
Dibromochloromethane	ND	U	0.50	0.14	1	11/09/20 20:07	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/09/20 20:07	
1,1-Dichloroethene	ND	U	0.50	0.080	1	11/09/20 20:07	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/09/20 20:07	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	11/09/20 20:07	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/09/20 20:07	
Methylene Chloride	ND	U	2.0	0.10	1	11/09/20 20:07	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/09/20 20:07	
Tetrachloroethene (PCE)	**0.44**	**J**	0.50	0.099	1	11/09/20 20:07	
1,1,1-Trichloroethane (TCA)	**0.090**	**J**	0.50	0.075	1	11/09/20 20:07	
Trichloroethene (TCE)	**3.5**		0.50	0.10	1	11/09/20 20:07	
Trichlorofluoromethane (CFC 11)	**0.74**		0.50	0.12	1	11/09/20 20:07	
Vinyl Chloride	ND	U	0.50	0.075	1	11/09/20 20:07	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	11/09/20 20:07	
Dibromofluoromethane	97	73 - 122	11/09/20 20:07	
Toluene-d8	98	65 - 144	11/09/20 20:07	

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2010073
Project:	Boomsnub/1524098.01	**Date Collected:**	11/03/20 08:10
Sample Matrix:	Water	**Date Received:**	11/03/20 12:10
Sample Name:	EFF-110320	**Units:**	ug/L
Lab Code:	K2010073-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	11/09/20 20:33	
Carbon Tetrachloride	ND U	0.50	0.096	1	11/09/20 20:33	*
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	11/09/20 20:33	
Dibromochloromethane	ND U	0.50	0.14	1	11/09/20 20:33	*
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	11/09/20 20:33	
1,1-Dichloroethene	ND U	0.50	0.080	1	11/09/20 20:33	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	11/09/20 20:33	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	11/09/20 20:33	
Hexachlorobutadiene	ND U	2.0	0.11	1	11/09/20 20:33	
Methylene Chloride	ND U	2.0	0.10	1	11/09/20 20:33	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	11/09/20 20:33	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	11/09/20 20:33	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	11/09/20 20:33	
Trichloroethene (TCE)	ND U	0.50	0.10	1	11/09/20 20:33	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	11/09/20 20:33	
Vinyl Chloride	ND U	0.50	0.075	1	11/09/20 20:33	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	11/09/20 20:33	
Dibromofluoromethane	98	73 - 122	11/09/20 20:33	
Toluene-d8	98	65 - 144	11/09/20 20:33	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2010073
Project:	Boomsnub/1524098.01	**Date Collected:**	11/03/20 08:15
Sample Matrix:	Water	**Date Received:**	11/03/20 12:10
Sample Name:	TB-110320	**Units:**	ug/L
Lab Code:	K2010073-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	11/09/20 21:00	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/09/20 21:00	*
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	11/09/20 21:00	
Dibromochloromethane	ND	U	0.50	0.14	1	11/09/20 21:00	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/09/20 21:00	
1,1-Dichloroethene	ND	U	0.50	0.080	1	11/09/20 21:00	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/09/20 21:00	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	11/09/20 21:00	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/09/20 21:00	
Methylene Chloride	**0.11**	**J**	2.0	0.10	1	11/09/20 21:00	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/09/20 21:00	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	11/09/20 21:00	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	11/09/20 21:00	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	11/09/20 21:00	
Trichlorofluoromethane (CFC 11)	ND	U	0.50	0.12	1	11/09/20 21:00	
Vinyl Chloride	ND	U	0.50	0.075	1	11/09/20 21:00	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	91	68 - 117	11/09/20 21:00	
Dibromofluoromethane	96	73 - 122	11/09/20 21:00	
Toluene-d8	99	65 - 144	11/09/20 21:00	

December 4, 2020
Laboratory Analytical Results

Client: EA Engineering, Science, and Technology (EAEST) **Service Request:** K2011320
Project: Boomsnub **Date Received:** 12/04/2020
Sample Matrix: Water

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

Three water samples were received for analysis at ALS Environmental on 12/04/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

Method 8260C, 12/07/2020: The upper control criterion was exceeded for several analytes in Continuing Calibration Verification (CCV) MS13\1207F006.D. The field samples analyzed in this sequence did not contain the analytes in question. Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

Approved by _____ Date 12/21/2020

ALS Environmental

CHAIN OF CUSTODY
87369

004

SR# 1670113990

COC Set 1 of 1

COC#

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name: Boomsnub	Project Number: 1524098
Project Manager: Jonathan Reeve	
Company: EA Engineering	
Address: 2200 6th Ave, Suite 707, Seattle, WA 98121	
Phone #: (206) 452-5350	email: jreeve@eaest.com
Sampler Signature: Richard Read	Sampler Printed Name: RICK READ

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	0H SM 4500-H+ B / pH	14D 8260C / VOC FP	180D 200.7 / Metals T	1	2	3	4	5	Remarks
1. INF-120420		12/4/20	9:30	H_2O										
2. EFF-120420		↓	9:35	↓										
3. TB-120420		↓	9:40	↓										
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Report Requirements

- ___ I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- X III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- X V. EDD

Invoice Information

P.O.#

Bill To:

Turnaround Requirements

___ 24 hr ___ 48 hr.
___ 5 Day
X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

VOCs - 8260C
Total Metals - Cr

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Richard Read	Signature:	Signature	Signature	Signature	Signature
Printed Name: RICK READ	Printed Name:	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm:	Firm	Firm	Firm	Firm
Date/Time: 12/4/20 9:48	Date/Time: 12/4/20 1115	Date/Time	Date/Time	Date/Time	Date/Time

PM_____

Cooler Receipt and Preservation Form

Client Boomsnub Service Request K20 11320

Received: 12/4/20 Opened: 12/4/20 By: [illegible] Unloaded: 12/4/20 By: [illegible]

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? 1 Front
   If present, were custody seals intact? [illegible] Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA [illegible] N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
N/A	6.2	IR02	87369	-	-		

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions:_____

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2011320
Project:	Boomsnub/1524098	**Date Collected:**	12/04/20 09:30
Sample Matrix:	Water	**Date Received:**	12/04/20 11:15
Sample Name:	INF-120420	**Basis:**	NA
Lab Code:	K2011320-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	**36.8**	ug/L	8.4	2.1	1	12/14/20 10:39	12/10/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2011320
Project:	Boomsnub/1524098	**Date Collected:**	12/04/20 09:35
Sample Matrix:	Water	**Date Received:**	12/04/20 11:15
Sample Name:	EFF-120420	**Basis:**	NA
Lab Code:	K2011320-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	**3.0 J**	ug/L	8.4	2.1	1	12/14/20 10:03	12/10/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2011320
Project:	Boomsnub/1524098	**Date Collected:**	12/04/20 09:30
Sample Matrix:	Water	**Date Received:**	12/04/20 11:15
Sample Name:	INF-120420	**Units:**	ug/L
Lab Code:	K2011320-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	12/07/20 15:38	*
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/07/20 15:38	*
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	12/07/20 15:38	
Dibromochloromethane	ND	U	0.50	0.14	1	12/07/20 15:38	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/07/20 15:38	*
1,1-Dichloroethene	ND	U	0.50	0.080	1	12/07/20 15:38	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/07/20 15:38	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	12/07/20 15:38	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/07/20 15:38	
Methylene Chloride	ND	U	2.0	0.10	1	12/07/20 15:38	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/07/20 15:38	
Tetrachloroethene (PCE)	**0.51**		0.50	0.099	1	12/07/20 15:38	
1,1,1-Trichloroethane (TCA)	**0.080**	**J**	0.50	0.075	1	12/07/20 15:38	*
Trichloroethene (TCE)	**4.0**		0.50	0.10	1	12/07/20 15:38	
Trichlorofluoromethane (CFC 11)	**0.74**		0.50	0.12	1	12/07/20 15:38	
Vinyl Chloride	ND	U	0.50	0.075	1	12/07/20 15:38	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	68 - 117	12/07/20 15:38	
Dibromofluoromethane	93	73 - 122	12/07/20 15:38	
Toluene-d8	103	65 - 144	12/07/20 15:38	

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2011320
Project:	Boomsnub/1524098	**Date Collected:**	12/04/20 09:35
Sample Matrix:	Water	**Date Received:**	12/04/20 11:15
Sample Name:	EFF-120420	**Units:**	ug/L
Lab Code:	K2011320-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	12/07/20 16:04	*
Carbon Tetrachloride	ND U	0.50	0.096	1	12/07/20 16:04	*
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	12/07/20 16:04	
Dibromochloromethane	ND U	0.50	0.14	1	12/07/20 16:04	*
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	12/07/20 16:04	*
1,1-Dichloroethene	ND U	0.50	0.080	1	12/07/20 16:04	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	12/07/20 16:04	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	12/07/20 16:04	
Hexachlorobutadiene	ND U	2.0	0.11	1	12/07/20 16:04	
Methylene Chloride	ND U	2.0	0.10	1	12/07/20 16:04	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	12/07/20 16:04	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	12/07/20 16:04	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	12/07/20 16:04	*
Trichloroethene (TCE)	ND U	0.50	0.10	1	12/07/20 16:04	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	12/07/20 16:04	
Vinyl Chloride	ND U	0.50	0.075	1	12/07/20 16:04	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	92	68 - 117	12/07/20 16:04	
Dibromofluoromethane	99	73 - 122	12/07/20 16:04	
Toluene-d8	103	65 - 144	12/07/20 16:04	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2011320
Project:	Boomsnub/1524098	**Date Collected:**	12/04/20 09:40
Sample Matrix:	Water	**Date Received:**	12/04/20 11:15
Sample Name:	TB-120420	**Units:**	ug/L
Lab Code:	K2011320-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	12/07/20 16:31	*
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/07/20 16:31	*
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	12/07/20 16:31	
Dibromochloromethane	ND	U	0.50	0.14	1	12/07/20 16:31	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/07/20 16:31	*
1,1-Dichloroethene	ND	U	0.50	0.080	1	12/07/20 16:31	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/07/20 16:31	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	12/07/20 16:31	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/07/20 16:31	
Methylene Chloride	ND	U	2.0	0.10	1	12/07/20 16:31	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/07/20 16:31	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	12/07/20 16:31	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	12/07/20 16:31	*
Trichloroethene (TCE)	ND	U	0.50	0.10	1	12/07/20 16:31	
Trichlorofluoromethane (CFC 11)	ND	U	0.50	0.12	1	12/07/20 16:31	
Vinyl Chloride	ND	U	0.50	0.075	1	12/07/20 16:31	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	68 - 117	12/07/20 16:31	
Dibromofluoromethane	103	73 - 122	12/07/20 16:31	
Toluene-d8	102	65 - 144	12/07/20 16:31	

EA Engineering, Science, and Technology, Inc., PBC

2200 Sixth Avenue, Suite 707
Seattle, Washington 98121
Telephone: 206-452-5350
Fax: 206-443-7646
www.eaest.com

23 October 2020
15240.98 LN1708

Mr. Nick Imbery
Industrial Pretreatment Coordinator
City of Vancouver
Marine Park Engineering Office
P.O. Box 1995
Vancouver, Washington 98668-1995

Subject: Semi-Annual Self-Monitoring Report – 30 October 2020
Boomsnub/Airco Superfund Site
Hazel Dell, Washington

Dear Mr. Imbery:

On behalf of Messer LLC, we are submitting the Semi-Annual Self-Monitoring Report for the Boomsnub/Airco Superfund Site, prepared in accordance with the City of Vancouver Industrial Wastewater Discharge Permit 2019-06. The period covered includes July through September 2020. Flow data are being reported from the flow meter on the air stripper. During the reporting period, all discharges were made to the infiltration gallery on Messer property.

Effluent samples were collected by EA Engineering, Science, and Technology, Inc., PBC on July 7, August 3, and September 9, 2020. ALS Environmental, located in Kelso, Washington, is our analytical laboratory. The analytical data for each monthly sampling event are included, along with the case narrative, sample Chain-of-Custody forms, and a list of data qualifiers. The pH values reported were based on bi-monthly field pH readings. The results indicate that concentrations of trichloroethene and chromium in effluent are lower than effluent discharge limits.

Please let me know if you have any questions regarding the enclosed information.

Sincerely,

Jonathan Reeve, LHG
Project Manager

JR/lw
cc: Dave Sordi
Philipp Sieber

Enclosures: City of Vancouver Semi-Annual Self-Monitoring Report
List of Data Qualifiers
Laboratory Case Narratives, Chain of Custody forms, and Analytical Results

Industrial Wastewater Discharge Monitoring Report

CITY OF Vancouver WASHINGTON

Industrial Pretreatment
P.O. Box 1995
Vancouver, WA 98668
Office: 360-487-7130
Fax: 360- 487-7139

Industry Name: **Messer (Boomsnub Airco Superfund)** Permit Number: 2019-06
Report Due Date (check one): □ April 30 □ July 30 ■ **October 30** □ January 31
Sample Collection Date: _____

Parameter	Result	Daily Maximum Limit	Monthly Average	Instantaneous Maximum	Reporting Frequency	Sample Type
Flow, Daily Max Month #1 - July	0	230,400 gpd	NA	NA	Quarterly	Recording
Flow, Daily Max Month #2 - August	0	230,400 gpd	NA	NA	Quarterly	Recording
Flow, Daily Max Month #3 – September	0	230,400 gpd	NA	NA	Quarterly	Recording
pH, Max	8.00	5.5 to 10.0 S.U.	NA	NA	Quarterly	Grab
pH, Min	7.96	5.5 to 10.0 S.U.	NA	NA	Quarterly	Grab
Max/Ave Total Chromium Month #1 - July	0.0084 U mg/l	7.22 mg/l	0.572 mg/l	14.44 mg/l	Quarterly	Composite
Max/Ave Total Chromium Month #2 - August	0.0032 J mg/l	7.22 mg/l	0.572 mg/l	14.44 mg/l	Quarterly	Composite
Max/Ave Total Chromium Month #3 - September	0.0029 J mg/l	7.22 mg/l	0.572 mg/l	14.44 mg/l	Quarterly	Composite
Trichloroethylene Month #1 - July	0.0005 U mg/l	0.33 mg/l	NA	NA	Quarterly	Grab
Trichloroethylene Month #2 - August	0.0005 U mg/l	0.33 mg/l	NA	NA	Quarterly	Grab
Trichloroethylene Month #3 - September	0.0005 U mg/l	0.33 mg/l	NA	NA	Quarterly	Grab
Chromium VI*	NA	4.28 mg/l	NA	8.56 mg/l	Quarterly	Composite

* Chromium VI results required if Messer discharges IX/AS treatment system wastewater to City sanitary sewer for a period of ten (10) consecutive days or more.

General Certification Statement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Representative Sampling Certification Statement

"I certify under penalty of law that the sample(s) collected by Messer LLC or its agent for the purpose of compliance monitoring was collected in accordance with 40 CFR 136 and represents the character of wastewater discharged to the city treatment system."

_____	Project Coordinator	October 23, 2020
Signature	*Title*	*Date*

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

July 7, 2020
Laboratory Analytical Results

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub
Sample Matrix: Water

Service Request: K2005628
Date Received: 07/07/2020

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

Three water samples were received for analysis at ALS Environmental on 07/07/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

No significant anomalies were noted with this analysis.

Approved by _____ Date 07/27/2020

ALS Environmental

CHAIN OF CUSTODY
87369

004

SR# 1260528

COC Set____of____

COC#_____

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name: Boomsnub	Project Number: 1524098
Project Manager: Jonathan Reeve	
Company: EA Engineering	
Address: 2200 6th Ave, Suite 707, Seattle, WA 98121	
Phone #: (206) 452-5350	email: jreeve@eaest.com
Sampler Signature: Richard Read	Sampler Printed Name: Rick Read

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	0H SM 4500-H+ B / pH	14D 8260C / VOC FP	180D 200.7 / Metals T	1	2	3	4	5	Remarks
1. INF-070720		7/7/20	9:00	H_2O	4		X	X						
2. EFF-070720		↓	9:05	↓	4		X	X						
3. TB-070720		↓	9:10	↓	2		X							
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Report Requirements

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

X III. CLP Like Summary (no raw data)

___ IV. Data Validation Report

X V. EDD

Invoice Information

P.O.#_____

Bill To:_____

Turnaround Requirements

___ 24 hr. ___ 48 hr.

___ 5 Day

X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

VOCs - 8260C
Total Metals - Cr

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other_____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Richard Read	Signature: Cody Graves	Signature	Signature	Signature	Signature
Printed Name: Rick Read	Printed Name: ALS	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm:	Firm	Firm	Firm	Firm
Date/Time: 7/7/20 10:00	Date/Time: 7/7/2020 1115	Date/Time	Date/Time	Date/Time	Date/Time

PC MH

Cooler Receipt and Preservation Form

Client EA Engineering Service Request *K20* 05U28

Received: 7/7/20 Opened: 7/7/20 By: Unloaded: 7/7/20 By:

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* (*Courier*) *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 1 Front
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Temp Blank	Sample 1	Sample 2	Sample 3	Sample 4	IR GUN	Cooler / COC ID NA	Tracking Number (NA)	Filed
6.5	7.5	8.4	9.2	8.6	IR01	~~8763~~ K		
						87365		

4. Packing material: (*Inserts*) *Baggies* (*Bubble Wrap*) *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) N
   If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA (Y) N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2005628
Project:	Boomsnub/1524098	**Date Collected:**	07/07/20 09:00
Sample Matrix:	Water	**Date Received:**	07/07/20 11:15
Sample Name:	INF_070720	**Basis:**	NA
Lab Code:	K2005628-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	**31.2**	ug/L	8.4	2.1	1	07/10/20 11:52	07/08/20	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2005628
Project:	Boomsnub/1524098	**Date Collected:**	07/07/20 09:05
Sample Matrix:	Water	**Date Received:**	07/07/20 11:15
Sample Name:	EFF_070720	**Basis:**	NA
Lab Code:	K2005628-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	ND U	ug/L	8.4	2.1	1	07/10/20 11:20	07/08/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2005628
Project:	Boomsnub/1524098	**Date Collected:**	07/07/20 09:00
Sample Matrix:	Water	**Date Received:**	07/07/20 11:15
Sample Name:	INF_070720	**Units:**	ug/L
Lab Code:	K2005628-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	07/16/20 16:06	
Carbon Tetrachloride	ND	U	0.50	0.096	1	07/16/20 16:06	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	07/16/20 16:06	
Dibromochloromethane	ND	U	0.50	0.14	1	07/16/20 16:06	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	07/16/20 16:06	
1,1-Dichloroethene	ND	U	0.50	0.080	1	07/16/20 16:06	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	07/16/20 16:06	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	07/16/20 16:06	
Hexachlorobutadiene	ND	U	2.0	0.11	1	07/16/20 16:06	
Methylene Chloride	ND	U	2.0	0.10	1	07/16/20 16:06	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	07/16/20 16:06	
Tetrachloroethene (PCE)	**0.42**	**J**	0.50	0.099	1	07/16/20 16:06	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	07/16/20 16:06	
Trichloroethene (TCE)	**2.8**		0.50	0.10	1	07/16/20 16:06	
Trichlorofluoromethane (CFC 11)	**0.36**	**J**	0.50	0.12	1	07/16/20 16:06	
Vinyl Chloride	ND	U	0.50	0.075	1	07/16/20 16:06	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	84	68 - 117	07/16/20 16:06	
Dibromofluoromethane	93	73 - 122	07/16/20 16:06	
Toluene-d8	99	65 - 144	07/16/20 16:06	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2005628
Project:	Boomsnub/1524098	**Date Collected:**	07/07/20 09:05
Sample Matrix:	Water	**Date Received:**	07/07/20 11:15
Sample Name:	EFF_070720	**Units:**	ug/L
Lab Code:	K2005628-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	07/16/20 16:33	
Carbon Tetrachloride	ND U	0.50	0.096	1	07/16/20 16:33	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	07/16/20 16:33	
Dibromochloromethane	ND U	0.50	0.14	1	07/16/20 16:33	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	07/16/20 16:33	
1,1-Dichloroethene	ND U	0.50	0.080	1	07/16/20 16:33	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	07/16/20 16:33	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	07/16/20 16:33	
Hexachlorobutadiene	ND U	2.0	0.11	1	07/16/20 16:33	
Methylene Chloride	ND U	2.0	0.10	1	07/16/20 16:33	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	07/16/20 16:33	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	07/16/20 16:33	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	07/16/20 16:33	
Trichloroethene (TCE)	ND U	0.50	0.10	1	07/16/20 16:33	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	07/16/20 16:33	
Vinyl Chloride	ND U	0.50	0.075	1	07/16/20 16:33	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	84	68 - 117	07/16/20 16:33	
Dibromofluoromethane	92	73 - 122	07/16/20 16:33	
Toluene-d8	101	65 - 144	07/16/20 16:33	

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2005628
Project:	Boomsnub/1524098	**Date Collected:**	07/07/20 09:10
Sample Matrix:	Water	**Date Received:**	07/07/20 11:15
Sample Name:	TB-070720	**Units:**	ug/L
Lab Code:	K2005628-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	07/16/20 16:59	
Carbon Tetrachloride	ND	U	0.50	0.096	1	07/16/20 16:59	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	07/16/20 16:59	
Dibromochloromethane	ND	U	0.50	0.14	1	07/16/20 16:59	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	07/16/20 16:59	
1,1-Dichloroethene	ND	U	0.50	0.080	1	07/16/20 16:59	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	07/16/20 16:59	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	07/16/20 16:59	
Hexachlorobutadiene	ND	U	2.0	0.11	1	07/16/20 16:59	
Methylene Chloride	**0.19**	**J**	2.0	0.10	1	07/16/20 16:59	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	07/16/20 16:59	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	07/16/20 16:59	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	07/16/20 16:59	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	07/16/20 16:59	
Trichlorofluoromethane (CFC 11)	ND	U	0.50	0.12	1	07/16/20 16:59	
Vinyl Chloride	ND	U	0.50	0.075	1	07/16/20 16:59	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	84	68 - 117	07/16/20 16:59	
Dibromofluoromethane	92	73 - 122	07/16/20 16:59	
Toluene-d8	101	65 - 144	07/16/20 16:59	

August 3, 2020
Laboratory Analytical Results

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub
Sample Matrix: Water

Service Request: K2006533
Date Received: 08/03/2020

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

Three water samples were received for analysis at ALS Environmental on 08/03/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

No significant anomalies were noted with this analysis.

Approved by _____ Date 08/17/2020

ALS Environmental

CHAIN OF CUSTODY
87369

004

SR# K2006533

COC Set 1 of 1

COC#

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name: Boomsnub	Project Number: 1324098.01
Project Manager: Jonathan Reeve	
Company: EA Engineering	
Address: 2200 6th Ave, Suite 707, Seattle, WA 98121	
Phone #: (206) 452-5350	email: jreeve@eaest.com
Sampler Signature: Richard Read	Sampler Printed Name: Rick READ

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	0H SM 4500-H+ B / pH	14D 8260C / VOC FP	180D 200.7 / Metals T	1	2	3	4	5	Remarks
1. INF-080320		8/3/20	9:05	H2O	4		X	X						
2. EFF-080320		↓	9:10	↓	4		X	X						
3. TB-080320		↓	9:15	↓	2		X							
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Report Requirements

- ___ I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- X III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- X V. EDD

Invoice Information

P.O.#
Bill To:

Turnaround Requirements

- ___ 24 hr. ___ 48 hr.
- ___ 5 Day
- X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

VOCs - 8260C
Total Metals - Cr

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Richard Read	Signature: Cody Graves	Signature	Signature	Signature	Signature
Printed Name: Rick READ	Printed Name: ALS	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm: ALS	Firm	Firm	Firm	Firm
Date/Time: 8/3/20 / 9:30	Date/Time: 8/3/2020 1405	Date/Time	Date/Time	Date/Time	Date/Time

PC MH

Cooler Receipt and Preservation Form

Client EA Engineering Service Request K2006533

Received: 8/2/2020 Opened: 8/2/2020 By: CG Unloaded: 8/2/2020 By: CG

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* (*Courier*) *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 1 Front
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Temp Blank	Sample 1	Sample 2	Sample 3	Sample 4	IR GUN	Cooler / COC ID NA	Tracking Number (NA)	Filed
4.1					IR01	87369		

4. Packing material: (*Inserts*) (*Baggies*) (*Bubble Wrap*) *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA (Y) N
   If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* (NA) Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y (N)
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
TB-080320	1/2 VOA	~~Y~~ 3°	X							

Notes, Discrepancies, & Resolutions: _____

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2006533
Project:	Boomsnub/1524098.01	**Date Collected:**	08/03/20 09:05
Sample Matrix:	Water	**Date Received:**	08/03/20 14:05
Sample Name:	INF-080320	**Basis:**	NA
Lab Code:	K2006533-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	**31.3**	ug/L	8.4	2.1	1	08/13/20 11:22	08/10/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2006533
Project:	Boomsnub/1524098.01	**Date Collected:**	08/03/20 09:10
Sample Matrix:	Water	**Date Received:**	08/03/20 14:05
Sample Name:	EFF-080320	**Basis:**	NA
Lab Code:	K2006533-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	**3.2 J**	ug/L	8.4	2.1	1	08/13/20 11:51	08/10/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2006533
Project:	Boomsnub/1524098.01	**Date Collected:**	08/03/20 09:05
Sample Matrix:	Water	**Date Received:**	08/03/20 14:05
Sample Name:	INF-080320	**Units:**	ug/L
Lab Code:	K2006533-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	08/05/20 19:23	
Carbon Tetrachloride	ND	U	0.50	0.096	1	08/05/20 19:23	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	08/05/20 19:23	
Dibromochloromethane	ND	U	0.50	0.14	1	08/05/20 19:23	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	08/05/20 19:23	
1,1-Dichloroethene	ND	U	0.50	0.080	1	08/05/20 19:23	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	08/05/20 19:23	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	08/05/20 19:23	
Hexachlorobutadiene	ND	U	2.0	0.11	1	08/05/20 19:23	
Methylene Chloride	ND	U	2.0	0.10	1	08/05/20 19:23	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	08/05/20 19:23	
Tetrachloroethene (PCE)	**0.54**		0.50	0.099	1	08/05/20 19:23	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	08/05/20 19:23	
Trichloroethene (TCE)	**2.9**		0.50	0.10	1	08/05/20 19:23	
Trichlorofluoromethane (CFC 11)	**0.40**	**J**	0.50	0.12	1	08/05/20 19:23	
Vinyl Chloride	ND	U	0.50	0.075	1	08/05/20 19:23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	86	68 - 117	08/05/20 19:23	
Dibromofluoromethane	96	73 - 122	08/05/20 19:23	
Toluene-d8	101	65 - 144	08/05/20 19:23	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2006533
Project:	Boomsnub/1524098.01	**Date Collected:**	08/03/20 09:10
Sample Matrix:	Water	**Date Received:**	08/03/20 14:05
Sample Name:	EFF-080320	**Units:**	ug/L
Lab Code:	K2006533-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	08/05/20 19:50	
Carbon Tetrachloride	ND U	0.50	0.096	1	08/05/20 19:50	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	08/05/20 19:50	
Dibromochloromethane	ND U	0.50	0.14	1	08/05/20 19:50	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	08/05/20 19:50	
1,1-Dichloroethene	ND U	0.50	0.080	1	08/05/20 19:50	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	08/05/20 19:50	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	08/05/20 19:50	
Hexachlorobutadiene	ND U	2.0	0.11	1	08/05/20 19:50	
Methylene Chloride	ND U	2.0	0.10	1	08/05/20 19:50	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	08/05/20 19:50	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	08/05/20 19:50	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	08/05/20 19:50	
Trichloroethene (TCE)	ND U	0.50	0.10	1	08/05/20 19:50	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	08/05/20 19:50	
Vinyl Chloride	ND U	0.50	0.075	1	08/05/20 19:50	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	93	68 - 117	08/05/20 19:50	
Dibromofluoromethane	99	73 - 122	08/05/20 19:50	
Toluene-d8	100	65 - 144	08/05/20 19:50	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2006533
Project:	Boomsnub/1524098.01	**Date Collected:**	08/03/20 09:15
Sample Matrix:	Water	**Date Received:**	08/03/20 14:05
Sample Name:	TB-080320	**Units:**	ug/L
Lab Code:	K2006533-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	08/05/20 18:57	
Carbon Tetrachloride	ND	U	0.50	0.096	1	08/05/20 18:57	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	08/05/20 18:57	
Dibromochloromethane	ND	U	0.50	0.14	1	08/05/20 18:57	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	08/05/20 18:57	
1,1-Dichloroethene	ND	U	0.50	0.080	1	08/05/20 18:57	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	08/05/20 18:57	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	08/05/20 18:57	
Hexachlorobutadiene	**0.16**	**J**	2.0	0.11	1	08/05/20 18:57	
Methylene Chloride	**0.27**	**J**	2.0	0.10	1	08/05/20 18:57	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	08/05/20 18:57	
Tetrachloroethene (PCE)	**0.28**	**J**	0.50	0.099	1	08/05/20 18:57	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	08/05/20 18:57	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	08/05/20 18:57	
Trichlorofluoromethane (CFC 11)	ND	U	0.50	0.12	1	08/05/20 18:57	
Vinyl Chloride	ND	U	0.50	0.075	1	08/05/20 18:57	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	86	68 - 117	08/05/20 18:57	
Dibromofluoromethane	98	73 - 122	08/05/20 18:57	
Toluene-d8	103	65 - 144	08/05/20 18:57	

September 9, 2020
Laboratory Analytical Results

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub
Sample Matrix: Water

Service Request: K2007761
Date Received: 09/09/2020

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

Sample Receipt:

Three water samples were received for analysis at ALS Environmental on 09/09/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

Method 8260C, 09/22/2020: The following analytes were flagged as outside the control criterion for Continuing Calibration Verification (CCV) MS13\0922F004.D\: 1,1-Dichloroethene. In accordance with the EPA Method, 80% or more of the CCV analytes must have passed within 20% of the true value. The remaining analytes are allowed a 40% difference as per the ALS SOP. The CCV met these criteria. No further corrective action was required.

Approved by _____ Date 10/02/2020

ALS Environmental

CHAIN OF CUSTODY
87369

004

SR# K2007761

COC Set 1 of 1

COC#

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name: Boomsnub	Project Number: 1524098
Project Manager: Jonathan Reeve	
Company: EA Engineering	
Address: 2200 6th Ave. Seattle, Wa 98121	
Phone #: (206) 452-5350	email: jreeve@eaest.com
Sampler Signature:	Sampler Printed Name: Rick READ

CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix	NUMBER OF CONTAINERS	0H	14D	180D						Remarks
						SM 4500-H+ B / pH	8260C / VOC FP	200.7 / Metals T	1	2	3	4	5	
1. INF-090920		9/9/20	8:10	H_2O	4		X	X						
2. EFF-090920		↓	8:15	↓	4		X	X						
3. TB-090920		↓	8:20	↓	2		X							
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Report Requirements

- ___ I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- X III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- X V. EDD

Invoice Information

P.O.#

Bill To:

Turnaround Requirements

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

VOCs - 8260c
Total Metals - Cr

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other_____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature:	Signature:	Signature	Signature	Signature	Signature
Printed Name: Rick READ	Printed Name:	Printed Name	Printed Name	Printed Name	Printed Name
Firm: EA	Firm:	Firm	Firm	Firm	Firm
Date/Time: 9/9/20 9:00	Date/Time: 9/9/20 1330	Date/Time	Date/Time	Date/Time	Date/Time

PM MH

Cooler Receipt and Preservation Form

Client EA Engineering Service Request K20 07761

Received: 9/9/20 Opened: 9/9/20 By: Unloaded: 9/9/20 By: 12

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N
4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column below:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
5.9	—	IR02	87369	—	—		

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: _____

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2007761
Project:	Boomsnub/1524098	**Date Collected:**	09/09/20 08:10
Sample Matrix:	Water	**Date Received:**	09/09/20 13:30
Sample Name:	INF-090920	**Basis:**	NA
Lab Code:	K2007761-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	**32.2**	ug/L	8.4	2.1	1	09/16/20 13:01	09/11/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2007761
Project:	Boomsnub/1524098	**Date Collected:**	09/09/20 08:15
Sample Matrix:	Water	**Date Received:**	09/09/20 13:30
Sample Name:	EFF-090920	**Basis:**	NA
Lab Code:	K2007761-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Chromium	200.7	**2.9 J**	ug/L	8.4	2.1	1	09/16/20 13:04	09/11/20	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2007761
Project:	Boomsnub/1524098	**Date Collected:**	09/09/20 08:10
Sample Matrix:	Water	**Date Received:**	09/09/20 13:30
Sample Name:	INF-090920	**Units:**	ug/L
Lab Code:	K2007761-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	09/22/20 19:18	
Carbon Tetrachloride	ND	U	0.50	0.096	1	09/22/20 19:18	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	09/22/20 19:18	
Dibromochloromethane	ND	U	0.50	0.14	1	09/22/20 19:18	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	09/22/20 19:18	
1,1-Dichloroethene	ND	U	0.50	0.080	1	09/22/20 19:18	*
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	09/22/20 19:18	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	09/22/20 19:18	
Hexachlorobutadiene	ND	U	2.0	0.11	1	09/22/20 19:18	
Methylene Chloride	ND	U	2.0	0.10	1	09/22/20 19:18	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	09/22/20 19:18	
Tetrachloroethene (PCE)	**0.49**	**J**	0.50	0.099	1	09/22/20 19:18	
1,1,1-Trichloroethane (TCA)	**0.10**	**J**	0.50	0.075	1	09/22/20 19:18	
Trichloroethene (TCE)	**3.0**		0.50	0.10	1	09/22/20 19:18	
Trichlorofluoromethane (CFC 11)	**0.45**	**J**	0.50	0.12	1	09/22/20 19:18	
Vinyl Chloride	ND	U	0.50	0.075	1	09/22/20 19:18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	09/22/20 19:18	
Dibromofluoromethane	95	73 - 122	09/22/20 19:18	
Toluene-d8	98	65 - 144	09/22/20 19:18	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2007761
Project:	Boomsnub/1524098	**Date Collected:**	09/09/20 08:15
Sample Matrix:	Water	**Date Received:**	09/09/20 13:30
Sample Name:	EFF-090920	**Units:**	ug/L
Lab Code:	K2007761-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	09/22/20 18:51	
Carbon Tetrachloride	ND U	0.50	0.096	1	09/22/20 18:51	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	09/22/20 18:51	
Dibromochloromethane	ND U	0.50	0.14	1	09/22/20 18:51	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	09/22/20 18:51	
1,1-Dichloroethene	ND U	0.50	0.080	1	09/22/20 18:51	*
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	09/22/20 18:51	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	09/22/20 18:51	
Hexachlorobutadiene	ND U	2.0	0.11	1	09/22/20 18:51	
Methylene Chloride	ND U	2.0	0.10	1	09/22/20 18:51	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	09/22/20 18:51	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	09/22/20 18:51	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	09/22/20 18:51	
Trichloroethene (TCE)	ND U	0.50	0.10	1	09/22/20 18:51	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	09/22/20 18:51	
Vinyl Chloride	ND U	0.50	0.075	1	09/22/20 18:51	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	85	68 - 117	09/22/20 18:51	
Dibromofluoromethane	97	73 - 122	09/22/20 18:51	
Toluene-d8	102	65 - 144	09/22/20 18:51	

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2007761
Project:	Boomsnub/1524098	**Date Collected:**	09/09/20 08:20
Sample Matrix:	Water	**Date Received:**	09/09/20 13:30
Sample Name:	TB-090920	**Units:**	ug/L
Lab Code:	K2007761-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND	U	0.50	0.091	1	09/22/20 18:24	
Carbon Tetrachloride	ND	U	0.50	0.096	1	09/22/20 18:24	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	09/22/20 18:24	
Dibromochloromethane	ND	U	0.50	0.14	1	09/22/20 18:24	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	09/22/20 18:24	
1,1-Dichloroethene	ND	U	0.50	0.080	1	09/22/20 18:24	*
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	09/22/20 18:24	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	09/22/20 18:24	
Hexachlorobutadiene	ND	U	2.0	0.11	1	09/22/20 18:24	
Methylene Chloride	**0.20**	**J**	2.0	0.10	1	09/22/20 18:24	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	09/22/20 18:24	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	09/22/20 18:24	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	09/22/20 18:24	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	09/22/20 18:24	
Trichlorofluoromethane (CFC 11)	ND	U	0.50	0.12	1	09/22/20 18:24	
Vinyl Chloride	ND	U	0.50	0.075	1	09/22/20 18:24	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	85	68 - 117	09/22/20 18:24	
Dibromofluoromethane	94	73 - 122	09/22/20 18:24	
Toluene-d8	99	65 - 144	09/22/20 18:24	

Appendix C

Groundwater Purge and Sampling Forms

This page intentionally left blank.

Passive Diffusion Bag Sampling Form

Well Identification: AMW-44

Depth (BTOC)

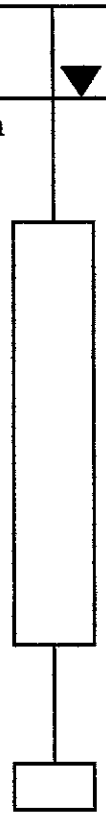
DTW at installation _____ DTW at sampling 31.93

Top _____

Bottom _____

Weight _____

Well TD _____



Site Location: Bramalea

Project Number: _____

Well Diameter: _____

PDB Installation Date: _____ Time: _____

Sample Information

Sample No: 2043-033

Sample Date: 10/20/20 Time: 1530

Sampling Personnel: KH RR

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): N

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : D

Well Casing Plug Locked and in Good Condition? Y

Comments: _____

Ground Water Purge and Sampling Form

Well Identification	AMW12A
Well Diameter (inches)	4
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	34.95

Site Location: Boomsnub (Fall 2019) Date: 10/21/20

Project Number: 1524058 Personnel: KH RR

Purge Method: ___Low Flow ✓Conventional ___None

Purge Equipment: ___Extraction Well ___Redi-flo Pump (Ded) ___None Bailer

Sampling Equipment: ___Extraction Well ___Redi-flo Pump ___Passive Diffusion Bag Bailer

Weather Conditions: ~50°F Cloudy

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	0903												
Depth to Ground water (ft btoc)	32.99												
Total Groundwater Purged (gallons, liters)													
Purge Rate (gpm, ft^3/min, ml/min)													
pH +/- 0.1													
Conductivity (mS/cm) +/- 3%													
Turbidity (NTU) +/- 10%													
Disssolved Oxygen (mg/L) +/- 0.3 mg/l													
Temperature (°C) +/- 10%													
ORP/eH (mV) +/- 10 mV													
Color of Purged Water (gray, brown, red, clear)													

Sample Identification: 2045-035

Time Sampled: 0910

Purge water disposed To: Boomsnub

# of bottles

___ VOCs by 8260C

___ Total Chromium by 200.7

___ Other: NA Parameters - SM 5220C, ALS 300 Organic Acids, Anion 300.0 TOC 5310C, Filtered metals 6010C, DOC 5310C

Comments: Purged over 3x well casing volume ~~but~~ well ran dry on 10/20/20

Ground Water Purge and Sampling Form

Well Identification	MW-12
Well Diameter (inches)	4
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	34.85

Site Location: Boomsnub (Fall 2019) Date: 10/20/20

Project Number: 1524058 Personnel: KH RR

Purge Method: ✓Low Flow ___Conventional ___None

Purge Equipment: ___Extraction Well ~~Redi-flo Pump (Ded)~~ ✓None Peristaltic KH 10/20/20

Sampling Equipment: ___Extraction Well ~~✓Redi-flo Pump~~ ___Passive Diffusion Bag KH 10/20/20

Weather Conditions: ~50°F partly cloudy

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1503	1509	1519	1529	1534	1539	1544	1549	Grundfos pump			
Depth to Ground water (ft btoc)	31.33	Begin purge @ 500mL/min	31.50	31.85	32.08	32.10	32.13		did not work			
Total Groundwater Purged (gallons, ~~liters~~)			5.0	10.0	12.5	15.0	17.5		Switched to peristaltic			
Purge Rate (gpm, ft³/min, ~~ml/min~~)			500	500	500	500	500		purged 3X well			
pH +/- 0.1			6.82	6.75	6.64	6.61	6.59	Stopped	Cassiof, well			
Conductivity (mS/cm) +/- 3%			0.186	0.187	0.187	0.186	0.187	pump	Run dry			
Turbidity (NTU) +/- 10%		13	—	—	—	—	—	Flow from pump troublesheet	purged approx 35L			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l			7.47	7.39	7.56	7.92	8.34					
Temperature (°C) +/- 10%			16.9	17.1	17.3	17.6	17.9					
ORP/eH (mV) +/- 10 mV			88.6	99.9	106.5	113.9	120.7					
Color of Purged Water (gray, brown, red, clear)			brown	brown	brown	brown	brown					

Sample Identification: ZO43-026

Time Sampled: 1645

Purge water disposed To: Boomsnub

# of bottles

3 VOCs by 8260C

X Total Chromium by 200.7

~~✓~~ Other: NR Parameters

Comments: Initially highly turbid

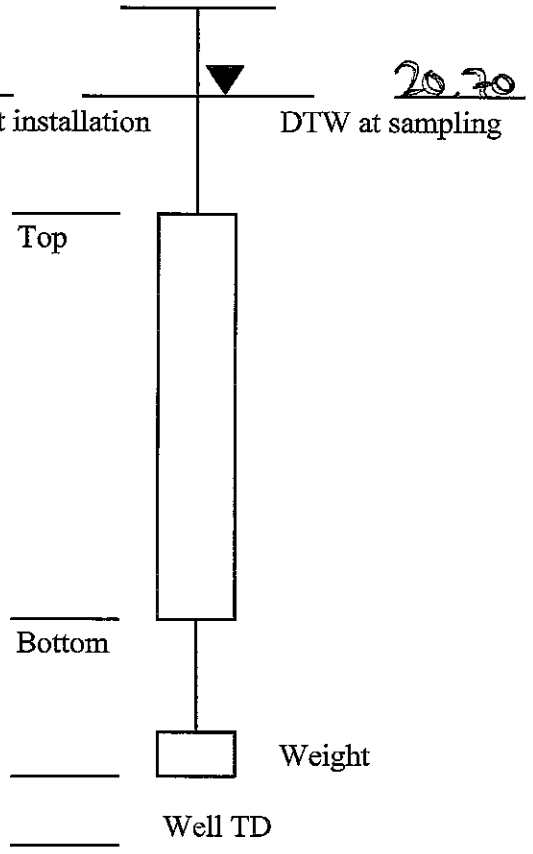
Collected 3x VOC

3x Dissolved gases

Passive Diffusion Bag Sampling Form

Well Identification: AMW-16

Depth (BTOC)



Site Location: Boomsnub

Project Number:

Well Diameter:

PDB Installation Date: Time:

Sample Information

Sample No: 2043-007

Sample Date: 10/19/20 Time: 1058

Sampling Personnel: AD

Analyses: VOC

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): Y

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : WBC

Well Casing Plug Locked and in Good Condition? Y

Comments:

Passive Diffusion Bag Sampling Form

Well Identification: AMW-17

Depth (BTOC) _____

_____ DTW at installation

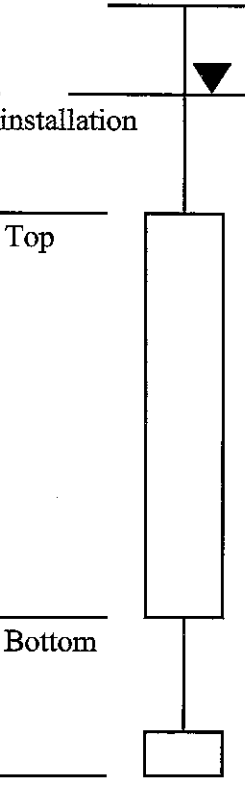
12.92 DTW at sampling

_____ Top

_____ Bottom

_____ Weight

_____ Well TD



Site Location: Boomsnub

Project Number: _____

Well Diameter: _____

PDB Installation Date: _____ Time: _____

Sample Information

Sample No: 2013-013

Sample Date: 10/19/20 Time: 1139

Sampling Personnel: HD+PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): Y

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : WBC

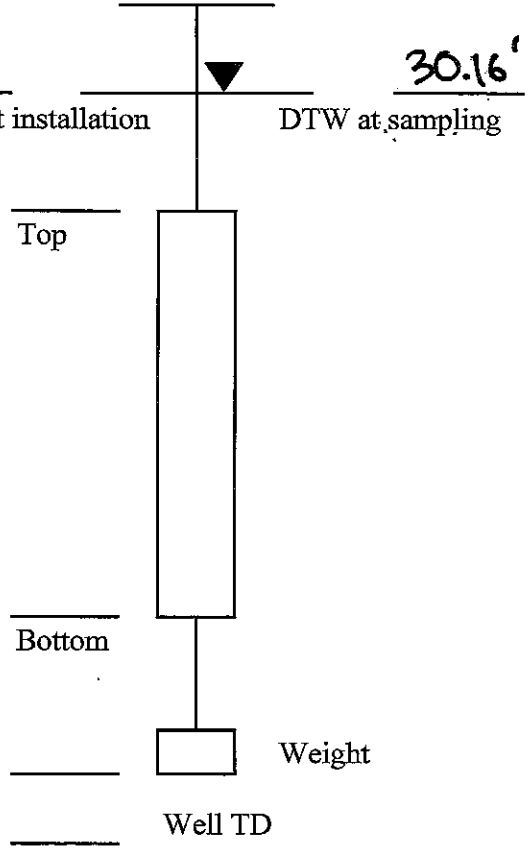
Well Casing Plug Locked and in Good Condition? Y

Comments: _____

Passive Diffusion Bag Sampling Form

Well Identification: AMW-18

Depth (BTOC)



Site Location: Boomsnub

Project Number:

Well Diameter:

PDB Installation Date: Time:

Sample Information

Sample No: 2043-025

Sample Date: 10/19/20 Time: 1502

Sampling Personnel: HD + PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): Y

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : WBC

Well Casing Plug Locked and in Good Condition? Y

Comments:

Passive Diffusion Bag Sampling Form

Well Identification: AMW-23

Depth (BTOC)

40.40

DTW at installation | DTW at sampling

Top

Bottom

Weight

Well TD

Site Location: Boomsnub

Project Number:

Well Diameter:

PDB Installation Date: Time:

Sample Information

Sample No: 2043-001

Sample Date: 10/19/20 Time: 1019

Sampling Personnel: HD + PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): N

Well Condition at Sampling

Well Monument Locked and in Good Condition? No bolts

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : D

Well Casing Plug Locked and in Good Condition? Y

Comments:

Ground Water Purge and Sampling Form

Well Identification	AMW-24
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	200

Site Location: Boomsnub (Fall 2019) Date: 10/24/20

Project Number: 1524058 Personnel: HD, KPE

Purge Method: ✓ Low Flow ___ Conventional ___ None

Purge Equipment: ___ Extraction Well ✓ Redi-flo Pump (Non-Ded) ___ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 60°, Sunny

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1509	1514	1519	1524	1529	1534	1539	1544	1549	1554	1557		
Depth to Ground water (ft btoc)	130.81	130.80	130.81	130.81	130.81	130.92	130.95	130.97	130.97	130.97	Collect Sample		
Total Groundwater Purged (gallons, liters)	1.0	2.0	3.0	4.0	5.0	6.0 (7.5)	10.0	12.5	15.0	17.5			
Purge Rate (gpm, ft³/min, ml/min)	200	200	200	200	200	200 (500)	500	500	500	500			
pH +/- 0.1	7.00	6.81	6.79	6.79	6.79	6.78	6.80	6.81	6.82	6.83			
Conductivity (mS/cm) +/- 3%	0.291	0.289	0.289	0.288	0.288	0.285	0.287	0.287	0.286	0.286			
Turbidity (NTU) +/- 10%	459.19	357.10	166.42	125.00	108.26	48.99	35.30	32.79	33.81	30.39			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	3.27	2.74	2.58	2.55	2.53	2.43	2.43	2.42	2.42	2.40			
Temperature (°C) +/- 10%	12.6	12.6	12.8	12.9	13.0	13.8	14.4	14.5	14.4	14.4			
ORP/eH (mV) +/- 10 mV	180.0	175.1	168.7	165.5	162.1	158.2	154.8	151.7	148.2	145.4			
Color of Purged Water (gray, brown, red, clear)	Cloudy, orange	Cloudy, orange	Cloudy, white	Cloudy, white	Cloudy, Gray	Cloudy, Gray	Cloudy, Gray	Cloudy, Gray	Cloudy, Gray	Cloudy, gray			MD

Sample Identification: 2043-018

Time Sampled: 1557

Purge water disposed To: Boomsnub

# of bottles

3 VOCs by 8260C

___ Total Chromium by 200.7

___ Other:

Comments:

Passive Diffusion Bag Sampling Form

Well Identification: AMW-53A

Depth (BTOC)

DTW at installation: _____ DTW at sampling: 24.73

Top

Bottom

Weight

Well TD

Site Location: Boomsnub

Project Number: _____

Well Diameter: 2

PDB Installation Date: _____ Time: 1015

Sample Information

Sample No: 2043-037

Sample Date: 10/21/20 Time: 1025

Sampling Personnel: KH RR

Analyses: VOC 8260C

Biofilm Present (Y/N): _____

New PDB Deployed (Y/N): _____

Insufficient water for MS/MSD + parameters

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : D

Well Casing Plug Locked and in Good Condition? Y

Comments: _____

Ground Water Purge and Sampling Form

Well Identification	AMW-59
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	140.04

Site Location: Boomsnub (Fall 2019) Date: 10/20/20

Project Number: 1524058 Personnel: HD + PE

Purge Method: ✓ Low Flow ___ Conventional ___ None

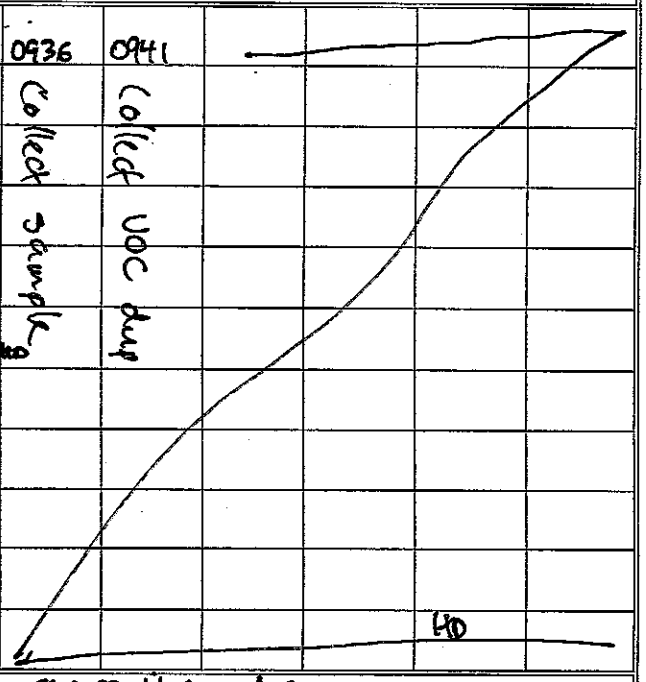
Purge Equipment: ___ Extraction Well ✓ Redi-flo Pump (Non-Ded) ___ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 65°, partly cloudy

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	0907	0912	0917	0922	0927	0932	0936	0941	
Depth to Ground water (ft btoc)	22.25	22.25	22.35	22.38	22.38	22.38	Collect	Collect	
Total Groundwater Purged (gallons, liters)	0.6	1.6	2.6	3.6	4.6	5.6	sample	VOC dup	
Purge Rate (gpm, ft³/min, ml/min)	200	200	200	200	200	200			
pH +/- 0.1	6.42	6.44	6.45	6.45	6.46	6.48			
Conductivity (mS/cm) +/- 3%	0.1237 ~~1.237~~	0.1205 ~~1.205~~	0.1190 ~~1.190~~	0.1180 ~~1.180~~	0.1163 ~~1.163~~	0.1136 ~~1.136~~			
Turbidity (NTU) +/- 10%	11.16	44.05	45.65	40.24	37.78	32.20			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	2.51	1.81	1.46	1.36	1.31	1.28			
Temperature (°C) +/- 10%	14.4	14.5	14.5	14.5	14.5	14.6			
ORP/eH (mV) +/- 10 mV	-85.7	-97.5	-106.5	-109.6	-112.4	-114.5			
Color of Purged Water (gray, brown, red, clear)	Gray	Gray	Gray	Gray	Gray	Grey			



Sample Identification: 2043-027/2043-028 # of bottles Comments: Strong sewage-like odor

Time Sampled: 0936/0941

3 VOCs by 8260C

1 ~~Total~~ Chromium by 200.7 (filtered)

Purge water disposed To: Boomsnub

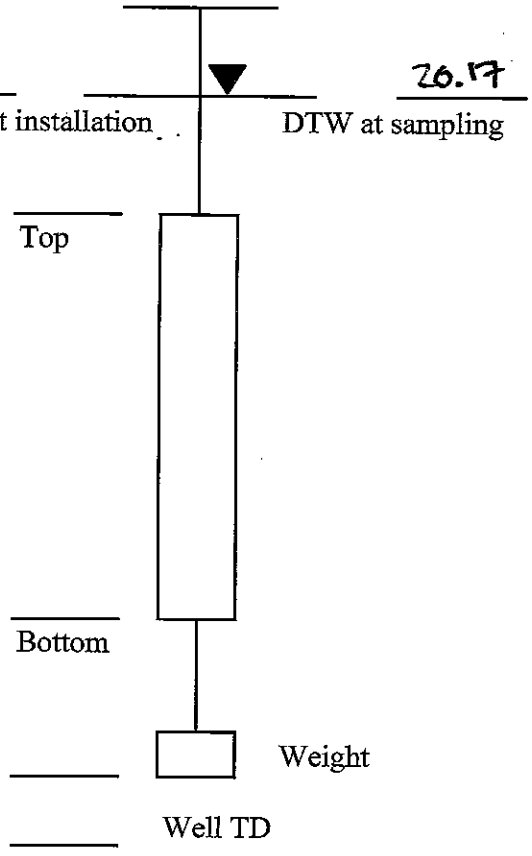
10 Other: NA parameters + Hex chrome

DUPLICATE (2043-028): 3 VOAs by 8260C

Passive Diffusion Bag Sampling Form

Well Identification: AMW-60

Depth (BTOC)



Site Location: Boomsnub

Project Number:

Well Diameter:

PDB Installation Date: Time:

Sample Information

Sample No: 2043-009

Sample Date: 10/19/20 Time: 1110

Sampling Personnel: HD + PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): N

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : WBC

Well Casing Plug Locked and in Good Condition? Y

Comments:

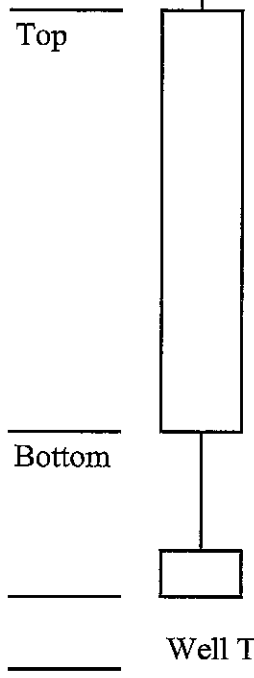
Passive Diffusion Bag Sampling Form

Well Identification: AMW-61

Depth (BTOC) _____

_____ _____ 89.78

DTW at installation DTW at sampling



Site Location: Boomsnub

Project Number: _____

Well Diameter: _____

PDB Installation Date: _____ Time: _____

Sample Information

Sample No: 2043-003

Sample Date: 10/19/20 Time: 1031

Sampling Personnel: HD + PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): N

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : WAC

Well Casing Plug Locked and in Good Condition? Y

Comments: _____

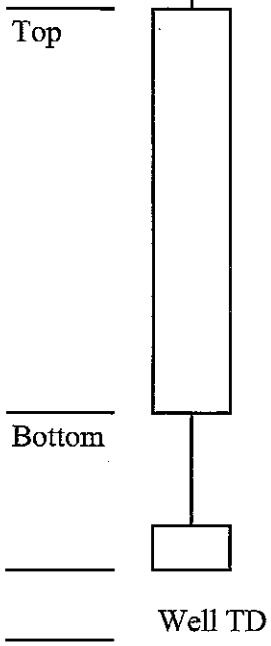
Passive Diffusion Bag Sampling Form

Well Identification: AMW-64

Depth (BTOC) _____

_____ ▼ 19.32

DTW at installation — DTW at sampling



Site Location: Boomsnub

Project Number: _____

Well Diameter: _____

PDB Installation Date: _____ Time: _____

Sample Information

Sample No: 203-011

Sample Date: 10/19/20 Time: 1124

Sampling Personnel: HD+PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): Y

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : WBC

Well Casing Plug Locked and in Good Condition? Y

Comments: _____

Ground Water Purge and Sampling Form

Well Identification	Bennett
Well Diameter (inches)	N/A
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	N/A
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	197

Site Location: Boomsnub (Fall 2019) Date: 10/21/20

Project Number: 1524058 Personnel: PE, HD

Purge Method: ___Low Flow ___Conventional X None Spigot

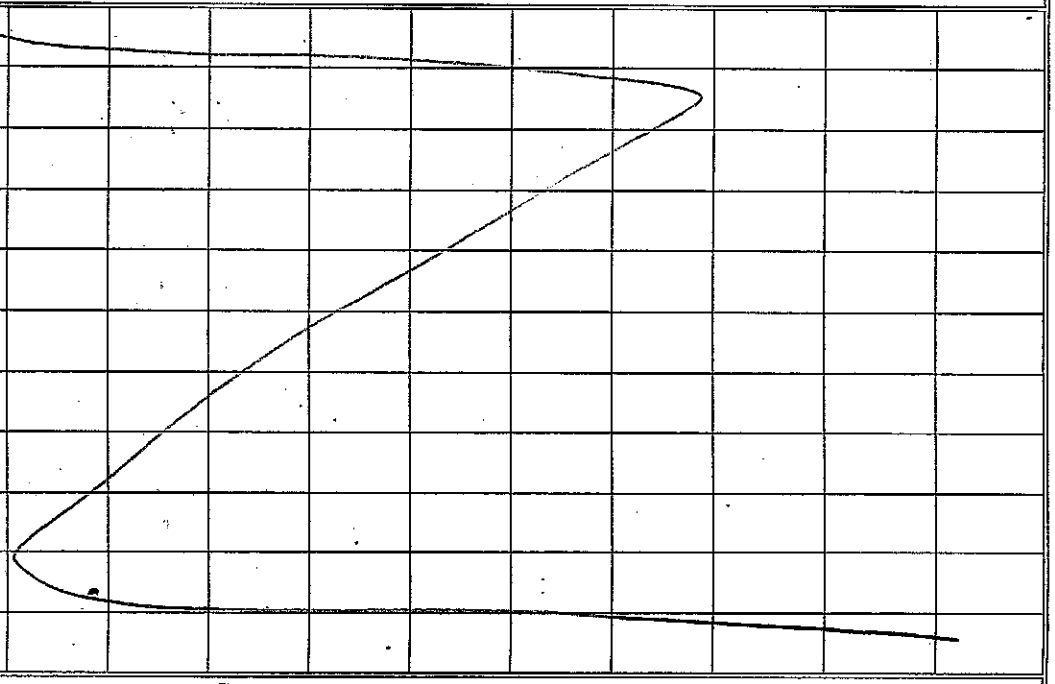
Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___None

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Passive Diffusion Bag

Weather Conditions: Sunny 60°F

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time		1120
Depth to Ground water (ft btoc)		N/A
Total Groundwater Purged (gallons, liters)		n/A
Purge Rate (gpm, ft³/min, ml/min)		n/A
pH	+/- 0.1	7.54
Conductivity (mS/cm)	+/- 3%	0.296
Turbidity (NTU)	+/- 10%	0.19
Disssolved Oxygen (mg/L)	+/- 0.3 mg/l	8.09
Temperature (°C)	+/- 10%	19.2
ORP/eH (mV)	+/- 10 mV	109.9
Color of Purged Water (gray, brown, red, clear)		Clear



Sample Identification: 2043-640

Time Sampled: 1125

Purge water disposed To: Boomsnub

# of bottles

9

___

___

Comments:

VOCs by 8260C MS/MSD

Total Chromium by 200.7

Other:

Ground Water Purge and Sampling Form

Well Identification	CBW-12
Well Diameter (inches)	4
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	72.12

Site Location: Boomsnub (Fall 2019) Date: 10/21/20

Project Number: 1524058 Personnel: KH RR

Purge Method: ✓Low Flow ___Conventional ___None

Purge Equipment: ___Extraction Well ___Redi-flo Pump (Ded) ✓None

Sampling Equipment: ___Extraction Well ✓Redi-flo Pump ___Passive Diffusion Bag

Weather Conditions: ~60°F Clear

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1441	1509	1519	1529	1534	1539	1544	1549	1554			
Depth to Ground water (ft btoc)	32.95		33.10	33.08	33.08	33.08	33.08	33.08	33.08			
Total Groundwater Purged (gallons, liters)		5 gal/min	5.0	10.0	12.5	15.0	17.5	20.0	22.5	Stable		
Purge Rate (gpm, ft³/min, ml/min)			500	500	500	500	500	500	500			
pH +/- 0.1		@	6.89	6.81	6.81	6.79	6.77	6.76	6.74			
Conductivity (mS/cm) +/- 3%		purge	0.427	0.417	0.415	0.411	0.410	0.410	0.410			
Turbidity (NTU) +/- 10%			—	—	96.70	22.81	13.11	9.01	6.89			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l		Begin	0.52	0.53	0.57	0.53	0.50	0.47	0.45			
Temperature (°C) +/- 10%			13.7	13.4	13.8	13.8	13.7	13.7	13.7			
ORP/eH (mV) +/- 10 mV			114.2	111.2	108.3	106.3	103.8	101.0	99.5			
Color of Purged Water (gray, brown, red, clear)			gray	gray	gray	gray	clear	clear	clear			

10/21/20

Sample Identification: 2043-045

Time Sampled: 1555

Purge water disposed To: Boomsnub

# of bottles	
___	VOCs by 8260C
1	Total Chromium by 200.7
___	Other:

Comments:

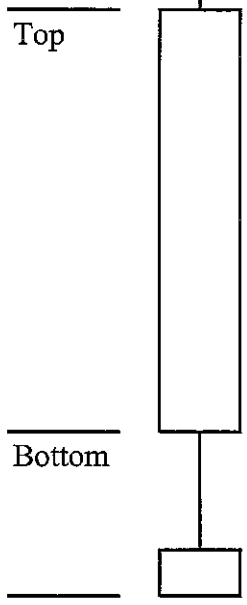
Passive Diffusion Bag Sampling Form

Well Identification: CPU - 14

Depth (BTOC) _____

_____ _____ 11.17

DTW at installation DTW at sampling



_____ Top

_____ Bottom

_____ Weight

_____ Well TD

Site Location: Boomsnub

Project Number: _____

Well Diameter: _____

PDB Installation Date: _____ Time: _____

Sample Information

Sample No: 2013-015

Sample Date: 10/19/20 Time: 1159

Sampling Personnel: HD + PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): Y

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : D

Well Casing Plug Locked and in Good Condition? Y

Comments: _____

Ground Water Purge and Sampling Form

Well Identification	MW45
Well Diameter (inches)	2
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	38.56

Site Location: Boomsnub (Fall 2019) Date: 10/21/20

Project Number: 1524058 Personnel: KH RR

Purge Method: ___Low Flow ✓Conventional ___None

Purge Equipment: ___Extraction Well ___Redi-flo Pump (Ded) ___None Bailer

Sampling Equipment: ___Extraction Well ___Redi-flo Pump ___Passive Diffusion Bag Bailer

Weather Conditions: ~50°F Cloudy

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	0949		1016										
Depth to Ground water (ft btoc)	34.05		—										
Total Groundwater Purged (gallons, liters)			2.15 (3x well casing volume)										
Purge Rate (gpm, ft³/min, ml/min)													
pH +/- 0.1													
Conductivity (mS/cm) +/- 3%													
Turbidity (NTU) +/- 10%													
Disssolved Oxygen (mg/L) +/- 0.3 mg/l													
Temperature (°C) +/- 10%													
ORP/eH (mV) +/- 10 mV													
Color of Purged Water (gray, brown, red, clear)			pitch black										

Sample Identification: 2019-037 (KH to today)

Time Sampled: —

Purge water disposed To: Boomsnub

# of bottles

3 VOCs by 8260C

___ Total Chromium by 200.7

___ Other:

Comments: Purged 3x well casing, water pitch black from nearby injections no sample

Ground Water Purge and Sampling Form

Well Identification	MW24
Well Diameter (inches)	2
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	37.45

Site Location: Boomsnub (Fall 2019) Date: 10/19/20

Project Number: 1524058 Personnel: ICH RR

Purge Method: ✓ Low Flow ___ Conventional ___ None

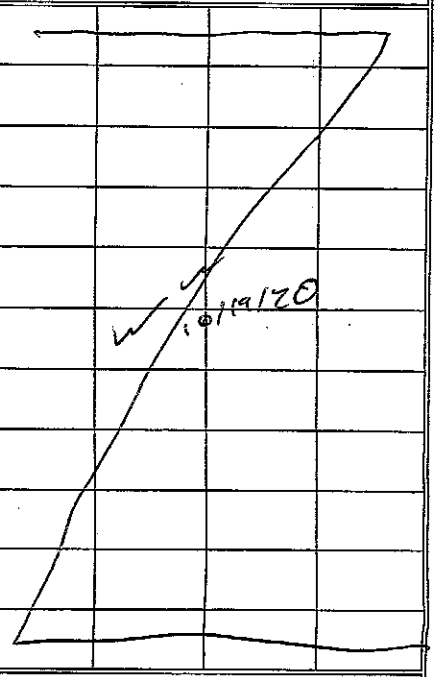
Purge Equipment: ___ Extraction Well ___ Redi-flo Pump (Ded) ___ None Peristaltic

Sampling Equipment: ___ Extraction Well ___ Redi-flo Pump ___ Passive Diffusion Bag Peristaltic

Weather Conditions: ~55°F partly cloudy

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1135	1149	~~1154~~ 1154	1209	1214	1219	1224		
Depth to Ground water (ft btoc)	31.96		32.00	31.98	31.99	31.99	31.99		
Total Groundwater Purged (gallons/liters)			5.0	10.0	12.5	15.0	17.5	Stabilized	
Purge Rate (gpm, ft³/min, ml/min)		500mL/min	500	500	500	500	500		
pH +/- 0.1		@	5.96	5.87	5.89	5.91	5.96		
Conductivity (mS/cm) +/- 3%			0.174	0.175	0.174	0.174	0.173		
Turbidity (NTU) +/- 10%		Begin purge	0.31	1.43	2.00	2.79	2.36		
Disssolved Oxygen (mg/L) +/- 0.3 mg/l			7.37	7.20	7.14	7.15	7.15		
Temperature (°C) +/- 10%			14.3	14.9	14.4	14.4	14.4		
ORP/eH (mV) +/- 10 mV			217.8	223.2	223.2	222.3	222.0		
Color of Purged Water (gray, brown, red, clear)			Clear	Clear	Clear	Clear	Clear		



Sample Identification: 2043-010

Time Sampled: 1225

Purge water disposed To: Boomsnub

# of bottles

— VOCs by 8260C

1 Total Chromium by 200.7

___ Other:

Comments:

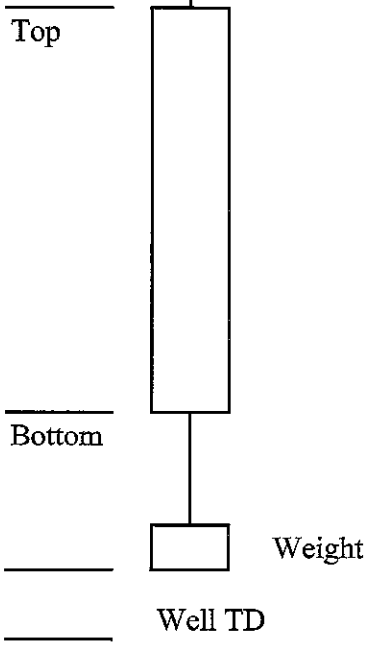
Passive Diffusion Bag Sampling Form

Well Identification: MW-23

Depth (BTOC)

31.87

DTW at installation | DTW at sampling



Site Location: Boomsnub

Project Number:

Well Diameter:

PDB Installation Date: Time:

Sample Information

Sample No: 2043-021

Sample Date: 10/19/23 Time: 1232

Sampling Personnel: HD+PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): Y

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : D

Well Casing Plug Locked and in Good Condition? Y

Comments:

Ground Water Purge and Sampling Form

Well Identification	MW-4A
Well Diameter (inches)	2
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	37.69

Site Location: Boomsnub (Fall 2019) Date: 10/19/20

Project Number: 1524058 Personnel: KH RR

Purge Method: ✓ Low Flow ___ Conventional ___ None

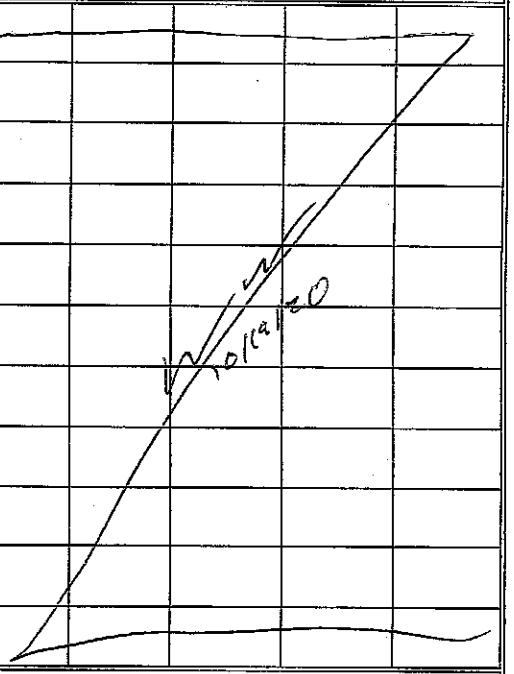
Purge Equipment: ___ Extraction Well ___ Redi-flo Pump (Ded) ___ None peristaltic

Sampling Equipment: ___ Extraction Well ___ Redi-flo Pump ___ Passive Diffusion Bag peristaltic

Weather Conditions: partly cloudy ~60°F

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1343	~~1402~~ 1350 not flowing	1412 1402 1st reading	~~1422~~ 1416 last reading	1427	1432	
Depth to Ground water (ft btoc)	~~30.10~~ ~~31.50~~ 1st reading		30.76	30.70	30.71	30.70	
Total Groundwater Purged (gallons, liters)		500ml/min	5.0	10.0	12.5	15.0	
Purge Rate (gpm, ft³/min, ml/min)			500	500	500	500	Stable
pH +/- 0.1			6.38	6.31	6.31	6.32	
Conductivity (mS/cm) +/- 3%			0.186	0.186	0.186	0.186	
Turbidity (NTU) +/- 10%		Begin purge @	22.25	3.81	2.69	2.20	
Disssolved Oxygen (mg/L) +/- 0.3 mg/l			6.67	6.68	6.66	6.67	
Temperature (°C) +/- 10%			14.2	14.2	14.3	14.3	
ORP/eH (mV) +/- 10 mV			189.6	195.5	197.1	195.0	
Color of Purged Water (gray, brown, red, clear)			Clear	Clear	Clear	Clear	



Sample Identification:
Time Sampled: 2043-12 ~1435
2043-14 ~1440

Purge water disposed To: Boomsnub

# of bottles
3 VOCs by 8260C
1 Total Chromium by 200.7
___ Other:

Comments:

Ground Water Purge and Sampling Form

MW-4B

Well Identification	MW-4B
Well Diameter (inches)	2
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	44.77

Site Location: Boomsnub (Fall 2019) Date: 10/19/20

Project Number: 1524058 Personnel: ICH RR

Purge Method: ✓ Low Flow ___ Conventional ___ None

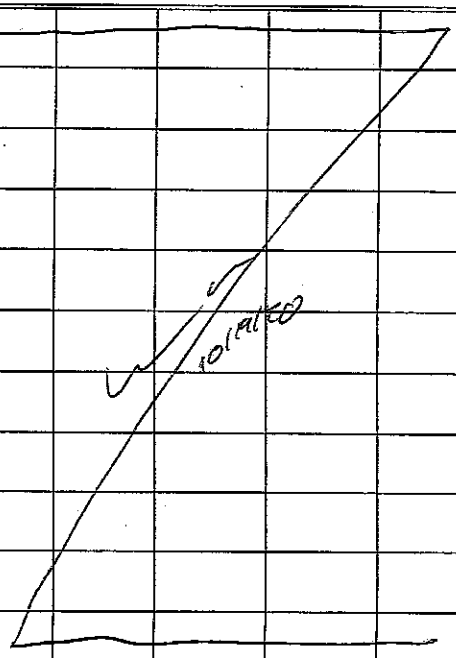
Purge Equipment: ___ Extraction Well ___ Redi-flo Pump (Ded) ___ None peristaltic

Sampling Equipment: ___ Extraction Well ___ Redi-flo Pump ___ Passive Diffusion Bag peristaltic

Weather Conditions: partly cloudy ~ 60°F

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1450	1452	1502	1512	1519	1524		
Depth to Ground water (ft btoc)	30.10	Begin purge @ 500 mL/min	30.75	30.72	30.78	30.76		
Total Groundwater Purged (gallons, liters)			5.0	10.0	12.5	15.0	Stable	
Purge Rate (gpm, ft³/min, ml/min)			500	500	500	500		
pH +/- 0.1			6.27	6.16	6.16	6.12		
Conductivity (mS/cm) +/- 3%			~~185.5~~ 0.185	0.185	0.184	0.184		
Turbidity (NTU) +/- 10%			30.60	14.72	7.88	3.27		
Disssolved Oxygen (mg/L) +/- 0.3 mg/l			6.63	6.62	6.62	6.63		
Temperature (°C) +/- 10%			14.4	14.4	14.4	14.4		
ORP/eH (mV) +/- 10 mV			185.1	198.5	202.5	204.2		
Color of Purged Water (gray, brown, red, clear)			Clear	Clear	Clear	Clear		



Sample Identification: 2043-16

Time Sampled: 1525

Purge water disposed To: Boomsnub

# of bottles	
X	VOCs by 8260C
1	Total Chromium by 200.7
___	Other:

Comments:

Ground Water Purge and Sampling Form

Well Identification	MW-GA
Well Diameter (inches)	2"
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc) (remeasured)	35.14

Site Location: Boomsnub (Fall 2019) Date: 10/21/20

Project Number: 1524058 Personnel: HD + PE

Purge Method: ✓ Low Flow ___ Conventional ___ None

Purge Equipment: ___ Extraction Well ✓ Redi-flo Pump (Non-Ded) ___ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 62°, partly cloudy

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1151	1154	1157	1200	1203	1206	1211	
Depth to Ground water (ft btoc)	29.27	29.37	29.47	29.49	29.45	Collect sample	Collect duplicate	
Total Groundwater Purged (gallons, liters)	0.6	1.2	1.8	2.4	3.0			
Purge Rate (gpm, ft³/min, ml/min)	200	200	200	200	200			
pH +/- 0.1	6.08	5.92	5.89	5.87	5.87			
Conductivity (mS/cm) +/- 3%	0.166	0.165	0.164	0.162	0.162			
Turbidity (NTU) +/- 10%	3.78	3.51	3.32	2.88	2.60			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	2.78	2.83	2.88	2.92	2.91			
Temperature (°C) +/- 10%	16.6	17.4	17.4	17.6	17.8			
ORP/eH (mV) +/- 10 mV	138.5	143.4	145.9	148.1	150.3			
Color of Purged Water (gray, brown, red, clear)	Clear	Clear	Clear	Clear	Clear			HD

Sample Identification: 20437042/2043-042 # of bottles

Time Sampled: 1206/1211

Purge water disposed To: Boomsnub

6 VOCs by 8260C

2 Total Chromium by 200.7

___ Other:

Comments: 3 min readings due to low water level

Duplicate

Ground Water Purge and Sampling Form

Well Identification	MW63
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	59

Site Location: Boomsnub (Fall 2019) Date: 10/19/20

Project Number: 1524058 Personnel: ICH RR

Purge Method: ___Low Flow ✓Conventional ___None

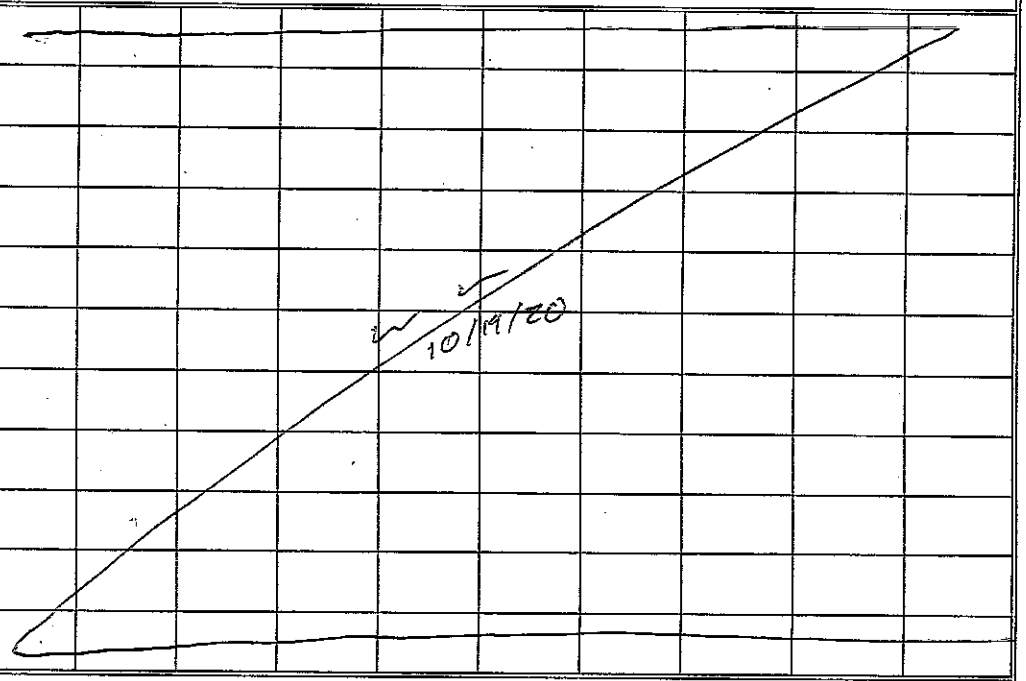
Purge Equipment: ✓Extraction Well ___Redi-flo Pump (Ded) ___None

Sampling Equipment: ✓Extraction Well ___Redi-flo Pump ___Passive Diffusion Bag

Weather Conditions: partly cloudy — 55°F

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time		1037	1042
Depth to Ground water (ft btoc)		40.00	—
Total Groundwater Purged (gallons, liters)			—
Purge Rate (gpm, ft³/min, ml/min)			4.8
pH	+/- 0.1		6.44
Conductivity (mS/cm)	+/- 3%		0.186
Turbidity (NTU)	+/- 10%		1.2
Disssolved Oxygen (mg/L)	+/- 0.3 mg/l		10.08
Temperature (°C)	+/- 10%		15.2
ORP/eH (mV)	+/- 10 mV		173.4
Color of Purged Water (gray, brown, red, clear)			clear



Sample Identification: 2003-004

Time Sampled: 1045

Purge water disposed To: Boomsnub

# of bottles

3 VOCs by 8260C

1 Total Chromium by 200.7

___ Other:

Comments: Totalizer 6314780

Passive Diffusion Bag Sampling Form

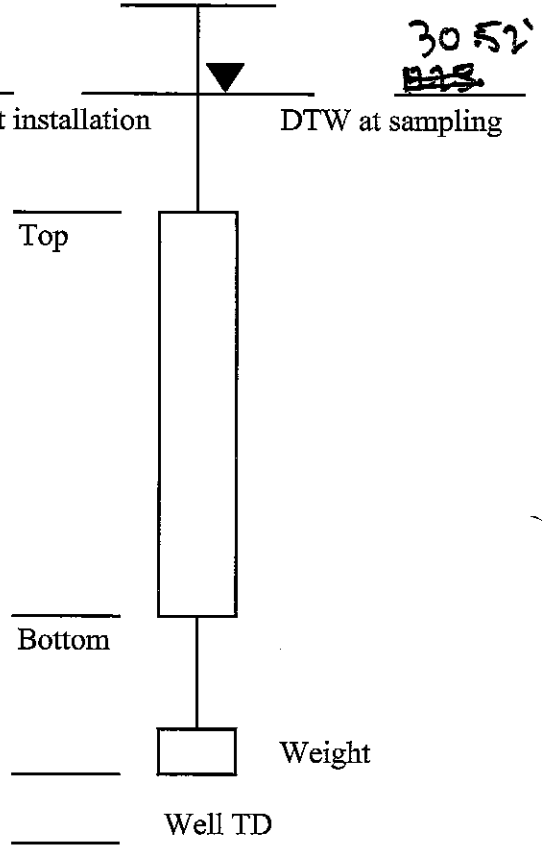
Well Identification: MW - 78

Depth (BTOC)

30.52'

DTW at installation

DTW at sampling



Site Location: Boomsnub

Project Number:

Well Diameter:

PDB Installation Date: Time:

Sample Information

Sample No: 2043-09

Sample Date: 10/19/20 Time: 1225

Sampling Personnel: HD + PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): N

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : D

Well Casing Plug Locked and in Good Condition? Y

Comments:

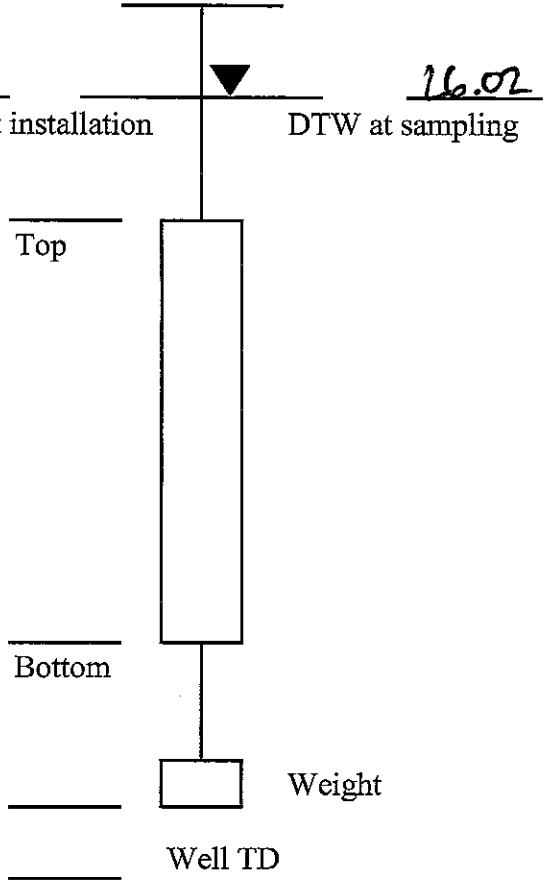
Passive Diffusion Bag Sampling Form

Well Identification: MW-9L

Depth (BTOC) _____

_____ DTW at installation

_____ 16.02 DTW at sampling



Site Location: Boomsnub

Project Number: _____

Well Diameter: _____

PDB Installation Date: _____ Time: _____

Sample Information

Sample No: 2043-017

Sample Date: 10/19/20 Time: 1211

Sampling Personnel: HD+PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): Y

Well Condition at Sampling

Well Monument Locked and in Good Condition? Y

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : D

Well Casing Plug Locked and in Good Condition? Y

Comments: _____

Ground Water Purge and Sampling Form

Well Identification	MW-10A
Well Diameter (inches)	4
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	61.5

Site Location: Boomsnub (Fall 2019) Date: 10/19/20

Project Number: 1524058 Personnel: JCH RR

Purge Method: ~~✓ Low Flow~~ ✓ Conventional ___None

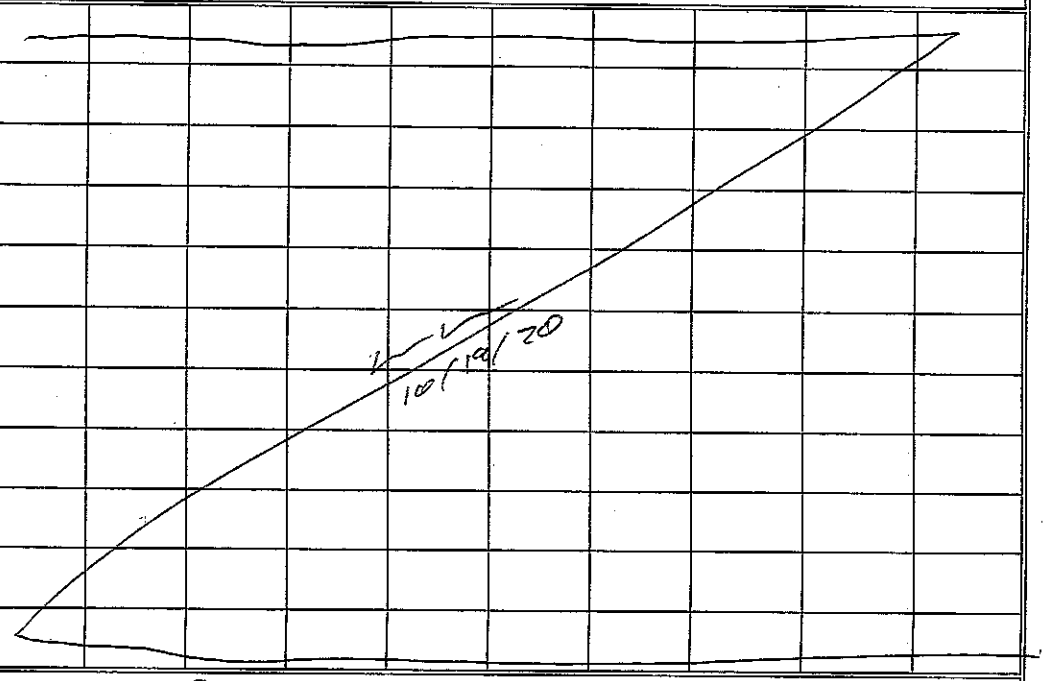
Purge Equipment: ✓ Extraction Well ___Redi-flo Pump (Ded) ___None

Sampling Equipment: ✓ Extraction Well ___Redi-flo Pump ___Passive Diffusion Bag

Weather Conditions: Partly Cloudy 55°F

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1050	1053
Depth to Ground water (ft btoc)	50.23	—
Total Groundwater Purged (gallons, liters)		—
Purge Rate (gpm, ft³/min, ml/min)		10.6
pH +/- 0.1		6.33
Conductivity (mS/cm) +/- 3%		0.215
Turbidity (NTU) +/- 10%		0.1
Disssolved Oxygen (mg/L) +/- 0.3 mg/l		8.57
Temperature (°C) +/- 10%		14.2
ORP/eH (mV) +/- 10 mV		152.2
Color of Purged Water (gray, brown, red, clear)		clear



Sample Identification: 7043-006

Time Sampled: 1053

Purge water disposed To: Boomsnub

# of bottles

3 VOCs by 8260C

1 Total Chromium by 200.7

___ Other:

Comments:

Totalizer 6419030

Ground Water Purge and Sampling Form

Well Identification	MW100
Well Diameter (inches)	4
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	81.5

Site Location: Boomsnub (Fall 2019) Date: 10/19/20

Project Number: 1524058 Personnel: ICH, RR

Purge Method: ___Low Flow ✓Conventional ___None

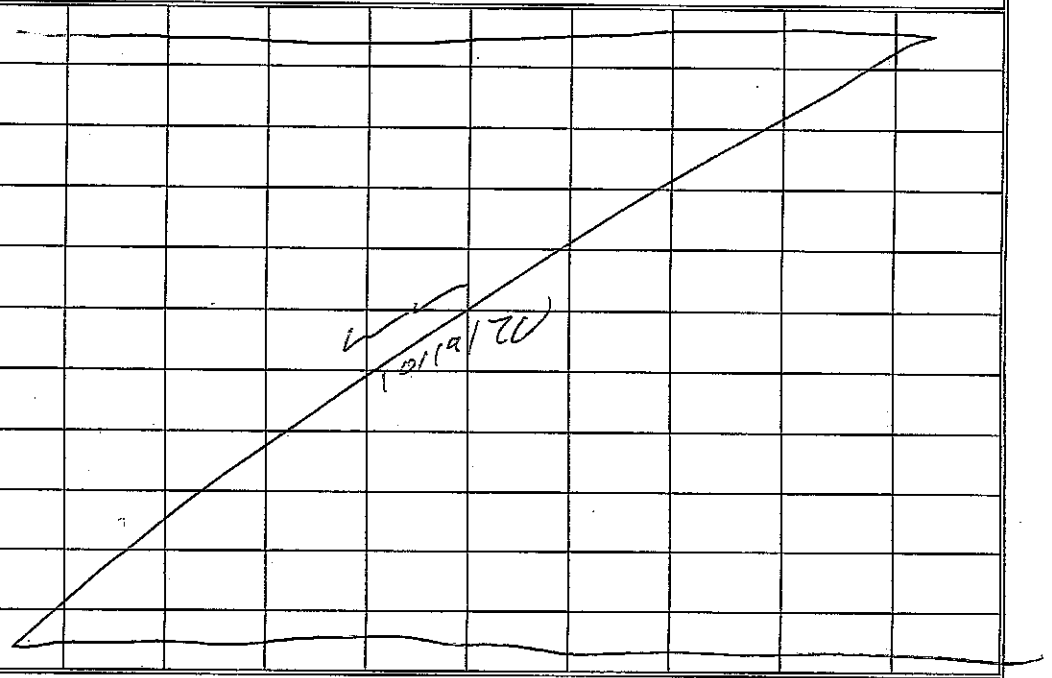
Purge Equipment: ✓Extraction Well ___Redi-flo Pump (Ded) ___None

Sampling Equipment: ✓Extraction Well ___Redi-flo Pump ___Passive Diffusion Bag

Weather Conditions: Partly cloudy ~55°

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time		1059	1103
Depth to Ground water (ft btoc)		27.93	—
Total Groundwater Purged (gallons, liters)		1	—
Purge Rate (gpm, ft³/min, ml/min)			12.2
pH	+/- 0.1		6.34
Conductivity (mS/cm)	+/- 3%		0.214
Turbidity (NTU)	+/- 10%		6.32
Disssolved Oxygen (mg/L)	+/- 0.3 mg/l		8.27
Temperature (°C)	+/- 10%		14.3
ORP/eH (mV)	+/- 10 mV		174.8
Color of Purged Water (gray, brown, red, clear)			clear



Sample Identification: 2043-GW8

Time Sampled: 1105

Purge water disposed To: Boomsnub

# of bottles

3 VOCs by 8260C

1 Total Chromium by 200.7

___ Other:

Comments: Tonalizer 2104480 12.2gpm

Ground Water Purge and Sampling Form

Well Identification	MW-180
Well Diameter (inches)	6
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	94.4

Site Location: Boomsnub (Fall 2019) Date: 10/20/20

Project Number: 1524058 Personnel: ICH RR

Purge Method: ✓ Low Flow ___ Conventional ___ None

Purge Equipment: ___ Extraction Well ___ Redi-flo Pump (Ded) ✓ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: ~60°F Sunny

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1250	1256	1306	1316	1321	1326	1331	1336	1341			
Depth to Ground water (ft btoc)	12.86		12.95	12.90	12.88	12.88	12.86	12.88	12.68			
Total Groundwater Purged (gallons, liters)			5.0	10.0	12.5	15.0	17.5	20.0	22.5			
Purge Rate (gpm, ft³/min, ml/min)			500	500	500	500	500	500	500			
pH +/- 0.1			6.82	6.69	6.63	6.60	6.65	6.59	6.57			
Conductivity (mS/cm) +/- 3%			0.218	0.217	0.217	0.217	0.219	0.219	0.219			
Turbidity (NTU) +/- 10%			—	70.52	75.11	63.69	54.02	52.07	57.8			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l			0.46	0.42	0.40	0.40	0.40	0.40	0.40			
Temperature (°C) +/- 10%			14.7	14.6	14.8	15.2	16.0	15.9	16.1			
ORP/eH (mV) +/- 10 mV			14.6	10.8	14 15.7	16.9	15.9	15.2	14.7			
Color of Purged Water (gray, brown, red, clear)			gray	gray	gray	gray	gray	gray	gray			

Begin purge @ 1250 Stable 10/20/20

Sample Identification: 2043-022

Time Sampled: 1345

Purge water disposed To: Boomsnub

# of bottles	
3	VOCs by 8260C
1	Total Chromium by 200.7
___	Other: NA Parameters

Comments:

Turb 720

Collected filtered TCr/ metal sign

Ground Water Purge and Sampling Form

Well Identification	MW-HC
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	81.5

Site Location: Boomsnub (Fall 2019) Date: 10/20/20

Project Number: 1524058 Personnel: HD + PE

Purge Method: ✓ Low Flow ___ Conventional ___ None

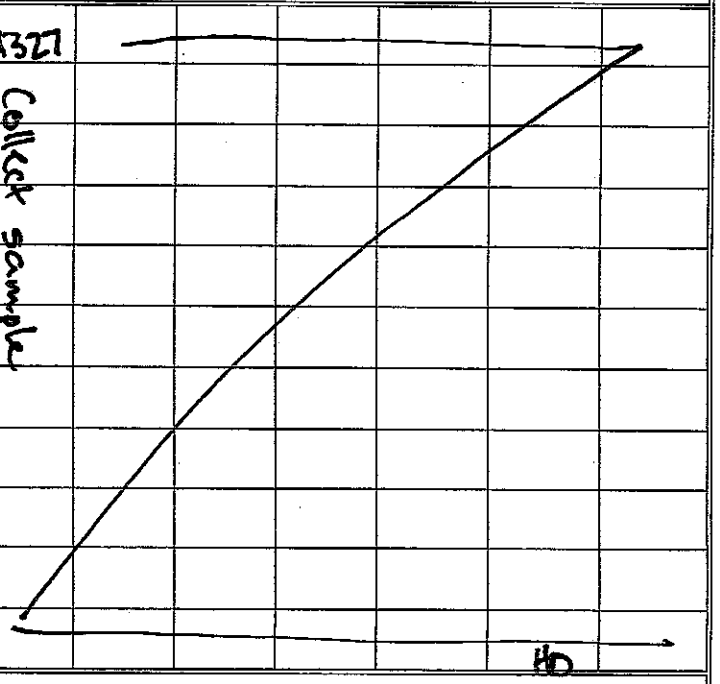
Purge Equipment: ___ Extraction Well ✓ Redi-flo Pump (Non-Ded) ___ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 70°, partly cloudy

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1304	1309	1314	1319	1324	1327	Collect sample
Depth to Ground water (ft btoc)	22.14	22.14	22.14	22.14	22.14		
Total Groundwater Purged (gallons, liters)	0.6	1.6	2.6	3.6	4.6		
Purge Rate (gpm, ft³/min, ml/min)	200	200	200	200	200		
pH +/- 0.1	6.45	6.35	6.34	6.33	6.32		
Conductivity (mS/cm) +/- 3%	0.255	0.254	0.253	0.252	0.252		
Turbidity (NTU) +/- 10%	16.07	11.90	7.27	4.80	4.03		
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	2.41	1.86	1.60	1.43	1.33		
Temperature (°C) +/- 10%	15.1	15.6	15.7	15.7	15.6		
ORP/eH (mV) +/- 10 mV	92.8	86.5	80.5	75.2	70.7		
Color of Purged Water (gray, brown, red, clear)	Clear	Clear	Clear	Clear	Clear		



Sample Identification: 2013-031

Time Sampled: 1327

Purge water disposed To: Boomsnub

# of bottles	
3	VOCs by 8260C
1	Total Chromium by 200.7
9	Other: NA parameters

Comments:

Ground Water Purge and Sampling Form

Well Identification	MW-46
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	126

Site Location: Boomsnub (Fall 2019) Date: 10/20/20

Project Number: 1524058 Personnel: MD + TE

Purge Method: ✓ Low Flow ___ Conventional ___ None

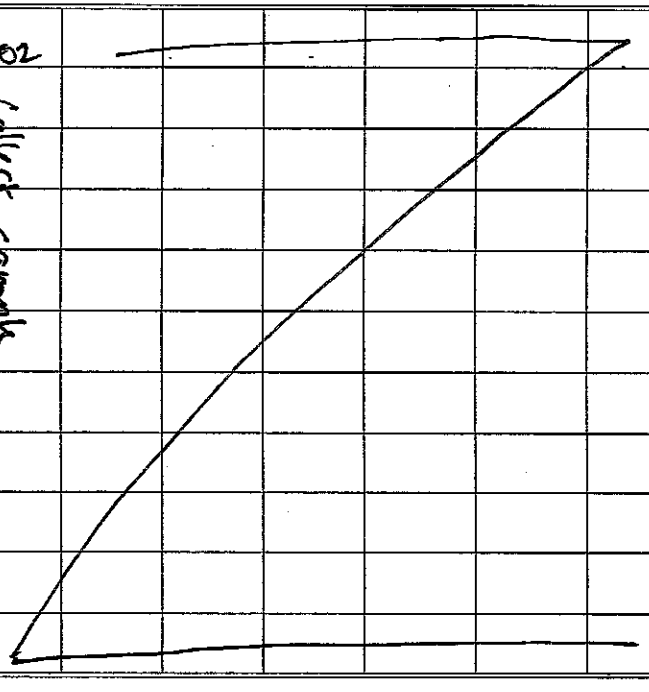
Purge Equipment: ___ Extraction Well ✓ Redi-flo Pump (Ded) Non ___ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 66°, partly cloudy

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1139	1144	1149	1154	1159	1202	Collect sample
Depth to Ground water (ft btoc)	20.52	20.52	20.52	20.52	20.52		
Total Groundwater Purged (gallons, liters)	0.6	1.6	2.6	3.6	4.6		
Purge Rate (gpm, ft³/min, ml/min)	200	200	200	200	200		
pH +/- 0.1	6.68	6.51	6.48	6.47	6.47		
Conductivity (mS/cm) +/- 3%	~~268.7~~ 0.269	0.269	0.269	0.268	0.268		
Turbidity (NTU) +/- 10%	44.66	22.39	9.77	6.05	4.19		
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	6.87	6.45	6.27	6.19	6.13		
Temperature (°C) +/- 10%	14.7	14.9	14.9	14.8	15.0		
ORP/eH (mV) +/- 10 mV	75.4	81.1	85.3	88.4	90.4		
Color of Purged Water (gray, brown, red, clear)	Clear	Gray Clear	Gray	Clear	Clear		



Sample Identification: 2043-030

Time Sampled: 1202

Purge water disposed To: Boomsnub

# of bottles	Comments:
3	VOCs by 8260C
1	Total Chromium by 200.7
9	Other: NA Parameters

Ground Water Purge and Sampling Form

Well Identification	MW-BZ
Well Diameter (inches)	4
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	122.81

Site Location: Boomsnub (Fall 2019) Date: 10/20/20

Project Number: 1524058 Personnel: KH RR

Purge Method: ✓ Low Flow ___ Conventional ___ None

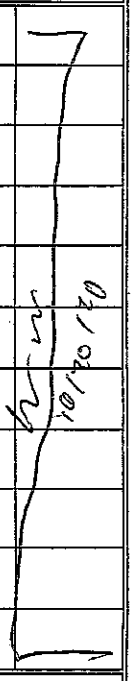
Purge Equipment: ___ Extraction Well ___ Redi-flo Pump (Ded) ✓ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: ~60° Clear

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1126	1137	1147	1157	1202	1207	1212	1217	1222	1227			
Depth to Ground water (ft btoc)	13.77		13.98	14.53	14.73	14.45	14.07	14.07	14.00	14.00			
Total Groundwater Purged (gallons, liters)		2.5 mL/min	5.0	10.0	12.5	15.0	17.5	20.0	22.5	25.0	Steady		
Purge Rate (gpm, ft³/min, ml/min)		500 mL/min	500	500	500	500	500	500	500	500			
pH +/- 0.1		@	6.93	6.97	6.96	6.94	~~6.98~~ 6.94	6.94	6.93	6.95			
Conductivity (mS/cm) +/- 3%		Begin purge	0.702	0.707	0.709	0.707	0.708	0.710	0.715	0.717			
Turbidity (NTU) +/- 10%			58.96	58.85	58.85	46.07	48.82	44.12	41.09	40.80			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l			0.49	0.41	0.39	0.34	0.33	0.32	0.34	0.32			
Temperature (°C) +/- 10%			15.1	13.8	14.1	14.1	14.1	14.0	14.2	14.2			
ORP/eH (mV) +/- 10 mV			-99.6	-113.7	-118.1	-123.6	-127.6	-130.7	-120.0	-127.8			
Color of Purged Water (gray, brown, red, clear)			brown	clear	clear	clear	clear	clear	clear	clear			



Sample Identification: 2043-20

Time Sampled: 1230

Purge water disposed To: Boomsnub

# of bottles

3 VOCs by 8260C

X Total Chromium by 200.7

___ Other: NA Parameters

Comments: Turbs >20

Collected filtered Metal Scan

Ground Water Purge and Sampling Form

Well Identification	MW-19D
Well Diameter (inches)	4
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	97.2

Site Location: Boomsnub (Fall 2019) Date: 10/20/20

Project Number: 1524058 Personnel: KH RR

Purge Method: ✓ Low Flow ___ Conventional ___ None

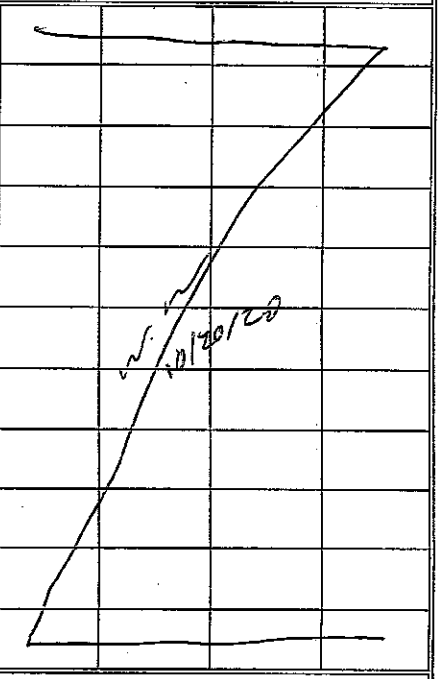
Purge Equipment: ___ Extraction Well ___ Redi-flo Pump (Ded) ✓ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 50° partly cloudy

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	0858	0910	0920	0930	0935	0940	0945		
Depth to Ground water (ft btoc)	12.60		12.73	12.75	12.75	12.75	12.75		
Total Groundwater Purged (gallons, liters)			5.0	10.0	12.5	15.0	17.5		
Purge Rate (gpm, ft³/min, ml/min)		ml/min	500	500	500	500	500	Stable	
pH +/- 0.1		@ 500	6.95	7.06	7.09	7.11	7.13		
Conductivity (mS/cm) +/- 3%			0.966	0.804	0.739	0.729	0.720		
Turbidity (NTU) +/- 10%		Begin purge	10.50	6.64	6.10	6.72	7.50		
Disssolved Oxygen (mg/L) +/- 0.3 mg/l			0.47	0.42	0.41	0.40	0.39		
Temperature (°C) +/- 10%			13.7	13.8	13.8	13.8	13.9		
ORP/eH (mV) +/- 10 mV			-154.6	-175.3	-174.9	-174.2	-173.7		
Color of Purged Water (gray, brown, red, clear)			Clear	Clear	Clear	Clear	Clear		



Sample Identification: 2043-019

Time Sampled: 0950

Purge water disposed To: Boomsnub

# of bottles

9 VOCs by 8260C

3 Total Chromium by 200.7

___ Other: NA Parameters Hex Chrome

Comments: MS/MSD

Ground Water Purge and Sampling Form

Well Identification	MW-20D
Well Diameter (inches)	4
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	87

Site Location: Boomsnub (Fall 2019) Date: 10/20/20

Project Number: 1524058 Personnel: HD + PE

Purge Method: ✓ Low Flow ___ Conventional ___ None

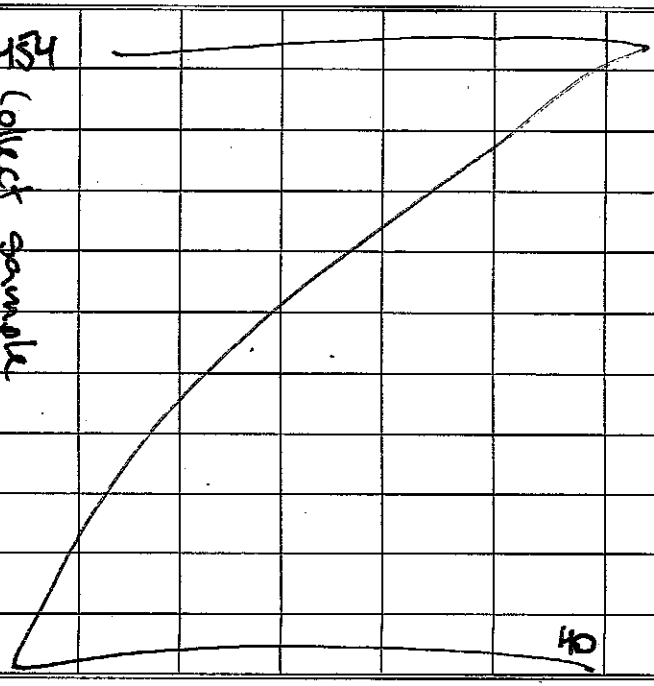
Purge Equipment: ___ Extraction Well ___ Redi-flo Pump (Ded) ___ None (Non-)

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 60°, partly sunny

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1430	1435	1440	1445	1450	1454	Collect sample
Depth to Ground water (ft btoc)	24.06	24.06	24.06	24.06	24.06		
Total Groundwater Purged (gallons, liters)	0.9	2.4	3.9	5.4	6.9		
Purge Rate (gpm, ft³/min, ml/min)	300	300	300	300	300		
pH +/- 0.1	6.67	6.73	6.67	6.64	6.62		
Conductivity (mS/cm) +/- 3%	0.398	0.392	0.364	0.354	0.350		
Turbidity (NTU) +/- 10%	55.24	29.09	19.32	14.35	11.39		
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	3.10	1.96	1.70	1.55	1.51		
Temperature (°C) +/- 10%	14.2	14.5	14.7	14.8	14.8		
ORP/eH (mV) +/- 10 mV	113.2	106.1	101.8	97.3	95.1		
Color of Purged Water (gray, brown, red, clear)	Gray, Cloudy	Gray, Cloudy	Clear	Clear	Clear		



Sample Identification: 2043-032

Time Sampled: 1454

Purge water disposed To: Boomsnub

# of bottles	Comments:
3	VOCs by 8260C
1	Total Chromium by 200.7
9	Other: NA parameters

Ground Water Purge and Sampling Form

Well Identification	MW-20D
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	86

Site Location: Boomsnub (Fall 2019) Date: 10/20/20

Project Number: 1524058 Personnel: KD + PG

Purge Method: ✓ Low Flow ___ Conventional ___ None

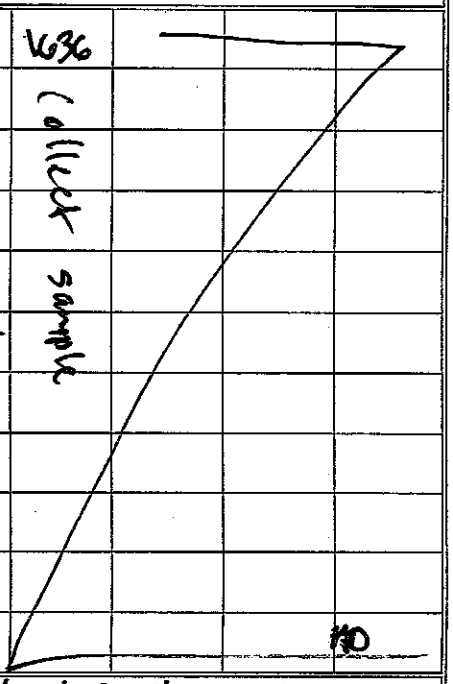
Purge Equipment: ___ Extraction Well ✓ Redi-flo Pump (Non-Ded) ___ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 58°, overcast

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1558	1603	1608	1613	1618	1623	1628	1633	1636				
Depth to Ground water (ft btoc)	21.72	21.72	21.80	21.80	21.99	21.98	21.98	21.98	Collect				
Total Groundwater Purged (gallons, liters)	0.8	1.8	2.9	3.8	6.3	9.8	10.3	12.8					
Purge Rate (gpm, ft³/min, ml/min)	200	200	200	200	500	500	500	500					
pH +/- 0.1	7.59	7.71	7.70	7.86	7.92	7.95	7.99	8.02	sample				
Conductivity (mS/cm) +/- 3%	0.132	0.132	0.132	0.132	0.133	0.133	0.134	0.135					
Turbidity (NTU) +/- 10%	831.46	741.49	603.31	444.16	343.18	335.50	315.11	319					
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	2.79	2.17	1.87	1.70	1.56	1.50	1.45	1.41					
Temperature (°C) +/- 10%	14.7	14.9	15.2	15.1	15.6	15.6	15.6	15.6					
ORP/eH (mV) +/- 10 mV	103.7	96.6	89.2	87.1	85.5	84.6	83.5	82.4					
Color of Purged Water (gray, brown, red, clear)	Grey-White	Grey-White	White	White	White	White	White	White					



Sample Identification: 2043-034

Time Sampled: 1636

Purge water disposed To: Boomsnub

# of bottles

3 VOCs by 8260C

1 Total Chromium by 200.7

___ Other:

Comments: Vault filled w/ water below casing

Ground Water Purge and Sampling Form

Well Identification	MW-22D
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	65

Site Location: Boomsnub (Fall 2019) Date: 10/21/20

Project Number: 1524058 Personnel: HD + PE

Purge Method: ✓ Low Flow ___ Conventional ___ None

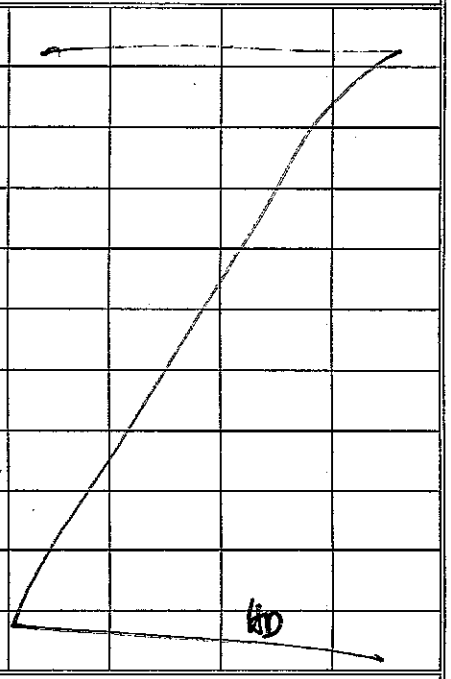
Purge Equipment: ___ Extraction Well ___ ✓ Redi-flo Pump (Ded) ___ None (Non-)

Sampling Equipment: ___ Extraction Well ___ ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 60°, sunny

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1347	1352	1357	1402	1405	1408	1411	1416		
Depth to Ground water (ft btoc)	23.24	23.24	23.24	23.24	23.24	23.24	Collect sample	Collect duplicate (VOCs only)		
Total Groundwater Purged (gallons, liters)	0.9	2.4	3.9	5.4	6.3	5.2				
Purge Rate (gpm, ft³/min, ml/min)	300	300	300	300	300	300				
pH +/- 0.1	6.92	6.97	7.03	7.07	7.11	7.14				
Conductivity (mS/cm) +/- 3%	0.353	0.338	0.343	0.355	0.359	0.356				
Turbidity (NTU) +/- 10%	25.09	16.59	20.02	21.63	22.11	16.81				
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	4.29	4.21	3.92	3.90	3.80	3.77				
Temperature (°C) +/- 10%	13.0	13.3	13.7	13.7	13.6	13.8				
ORP/eH (mV) +/- 10 mV	144.8	138.3	124.0	111.1	106.6	101.6				
Color of Purged Water (gray, brown, red, clear)	Clear	Clear	Clear	Clear	Clear	Clear				



Sample Identification: 2043-046 / 2043-047 (VOAs only)

Time Sampled: 1411 / 1416

Purge water disposed To: Boomsnub

# of bottles	
6	VOCs by 8260C
1	Total Chromium by 200.7
___	Other:

Comments:

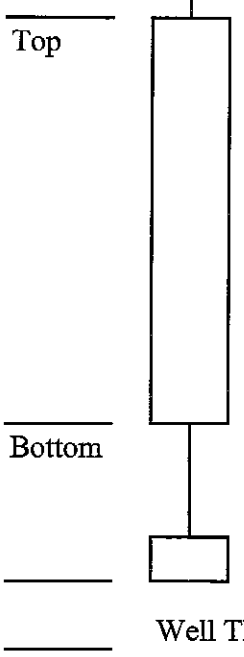
Passive Diffusion Bag Sampling Form

Well Identification: MW-23D

Depth (BTOC)

23.92

DTW at installation | DTW at sampling



Site Location: Boomsnub

Project Number:

Well Diameter:

PDB Installation Date: Time:

Sample Information

Sample No: 2043-005

Sample Date: 10/19/20 Time: 1047

Sampling Personnel: HD + PE

Analyses: VOCs

Biofilm Present (Y/N): N

New PDB Deployed (Y/N): Y

Well Condition at Sampling

Well Monument Locked and in Good Condition? no bolts

Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing): WBC

Well Casing Plug Locked and in Good Condition? Y

Comments:

Ground Water Purge and Sampling Form

Well Identification	MW-33
Well Diameter (inches)	2"
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	215

Site Location: Boomsnub (Fall 2019) Date: 10/19/20

Project Number: 1524058 Personnel: HD + PE

Purge Method: ✓ Low Flow ___ Conventional ___ None

Purge Equipment: ___ Extraction Well ✓ Redi-flo Pump (Ded) ___ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 65°, Partly cloudy

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1418	1423	1428	1433	1438	1441	
Depth to Ground water (ft btoc)	132.68	132.68	132.68	132.68	132.68	collect sample	
Total Groundwater Purged (gallons, liters)	1.0	2.5	4.0	5.5	7.0		
Purge Rate (gpm, ft³/min, ml/min)	300	300	300	300	300		
pH +/- 0.1	6.55	6.60	6.64	6.67	6.69		
Conductivity (mS/cm) +/- 3%	0.2842 284.2	0.2839 283.9	0.2842 284.2	0.2842 284.2	0.2846 284.6	NO	
Turbidity (NTU) +/- 10%	3.22	2.39	1.98	2.48	2.47		
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	3.90	3.47	3.23	3.12	3.05		
Temperature (°C) +/- 10%	12.8	13.1	13.3	13.7	14.0		
ORP/eH (mV) +/- 10 mV	100.3	95.9	91.9	89.1	87.4		
Color of Purged Water (gray, brown, red, clear)	Clear	Clear	Clear	Clear	Clear		NO

Sample Identification: 2043 - 025023

Time Sampled: 1441

Purge water disposed To: Boomsnub

# of bottles

3 VOCs by 8260C

___ Total Chromium by 200.7

___ Other:

Comments: Buried under pallets

Ground Water Purge and Sampling Form

Well Identification	MW-39
Well Diameter (inches)	2
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WAC
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	820

Site Location: Boomsnub (Fall 2019) Date: 10/21/20

Project Number: 1524058 Personnel: KH RR

Purge Method: ✓ Low Flow ___ Conventional ___ None

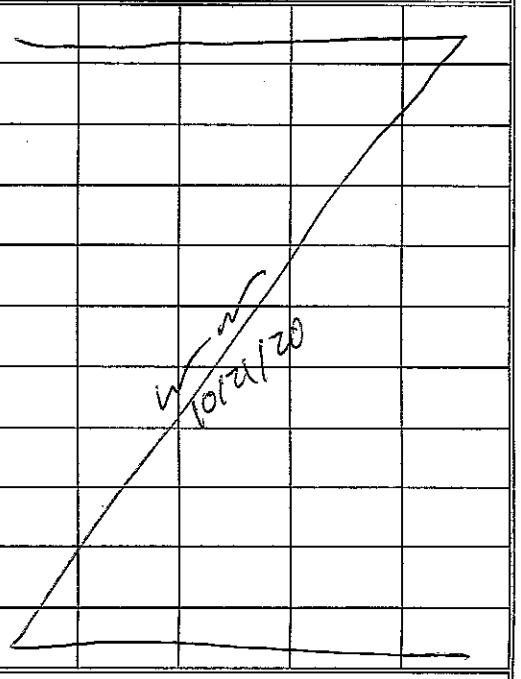
Purge Equipment: ___ Extraction Well ___ Redi-flo Pump (Ded) ✓ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: ~60°F Sunny

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1313	1322	1332	1342	1347	1352		
Depth to Ground water (ft btoc)	17.63		17.63	17.63	17.63	17.63		
Total Groundwater Purged (gallons, liters)		Begin Purge @ 400 ml/min	4.0	8.0	10.0	12.0		
Purge Rate (gpm, ft³/min, ml/min)			400	400	400	400	Stable	
pH +/- 0.1			6.58	6.52	6.51	6.49		
Conductivity (mS/cm) +/- 3%			0.267	0.269	0.269	0.269		
Turbidity (NTU) +/- 10%			21.72	6.23	4.18	2.79		
Disssolved Oxygen (mg/L) +/- 0.3 mg/l			1.16	1.03	0.99	0.96		
Temperature (°C) +/- 10%			14.6	14.8	14.7	14.8		
ORP/eH (mV) +/- 10 mV			161.4	154.9	152.9	150.6		
Color of Purged Water (gray, brown, red, clear)		~~Clear~~ Cloudy	Clear	Clear	Clear	Clear		



Sample Identification: 20193243

Time Sampled: 1355

Purge water disposed To: Boomsnub

# of bottles

9 VOCs by 8260C

3 Total Chromium by 200.7

Other:

Comments: MS/MSD

Ground Water Purge and Sampling Form

Well Identification	MW-40
Well Diameter (inches)	2
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	66.0

Site Location: Boomsnub (Fall 2019) Date: 10/21/20

Project Number: 1524058 Personnel: ICH RR

Purge Method: ✓Low Flow ___Conventional ___None

Purge Equipment: ___Extraction Well ___Redi-flo Pump (Ded) ✓None

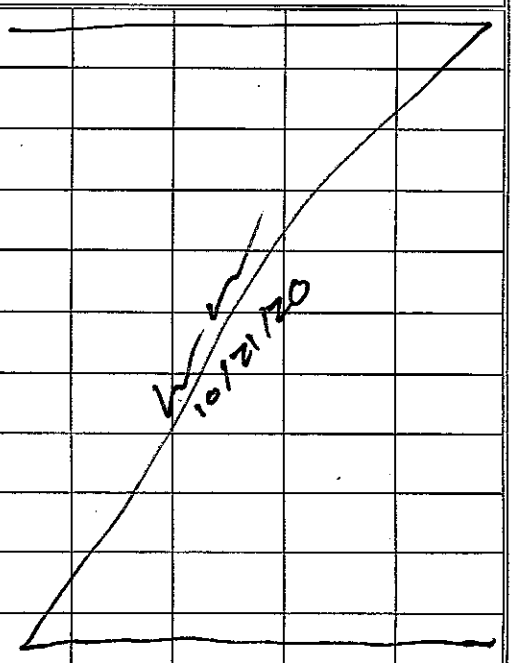
Sampling Equipment: ___Extraction Well ✓Redi-flo Pump ___Passive Diffusion Bag

Weather Conditions: ~50°F Clear

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time		1043	1050	1100	1110	1115	1120	
Depth to Ground water (ft btoc)		20.13		20.81	20.81	20.81	20.81	
Total Groundwater Purged (gallons, liters)				3.0 ~~300~~ 300 mL/min	6.0	7.5	9.0	Stable
Purge Rate (gpm, ft³/min, ml/min)				300	300	300	300	
pH	+/- 0.1			6.45	6.32	6.30	6.30	
Conductivity (mS/cm)	+/- 3%			0.220	0.221	0.221	0.220	
Turbidity (NTU)	+/- 10%			12.72	3.76	2.40	2.30	
Disssolved Oxygen (mg/L)	+/- 0.3 mg/l			4.79	4.73	4.71	4.70	
Temperature (°C)	+/- 10%			15.0	15.2	15.1	15.1	
ORP/eH (mV)	+/- 10 mV			147.3	146.4	146.7	146.3	
Color of Purged Water (gray, brown, red, clear)				Clear	Clear	Clear	Clear	

Begin purge @ 40 mL/min



Sample Identification: 2043-039

Time Sampled: 1125

Purge water disposed To: Boomsnub

# of bottles	
___	VOCs by 8260C
1	Total Chromium by 200.7
___	Other:

Comments:

Ground Water Purge and Sampling Form

Well Identification	PW-1B
Well Diameter (inches)	6
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	NA
Well Total Depth (ft btoc)	58

Site Location: Boomsnub (Fall 2019) Date: 10/19/20

Project Number: 1524058 Personnel: KH, RR

Purge Method: ___Low Flow ✓Conventional ___None

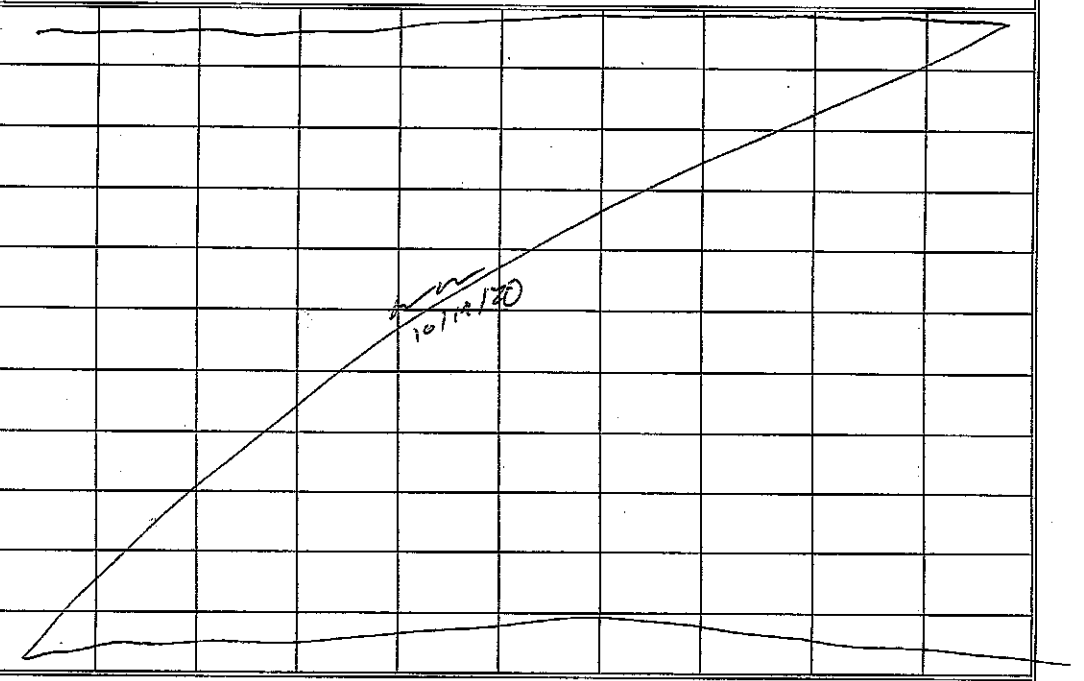
Purge Equipment: ✓Extraction Well ___Redi-flo Pump (Ded) ___None

Sampling Equipment: ✓Extraction Well ___Redi-flo Pump ___Passive Diffusion Bag

Weather Conditions: Partly Cloudy - Cool

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time		1005	1015
Depth to Ground water (ft btoc)		38.04	—
Total Groundwater Purged (gallons, liters)			-
Purge Rate (gpm, ft³/min, ml/min)			11.8 GPM
pH	+/- 0.1		7.31
Conductivity (mS/cm)	+/- 3%		0.0271
Turbidity (NTU)	+/- 10%		0.2
Disssolved Oxygen (mg/L)	+/- 0.3 mg/l		9.21
Temperature (°C)	+/- 10%		15.7
ORP/eH (mV)	+/- 10 mV		137.7
Color of Purged Water (gray, brown, red, clear)			clear



Sample Identification: 2019-002

Time Sampled: 1015

Purge water disposed To: Boomsnub

# of bottles

9 ___ VOCs by 8260C

3 ___ Total Chromium by 200.7

___ Other:

Comments: Totalizer 9410600

11.8 GPM

Ground Water Purge and Sampling Form

Well Identification	P2-39
Well Diameter (inches)	2"
Well Monument Locked and Good Condition?	No bolts
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WAC
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	91.2

Site Location: Boomsnub (Fall 2019) Date: 10/21/20

Project Number: 1524058 Personnel: AD-PE

Purge Method: ✓ Low Flow ___ Conventional ___ None

Purge Equipment: ___ Extraction Well ✓ Redi-flo Pump (Ded) (Non-) ___ None

Sampling Equipment: ___ Extraction Well ✓ Redi-flo Pump ___ Passive Diffusion Bag

Weather Conditions: 60°, Overcast

Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	0938	0943	0948	0953	0958	1003	1008	1011	1014	1017	1020	—	
Depth to Ground water (ft btoc)	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	Collect sample		
Total Groundwater Purged (gallons, liters)	0.6	1.6	2.6	3.6	4.6	5.6	6.6	7.2	7.8	8.4			
Purge Rate (gpm, ft³/min, ml/min)	200	200	200	200	200	200	200	200	200	200			
pH +/- 0.1	6.56	7.01	7.28	7.41	7.47	7.49	7.50	7.50	7.50	7.50			
Conductivity (mS/cm) +/- 3%	0.496	0.487	0.516	0.527	0.528	0.527	0.527	0.525	0.525	0.525			
Turbidity (NTU) +/- 10%	19.08	47.15	9.71	4.11	2.94	2.23	1.68	1.60	1.56	1.51			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	4.33	2.23	1.78	1.56	1.44	1.37	1.31	1.29	1.27	1.26			
Temperature (°C) +/- 10%	14.1	14.2	14.4	14.4	14.5	14.5	14.5	14.6	14.6	14.6			
ORP/eH (mV) +/- 10 mV	196.3 ~~179.5~~	174.2	165.0	153.2	145.0	130.0	117.1	114.0	110.0	104.2			
Color of Purged Water (gray, brown, red, clear)	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear			

Sample Identification: 2043-038

Time Sampled: 1020

Purge water disposed To: Boomsnub

# of bottles

3 VOCs by 8260C

___ Total Chromium by 200.7

9 Other: NA parameters

Comments:

Appendix D

Monthly Data QA/QC Summary of Groundwater Data/Validation Report

This page intentionally left blank.

ANALYTICAL DATA QUALITY

Treatment System Influent and Effluent Samples

The monthly OU-3 influent/effluent data for the reporting period were reviewed in accordance with the standards established in the Site QASP[1]. The sample coolers and the samples contained within them were received intact at the laboratory with the proper chemical preservative. No qualification of sample data was made based on the sample receipt or chain of custody.

Methylene chloride, a common laboratory contaminant, was detected in the trip and method blanks for January, February, March, April, May, June, July, August, September, October, November, and December 2020 at concentrations below the method reporting limit (MRL) of 2.0 micrograms per liter (µg/L). Methylene chloride was not detected in the field samples; therefore, no qualification of the field sample data was necessary based on these results. No trip blank was submitted in June 2020. The August trip blank had hexachlorobutadiene and PCE detected at concentrations lower than the MRL and is not expected to impact the data. The September method blank had a detection of 1.5 J for chromium, but the result is under the MRL and is not expected to impact the data.

Monthly data for the Spring reporting period (January through June) is presented in the Spring Progress and Groundwater Monitoring Report (EA 2020a) and monthly data for the Fall reporting period (July through December) is presented in Appendix B.4 of this report.

[1] *EA 2019. Quality Assurance and Sampling Plan, Revision 2. Boomsnub/Airco Superfund Site, Hazel Dell, Washington. February.*

DATA VALIDATION REPORT
SAMPLE DELIVERY GROUP NO. K2009623

PROJECT NO: 15240.98.0006
PROJECT NAME: Messner/Boomsnub/Airco Superfund Site
LABORATORY: ALS Environmental, Kelso, Washington
REVIEWER: Brenda O. Nuding, Project Chemist
DATE: 27 January 2021

Date(s) Collected	19 through 21 October 2020			
Sample Delivery Group No.	K2009623			
ANALYSIS (METHOD)	Water Sample(s)	Equipment Blank(s)	Trip Blank(s)	Field Duplicate(s)
Volatile organic compounds (SW8260C)	21	1	1	3
Metals (SW6010C)	13	1	0	2

The analytical data were reviewed with respect to quality assurance and quality control (QA/QC) parameters as specified in the *Quality Assurance and Sampling Plan for the Groundwater Treatment System Operation and Maintenance at Boomsub/Airco Superfund Site, Hazel Dell, Washington* (EA, 2017). In addition, the following guidance documents were used while assessing the validity of these data: the U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program, *National Functional Guidelines for Inorganic Superfund Data Review*, January 2017, and *National Functional Guidelines for Organic Superfund Methods Data Review*, January 2017; and the USEPA Office of Solid Waste, *SW-846 Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*, April 1998 and the associated updates. As applicable to referenced methodology, QA/QC parameters reviewed include:

- Chain-of-custody/ Sample receipt
- Holding times
- Instrument performance checks
- Initial and continuing calibrations
- Method and calibration blanks
- Interference check samples
- Laboratory control samples (LCSs)
- Surrogate recovery
- Matrix spike (MS), matrix spike duplicate, and laboratory replicate samples
- Field QC samples
- Serial dilution
- Internal standards
- Target compound identification
- Compound quantitation
- Data qualifiers

SAMPLE DELIVERY GROUP	K2009623

Chain-of-custody/Sample Receipt:
The sample cooler(s) and the samples contained within were received intact at the laboratory with the proper chemical preservatives. The sample temperature at receipt was measured at 7.8 degrees Celsius (°C), slightly above the recommended temperature range of less than 6 °C. However, as there was evidence of cooling, no qualification of sample data is necessary on the condition at sample receipt or chain of custody.

Holding Times:
The project samples were prepared and analyzed within the holding times specified by the referenced methods of analysis.

Instrument Performance Check:
Instrument performance checks are performed to ensure mass resolution, identification, and sensitivity. The instrument performance check results associated with samples from this sample delivery group (SDG) are within the method-established QC limits.

Initial and Continuing Calibrations:
Initial and continuing calibrations were performed at the required frequencies. The results for target analytes are within the laboratory and project-established QC limits, or the indicated bias is high, and the associated sample results are nondetectable, with the following exceptions.

The percent differences were outside the QC limits (<20%) for dibromochloromethane (high bias) and vinyl chloride (low bias) for continuing calibration verification standards (CCVs) associated with project samples. The results for the samples associated with the CCV with the dibromochloromethane exceedance are nondetectable and have not been qualified due to evidence of high bias. The results for the samples associated with the CCV with the vinyl chloride exceedance are nondetectable and have been qualified due to evidence of high low with the UJ qualifier.

Method and Calibration Blanks:
Method and calibration blanks were prepared and analyzed as recommended by the referenced method. The results for the method and calibration blank samples are nondetectable, with the following exceptions.

- Hexachlorobutadiene was detected at 0.13 micrograms per liter (µg/L) in one of the method blanks associated with project samples. This concentration is below the reporting limit (RL) and J flagged by the laboratory. Hexachlorobutadiene is nondetectable for project samples with the exception of the results for project samples 12043-019 (MW-7B). The result for the project sample has been flagged with the UJ qualifier due to the method blank results. No further qualification has been performed.
- Methylene chloride was detected at 0.10 µg/L in one of the method blanks associated with project samples. This concentration is below the RL and J flagged by the laboratory. Methylene chloride is nondetectable for project samples; therefore, no qualification has been performed on the basis of the trip blank results.

SAMPLE DELIVERY GROUP	K2009623

Interference Check Samples:
Inductively coupled plasma (ICP) interference check samples (ICSA/ICSAB) verify the interelement and background correction factors. ICSA/ICSAB standards were analyzed at the beginning of each analytical sequence. The ICSAB standard associated with samples from this SDG are within the laboratory and project-established QC limits.

Laboratory Control Samples:
LCSs were prepared and analyzed as recommended by the referenced USEPA method. The percent recoveries (%R) for LCSs are within the laboratory and project-established QC limits for the analytical batches containing the samples from this SDG.

Surrogate Recovery:
Surrogates were added to environmental and QC samples and standards for analysis of organic compounds as required by the referenced methodology. The surrogate %Rs are within the laboratory and project-established QC limits.

Matrix Spikes / Matrix Spike Duplicates / Laboratory Replicates:
The results for matrix spike and laboratory replicate samples were reviewed. The %R and relative percent difference (RPD) for these QC samples are within the laboratory and project-established QC limits, or the results show potential high bias, and the associated sample results are nondetectable. .

Field Quality Control Samples:

Field Duplicate(s): Three field duplicates were collected with this SDG. The analytical results reported for the duplicates were compared those for the primary samples. The RPDs for field duplicate results greater than the associated reporting limits are less than 25 percent, with the following exceptions. For primary sample 2043-012 and field duplicate 2043-014 collected at MW-44, relative percent differences exceed the QC criteria for results of iron (65%) and manganese (63%). Results for these samples have been qualified as estimated with the J qualifier.

Trip Blank(s): One trip blank was collected with this SDG (sample ID 2043-051). The analytical results for the trip blank sample are below the RLs and method detection limits, with the exception of methylene chloride at 0.42 micrograms per liter (µg/L), a concentration below the RL and J flagged by the laboratory. Note that methylene chloride was also detected in the one of the method blanks associated with project samples. Methylene chloride was nondetectable for project samples; therefore, no qualification has been performed on the basis of the trip blank results.

Equipment Rinsate Blank(s): One equipment rinsate blank was collected with this SDG (sample ID 2043-041). The analytical results for this blank are below the RLs and MDLs, with the exception of calcium, iron, magnesium, and manganese. The associated results for project samples are flagged with the UJ qualifier if less than five times the amount reported for the blank.

SAMPLE DELIVERY GROUP	K2009623

Serial Dilution:
The ICP serial dilution determines whether significant physical or chemical interferences exist due to sample matrix. Serial dilution was performed at a minimum rate of one per 20 samples per matrix. The percent difference for the serial dilution results were within the laboratory and project-established QC limits for the analytical batches containing the samples from this SDG.

Internal Standards:
Internal standards were added to environmental and QC samples and standards to monitor sensitivity and response during every analytical run, as appropriate for the analytical method. The internal standard area counts and retention times were within the method-specified control limits.

Target Compound Identification:
Organic analysis performed by gas chromatograph mass spectrometry methods requires reporting mass spectra comparison to verify compound identification. For project samples, mass spectra criteria were within method-specified criteria for the detectable target analytes.

Compound Quantitation:
The reported quantitation results and reported detection limits were reviewed and found to be accurate and to meet project requirements.

Data Qualifiers:
The appropriate data flags were used and defined in the analytical report. During data validation, additional qualifiers have been applied to data. These are defined below:

"J" indicates that the analyte was detected; however, the quantitation limit is estimated due to discrepancies in the associated quality control criteria or a result between the RL and MDL.

"UJ" indicates that the analyte was not detected; however, the quantitation limit is estimated due to discrepancies in the associated quality control criteria.

Summary:
The analytical data contained in this report have been reviewed for completeness, accuracy, and precision. The data as qualified meet the quality objectives for the intended use.

Rinsate

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 12:50
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-041	**Basis:**	NA
Lab Code:	K2009623-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:02	11/02/20	
Calcium	6010C	**57**	ug/L	21	3	1	11/10/20 10:02	11/02/20	
Chromium	6010C	ND U	ug/L	8.4	2.1	1	11/10/20 10:02	11/02/20	
Iron	6010C	**45**	ug/L	21	8	1	11/10/20 10:02	11/02/20	
Magnesium	6010C	**18.1**	ug/L	5.3	0.4	1	11/10/20 10:02	11/02/20	
Manganese	6010C	**2.3**	ug/L	1.1	0.2	1	11/10/20 10:02	11/02/20	

1/27/21

MW-44 FD

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 14:40
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-014	**Basis:**	NA
Lab Code:	K2009623-002		

Total Metals

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND	U	ug/L	21	5	1	11/10/20 10:05	11/02/20	
Calcium	6010C	**18500**		ug/L	21	3	1	11/10/20 10:05	11/02/20	
Chromium	6010C	**556**		ug/L	8.4	2.1	1	11/10/20 10:05	11/02/20	
Iron	6010C	**2050**	J	ug/L	21	8	1	11/10/20 10:05	11/02/20	
Magnesium	6010C	**6430**		ug/L	5.3	0.4	1	11/10/20 10:05	11/02/20	
Manganese	6010C	**34.6**	J	ug/L	1.1	0.2	1	11/10/20 10:05	11/02/20	

RL 1/27/21

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/20/20 16:36
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-034	**Basis:**	NA
Lab Code:	K2009623-003		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	**20 J**	ug/L	21	5	1	11/10/20 10:07	11/02/20	
Calcium	6010C	**15300**	ug/L	21	3	1	11/10/20 10:07	11/02/20	
Chromium	6010C	**14.6**	ug/L	8.4	2.1	1	11/10/20 10:07	11/02/20	
Iron	6010C	**5540**	ug/L	21	8	1	11/10/20 10:07	11/02/20	
Magnesium	6010C	**2480**	ug/L	5.3	0.4	1	11/10/20 10:07	11/02/20	
Manganese	6010C	**143**	ug/L	1.1	0.2	1	11/10/20 10:07	11/02/20	

PL 1/27/21

MW-6A

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 12:06
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-042	**Basis:**	NA
Lab Code:	K2009623-004		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:10	11/02/20	
Calcium	6010C	**16100**	ug/L	21	3	1	11/10/20 10:10	11/02/20	
Chromium	6010C	**149**	ug/L	8.4	2.1	1	11/10/20 10:10	11/02/20	
Iron	6010C	**129**	ug/L	21	8	1	11/10/20 10:10	11/02/20	
Magnesium	6010C	**5130**	ug/L	5.3	0.4	1	11/10/20 10:10	11/02/20	
Manganese	6010C	**9.4**	ug/L	1.1	0.2	1	11/10/20 10:10	11/02/20	

1/27/21

ALS Group USA, Corp.
dba ALS Environmental

MW-22D

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 14:11
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-046	**Basis:**	NA
Lab Code:	K2009623-005		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:13	11/02/20	
Calcium	6010C	**45300**	ug/L	21	3	1	11/10/20 10:13	11/02/20	
Chromium	6010C	**66.7**	ug/L	8.4	2.1	1	11/10/20 10:13	11/02/20	
Iron	6010C	**861**	ug/L	21	8	1	11/10/20 10:13	11/02/20	
Magnesium	6010C	**13300**	ug/L	5.3	0.4	1	11/10/20 10:13	11/02/20	
Manganese	6010C	**543**	ug/L	1.1	0.2	1	11/10/20 10:13	11/02/20	

RB 1/27/21

ALS Group USA, Corp.
dba ALS Environmental

MW-6A FD

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 12:11
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-044	**Basis:**	NA
Lab Code:	K2009623-006		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:15	11/02/20	
Calcium	6010C	**15700**	ug/L	21	3	1	11/10/20 10:15	11/02/20	
Chromium	6010C	**148**	ug/L	8.4	2.1	1	11/10/20 10:15	11/02/20	
Iron	6010C	**128**	ug/L	21	8	1	11/10/20 10:15	11/02/20	
Magnesium	6010C	**5010**	ug/L	5.3	0.4	1	11/10/20 10:15	11/02/20	
Manganese	6010C	**9.2**	ug/L	1.1	0.2	1	11/10/20 10:15	11/02/20	

1/27/21

MW-39

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 12:55
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-043	**Basis:**	NA
Lab Code:	K2009623-008		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:18	11/02/20	
Calcium	6010C	**22400**	ug/L	21	3	1	11/10/20 10:18	11/02/20	
Chromium	6010C	**4.7 J**	ug/L	8.4	2.1	1	11/10/20 10:18	11/02/20	
Iron	6010C	**342**	ug/L	21	8	1	11/10/20 10:18	11/02/20	
Magnesium	6010C	**13100**	ug/L	5.3	0.4	1	11/10/20 10:18	11/02/20	
Manganese	6010C	**6.8** NJ	ug/L	1.1	0.2	1	11/10/20 10:18	11/02/20	

1/27/21

MW-6B

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 10:45
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-004	**Basis:**	NA
Lab Code:	K2009623-009		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:26	11/02/20	
Calcium	6010C	**15300**	ug/L	21	3	1	11/10/20 10:26	11/02/20	
Chromium	6010C	**14.9**	ug/L	8.4	2.1	1	11/10/20 10:26	11/02/20	
Iron	6010C	ND U	ug/L	21	8	1	11/10/20 10:26	11/02/20	
Magnesium	6010C	**6950**	ug/L	5.3	0.4	1	11/10/20 10:26	11/02/20	
Manganese	6010C	ND U	ug/L	1.1	0.2	1	11/10/20 10:26	11/02/20	

PG 1/27/21

MW-10B

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 10:55
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-006	**Basis:**	NA
Lab Code:	K2009623-010		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:37	11/02/20	
Calcium	6010C	**18100**	ug/L	21	3	1	11/10/20 10:37	11/02/20	
Chromium	6010C	**32.1**	ug/L	8.4	2.1	1	11/10/20 10:37	11/02/20	
Iron	6010C	ND U	ug/L	21	8	1	11/10/20 10:37	11/02/20	
Magnesium	6010C	**8690**	ug/L	5.3	0.4	1	11/10/20 10:37	11/02/20	
Manganese	6010C	ND U	ug/L	1.1	0.2	1	11/10/20 10:37	11/02/20	

1/29/21

ALS Group USA, Corp.
dba ALS Environmental

MW-10C

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 11:05
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-008	**Basis:**	NA
Lab Code:	K2009623-011		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:39	11/02/20	
Calcium	6010C	**17600**	ug/L	21	3	1	11/10/20 10:39	11/02/20	
Chromium	6010C	**57.9**	ug/L	8.4	2.1	1	11/10/20 10:39	11/02/20	
Iron	6010C	ND U	ug/L	21	8	1	11/10/20 10:39	11/02/20	
Magnesium	6010C	**7680**	ug/L	5.3	0.4	1	11/10/20 10:39	11/02/20	
Manganese	6010C	**0.3 J**	ug/L	1.1	0.2	1	11/10/20 10:39	11/02/20	

1/27/21

ALS Group USA, Corp.
dba ALS Environmental

MW-44

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 14:35
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-012	**Basis:**	NA
Lab Code:	K2009623-012		

Total Metals

Analyte Name	Analysis Method	Result		Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND	U	ug/L	21	5	1	11/10/20 10:42	11/02/20	
Calcium	6010C	**17800**		ug/L	21	3	1	11/10/20 10:42	11/02/20	
Chromium	6010C	**543**		ug/L	8.4	2.1	1	11/10/20 10:42	11/02/20	
Iron	6010C	**1040**	J	ug/L	21	8	1	11/10/20 10:42	11/02/20	
Magnesium	6010C	**6160**		ug/L	5.3	0.4	1	11/10/20 10:42	11/02/20	
Manganese	6010C	**18.1**	J	ug/L	1.1	0.2	1	11/10/20 10:42	11/02/20	

RC 1/27/21

ALS Group USA, Corp.
dba ALS Environmental

PW-1B

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 10:15
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-002	**Basis:**	NA
Lab Code:	K2009623-013		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:44	11/02/20	
Calcium	6010C	**15300**	ug/L	21	3	1	11/10/20 10:44	11/02/20	
Chromium	6010C	**31.9**	ug/L	8.4	2.1	1	11/10/20 10:44	11/02/20	
Iron	6010C	ND U	ug/L	21	8	1	11/10/20 10:44	11/02/20	
Magnesium	6010C	**6530**	ug/L	5.3	0.4	1	11/10/20 10:44	11/02/20	
Manganese	6010C	**1.8**	ug/L	1.1	0.2	1	11/10/20 10:44	11/02/20	

1/27/21

CPU-12

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 15:55
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-045	**Basis:**	NA
Lab Code:	K2009623-014		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:52	11/02/20	
Calcium	6010C	**39100**	ug/L	21	3	1	11/10/20 10:52	11/02/20	
Chromium	6010C	**7.0 J**	ug/L	8.4	2.1	1	11/10/20 10:52	11/02/20	
Iron	6010C	**423**	ug/L	21	8	1	11/10/20 10:52	11/02/20	
Magnesium	6010C	**22600**	ug/L	5.3	0.4	1	11/10/20 10:52	11/02/20	
Manganese	6010C	**6.4**	ug/L	1.1	0.2	1	11/10/20 10:52	11/02/20	

1/27/21

ALS Group USA, Corp.
dba ALS Environmental

MW-40

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 11:25
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-039	**Basis:**	NA
Lab Code:	K2009623-015		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:55	11/02/20	
Calcium	6010C	**20900**	ug/L	21	3	1	11/10/20 10:55	11/02/20	
Chromium	6010C	**103**	ug/L	8.4	2.1	1	11/10/20 10:55	11/02/20	
Iron	6010C	**513**	ug/L	21	8	1	11/10/20 10:55	11/02/20	
Magnesium	6010C	**8840**	ug/L	5.3	0.4	1	11/10/20 10:55	11/02/20	
Manganese	6010C	**35.4**	ug/L	1.1	0.2	1	11/10/20 10:55	11/02/20	

1/27/21

AMW-24

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 12:25
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-010	**Basis:**	NA
Lab Code:	K2009623-016		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 10:58	11/02/20	
Calcium	6010C	**14700**	ug/L	21	3	1	11/10/20 10:58	11/02/20	
Chromium	6010C	**601**	ug/L	8.4	2.1	1	11/10/20 10:58	11/02/20	
Iron	6010C	**11** J UJ	ug/L	21	8	1	11/10/20 10:58	11/02/20	
Magnesium	6010C	**5010**	ug/L	5.3	0.4	1	11/10/20 10:58	11/02/20	
Manganese	6010C	**0.2** J UJ	ug/L	1.1	0.2	1	11/10/20 10:58	11/02/20	

1/27/21

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

MW-4B

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 15:25
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-016	**Basis:**	NA
Lab Code:	K2009623-017		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6010C	ND U	ug/L	21	5	1	11/10/20 11:00	11/02/20	
Calcium	6010C	**17100**	ug/L	21	3	1	11/10/20 11:00	11/02/20	
Chromium	6010C	**318**	ug/L	8.4	2.1	1	11/10/20 11:00	11/02/20	
Iron	6010C	**18 J**	ug/L	21	8	1	11/10/20 11:00	11/02/20	
Magnesium	6010C	**5250**	ug/L	5.3	0.4	1	11/10/20 11:00	11/02/20	
Manganese	6010C	**0.5 J**	ug/L	1.1	0.2	1	11/10/20 11:00	11/02/20	

RL 1/27/21

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 12:50
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-041	**Units:**	ug/L
Lab Code:	K2009623-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 16:27	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 16:27	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 16:27	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 16:27	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 16:27	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 16:27	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 16:27	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 16:27	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 16:27	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 16:27	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 16:27	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	10/24/20 16:27	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 16:27	
Trichloroethene (TCE)	ND U	0.50	0.10	1	10/24/20 16:27	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 16:27	
Vinyl Chloride	ND ~~U~~ UJ	0.50	0.075	1	10/24/20 16:27	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	10/24/20 16:27	
Dibromofluoromethane	114	73 - 122	10/24/20 16:27	
Toluene-d8	103	65 - 144	10/24/20 16:27	

1/27/21

ALS Group USA, Corp.
dba ALS Environmental

MW-44 FD

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 14:40
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-014	**Units:**	ug/L
Lab Code:	K2009623-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 16:53	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 16:53	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 16:53	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 16:53	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 16:53	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 16:53	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 16:53	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 16:53	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 16:53	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 16:53	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 16:53	
Tetrachloroethene (PCE)	**0.44 J**	0.50	0.099	1	10/24/20 16:53	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 16:53	
Trichloroethene (TCE)	**1.8**	0.50	0.10	1	10/24/20 16:53	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 16:53	
Vinyl Chloride	~~ND U~~ U5	0.50	0.075	1	10/24/20 16:53	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	68 - 117	10/24/20 16:53	
Dibromofluoromethane	111	73 - 122	10/24/20 16:53	
Toluene-d8	100	65 - 144	10/24/20 16:53	

PR 1/7/21

MW-21D

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/20/20 16:36
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-034	**Units:**	ug/L
Lab Code:	K2009623-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 17:19	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 17:19	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 17:19	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 17:19	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 17:19	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 17:19	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 17:19	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 17:19	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 17:19	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 17:19	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 17:19	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	10/24/20 17:19	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 17:19	
Trichloroethene (TCE)	**0.31 J**	0.50	0.10	1	10/24/20 17:19	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 17:19	
Vinyl Chloride	ND ~~U~~ UJ	0.50	0.075	1	10/24/20 17:19	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	98	68 - 117	10/24/20 17:19	
Dibromofluoromethane	113	73 - 122	10/24/20 17:19	
Toluene-d8	100	65 - 144	10/24/20 17:19	

1/27/21

MW-6A

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 12:06
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-042	**Units:**	ug/L
Lab Code:	K2009623-004	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 17:46	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 17:46	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 17:46	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 17:46	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 17:46	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 17:46	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 17:46	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 17:46	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 17:46	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 17:46	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 17:46	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	10/24/20 17:46	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 17:46	
Trichloroethene (TCE)	ND U	0.50	0.10	1	10/24/20 17:46	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 17:46	
Vinyl Chloride	ND U UJ	0.50	0.075	1	10/24/20 17:46	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	98	68 - 117	10/24/20 17:46	
Dibromofluoromethane	115	73 - 122	10/24/20 17:46	
Toluene-d8	101	65 - 144	10/24/20 17:46	

1/27/21

MW-22D

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 14:11
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-046	**Units:**	ug/L
Lab Code:	K2009623-005	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 18:12	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 18:12	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 18:12	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 18:12	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 18:12	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 18:12	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 18:12	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 18:12	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 18:12	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 18:12	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 18:12	
Tetrachloroethene (PCE)	**1.3**	0.50	0.099	1	10/24/20 18:12	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 18:12	
Trichloroethene (TCE)	**1.6**	0.50	0.10	1	10/24/20 18:12	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 18:12	
Vinyl Chloride	ND ~~U~~ UJ	0.50	0.075	1	10/24/20 18:12	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	68 - 117	10/24/20 18:12	
Dibromofluoromethane	113	73 - 122	10/24/20 18:12	
Toluene-d8	103	65 - 144	10/24/20 18:12	

MW-6A FD

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 12:11
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-044	**Units:**	ug/L
Lab Code:	K2009623-006	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 18:38	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 18:38	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 18:38	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 18:38	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 18:38	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 18:38	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 18:38	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 18:38	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 18:38	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 18:38	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 18:38	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	10/24/20 18:38	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 18:38	
Trichloroethene (TCE)	ND U	0.50	0.10	1	10/24/20 18:38	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 18:38	
Vinyl Chloride	ND ~~U~~ UJ	0.50	0.075	1	10/24/20 18:38	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	68 - 117	10/24/20 18:38	
Dibromofluoromethane	113	73 - 122	10/24/20 18:38	
Toluene-d8	101	65 - 144	10/24/20 18:38	

MW-22D FD

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 14:16
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-047	**Units:**	ug/L
Lab Code:	K2009623-007	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 19:04	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 19:04	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 19:04	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 19:04	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 19:04	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 19:04	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 19:04	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 19:04	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 19:04	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 19:04	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 19:04	
Tetrachloroethene (PCE)	**1.3**	0.50	0.099	1	10/24/20 19:04	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 19:04	
Trichloroethene (TCE)	**1.5**	0.50	0.10	1	10/24/20 19:04	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 19:04	
Vinyl Chloride	ND ~~U~~ UJ	0.50	0.075	1	10/24/20 19:04	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	68 - 117	10/24/20 19:04	
Dibromofluoromethane	113	73 - 122	10/24/20 19:04	
Toluene-d8	102	65 - 144	10/24/20 19:04	

JV 1/27/21

ALS Group USA, Corp.
dba ALS Environmental

MW-38

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 12:55
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-043	**Units:**	ug/L
Lab Code:	K2009623-008	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 19:30	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 19:30	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 19:30	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 19:30	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 19:30	
1,1-Dichloroethene	**0.32 J**	0.50	0.080	1	10/24/20 19:30	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 19:30	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 19:30	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 19:30	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 19:30	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 19:30	
Tetrachloroethene (PCE)	**0.57**	0.50	0.099	1	10/24/20 19:30	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 19:30	
Trichloroethene (TCE)	**12**	0.50	0.10	1	10/24/20 19:30	
Trichlorofluoromethane (CFC 11)	**0.20 J**	0.50	0.12	1	10/24/20 19:30	
Vinyl Chloride	ND ~~U~~ UJ	0.50	0.075	1	10/24/20 19:30	*

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	68 - 117	10/24/20 19:30	
Dibromofluoromethane	114	73 - 122	10/24/20 19:30	
Toluene-d8	103	65 - 144	10/24/20 19:30	

1/27/21

MW-6B

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 10:45
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-004	**Units:**	ug/L
Lab Code:	K2009623-009	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 15:02	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 15:02	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 15:02	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 15:02	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 15:02	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 15:02	
cis-1,2-Dichloroethene	**0.13 J**	0.50	0.067	1	10/24/20 15:02	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 15:02	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 15:02	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 15:02	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 15:02	
Tetrachloroethene (PCE)	**0.40 J**	0.50	0.099	1	10/24/20 15:02	
1,1,1-Trichloroethane (TCA)	**0.31 J**	0.50	0.075	1	10/24/20 15:02	
Trichloroethene (TCE)	**4.2**	0.50	0.10	1	10/24/20 15:02	
Trichlorofluoromethane (CFC 11)	**2.0**	0.50	0.12	1	10/24/20 15:02	
Vinyl Chloride	ND U	0.50	0.075	1	10/24/20 15:02	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	10/24/20 15:02	
Dibromofluoromethane	93	73 - 122	10/24/20 15:02	
Toluene-d8	99	65 - 144	10/24/20 15:02	

1/27/21

ALS Group USA, Corp.
dba ALS Environmental

MW-10B

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 10:55
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-006	**Units:**	ug/L
Lab Code:	K2009623-010	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 15:28	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 15:28	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 15:28	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 15:28	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 15:28	
1,1-Dichloroethene	**0.080 J**	0.50	0.080	1	10/24/20 15:28	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 15:28	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 15:28	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 15:28	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 15:28	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 15:28	
Tetrachloroethene (PCE)	**0.71**	0.50	0.099	1	10/24/20 15:28	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 15:28	
Trichloroethene (TCE)	**8.9**	0.50	0.10	1	10/24/20 15:28	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 15:28	
Vinyl Chloride	ND U	0.50	0.075	1	10/24/20 15:28	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	10/24/20 15:28	
Dibromofluoromethane	97	73 - 122	10/24/20 15:28	
Toluene-d8	99	65 - 144	10/24/20 15:28	

MW-10C

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 11:05
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-008	**Units:**	ug/L
Lab Code:	K2009623-011	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	**0.13**	**J**	0.50	0.091	1	10/24/20 15:55	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/24/20 15:55	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	10/24/20 15:55	
Dibromochloromethane	ND	U	0.50	0.14	1	10/24/20 15:55	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/24/20 15:55	
1,1-Dichloroethene	ND	U	0.50	0.080	1	10/24/20 15:55	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/24/20 15:55	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	10/24/20 15:55	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/24/20 15:55	
Methylene Chloride	ND	U	2.0	0.10	1	10/24/20 15:55	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/24/20 15:55	
Tetrachloroethene (PCE)	**0.44**	**J**	0.50	0.099	1	10/24/20 15:55	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/24/20 15:55	
Trichloroethene (TCE)	**1.3**		0.50	0.10	1	10/24/20 15:55	
Trichlorofluoromethane (CFC 11)	**1.3**		0.50	0.12	1	10/24/20 15:55	
Vinyl Chloride	ND	U	0.50	0.075	1	10/24/20 15:55	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	10/24/20 15:55	
Dibromofluoromethane	101	73 - 122	10/24/20 15:55	
Toluene-d8	103	65 - 144	10/24/20 15:55	

RC 1/17/21

ALS Group USA, Corp.
dba ALS Environmental

MW-44

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 14:35
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-012	**Units:**	ug/L
Lab Code:	K2009623-012	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 16:21	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 16:21	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 16:21	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 16:21	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 16:21	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 16:21	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 16:21	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 16:21	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 16:21	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 16:21	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 16:21	
Tetrachloroethene (PCE)	**0.37 J**	0.50	0.099	1	10/24/20 16:21	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 16:21	
Trichloroethene (TCE)	**1.8**	0.50	0.10	1	10/24/20 16:21	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 16:21	
Vinyl Chloride	ND U	0.50	0.075	1	10/24/20 16:21	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	10/24/20 16:21	
Dibromofluoromethane	96	73 - 122	10/24/20 16:21	
Toluene-d8	98	65 - 144	10/24/20 16:21	

RL 1/27/21

PW-1B

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 10:15
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-002	**Units:**	ug/L
Lab Code:	K2009623-013	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 16:48	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 16:48	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 16:48	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 16:48	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 16:48	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 16:48	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 16:48	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 16:48	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 16:48	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 16:48	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 16:48	
Tetrachloroethene (PCE)	**0.29 J**	0.50	0.099	1	10/24/20 16:48	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 16:48	
Trichloroethene (TCE)	**2.2**	0.50	0.10	1	10/24/20 16:48	
Trichlorofluoromethane (CFC 11)	**0.27 J**	0.50	0.12	1	10/24/20 16:48	
Vinyl Chloride	ND U	0.50	0.075	1	10/24/20 16:48	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	10/24/20 16:48	
Dibromofluoromethane	93	73 - 122	10/24/20 16:48	
Toluene-d8	100	65 - 144	10/24/20 16:48	

AMW-44

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/20/20 15:30
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-033	**Units:**	ug/L
Lab Code:	K2009623-018	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 18:34	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 18:34	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 18:34	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 18:34	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 18:34	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 18:34	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 18:34	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 18:34	
Hexachlorobutadiene	**0.23 J**	2.0	0.11	1	10/24/20 18:34	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 18:34	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 18:34	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	10/24/20 18:34	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 18:34	
Trichloroethene (TCE)	ND U	0.50	0.10	1	10/24/20 18:34	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 18:34	
Vinyl Chloride	ND U	0.50	0.075	1	10/24/20 18:34	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	90	68 - 117	10/24/20 18:34	
Dibromofluoromethane	96	73 - 122	10/24/20 18:34	
Toluene-d8	99	65 - 144	10/24/20 18:34	

1/27/21

Bennett

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 11:25
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-040	**Units:**	ug/L
Lab Code:	K2009623-019	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/26/20 18:42	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/26/20 18:42	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/26/20 18:42	
Dibromochloromethane	ND U	0.50	0.14	1	10/26/20 18:42	*
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/26/20 18:42	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/26/20 18:42	
cis-1,2-Dichloroethene	**0.25 J**	0.50	0.067	1	10/26/20 18:42	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/26/20 18:42	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/26/20 18:42	
Methylene Chloride	ND U	2.0	0.10	1	10/26/20 18:42	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/26/20 18:42	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	10/26/20 18:42	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/26/20 18:42	
Trichloroethene (TCE)	**1.3**	0.50	0.10	1	10/26/20 18:42	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/26/20 18:42	
Vinyl Chloride	ND U	0.50	0.075	1	10/26/20 18:42	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	10/26/20 18:42	
Dibromofluoromethane	97	73 - 122	10/26/20 18:42	
Toluene-d8	95	65 - 144	10/26/20 18:42	

BL 1/27/21

AMW-60

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 11:10
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-009	**Units:**	ug/L
Lab Code:	K2009623-020	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 19:00	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 19:00	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 19:00	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 19:00	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 19:00	
1,1-Dichloroethene	**2.6**	0.50	0.080	1	10/24/20 19:00	
cis-1,2-Dichloroethene	**0.83**	0.50	0.067	1	10/24/20 19:00	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 19:00	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 19:00	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 19:00	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 19:00	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	10/24/20 19:00	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/24/20 19:00	
Trichloroethene (TCE)	**0.40 J**	0.50	0.10	1	10/24/20 19:00	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 19:00	
Vinyl Chloride	**8.4**	0.50	0.075	1	10/24/20 19:00	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	10/24/20 19:00	
Dibromofluoromethane	97	73 - 122	10/24/20 19:00	
Toluene-d8	98	65 - 144	10/24/20 19:00	

12/17/21

CPH-14

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 11:58
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-015	**Units:**	ug/L
Lab Code:	K2009623-021	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 19:27	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 19:27	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 19:27	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 19:27	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 19:27	
1,1-Dichloroethene	**0.11 J**	0.50	0.080	1	10/24/20 19:27	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 19:27	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 19:27	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 19:27	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 19:27	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 19:27	
Tetrachloroethene (PCE)	**0.10 J**	0.50	0.099	1	10/24/20 19:27	
1,1,1-Trichloroethane (TCA)	**0.13 J**	0.50	0.075	1	10/24/20 19:27	
Trichloroethene (TCE)	**3.7**	0.50	0.10	1	10/24/20 19:27	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/24/20 19:27	
Vinyl Chloride	ND U	0.50	0.075	1	10/24/20 19:27	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	10/24/20 19:27	
Dibromofluoromethane	95	73 - 122	10/24/20 19:27	
Toluene-d8	96	65 - 144	10/24/20 19:27	

1/27/21

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

AMW-53A

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 10:25
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-037	**Units:**	ug/L
Lab Code:	K2009623-022	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 19:53	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 19:53	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 19:53	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 19:53	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 19:53	
1,1-Dichloroethene	**0.69**	0.50	0.080	1	10/24/20 19:53	
cis-1,2-Dichloroethene	**0.34 J**	0.50	0.067	1	10/24/20 19:53	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 19:53	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 19:53	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 19:53	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 19:53	
Tetrachloroethene (PCE)	**1.2**	0.50	0.099	1	10/24/20 19:53	
1,1,1-Trichloroethane (TCA)	**3.7**	0.50	0.075	1	10/24/20 19:53	
Trichloroethene (TCE)	**19**	0.50	0.10	1	10/24/20 19:53	
Trichlorofluoromethane (CFC 11)	**32**	0.50	0.12	1	10/24/20 19:53	
Vinyl Chloride	ND U	0.50	0.075	1	10/24/20 19:53	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	10/24/20 19:53	
Dibromofluoromethane	96	73 - 122	10/24/20 19:53	
Toluene-d8	97	65 - 144	10/24/20 19:53	

PR 1/27/21

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

AMW-24

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 15:57
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-048	**Units:**	ug/L
Lab Code:	K2009623-023	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 20:20	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 20:20	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 20:20	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 20:20	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 20:20	
1,1-Dichloroethene	**0.50**	0.50	0.080	1	10/24/20 20:20	
cis-1,2-Dichloroethene	**1.1**	0.50	0.067	1	10/24/20 20:20	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 20:20	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 20:20	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 20:20	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 20:20	
Tetrachloroethene (PCE)	**0.10 J**	0.50	0.099	1	10/24/20 20:20	
1,1,1-Trichloroethane (TCA)	**0.11 J**	0.50	0.075	1	10/24/20 20:20	
Trichloroethene (TCE)	**5.7**	0.50	0.10	1	10/24/20 20:20	
Trichlorofluoromethane (CFC 11)	**0.28 J**	0.50	0.12	1	10/24/20 20:20	
Vinyl Chloride	ND U	0.50	0.075	1	10/24/20 20:20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	10/24/20 20:20	
Dibromofluoromethane	96	73 - 122	10/24/20 20:20	
Toluene-d8	101	65 - 144	10/24/20 20:20	

MW-9C

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 12:11
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-017	**Units:**	ug/L
Lab Code:	K2009623-024	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/24/20 20:47	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/24/20 20:47	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/24/20 20:47	
Dibromochloromethane	ND U	0.50	0.14	1	10/24/20 20:47	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/24/20 20:47	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/24/20 20:47	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/24/20 20:47	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/24/20 20:47	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/24/20 20:47	
Methylene Chloride	ND U	2.0	0.10	1	10/24/20 20:47	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/24/20 20:47	
Tetrachloroethene (PCE)	**0.60**	0.50	0.099	1	10/24/20 20:47	
1,1,1-Trichloroethane (TCA)	**0.14 J**	0.50	0.075	1	10/24/20 20:47	
Trichloroethene (TCE)	**1.2**	0.50	0.10	1	10/24/20 20:47	
Trichlorofluoromethane (CFC 11)	**1.9**	0.50	0.12	1	10/24/20 20:47	
Vinyl Chloride	ND U	0.50	0.075	1	10/24/20 20:47	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	10/24/20 20:47	
Dibromofluoromethane	94	73 - 122	10/24/20 20:47	
Toluene-d8	99	65 - 144	10/24/20 20:47	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

MW-7B

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 12:25
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-019	**Units:**	ug/L
Lab Code:	K2009623-025	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/26/20 20:28	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/26/20 20:28	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/26/20 20:28	
Dibromochloromethane	ND U	0.50	0.14	1	10/26/20 20:28	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/26/20 20:28	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/26/20 20:28	
cis-1,2-Dichloroethene	**0.19** J	0.50	0.067	1	10/26/20 20:28	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/26/20 20:28	
Hexachlorobutadiene	**0.18** J WJ	2.0	0.11	1	10/26/20 20:28	
Methylene Chloride	ND U	2.0	0.10	1	10/26/20 20:28	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/26/20 20:28	
Tetrachloroethene (PCE)	**0.63**	0.50	0.099	1	10/26/20 20:28	
1,1,1-Trichloroethane (TCA)	**0.19** J	0.50	0.075	1	10/26/20 20:28	
Trichloroethene (TCE)	**6.3**	0.50	0.10	1	10/26/20 20:28	
Trichlorofluoromethane (CFC 11)	**1.1**	0.50	0.12	1	10/26/20 20:28	
Vinyl Chloride	ND U	0.50	0.075	1	10/26/20 20:28	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	90	68 - 117	10/26/20 20:28	
Dibromofluoromethane	95	73 - 122	10/26/20 20:28	
Toluene-d8	97	65 - 144	10/26/20 20:28	

RG 1/27/21

ALS Group USA, Corp.
dba ALS Environmental

MW-2B

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 12:32
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-021	**Units:**	ug/L
Lab Code:	K2009623-026	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/26/20 20:54	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/26/20 20:54	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/26/20 20:54	
Dibromochloromethane	ND U	0.50	0.14	1	10/26/20 20:54	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/26/20 20:54	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/26/20 20:54	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/26/20 20:54	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/26/20 20:54	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/26/20 20:54	
Methylene Chloride	ND U	2.0	0.10	1	10/26/20 20:54	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/26/20 20:54	
Tetrachloroethene (PCE)	**0.30 J**	0.50	0.099	1	10/26/20 20:54	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/26/20 20:54	
Trichloroethene (TCE)	**2.5**	0.50	0.10	1	10/26/20 20:54	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/26/20 20:54	
Vinyl Chloride	ND U	0.50	0.075	1	10/26/20 20:54	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	91	68 - 117	10/26/20 20:54	
Dibromofluoromethane	96	73 - 122	10/26/20 20:54	
Toluene-d8	96	65 - 144	10/26/20 20:54	

1/7/21

MW-33

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 14:41
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-023	**Units:**	ug/L
Lab Code:	K2009623-027	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/26/20 21:21	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/26/20 21:21	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/26/20 21:21	
Dibromochloromethane	ND U	0.50	0.14	1	10/26/20 21:21	*
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/26/20 21:21	
1,1-Dichloroethene	**0.29 J**	0.50	0.080	1	10/26/20 21:21	
cis-1,2-Dichloroethene	**0.66**	0.50	0.067	1	10/26/20 21:21	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/26/20 21:21	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/26/20 21:21	
Methylene Chloride	ND U	2.0	0.10	1	10/26/20 21:21	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/26/20 21:21	
Tetrachloroethene (PCE)	**0.13 J**	0.50	0.099	1	10/26/20 21:21	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/26/20 21:21	
Trichloroethene (TCE)	**3.5**	0.50	0.10	1	10/26/20 21:21	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/26/20 21:21	
Vinyl Chloride	ND U	0.50	0.075	1	10/26/20 21:21	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	87	68 - 117	10/26/20 21:21	
Dibromofluoromethane	95	73 - 122	10/26/20 21:21	
Toluene-d8	100	65 - 144	10/26/20 21:21	

PC 11/27/21

AMW-61

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 10:31
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-003	**Units:**	ug/L
Lab Code:	K2009623-028	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/26/20 21:47	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/26/20 21:47	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/26/20 21:47	
Dibromochloromethane	ND U	0.50	0.14	1	10/26/20 21:47	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/26/20 21:47	
1,1-Dichloroethene	**0.18 J**	0.50	0.080	1	10/26/20 21:47	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/26/20 21:47	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/26/20 21:47	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/26/20 21:47	
Methylene Chloride	ND U	2.0	0.10	1	10/26/20 21:47	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/26/20 21:47	
Tetrachloroethene (PCE)	**2.2**	0.50	0.099	1	10/26/20 21:47	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/26/20 21:47	
Trichloroethene (TCE)	**6.2**	0.50	0.10	1	10/26/20 21:47	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/26/20 21:47	
Vinyl Chloride	ND U	0.50	0.075	1	10/26/20 21:47	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	91	68 - 117	10/26/20 21:47	
Dibromofluoromethane	94	73 - 122	10/26/20 21:47	
Toluene-d8	99	65 - 144	10/26/20 21:47	

11/27/21

GP-05

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/21/20 17:22
Sample Matrix:	Ground Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-049	**Units:**	ug/L
Lab Code:	K2009623-029	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/26/20 22:14	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/26/20 22:14	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/26/20 22:14	
Dibromochloromethane	ND U	0.50	0.14	1	10/26/20 22:14	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/26/20 22:14	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/26/20 22:14	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/26/20 22:14	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/26/20 22:14	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/26/20 22:14	
Methylene Chloride	ND U	2.0	0.10	1	10/26/20 22:14	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/26/20 22:14	
Tetrachloroethene (PCE)	**0.12 J**	0.50	0.099	1	10/26/20 22:14	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/26/20 22:14	
Trichloroethene (TCE)	**0.65**	0.50	0.10	1	10/26/20 22:14	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/26/20 22:14	
Vinyl Chloride	ND U	0.50	0.075	1	10/26/20 22:14	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	86	68 - 117	10/26/20 22:14	
Dibromofluoromethane	98	73 - 122	10/26/20 22:14	
Toluene-d8	97	65 - 144	10/26/20 22:14	

11/24/21

ALS Group USA, Corp.
dba ALS Environmental

TRIP BLANK

Analytical Report

Client:	EA Engineering, Science, and Technology (EAEST)	**Service Request:**	K2009623
Project:	Boomsnub/1524098.5	**Date Collected:**	10/19/20 10:00
Sample Matrix:	Water	**Date Received:**	10/22/20 14:00
Sample Name:	2043-051	**Units:**	ug/L
Lab Code:	K2009623-030	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Bromodichloromethane	ND U	0.50	0.091	1	10/26/20 22:41	
Carbon Tetrachloride	ND U	0.50	0.096	1	10/26/20 22:41	
1,2-Dibromo-3-chloropropane	ND U	2.0	0.22	1	10/26/20 22:41	
Dibromochloromethane	ND U	0.50	0.14	1	10/26/20 22:41	
1,2-Dichloroethane (EDC)	ND U	0.50	0.080	1	10/26/20 22:41	
1,1-Dichloroethene	ND U	0.50	0.080	1	10/26/20 22:41	
cis-1,2-Dichloroethene	ND U	0.50	0.067	1	10/26/20 22:41	
trans-1,2-Dichloroethene	ND U	0.50	0.072	1	10/26/20 22:41	
Hexachlorobutadiene	ND U	2.0	0.11	1	10/26/20 22:41	
Methylene Chloride	**0.42 J**	2.0	0.10	1	10/26/20 22:41	
1,1,2,2-Tetrachloroethane	ND U	0.50	0.16	1	10/26/20 22:41	
Tetrachloroethene (PCE)	ND U	0.50	0.099	1	10/26/20 22:41	
1,1,1-Trichloroethane (TCA)	ND U	0.50	0.075	1	10/26/20 22:41	
Trichloroethene (TCE)	ND U	0.50	0.10	1	10/26/20 22:41	
Trichlorofluoromethane (CFC 11)	ND U	0.50	0.12	1	10/26/20 22:41	
Vinyl Chloride	ND U	0.50	0.075	1	10/26/20 22:41	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	10/26/20 22:41	
Dibromofluoromethane	99	73 - 122	10/26/20 22:41	
Toluene-d8	99	65 - 144	10/26/20 22:41	

11/27/20

Appendix E

Chromium Concentrations in Groundwater

This page intentionally left blank.

Appendix E-1

Chromium Concentrations – Summary Table

This page intentionally left blank.

Table E-1. Chromium Concentrations – Summary Table

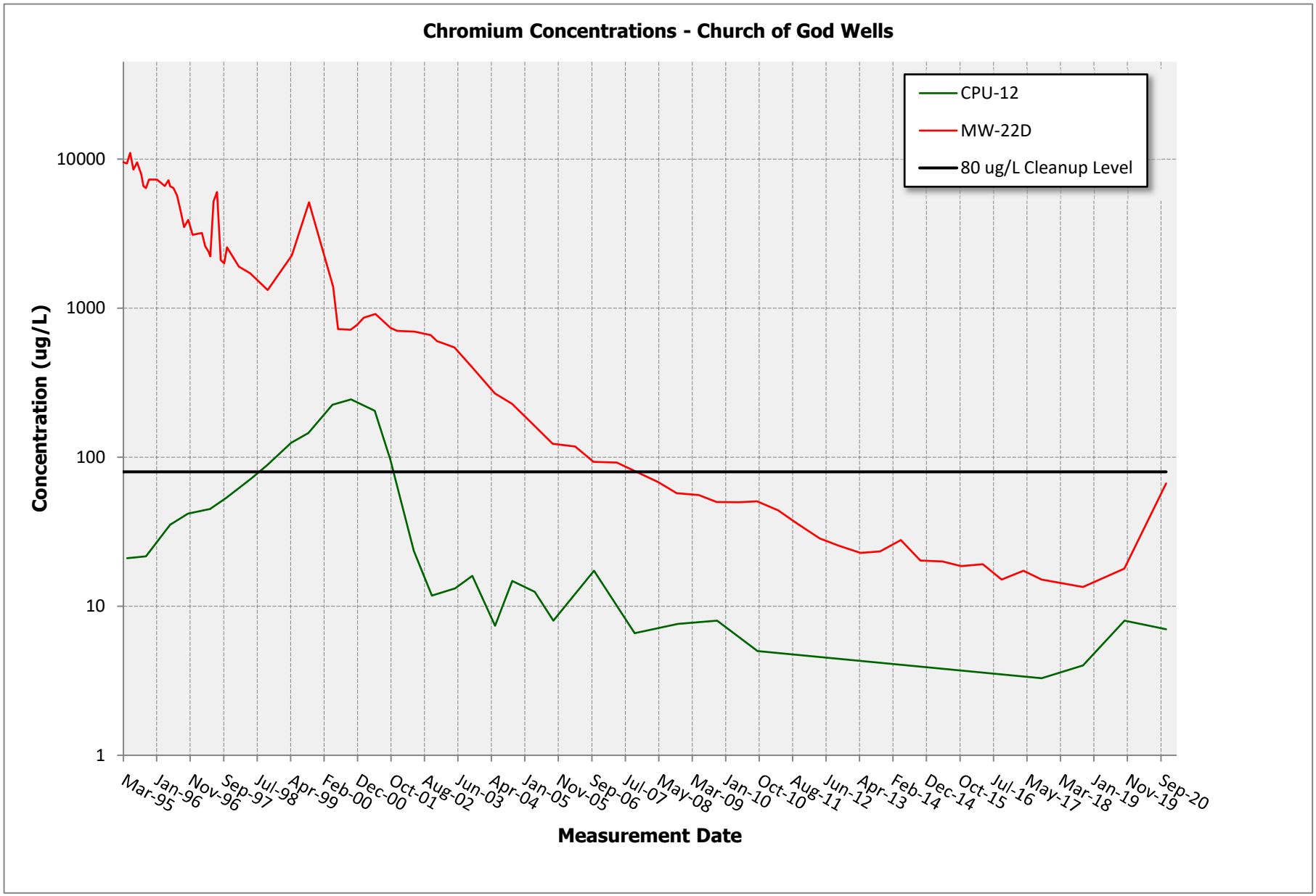
Well Group	Well	Spring 2019	Fall 2019	January 2020	Spring 2020	Fall 2020
TCE Upgradient Wells	AMW-12A	--	--	--	--	8.4U
Proximal Wells	MW-2A	--	**292**	--	--	**601**
	MW-4A	--	**371**	--	--	**556**
	MW-4B	--	**366**	--	--	**318**
	MW-6A	--	**128**	--	--	**149**
	MW-6B	--	12.2	--	--	14.9
	MW-10B	--	30.2	--	--	32.1
	MW-10C	--	61.7	--	--	57.9
	PW-1B	--	28.7	--	--	31.9
Intermediate Plume Wells	AMW-59	--	--	70.9	**100**	19.2
	MW-14C	--	48.1	62.9	73.8	10.2
	MW-14E	--	27.5	38.1	54.4	**173**
	MW-18D	51.3	74.2	46.4	**89.8**	15.8
	MW-18E	11.2	69.2	--	8.4 U	2.9 J
	MW-19D	**85.5**	**87.5**	**119**	**171**	38.4
	MW-20D	--	48.8	--	--	59.9
	MW-38	--	--	--	--	4.7 J
	MW-40	--	51.6	--	--	**103**
	PZ-39	--	--	--	--	3.2 J
Church of God Wells	CPU-12	--	8.0 J	--	--	7.0 J
	MW-21D	--	12.3	--	--	14.6
	MW-22D	--	17.9	--	--	66.7

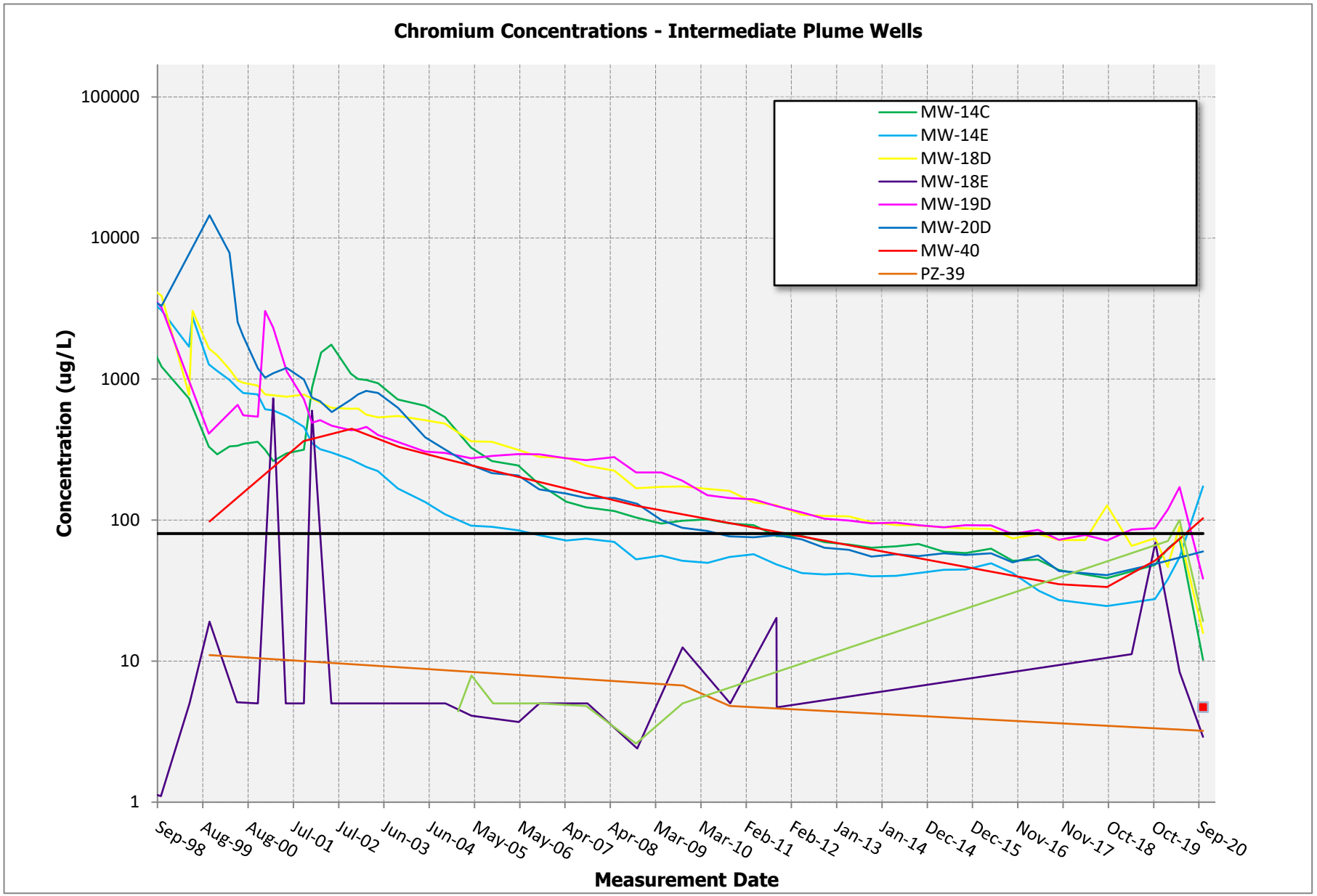
NOTES:
Only wells sampled for chromium during Fall 2020 are included in this table.
Results are in micrograms per liter (µg/L).
Results are for total chromium, unless otherwise noted.
Active extraction wells shown are in **bold**. Two wells were only active for a part of the reporting period. Well MW-20D was turned off 08 May 2020. Well MW-22D was turned off 21 September 2020.
Results shown in **blue bold** exceed the cleanup level of 80 µg/L.
-- = Not Sampled

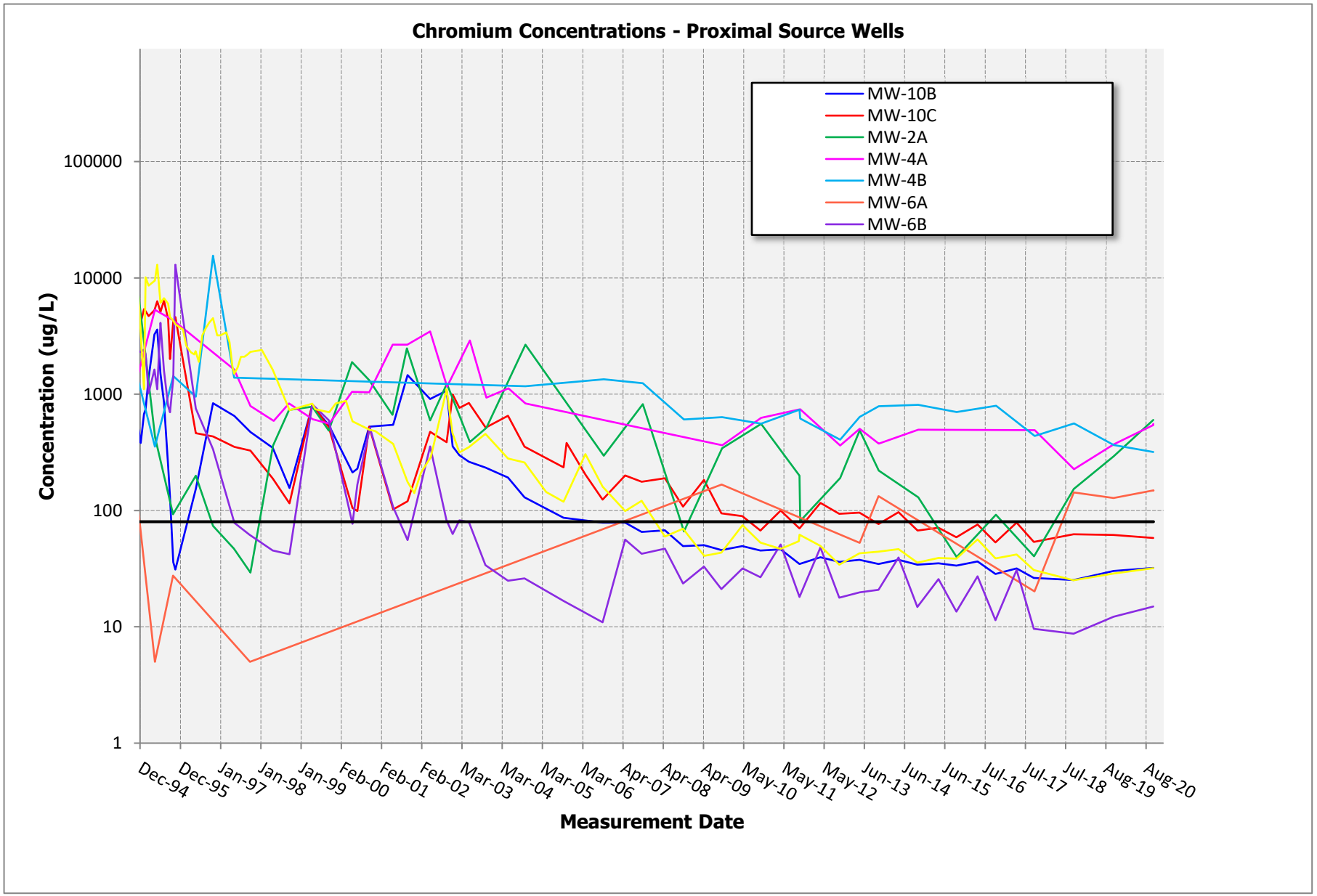
Appendix E-2

Chromium Concentrations – By Well Grouping

This page intentionally left blank.


Chromium Concentrations - Church of God Wells
CPU-12
MW-22D
80 ug/L Cleanup Level
Concentration (ug/L)
10000
1000
100
10
1
Mar-95
Jan-96
Nov-96
Sep-97
Jul-98
Apr-99
Feb-00
Dec-00
Oct-01
Aug-02
Jun-03
Apr-04
Jan-05
Nov-05
Sep-06
Jul-07
May-08
Mar-09
Jan-10
Oct-10
Aug-11
Jun-12
Apr-13
Feb-14
Dec-14
Oct-15
Jul-16
May-17
Mar-18
Jan-19
Nov-19
Sep-20
Measurement Date

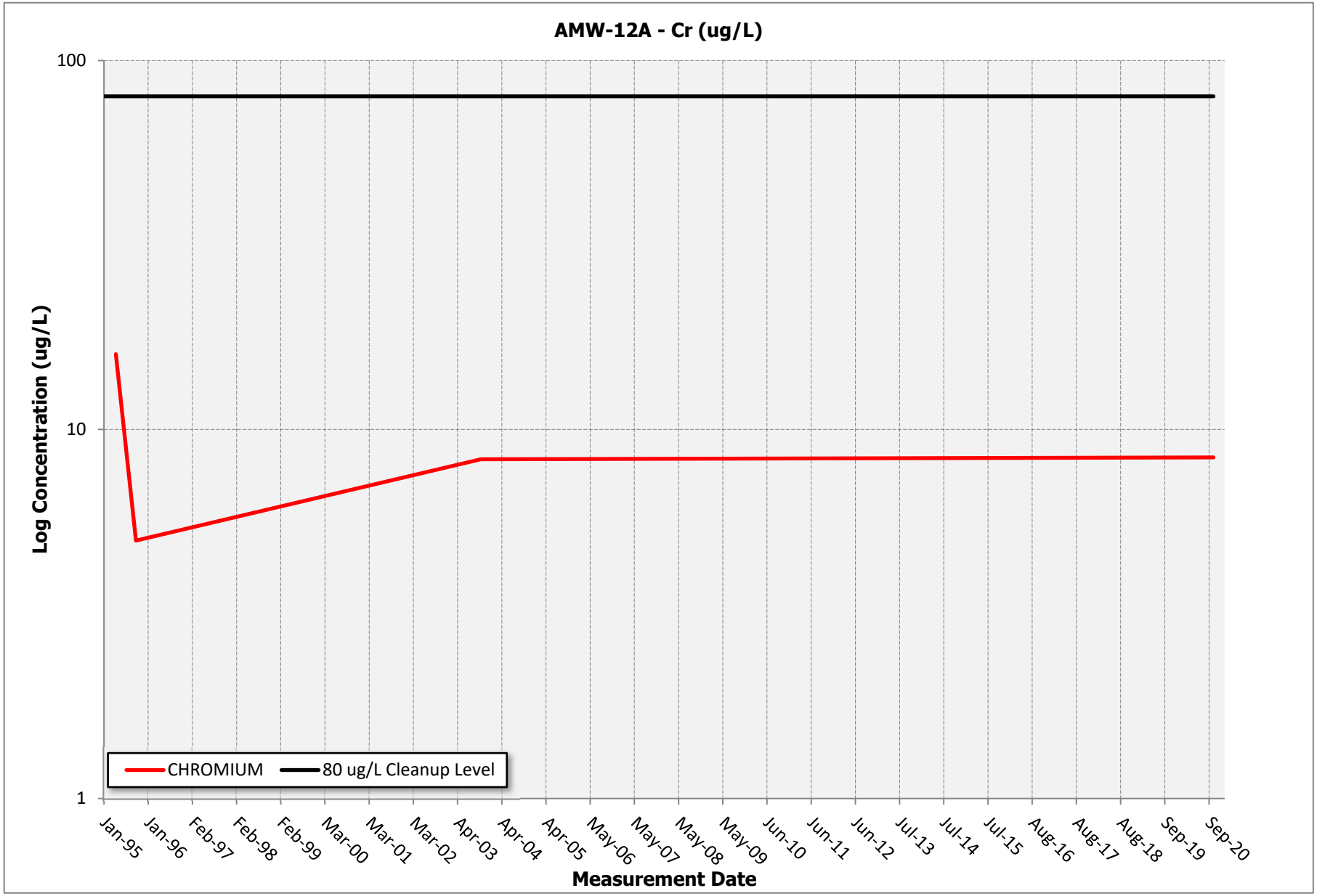

Chromium Concentrations - Intermediate Plume Wells
Concentration (ug/L)
100000
10000
1000
100
10
1
MW-14C
MW-14E
MW-18D
MW-18E
MW-19D
MW-20D
MW-40
PZ-39
Sep-98
Aug-99
Aug-00
Jul-01
Jul-02
Jun-03
Jun-04
May-05
May-06
Apr-07
Apr-08
Mar-09
Mar-10
Feb-11
Feb-12
Jan-13
Jan-14
Dec-14
Dec-15
Nov-16
Nov-17
Oct-18
Oct-19
Sep-20
Measurement Date

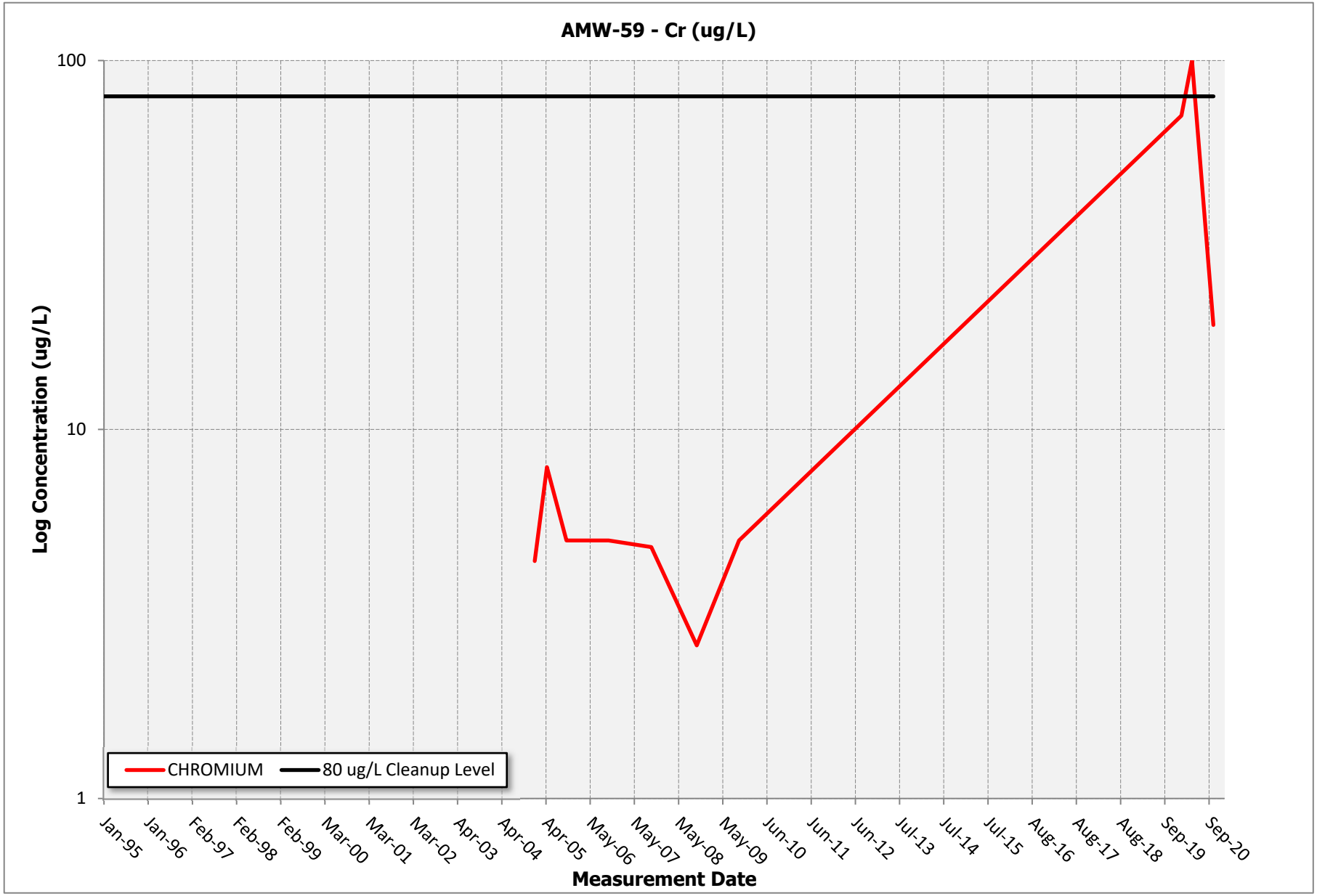

Chromium Concentrations - Proximal Source Wells
MW-10B
MW-10C
MW-2A
MW-4A
MW-4B
MW-6A
MW-6B
Concentration (ug/L)
100000
10000
1000
100
10
1
Dec-94
Dec-95
Jan-97
Jan-98
Jan-99
Feb-00
Feb-01
Feb-02
Mar-03
Mar-04
Mar-05
Mar-06
Apr-07
Apr-08
Apr-09
May-10
May-11
May-12
Jun-13
Jun-14
Jun-15
Jul-16
Jul-17
Jul-18
Aug-19
Aug-20
Measurement Date

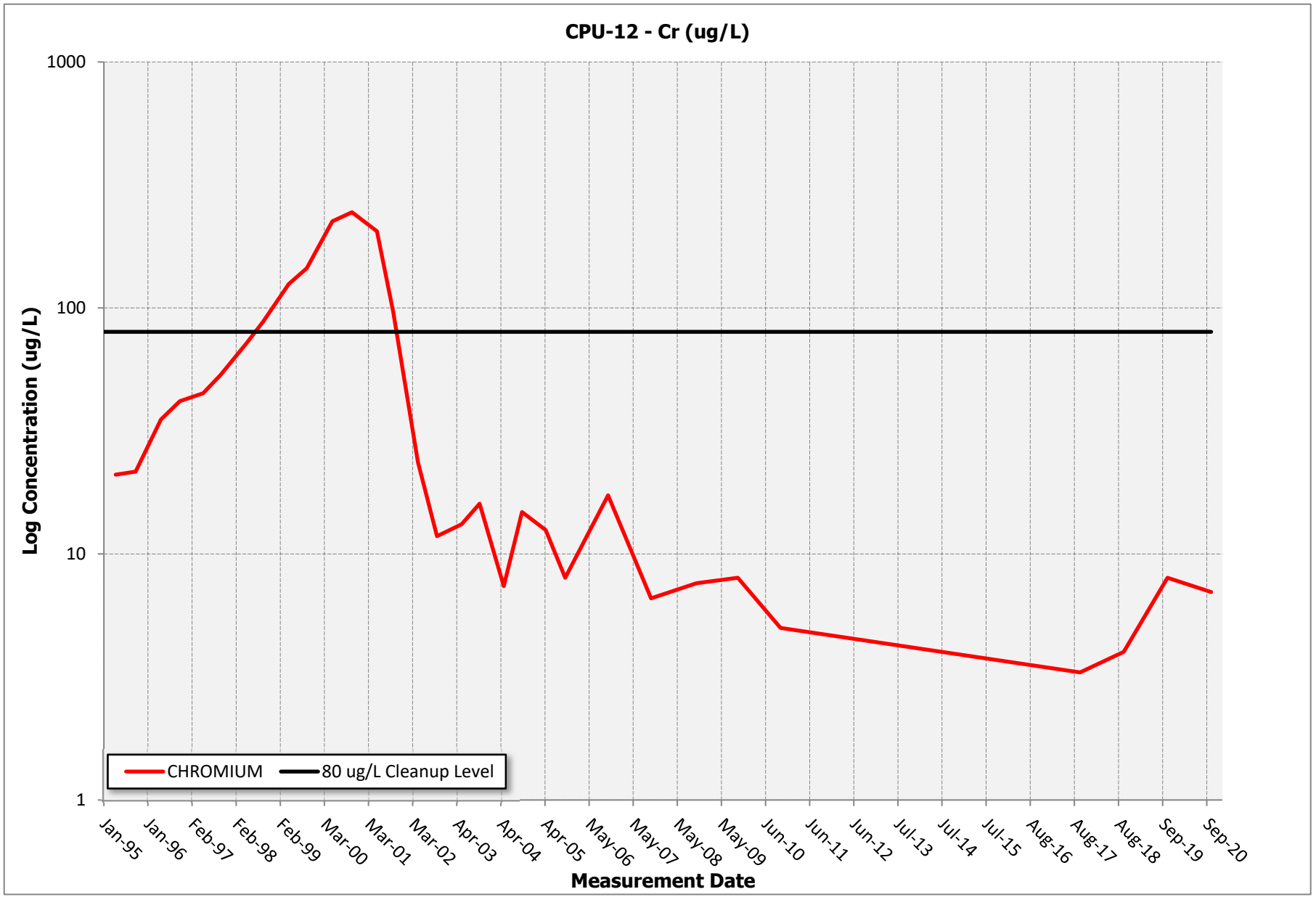
Appendix E-3

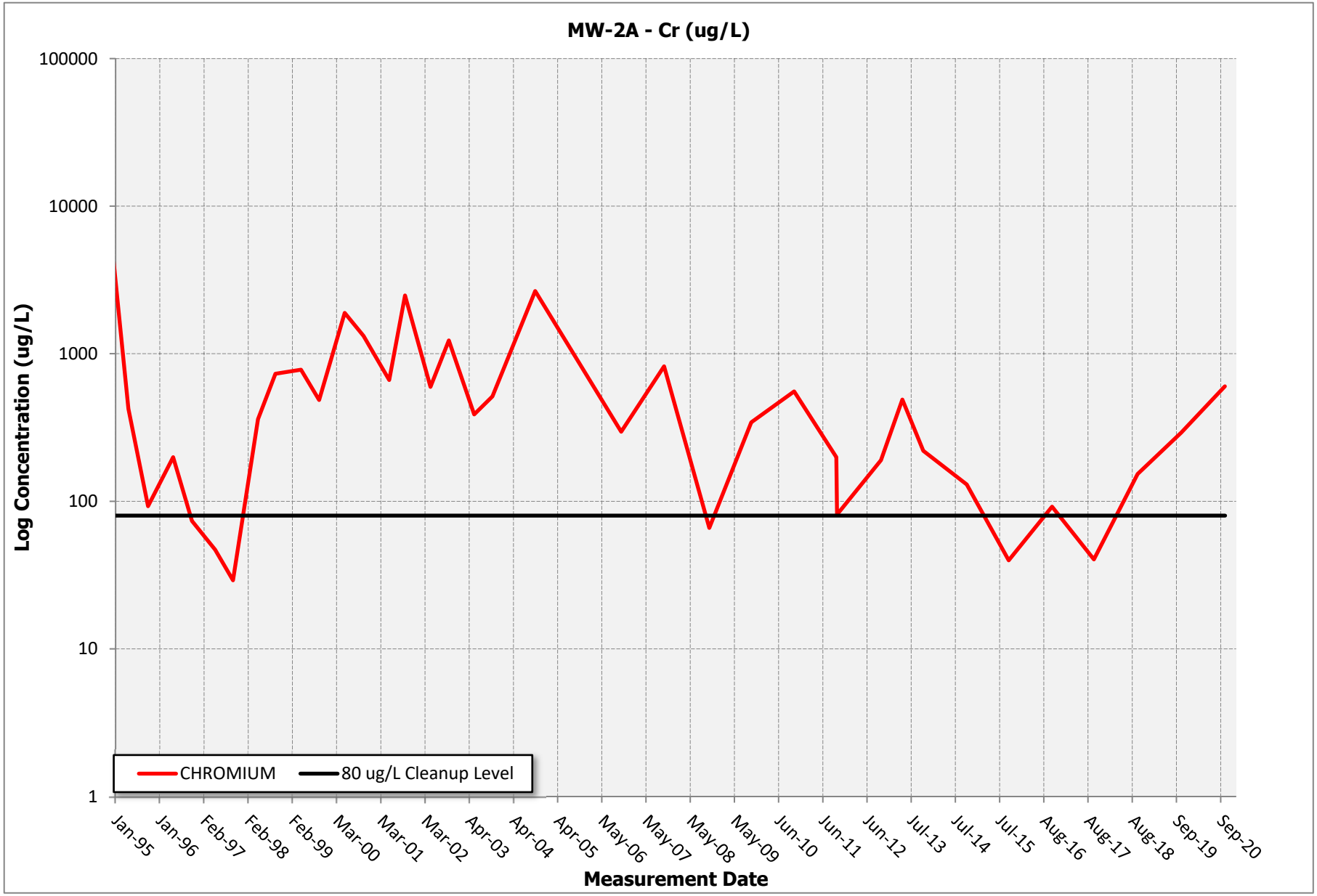
Chromium Concentrations – Individual Wells

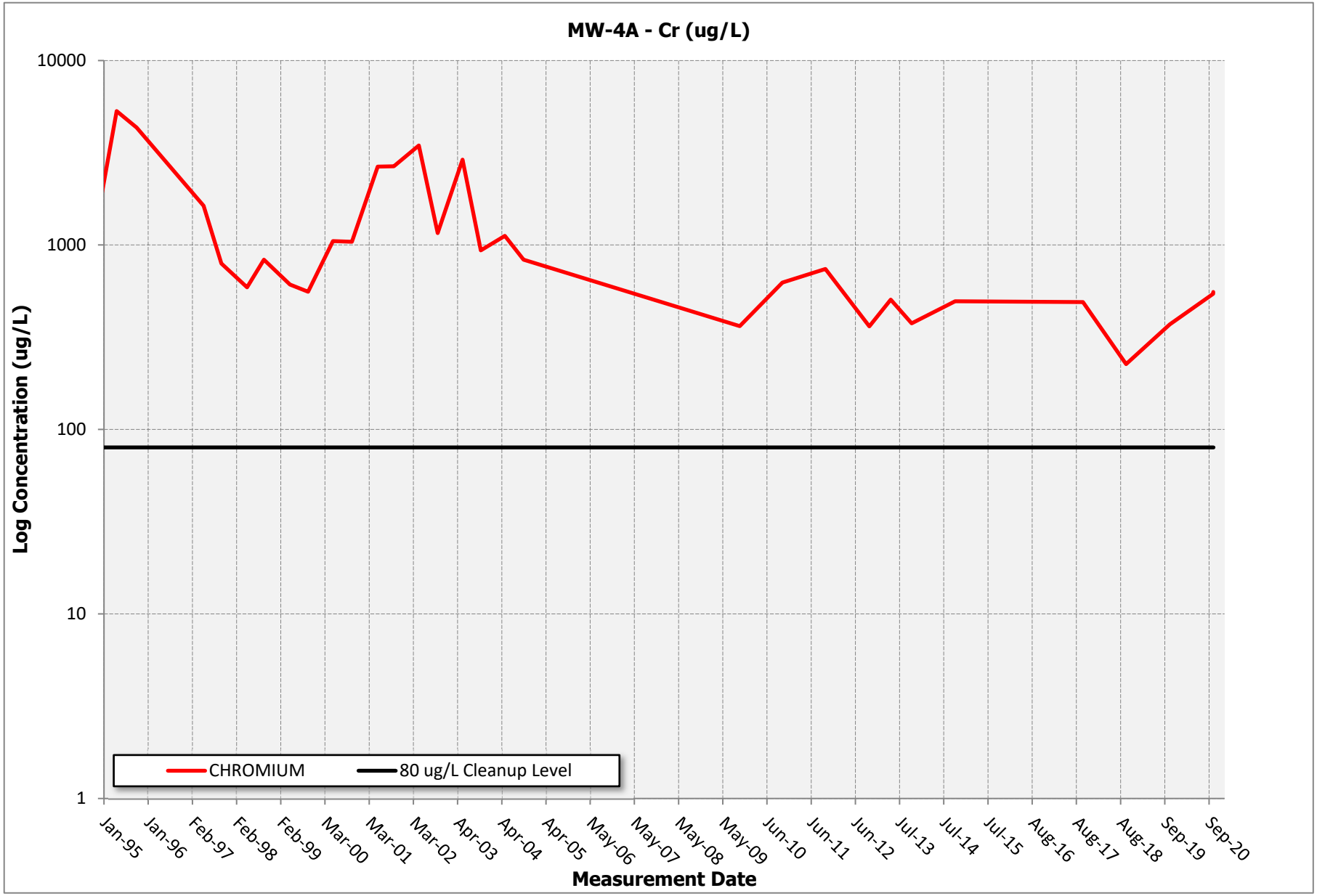
This page intentionally left blank.

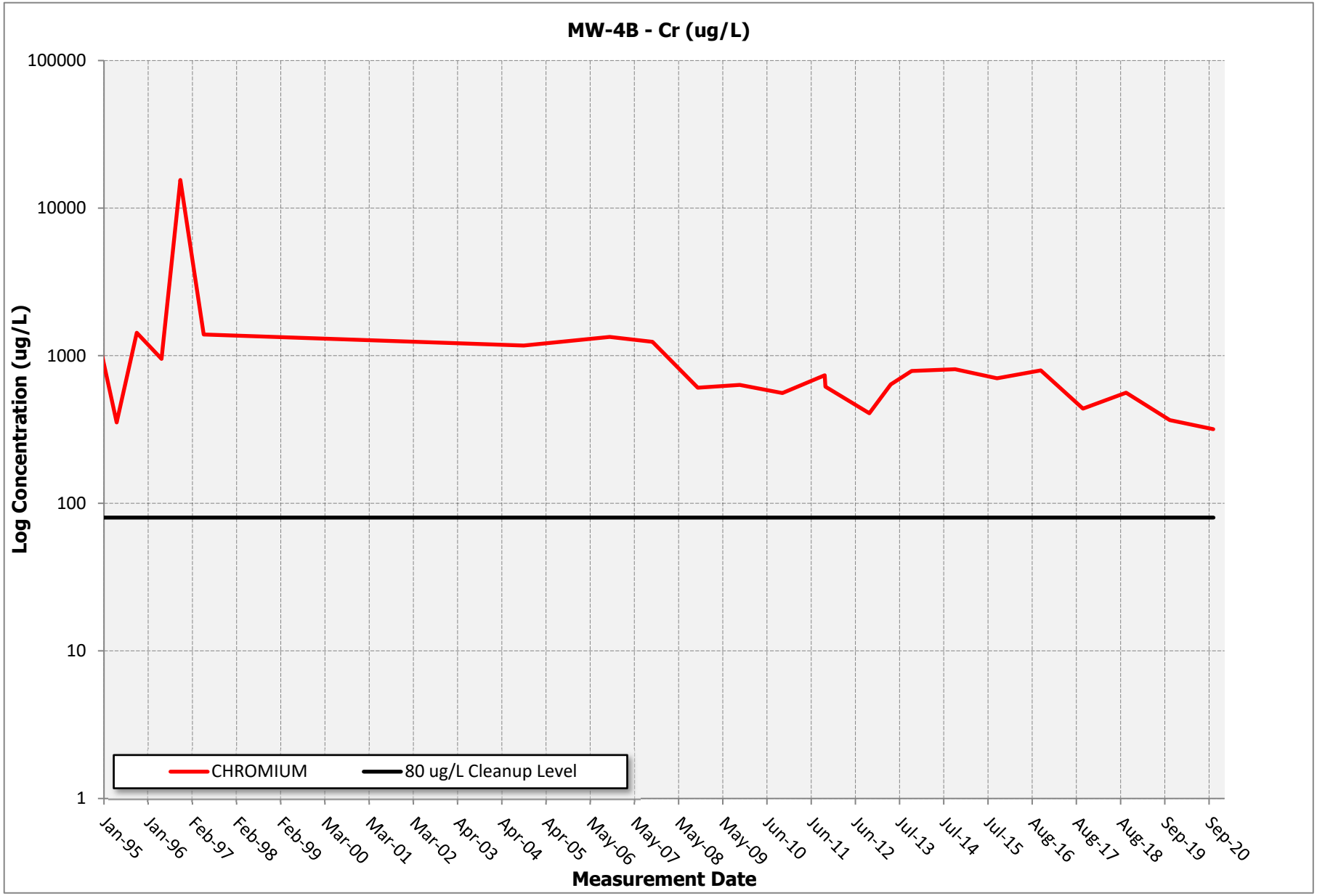

AMW-12A - Cr (ug/L)
100
10
1
Log Concentration (ug/L)
CHROMIUM
80 ug/L Cleanup Level
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

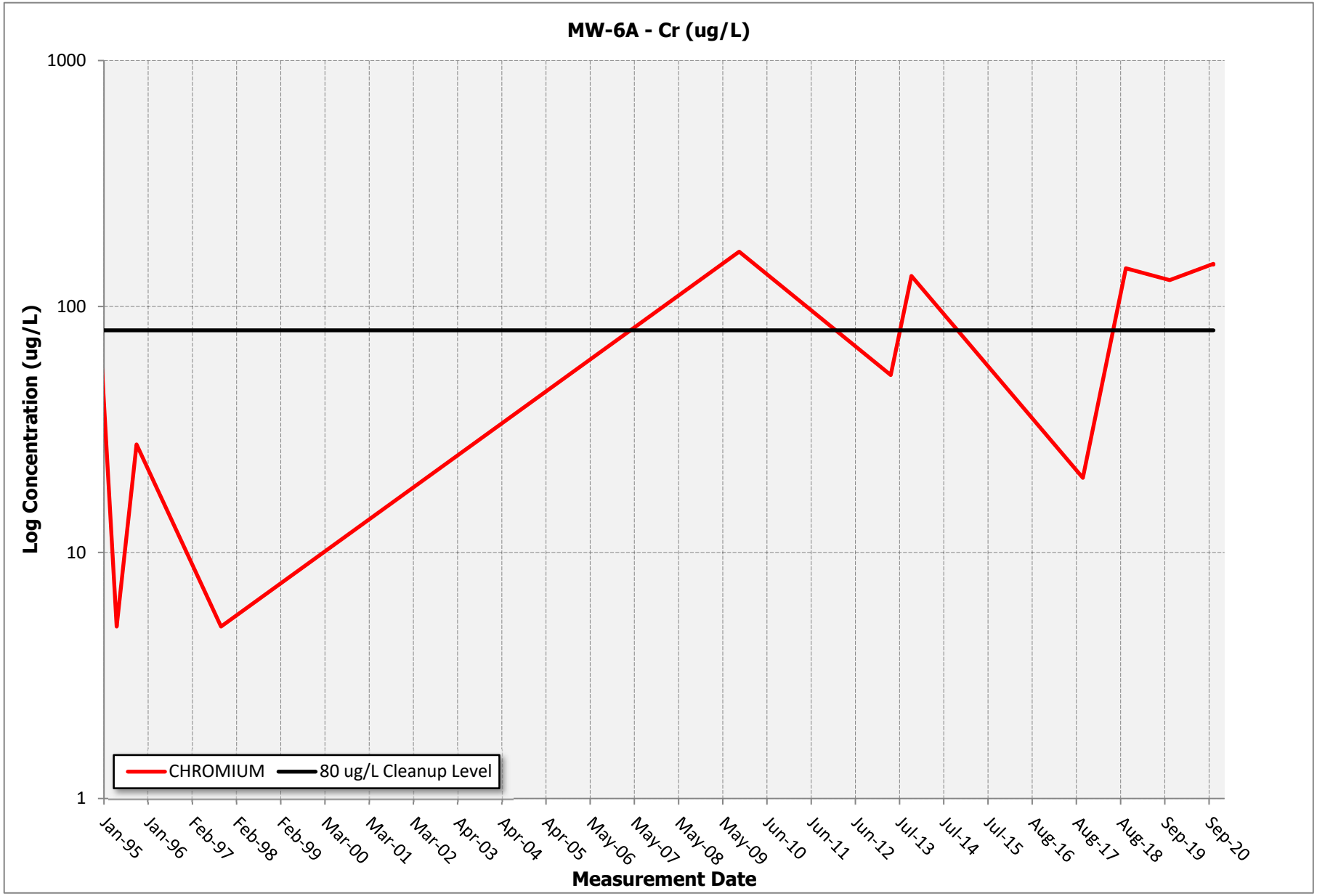

AMW-59 - Cr (ug/L)
100
10
1
Log Concentration (ug/L)
CHROMIUM
80 ug/L Cleanup Level
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

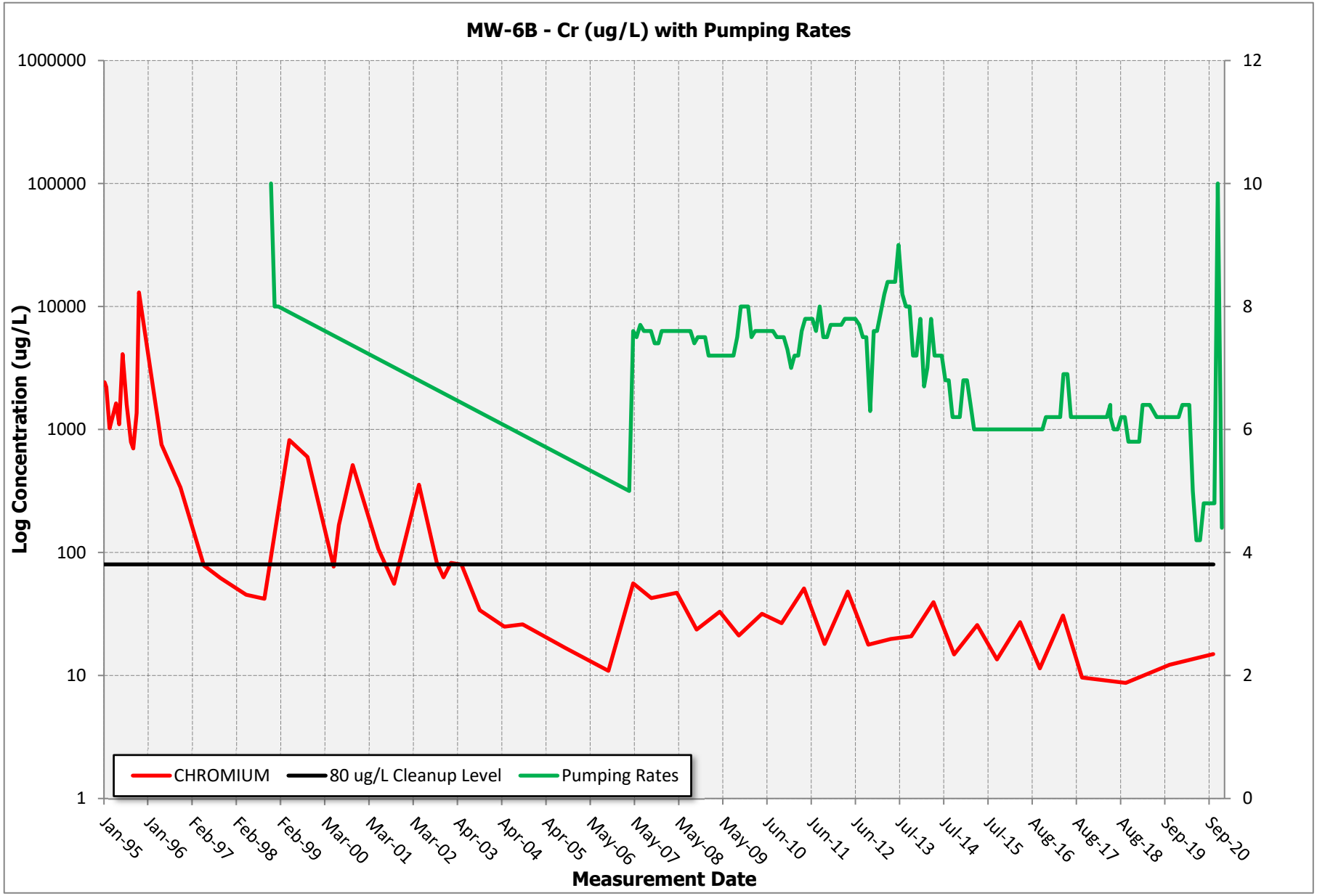

CPU-12 - Cr (ug/L)
1000
100
10
1
Log Concentration (ug/L)
CHROMIUM
80 ug/L Cleanup Level
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

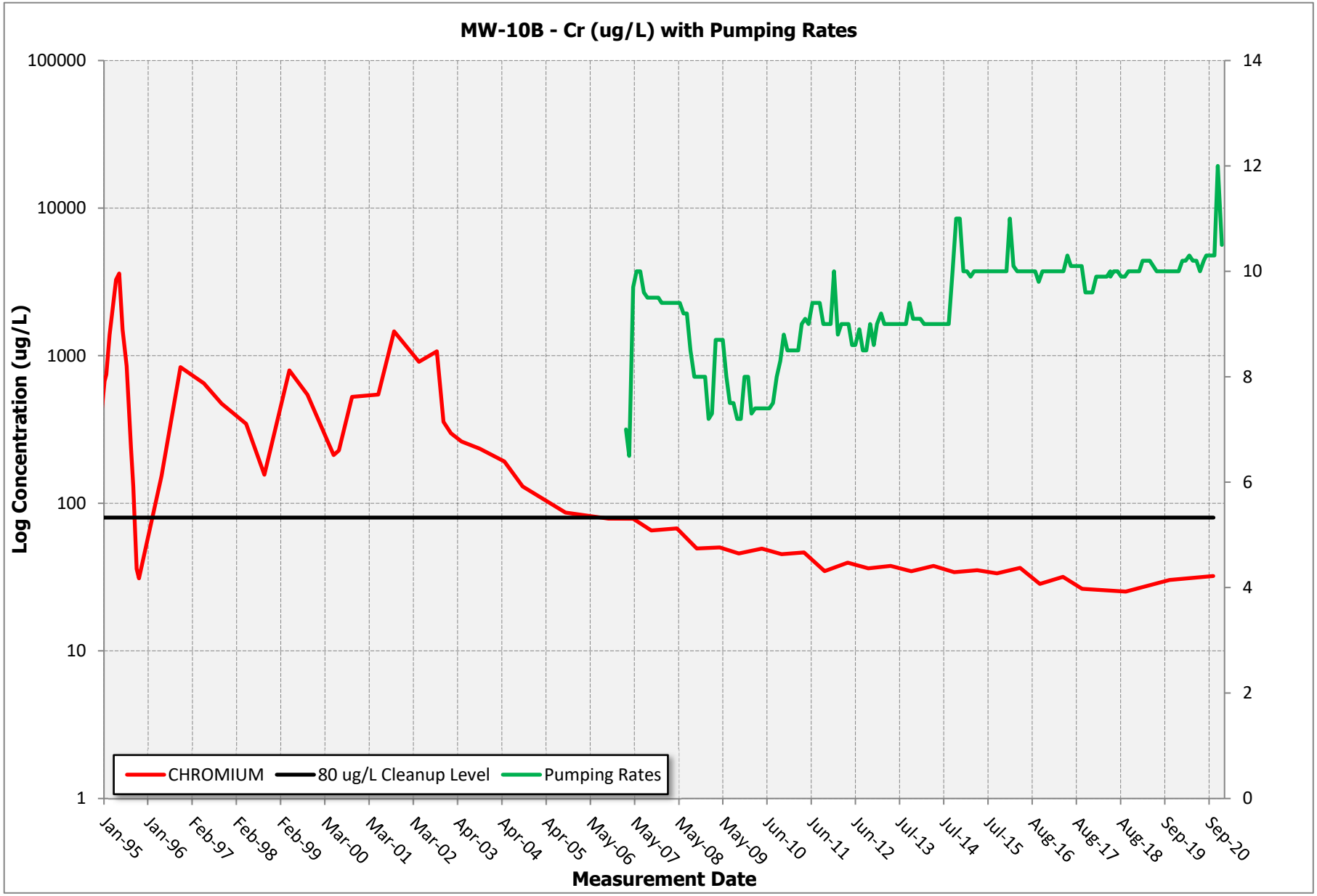

MW-2A - Cr (ug/L)
Log Concentration (ug/L)
100000
10000
1000
100
10
1
CHROMIUM
80 ug/L Cleanup Level
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

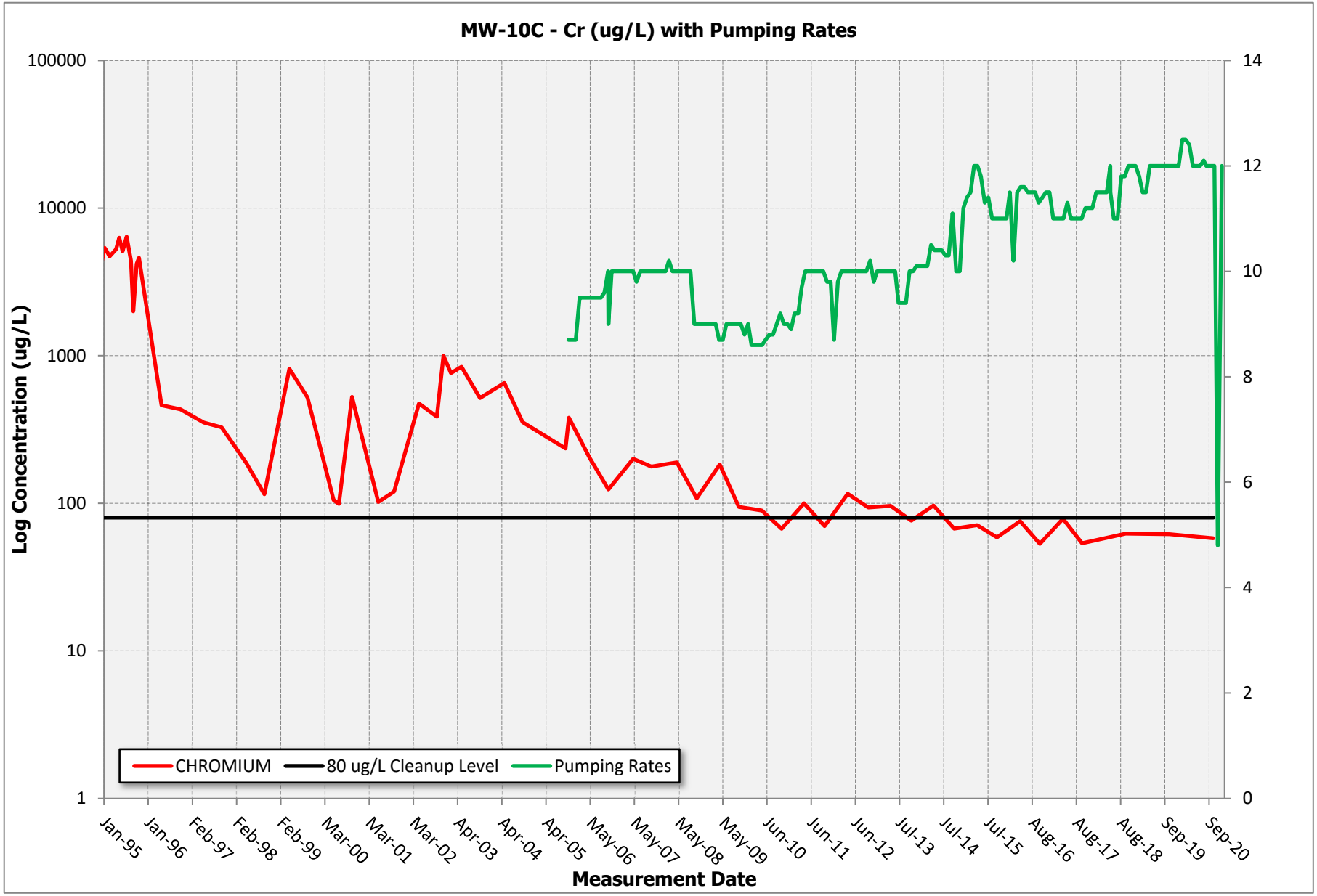

MW-4A - Cr (ug/L)
Log Concentration (ug/L)
10000
1000
100
10
1
CHROMIUM
80 ug/L Cleanup Level
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

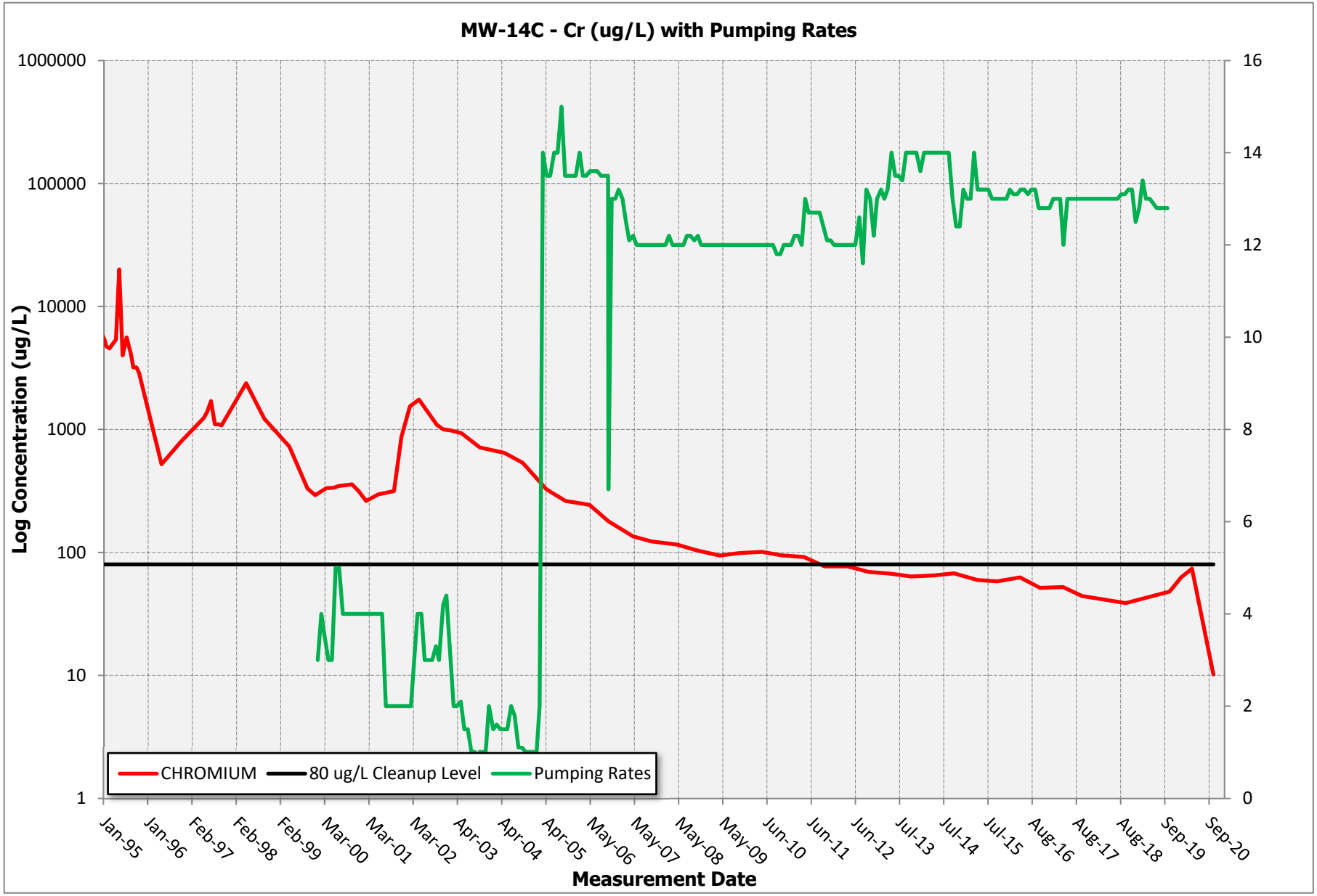

MW-4B - Cr (ug/L)
Log Concentration (ug/L)
100000
10000
1000
100
10
1
CHROMIUM
80 ug/L Cleanup Level
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

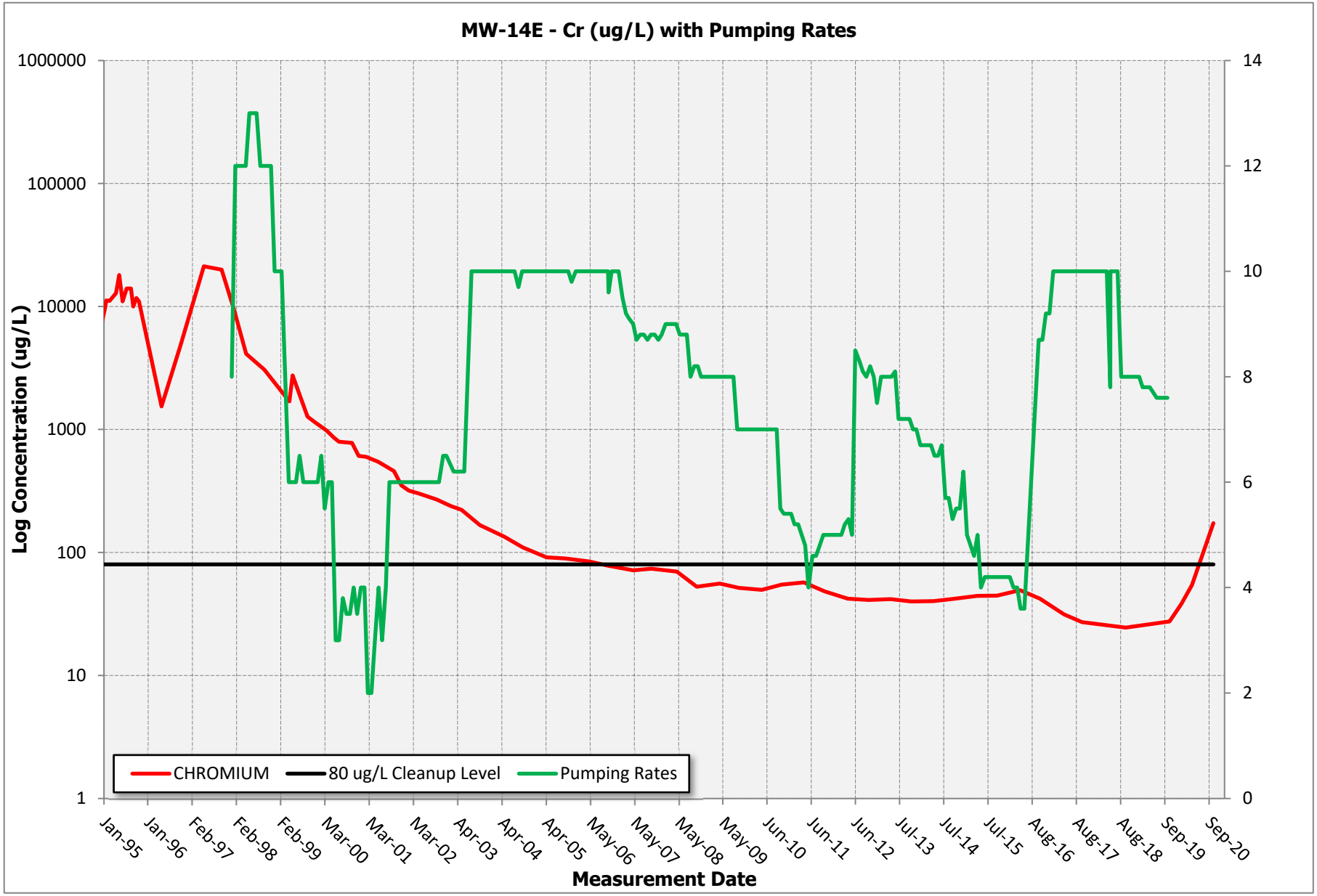

MW-6A - Cr (ug/L)
1000
100
10
1
Log Concentration (ug/L)
CHROMIUM
80 ug/L Cleanup Level
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

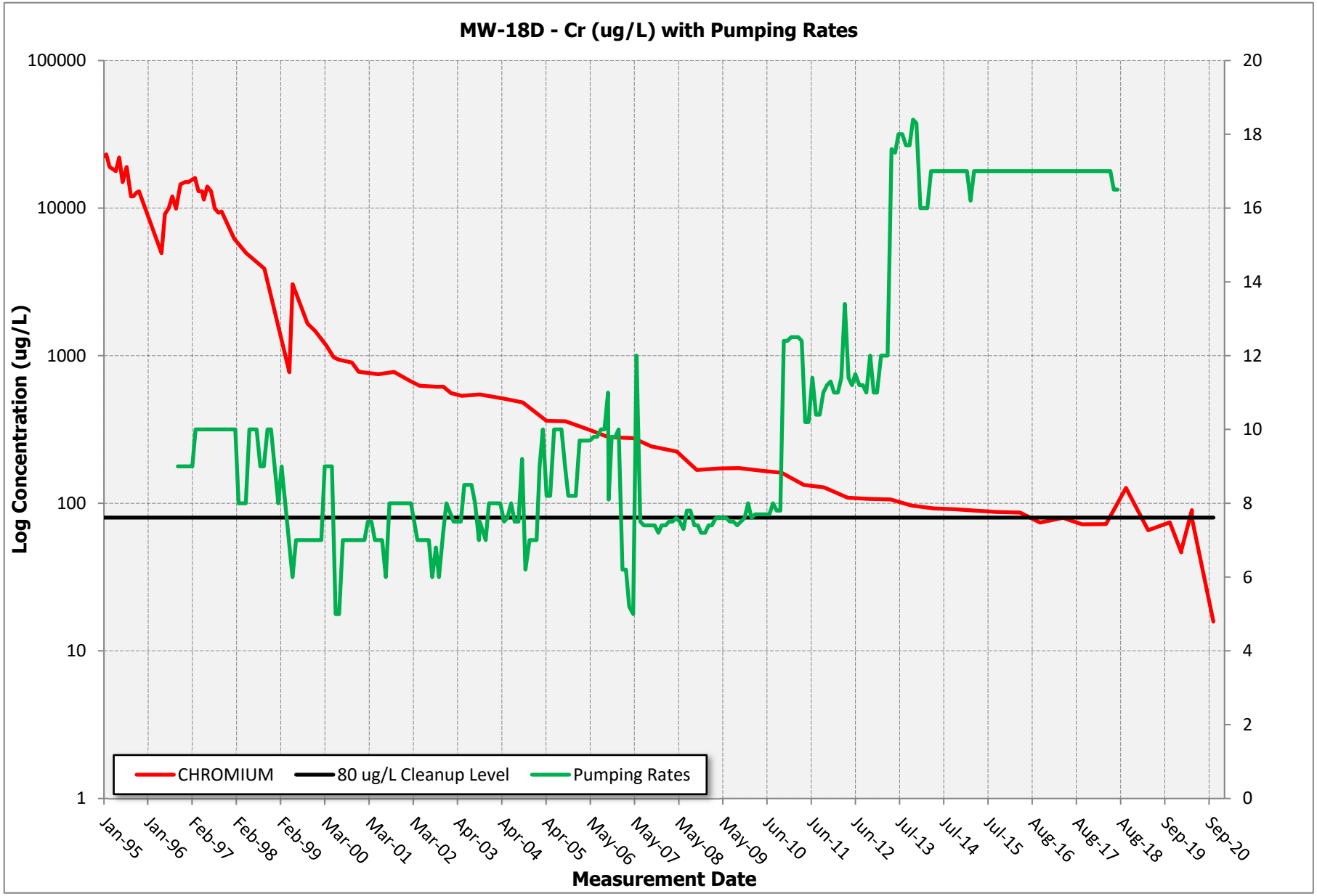

MW-6B - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
1000000
100000
10000
1000
100
10
1
12
10
8
6
4
2
0
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

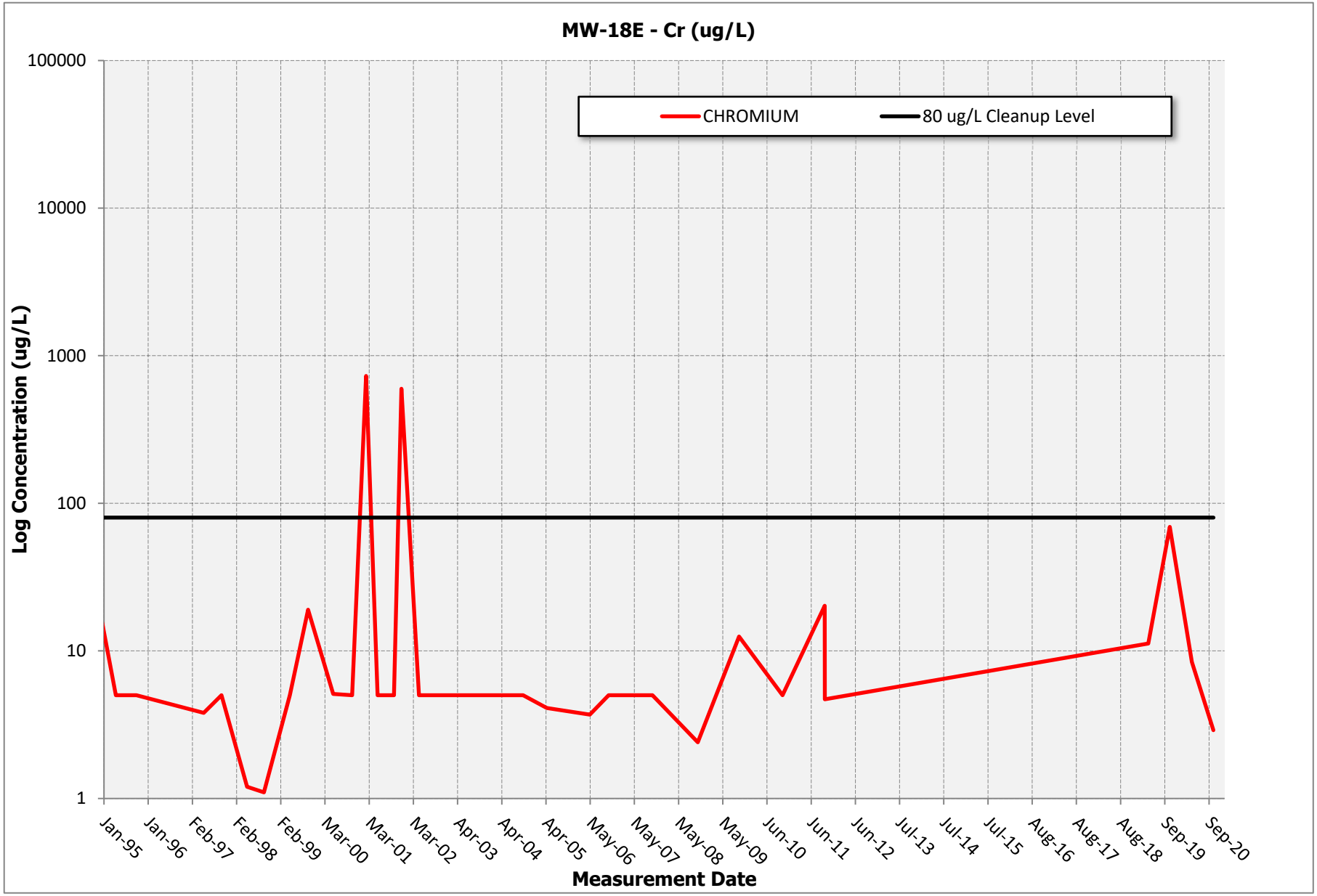

MW-10B - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
100000
10000
1000
100
10
1
14
12
10
8
6
4
2
0
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

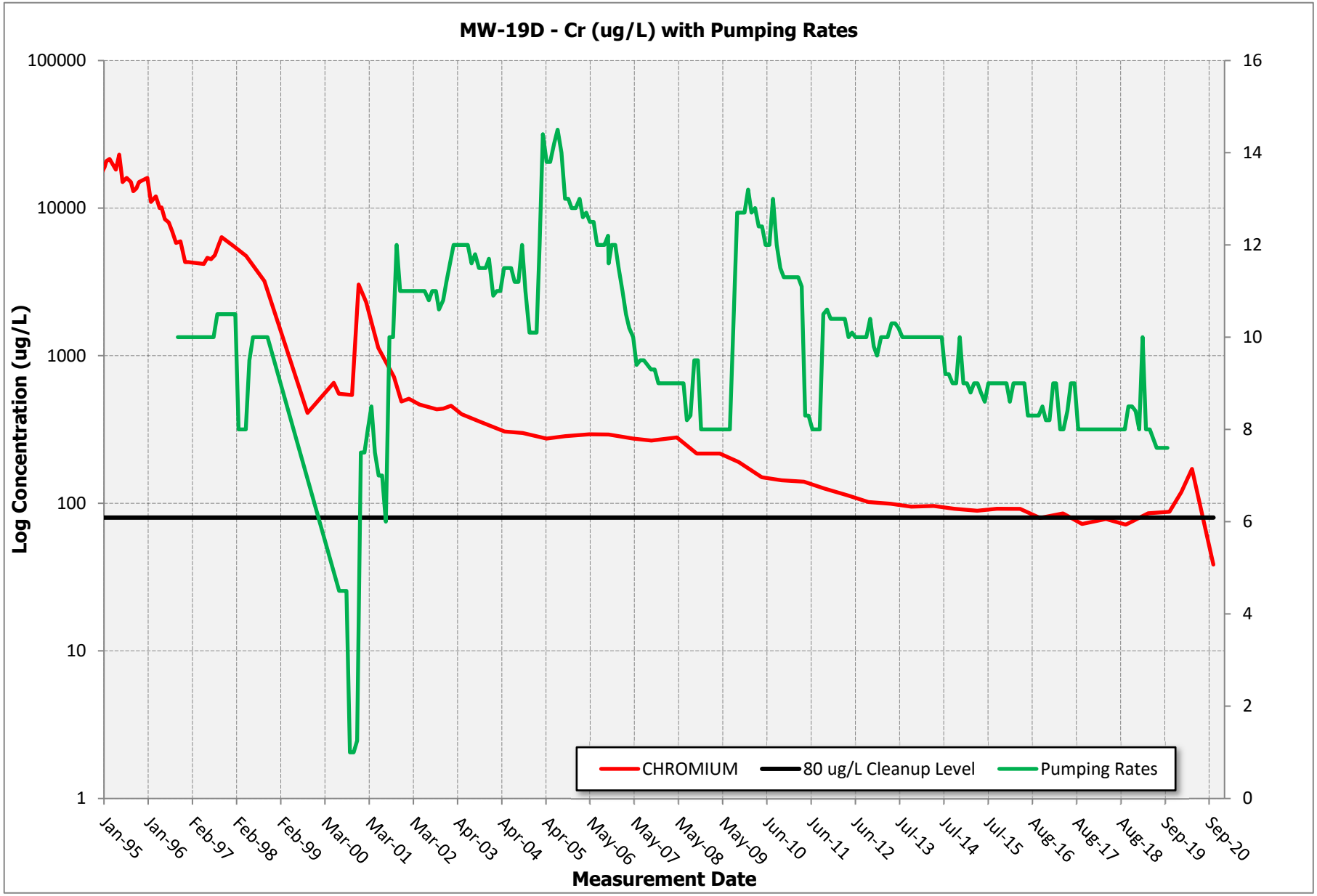

MW-10C - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
100000
10000
1000
100
10
1
14
12
10
8
6
4
2
0
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

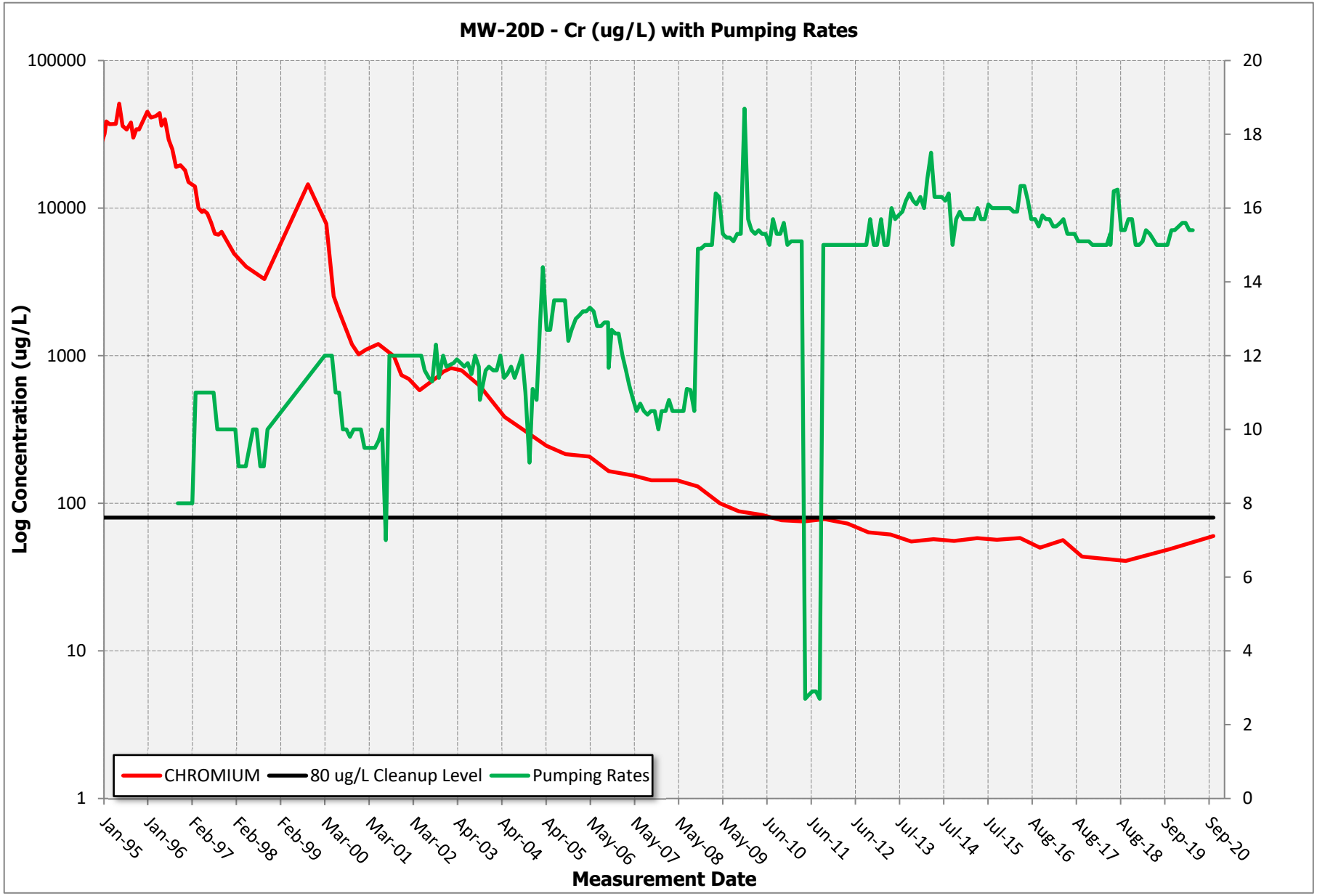

MW-14C - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
1000000
100000
10000
1000
100
10
1
16
14
12
10
8
6
4
2
0
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

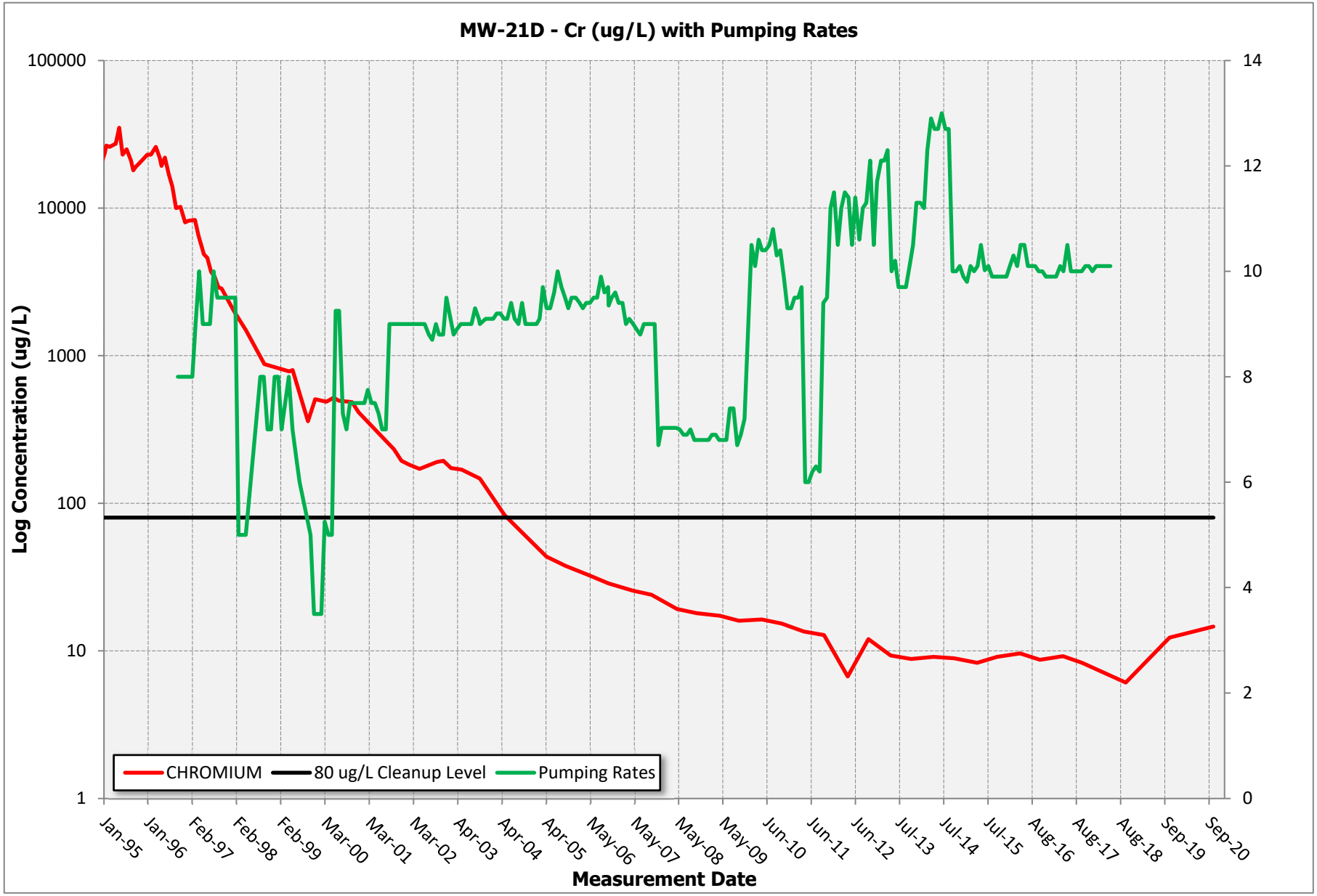

MW-14E - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
1000000
100000
10000
1000
100
10
1
14
12
10
8
6
4
2
0
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

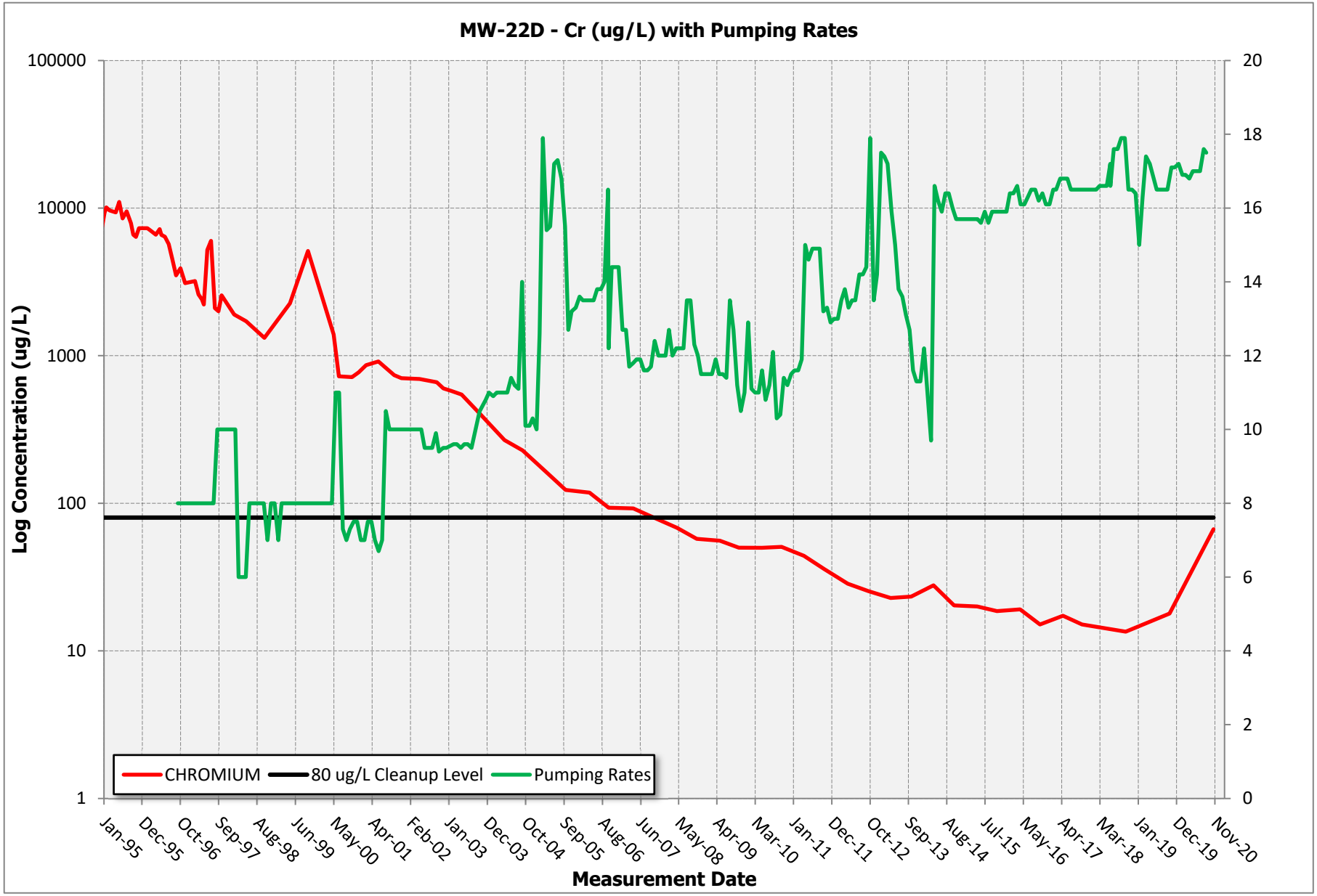

MW-18D - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
100000
10000
1000
100
10
1
20
18
16
14
12
10
8
6
4
2
0
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

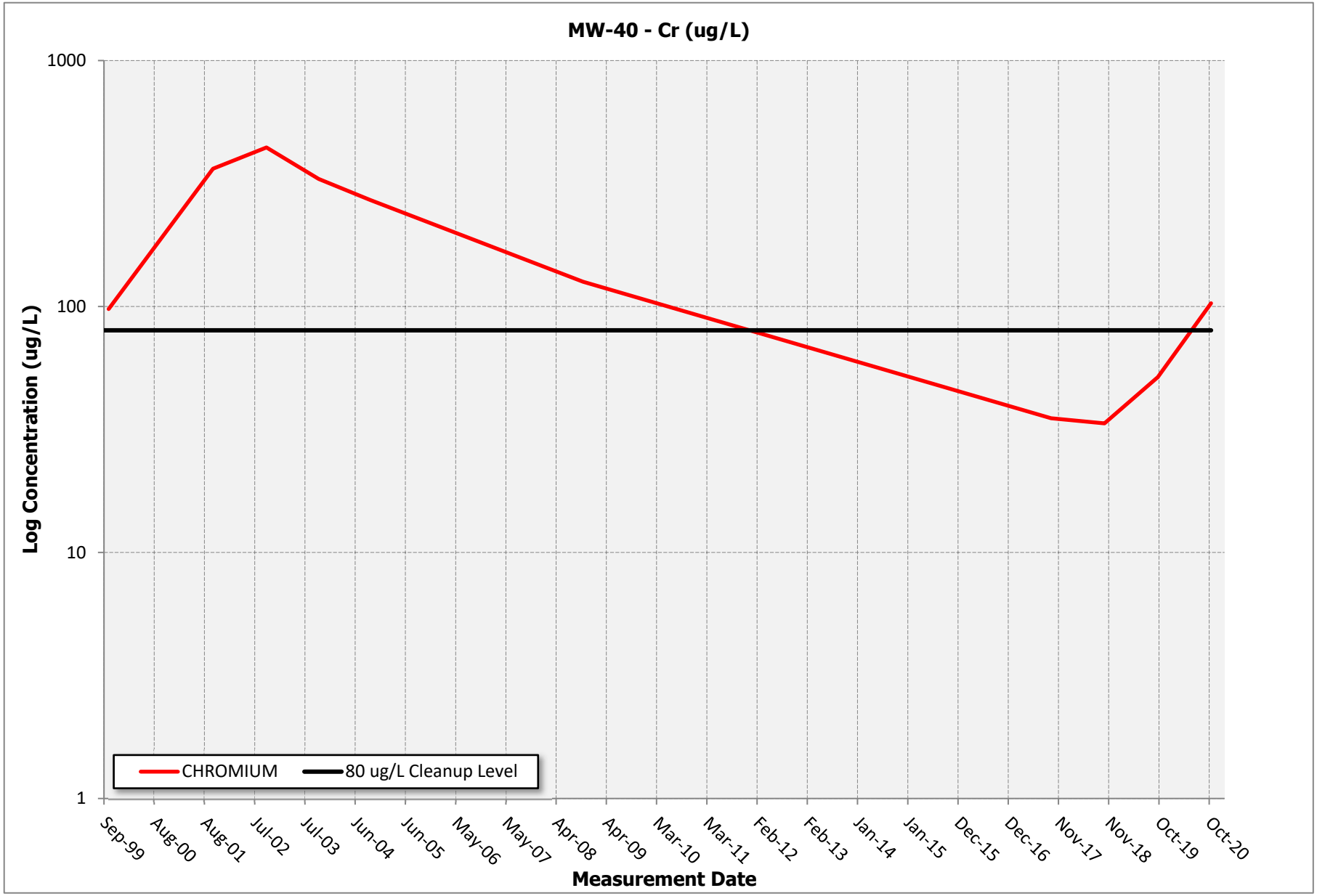

MW-18E - Cr (ug/L)
CHROMIUM
80 ug/L Cleanup Level
Log Concentration (ug/L)
100000
10000
1000
100
10
1
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

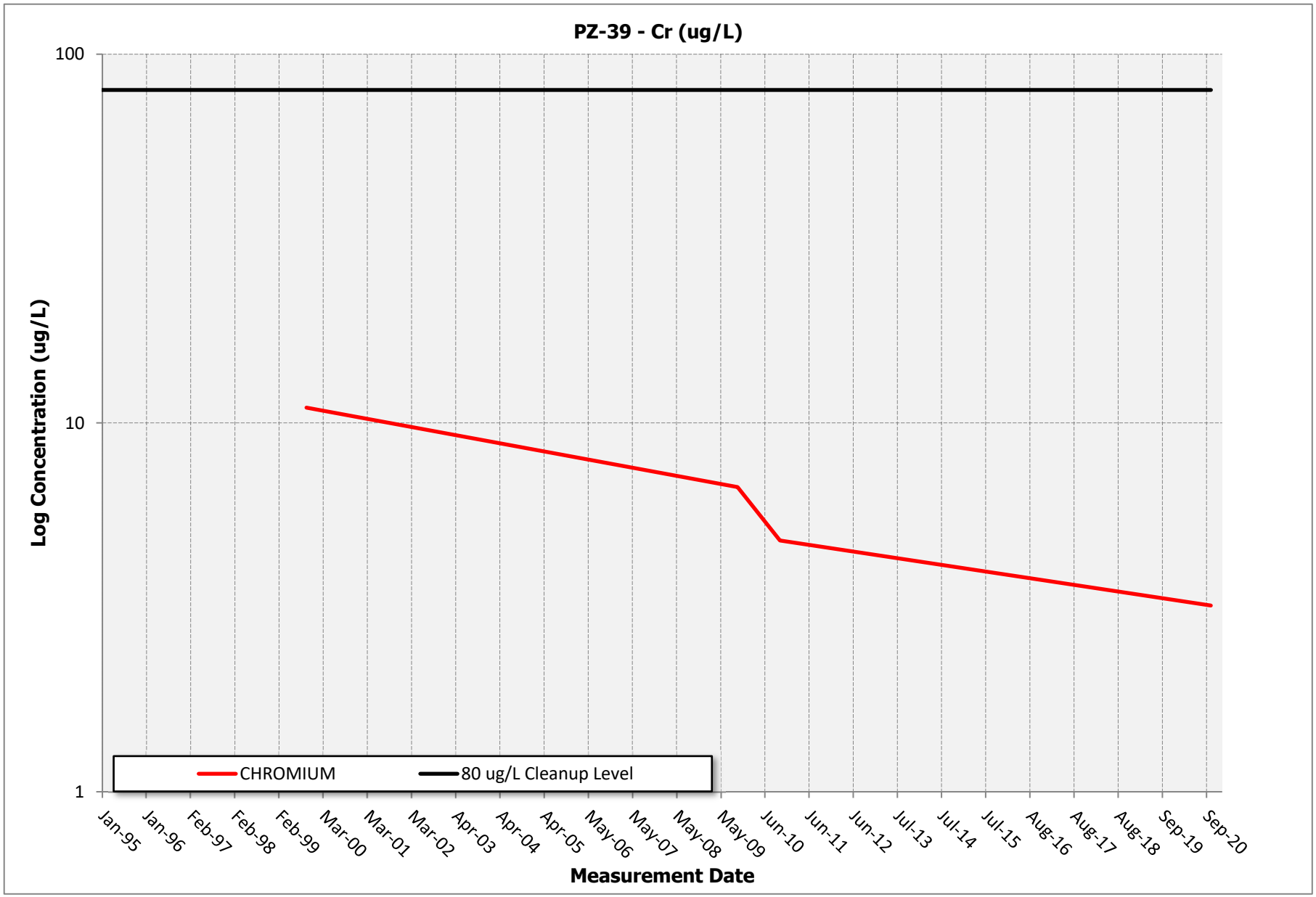

MW-19D - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
100000
10000
1000
100
10
1
16
14
12
10
8
6
4
2
0
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates

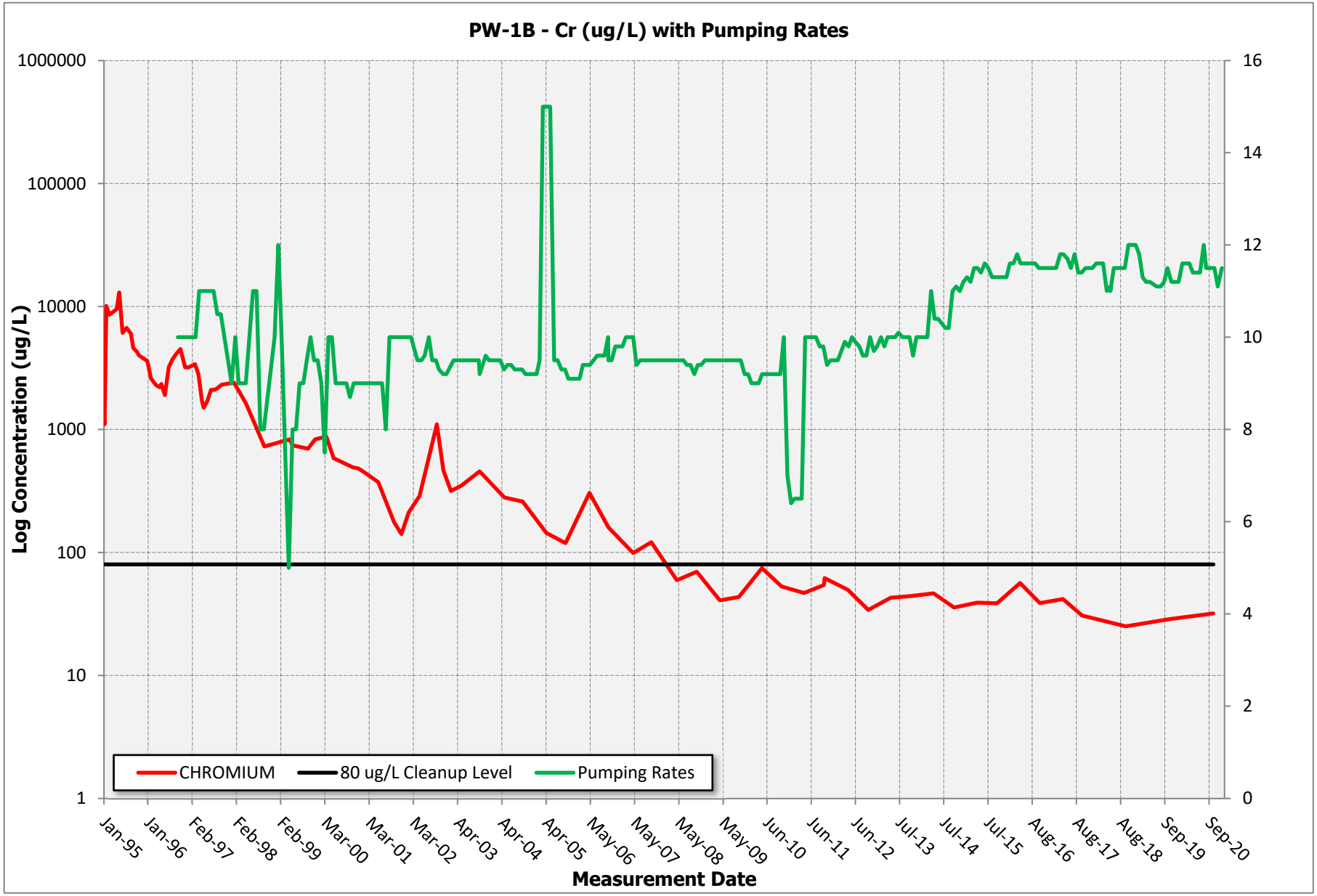

MW-20D - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
100000
10000
1000
100
10
1
20
18
16
14
12
10
8
6
4
2
0
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date


MW-21D - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
100000
10000
1000
100
10
1
14
12
10
8
6
4
2
0
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date


MW-22D - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
100000
10000
1000
100
10
1
20
18
16
14
12
10
8
6
4
2
0
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates
Jan-95
Dec-95
Oct-96
Sep-97
Aug-98
Jun-99
May-00
Apr-01
Feb-02
Jan-03
Dec-03
Oct-04
Sep-05
Aug-06
Jun-07
May-08
Apr-09
Mar-10
Jan-11
Dec-11
Oct-12
Sep-13
Aug-14
Jul-15
May-16
Apr-17
Mar-18
Jan-19
Dec-19
Nov-20
Measurement Date


MW-40 - Cr (ug/L)
1000
100
10
1
Log Concentration (ug/L)
CHROMIUM
80 ug/L Cleanup Level
Sep-99
Aug-00
Aug-01
Jul-02
Jul-03
Jun-04
Jun-05
May-06
May-07
Apr-08
Apr-09
Mar-10
Mar-11
Feb-12
Feb-13
Jan-14
Jan-15
Dec-15
Dec-16
Nov-17
Nov-18
Oct-19
Oct-20
Measurement Date


PZ-39 - Cr (ug/L)
100
10
1
Log Concentration (ug/L)
CHROMIUM
80 ug/L Cleanup Level
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date


PW-1B - Cr (ug/L) with Pumping Rates
Log Concentration (ug/L)
1000000
100000
10000
1000
100
10
1
16
14
12
10
8
6
4
2
0
CHROMIUM
80 ug/L Cleanup Level
Pumping Rates
Jan-95
Jan-96
Feb-97
Feb-98
Feb-99
Mar-00
Mar-01
Mar-02
Apr-03
Apr-04
Apr-05
May-06
May-07
May-08
May-09
Jun-10
Jun-11
Jun-12
Jul-13
Jul-14
Jul-15
Aug-16
Aug-17
Aug-18
Sep-19
Sep-20
Measurement Date

Appendix F

TCE Concentrations in Groundwater

This page intentionally left blank.

Appendix F-1

TCE Concentrations – Summary Table

This page intentionally left blank.

Table F-1. Trichloroethene Concentrations – Summary Table

Well Group	Well	Spring 2019	Fall 2019	January 2020	Spring 2020	Fall 2020
TCE Source Wells	AMW-1A	**23**	--	--	**9.2**	--
	AMW-2A	**4.8**	**12 J**	--	**37**	--
	AMW-4A	--	0.5 U	--	--	0.5 U
	AMW-12A	**21**	**21**	--	**20**	**12**
	AMW-53A	**13**	**15**	--	**11**	**19**
	MW-1A	**6.1**	**15**	--	0.77	--
Proximal Source Wells	MW-2B	--	1.1	--	--	2.5
	MW-4A	--	3.9	--	--	1.8
	MW-6A	--	0.5 U	--	--	0.5 U
	MW-6B	--	2.8	--	--	4.2
	MW-7B	--	4.2	--	--	**6.3**
	MW-9C	--	2.9	--	--	1.2
	MW-10B	**8.3**	**6.8**	--	**7.4**	**8.9**
	MW-10C	--	1.3	--	--	1.3
	PW-1B	--	2.4	--	--	2.2
Intermediate Plume Wells	AMW-59	--	**45**	**41**	**14**	4.1
	AMW-60	--	0.5 UJ	--	--	0.4 J
	CPU-14	--	**5.1**	--	--	3.7
	MW-14C	**6.9**	**5.9**	3.9	2.6	2.4
	MW-14E	**43**	**39**	**6.7**	**9.6**	**9.2**
	MW-18D	2.2	2.9	4.8	3	3.1
	MW-18E	1.8	0.7	--	0.25 J	0.24 J
	MW-19D	**18**	**15**	3.5	4.3	**45**
	MW-20D	**20**	**18**	--	**17**	**12**
	MW-38	--	**28**	--	--	**12**
	PZ-39	--	**33**	--	--	**42**
Northern Plume	AMW-16	**39**	**36**	--	**28**	**23**
	AMW-17	**66**	**48**	--	**57**	**55**
	AMW-18	**20**	**18**	--	**16**	**16**
	AMW-23	0.15 J	0.5 U	--	0.16 J	0.5 U
	AMW-64	**11**	**9.9**	--	**7.5**	**7.1**
	MW-21D	**15**	**9.1**	--	**7.1**	0.31 J

Table F-1. Trichloroethene Concentrations – Summary Table

Well Group	Well	Spring 2019	Fall 2019	January 2020	Spring 2020	Fall 2020
	MW-23D	**150 E**	**120**	--	**110**	**83**
	MW-38	**--**	**28**	--	**--**	**12**
Church of God	AMW-61	--	**6.9**	--	**--**	**6.2**
	MW-22D	--	1.5	--	--	1.6
Toe of Plume Wells – Sentinel	AMW-44	--	**--**	--	**--**	0.5 U
Troutdale	AMW-24	--	**6.5**	--	**--**	**5.7**
	BENNETT	--	0.9	--	**--**	1.3
	MW-33	**--**	3.6	--	**--**	3.5

NOTES:

Only wells sampled for TCE during 2020 are included in this table.

Active extraction wells shown are in **bold**. Two wells were only active for a part of the reporting period. Well MW-20D was turned off 08 May 2020. Well MW-22D was turned off 21 September 2020.

Results are in micrograms per liter (µg/L).

Results shown in **blue bold** exceed the cleanup level of 5 µg/L.

* = Unless otherwise noted.

E = The result is an estimated concentration because the value exceeded the instrument calibration range.

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.

-- = Not Sampled.

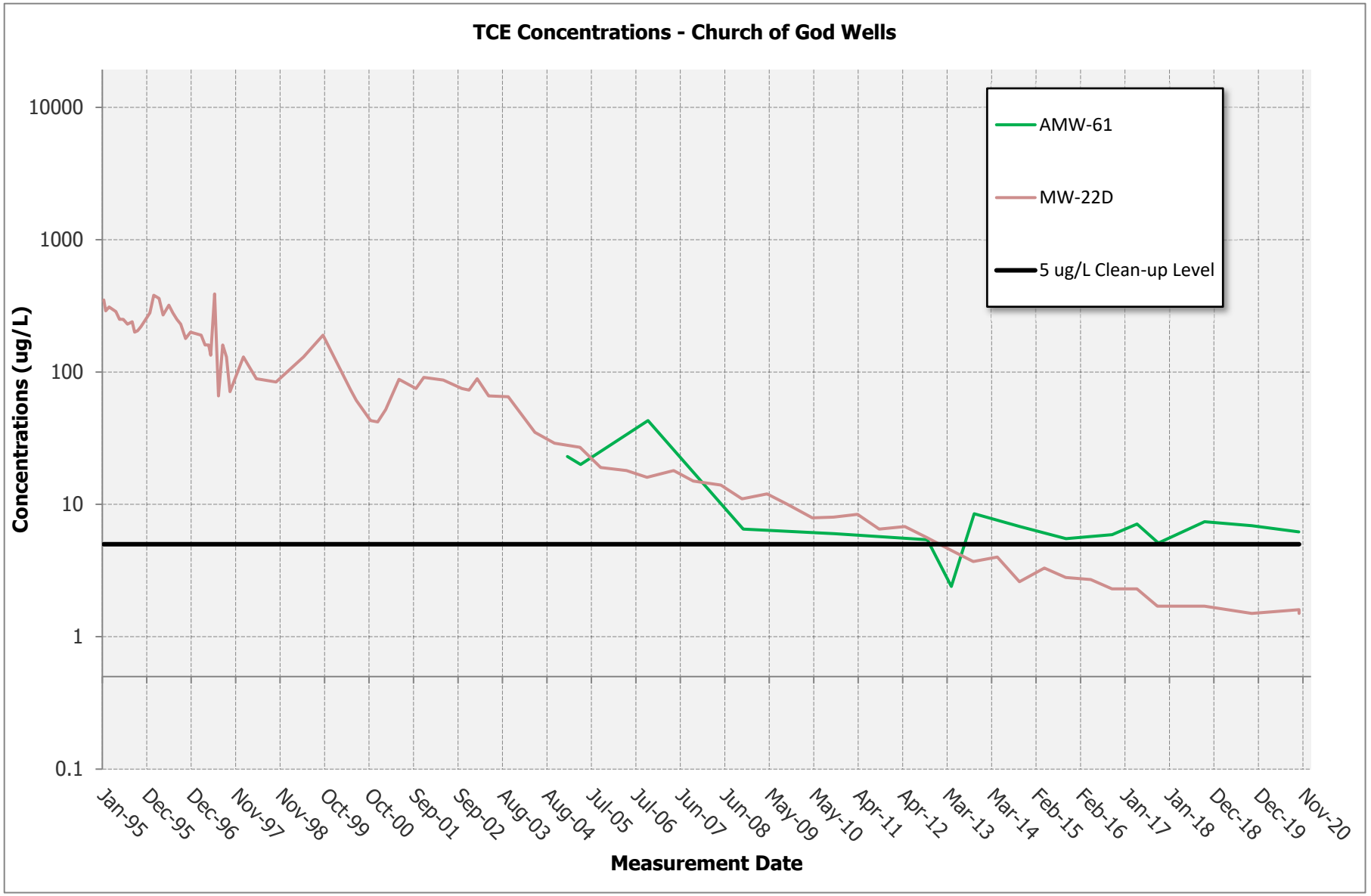
TCE = Trichloroethene.

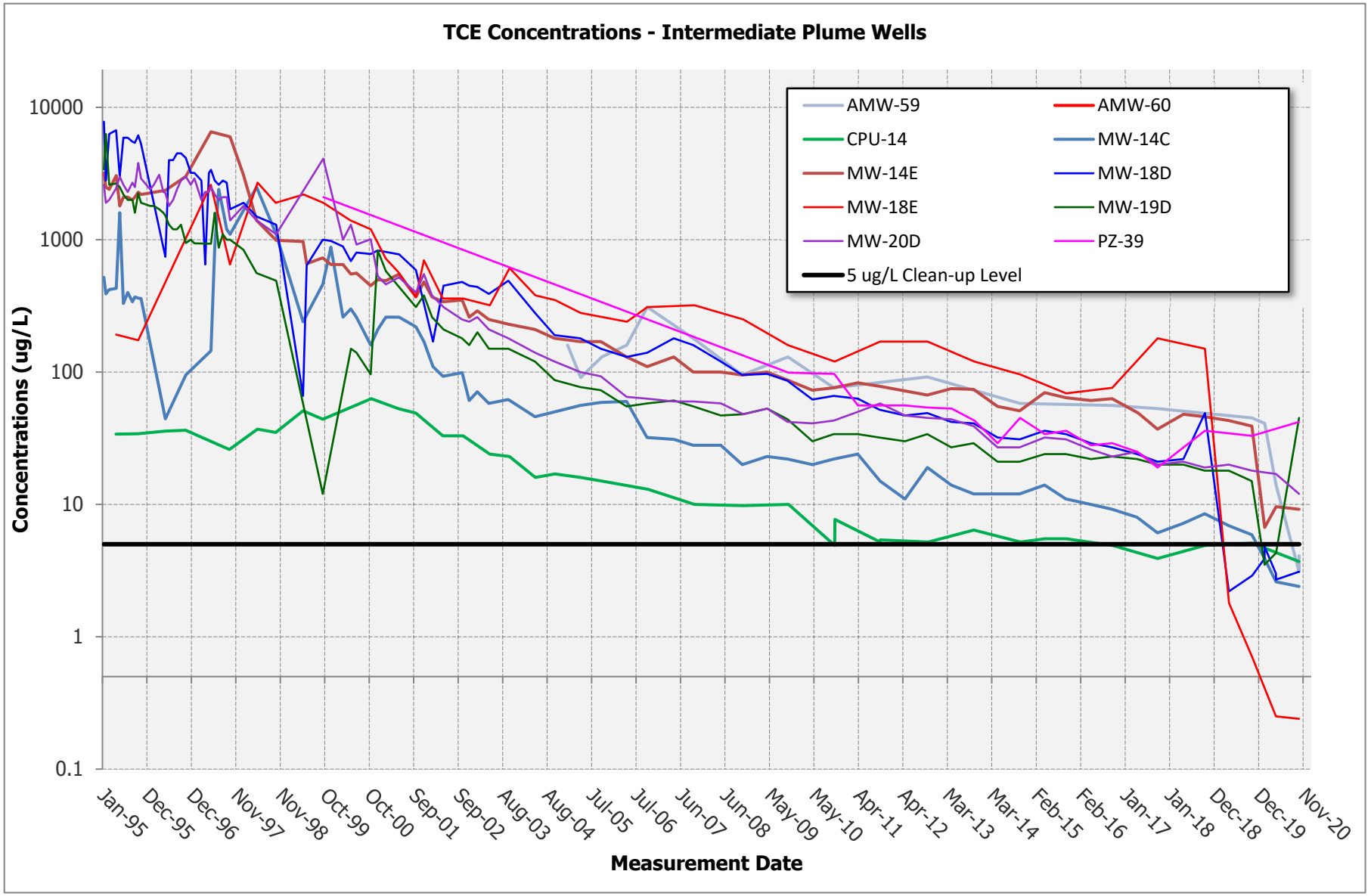
U = Analyte not detected above the specified reporting limit.

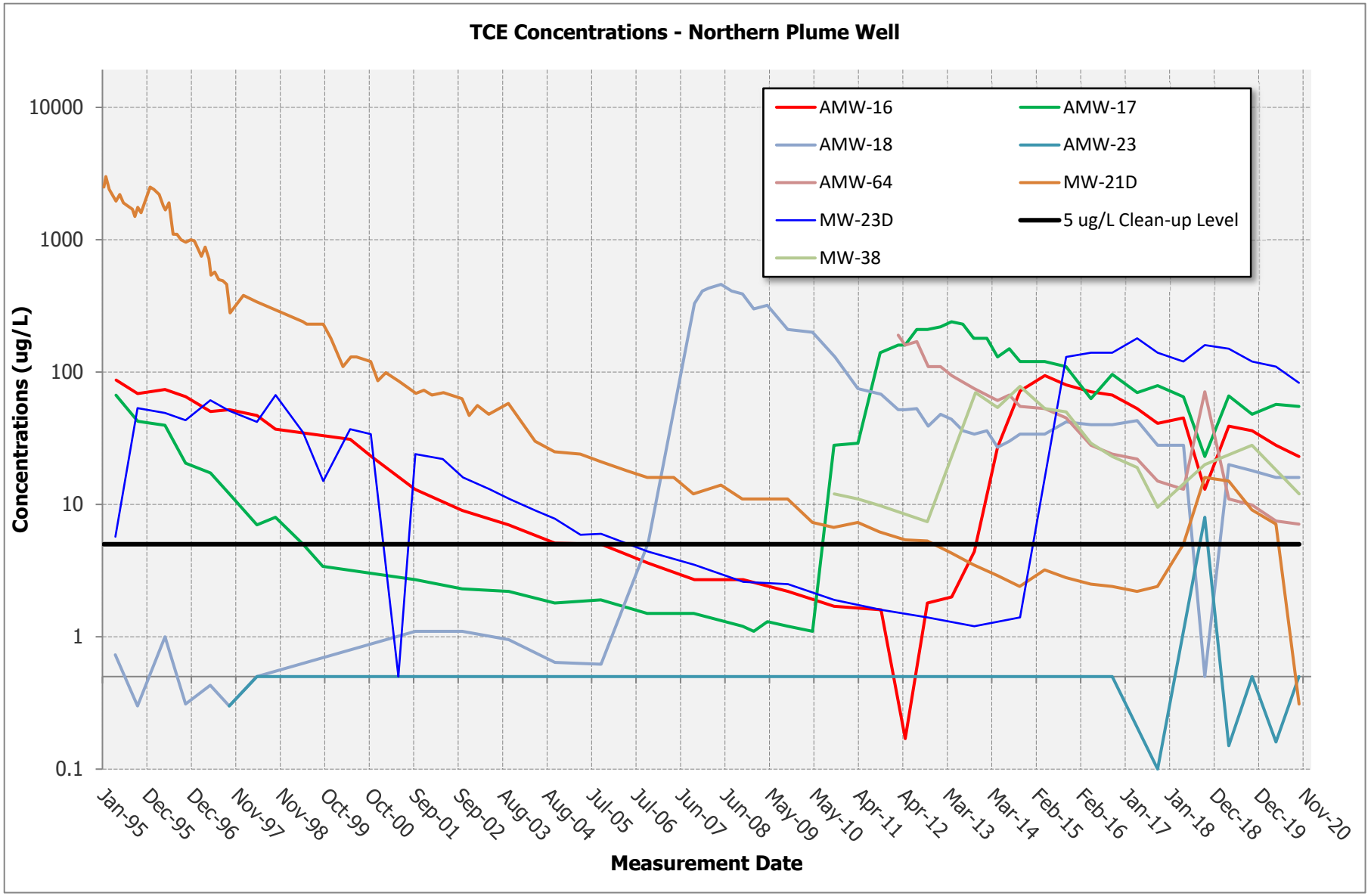
Appendix F-2

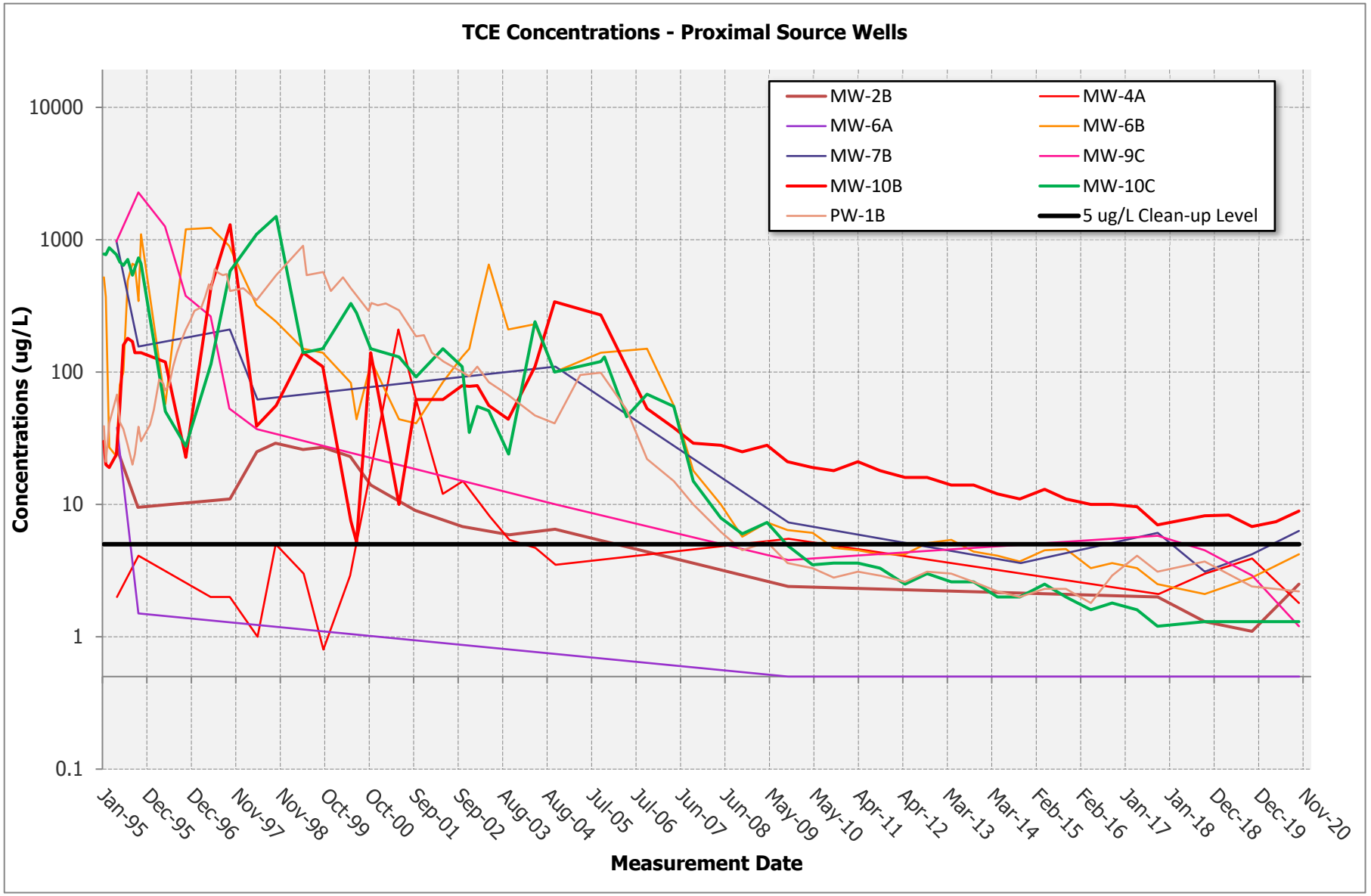
TCE Concentrations – By Well Grouping

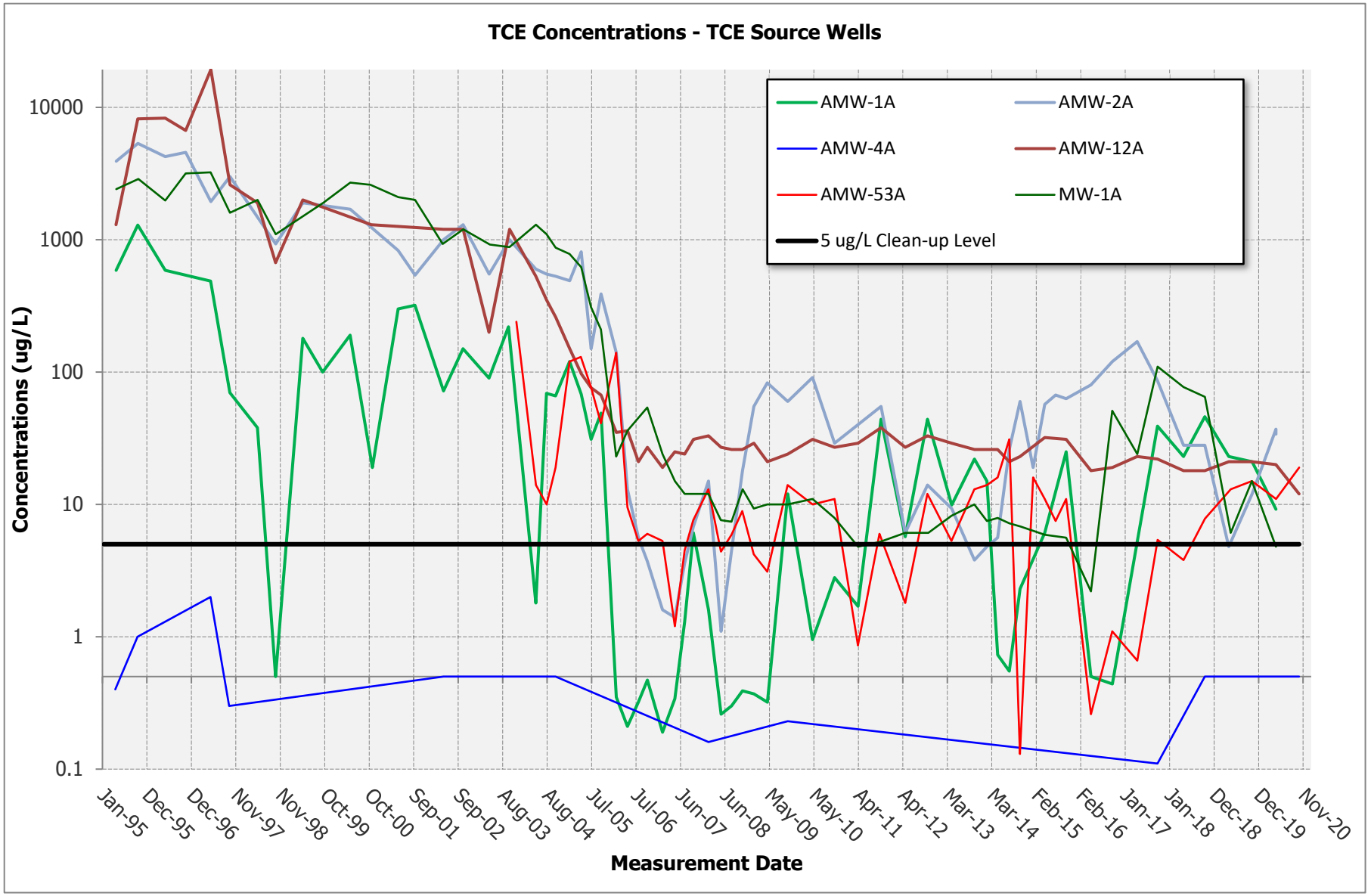
This page intentionally left blank.

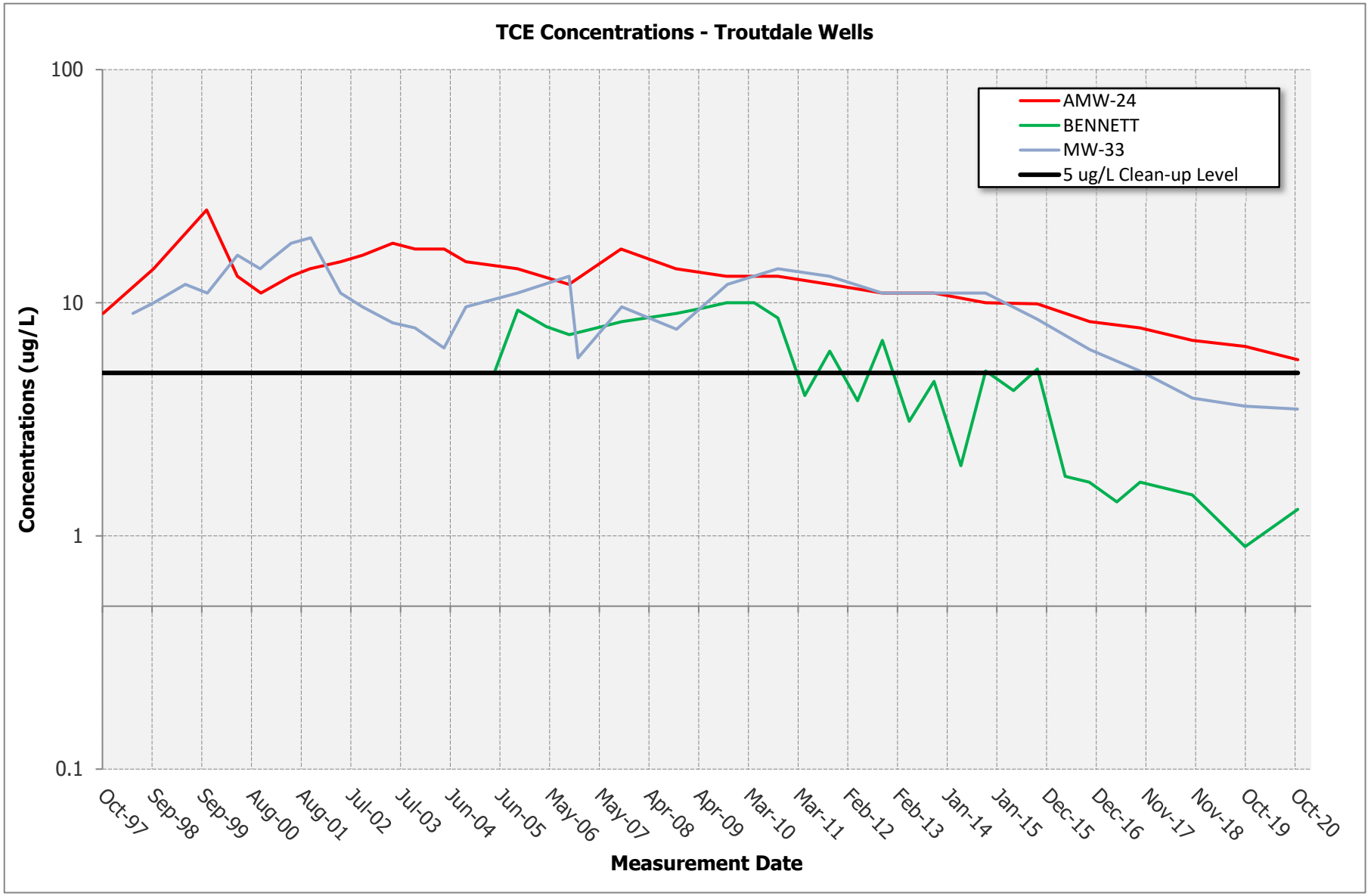

TCE Concentrations - Church of God Wells
Concentrations (ug/L)
10000
1000
100
10
1
0.1
AMW-61
MW-22D
5 ug/L Clean-up Level
Jan-95
Dec-95
Dec-96
Nov-97
Nov-98
Oct-99
Oct-00
Sep-01
Sep-02
Aug-03
Aug-04
Jul-05
Jul-06
Jun-07
Jun-08
May-09
May-10
Apr-11
Apr-12
Mar-13
Mar-14
Feb-15
Feb-16
Jan-17
Jan-18
Dec-18
Dec-19
Nov-20
Measurement Date


TCE Concentrations - Intermediate Plume Wells
Concentrations (ug/L)
10000
1000
100
10
1
0.1
AMW-59
AMW-60
CPU-14
MW-14C
MW-14E
MW-18D
MW-18E
MW-19D
MW-20D
PZ-39
5 ug/L Clean-up Level
Jan-95
Dec-95
Dec-96
Nov-97
Nov-98
Oct-99
Oct-00
Sep-01
Sep-02
Aug-03
Aug-04
Jul-05
Jul-06
Jun-07
Jun-08
May-09
May-10
Apr-11
Apr-12
Mar-13
Mar-14
Feb-15
Feb-16
Jan-17
Jan-18
Dec-18
Dec-19
Nov-20
Measurement Date


TCE Concentrations - Northern Plume Well
Concentrations (ug/L)
10000
1000
100
10
1
0.1
AMW-16
AMW-17
AMW-18
AMW-23
AMW-64
MW-21D
MW-23D
5 ug/L Clean-up Level
MW-38
Jan-95
Dec-95
Dec-96
Nov-97
Nov-98
Oct-99
Oct-00
Sep-01
Sep-02
Aug-03
Aug-04
Jul-05
Jul-06
Jun-07
Jun-08
May-09
May-10
Apr-11
Apr-12
Mar-13
Mar-14
Feb-15
Feb-16
Jan-17
Jan-18
Dec-18
Dec-19
Nov-20
Measurement Date


TCE Concentrations - Proximal Source Wells
Concentrations (ug/L)
10000
1000
100
10
1
0.1
MW-2B
MW-4A
MW-6A
MW-6B
MW-7B
MW-9C
MW-10B
MW-10C
PW-1B
5 ug/L Clean-up Level
Jan-95
Dec-95
Dec-96
Nov-97
Nov-98
Oct-99
Oct-00
Sep-01
Sep-02
Aug-03
Aug-04
Jul-05
Jul-06
Jun-07
Jun-08
May-09
May-10
Apr-11
Apr-12
Mar-13
Mar-14
Feb-15
Feb-16
Jan-17
Jan-18
Dec-18
Dec-19
Nov-20
Measurement Date

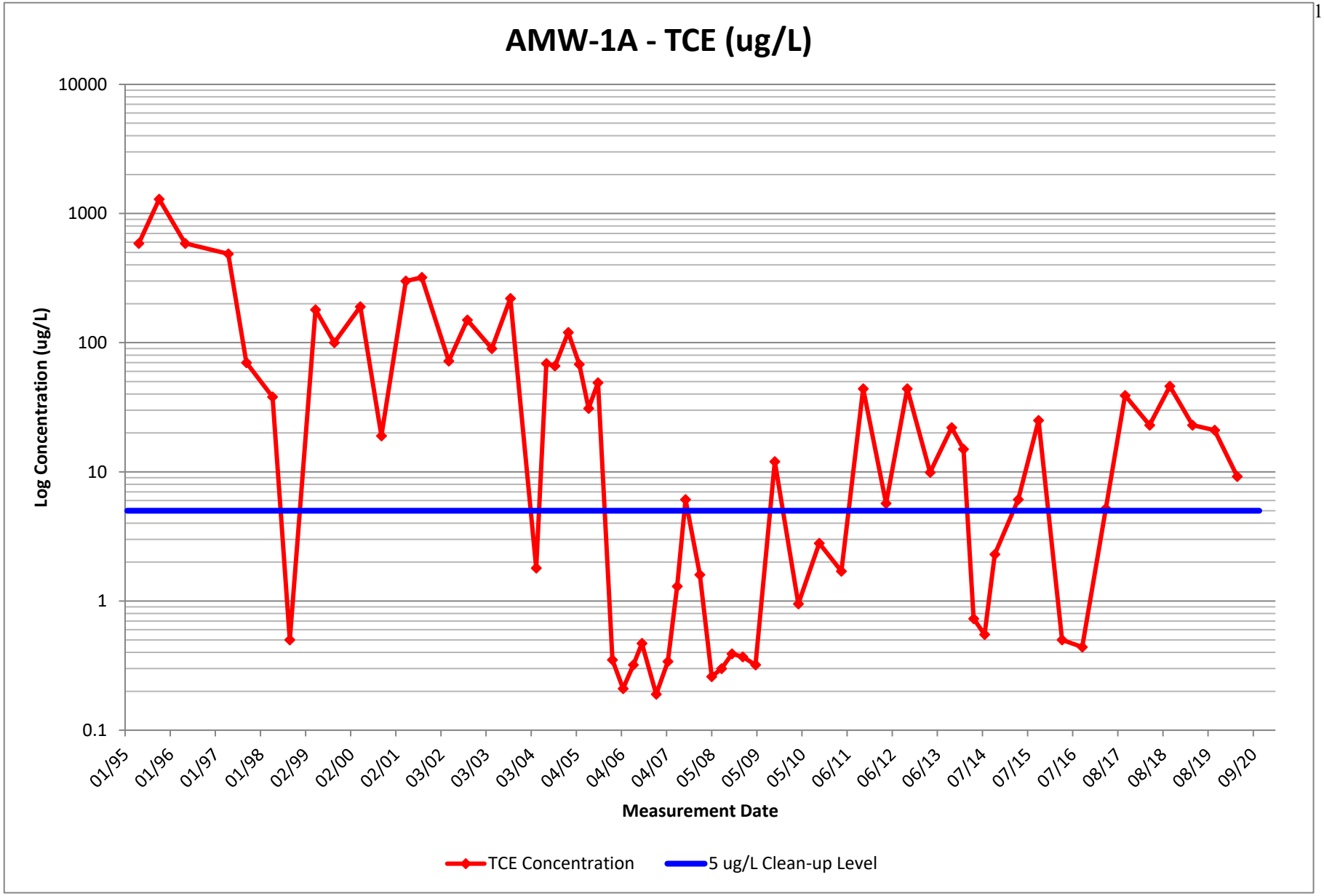

TCE Concentrations - TCE Source Wells
AMW-1A
AMW-2A
AMW-4A
AMW-12A
AMW-53A
MW-1A
5 ug/L Clean-up Level
Concentrations (ug/L)
10000
1000
100
10
1
0.1
Jan-95
Dec-95
Dec-96
Nov-97
Nov-98
Oct-99
Oct-00
Sep-01
Sep-02
Aug-03
Aug-04
Jul-05
Jul-06
Jun-07
Jun-08
May-09
May-10
Apr-11
Apr-12
Mar-13
Mar-14
Feb-15
Feb-16
Jan-17
Jan-18
Dec-18
Dec-19
Nov-20
Measurement Date

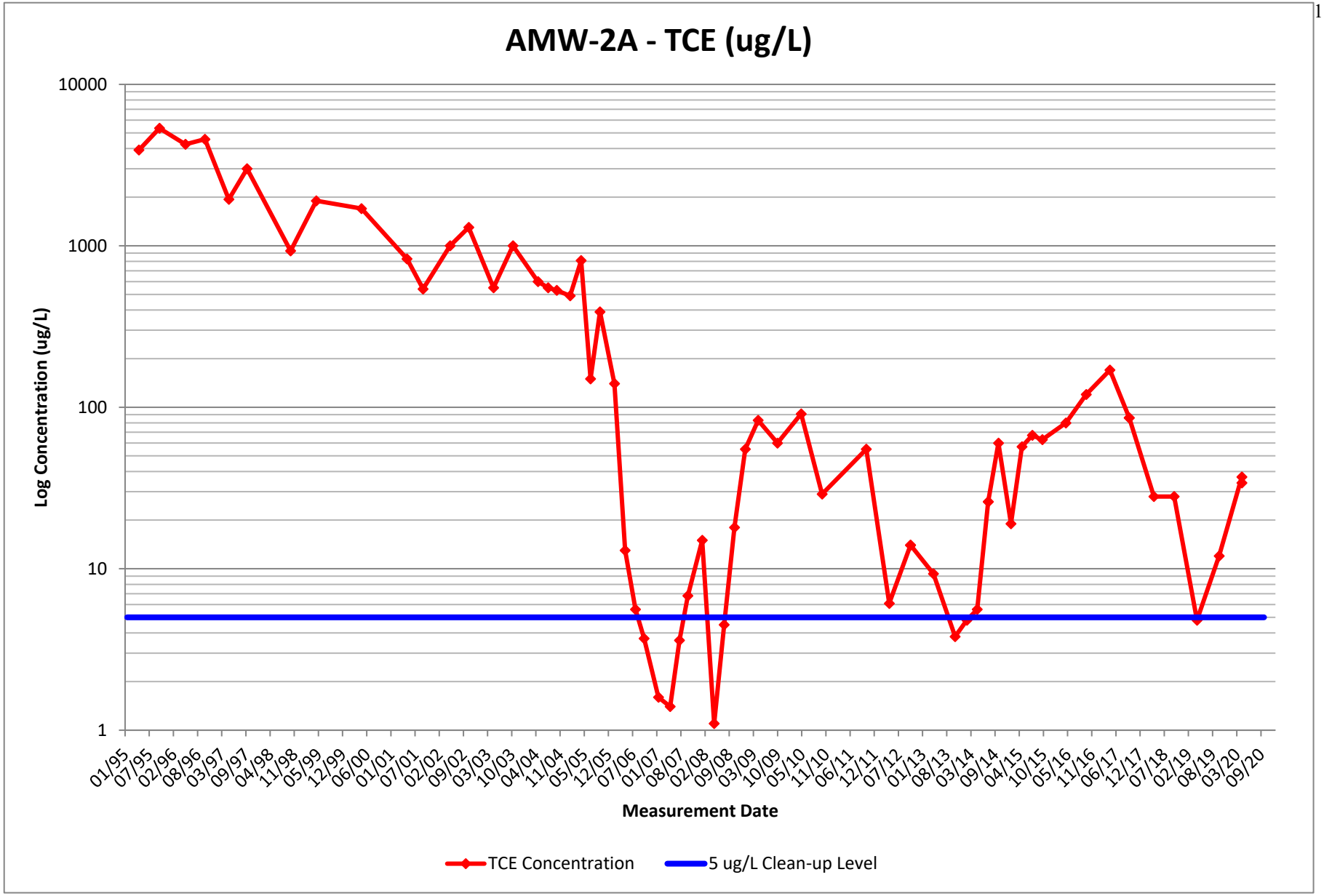

TCE Concentrations - Troutdale Wells
Concentrations (ug/L)
100
10
1
0.1
AMW-24
BENNETT
MW-33
5 ug/L Clean-up Level
Oct-97
Sep-98
Sep-99
Aug-00
Aug-01
Jul-02
Jul-03
Jun-04
Jun-05
May-06
May-07
Apr-08
Apr-09
Mar-10
Mar-11
Feb-12
Feb-13
Jan-14
Jan-15
Dec-15
Dec-16
Nov-17
Nov-18
Oct-19
Oct-20
Measurement Date

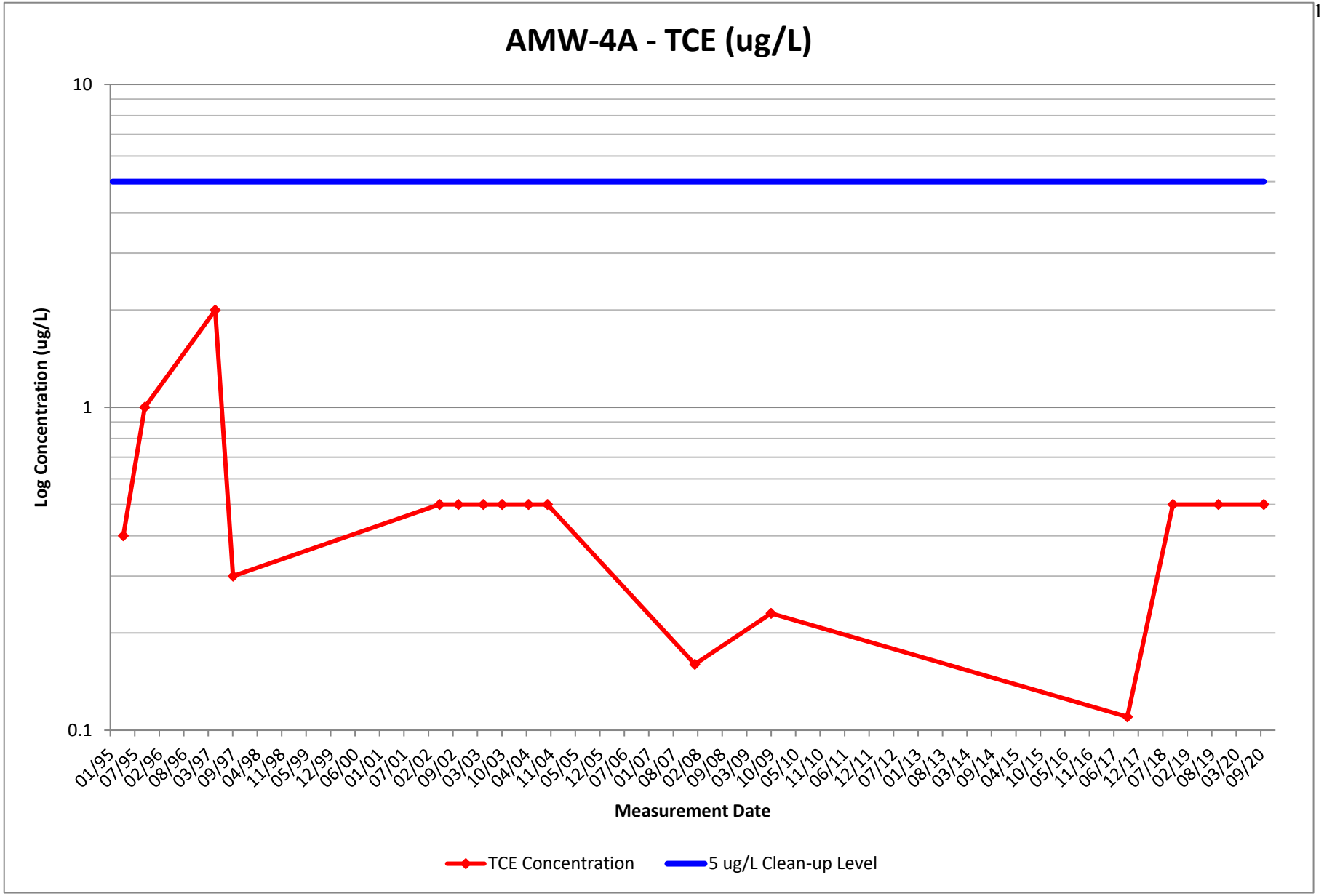
Appendix F-3

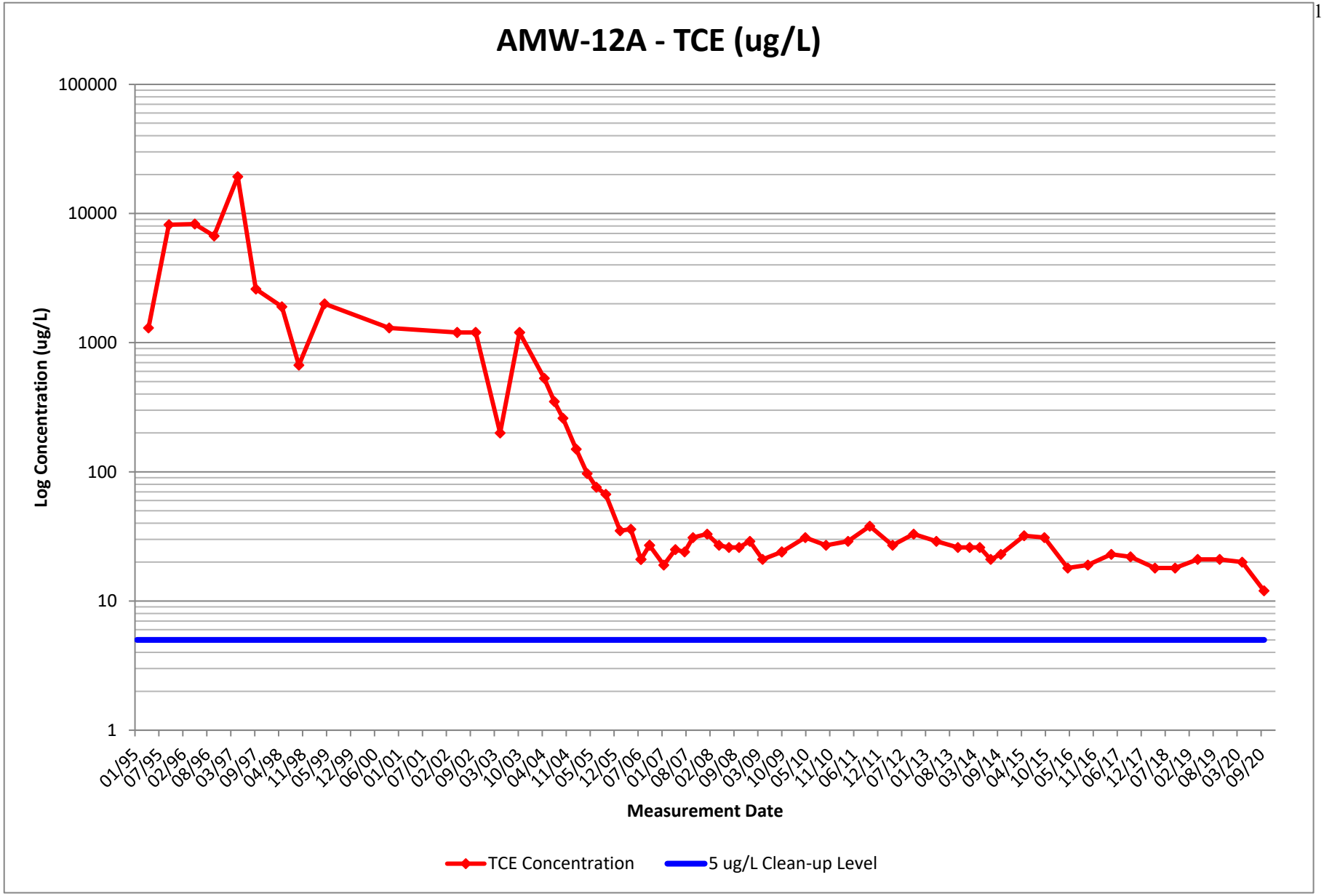
TCE Concentrations – Individual Wells

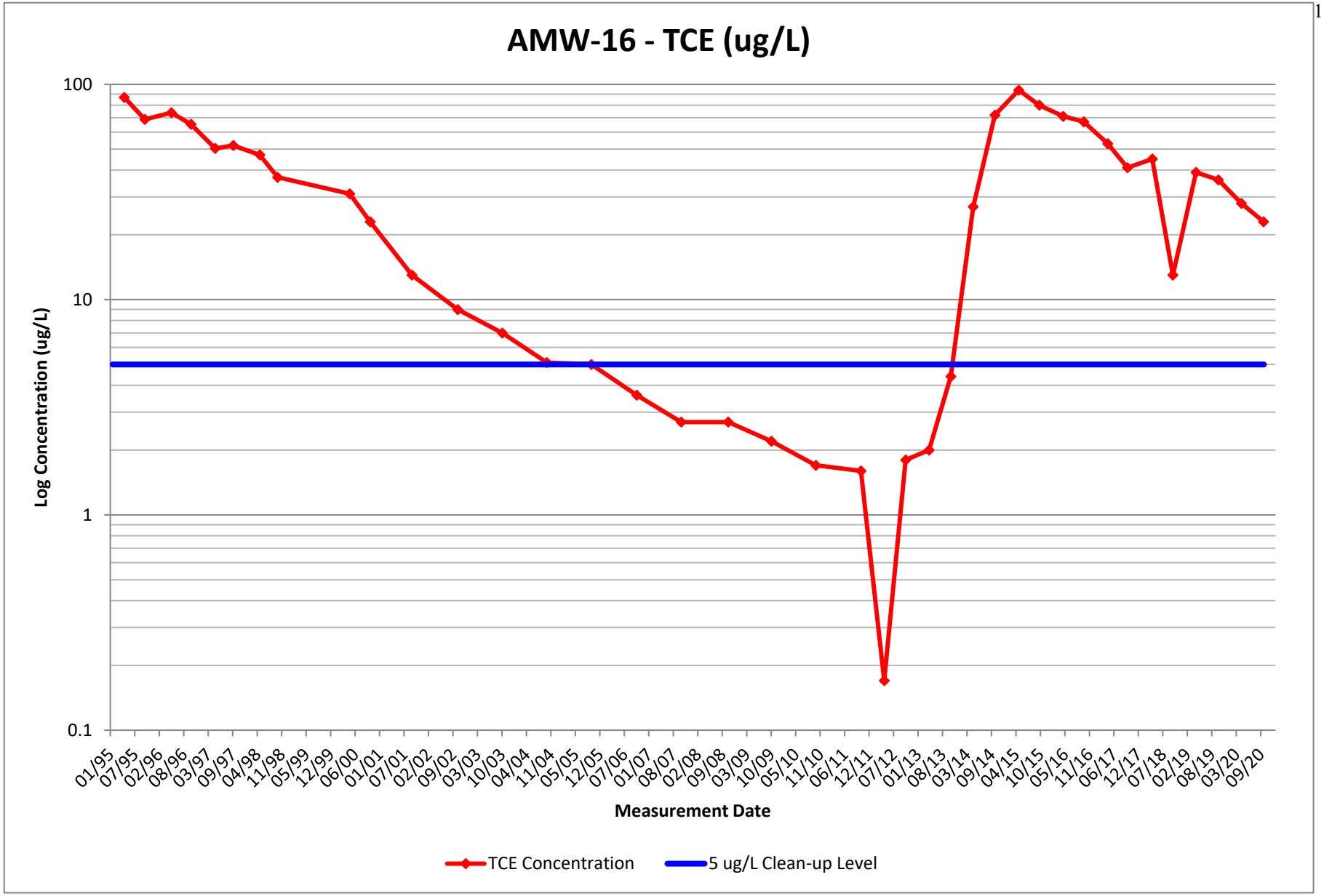
This page intentionally left blank.

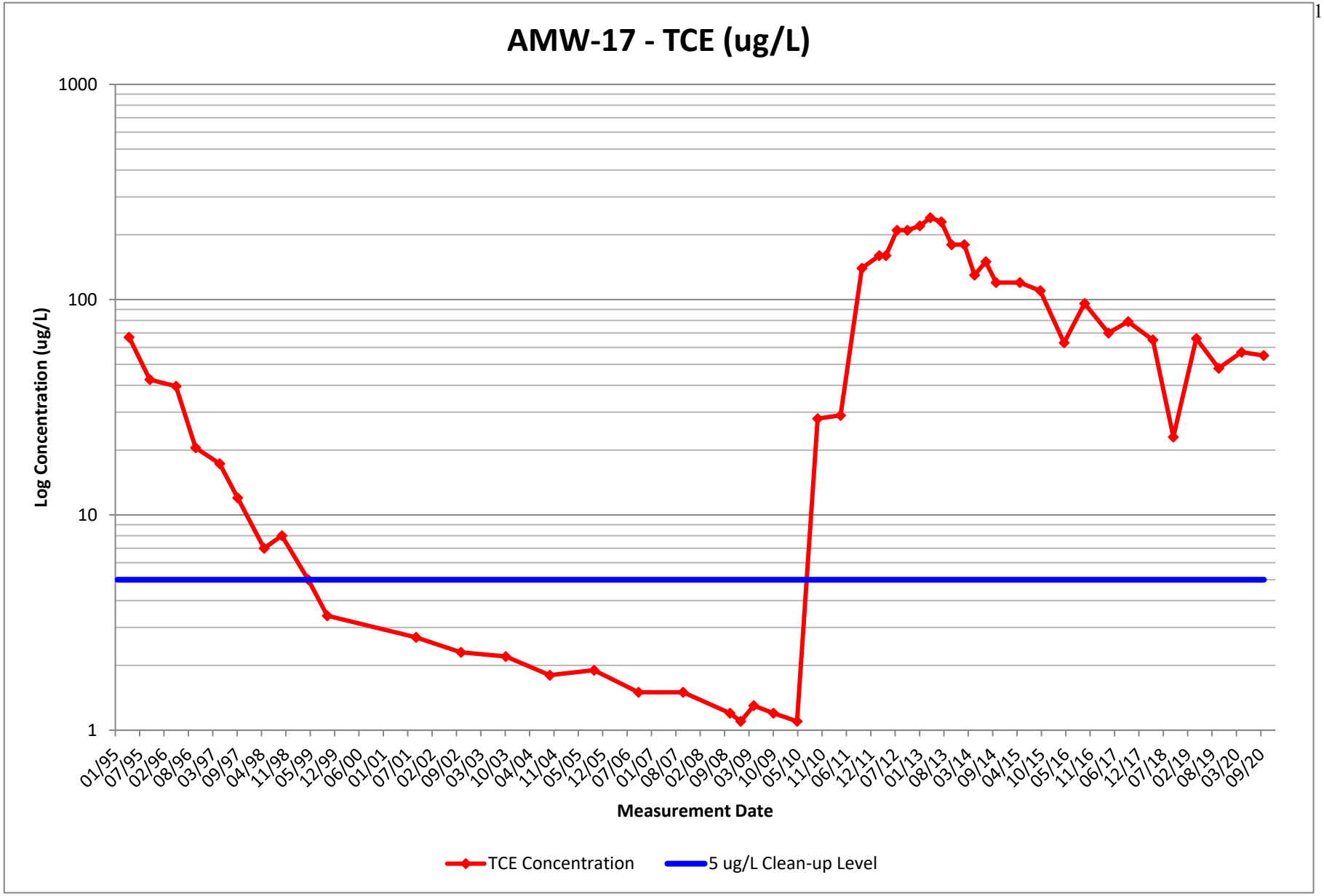

AMW-1A - TCE (ug/L)
Log Concentration (ug/L)
10000
1000
100
10
1
0.1
01/95
01/96
01/97
01/98
02/99
02/00
02/01
03/02
03/03
03/04
04/05
04/06
04/07
05/08
05/09
05/10
06/11
06/12
06/13
07/14
07/15
07/16
08/17
08/18
08/19
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

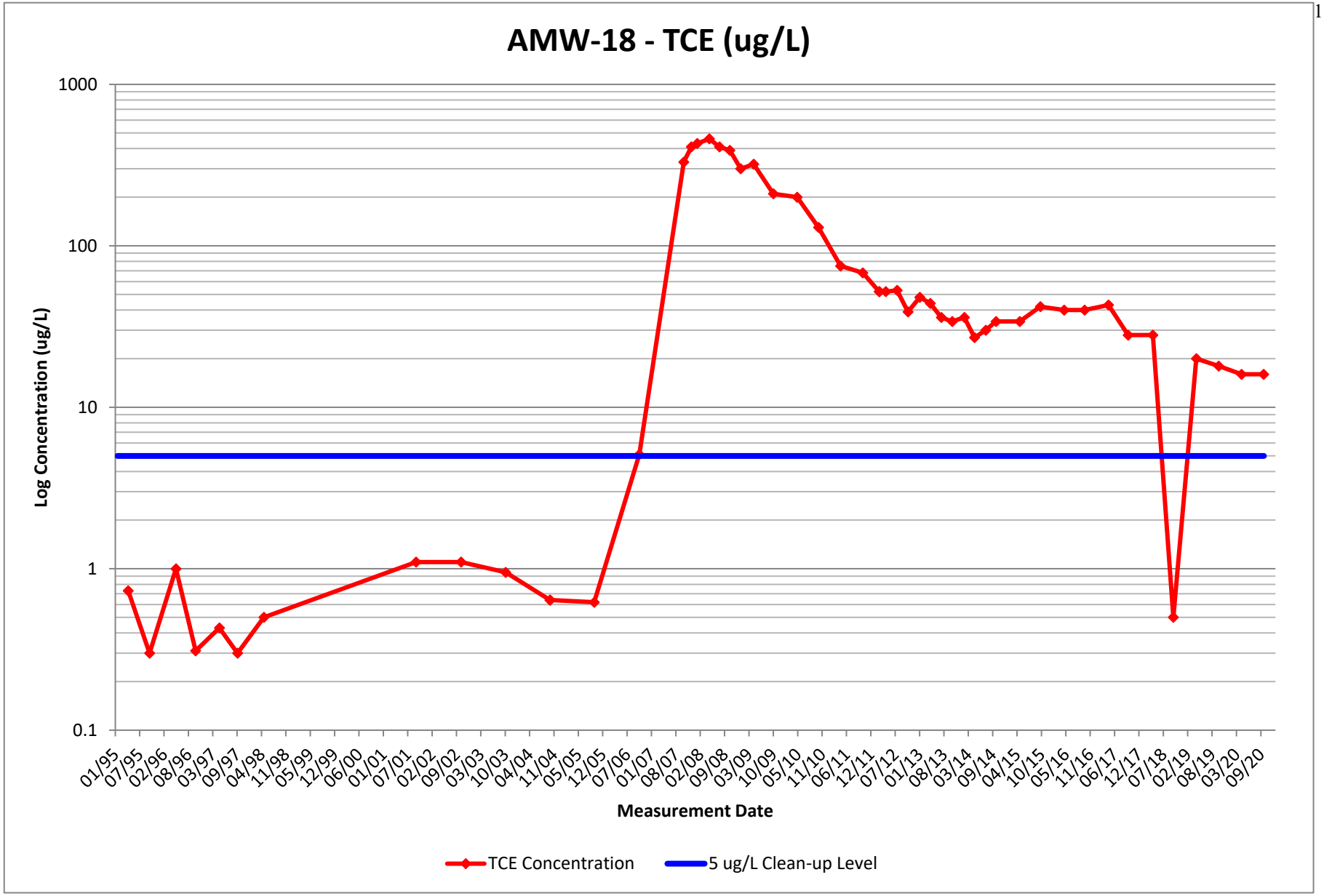

AMW-2A - TCE (ug/L)
Log Concentration (ug/L)
10000
1000
100
10
1
01/95
07/95
02/96
08/96
03/97
09/97
04/98
11/98
05/99
12/99
06/00
01/01
07/01
02/02
09/02
03/03
10/03
04/04
11/04
05/05
12/05
07/06
01/07
08/07
02/08
09/08
03/09
10/09
05/10
11/10
06/11
12/11
07/12
01/13
08/13
03/14
09/14
04/15
10/15
05/16
11/16
06/17
12/17
07/18
02/19
08/19
03/20
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

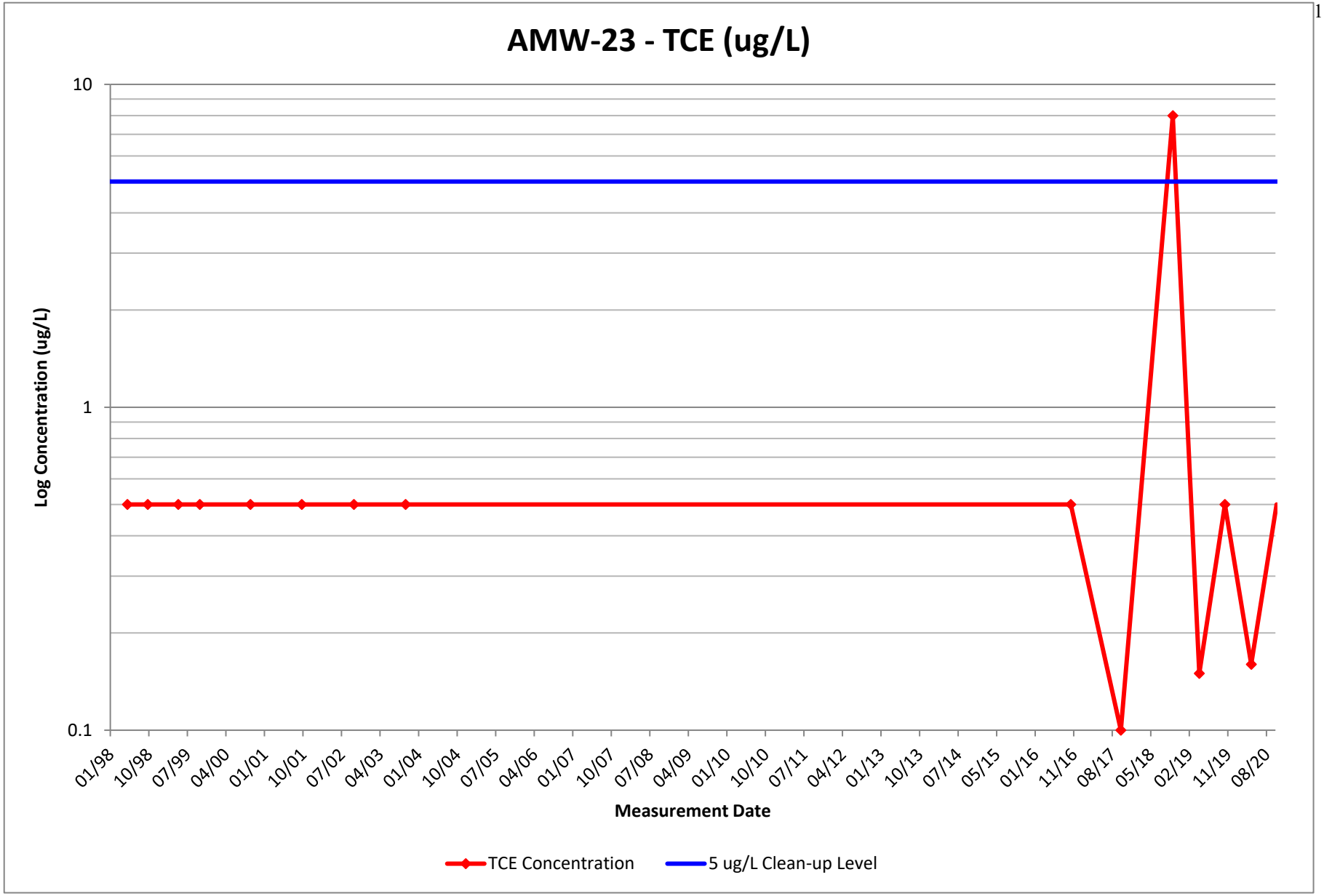

AMW-4A - TCE (ug/L)
10
1
0.1
Log Concentration (ug/L)
01/95
07/95
02/96
08/96
03/97
09/97
04/98
11/98
05/99
12/99
06/00
01/01
07/01
02/02
09/02
03/03
10/03
04/04
11/04
05/05
12/05
07/06
01/07
08/07
02/08
09/08
03/09
10/09
05/10
11/10
06/11
12/11
07/12
01/13
08/13
03/14
09/14
04/15
10/15
05/16
11/16
06/17
12/17
07/18
02/19
08/19
03/20
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

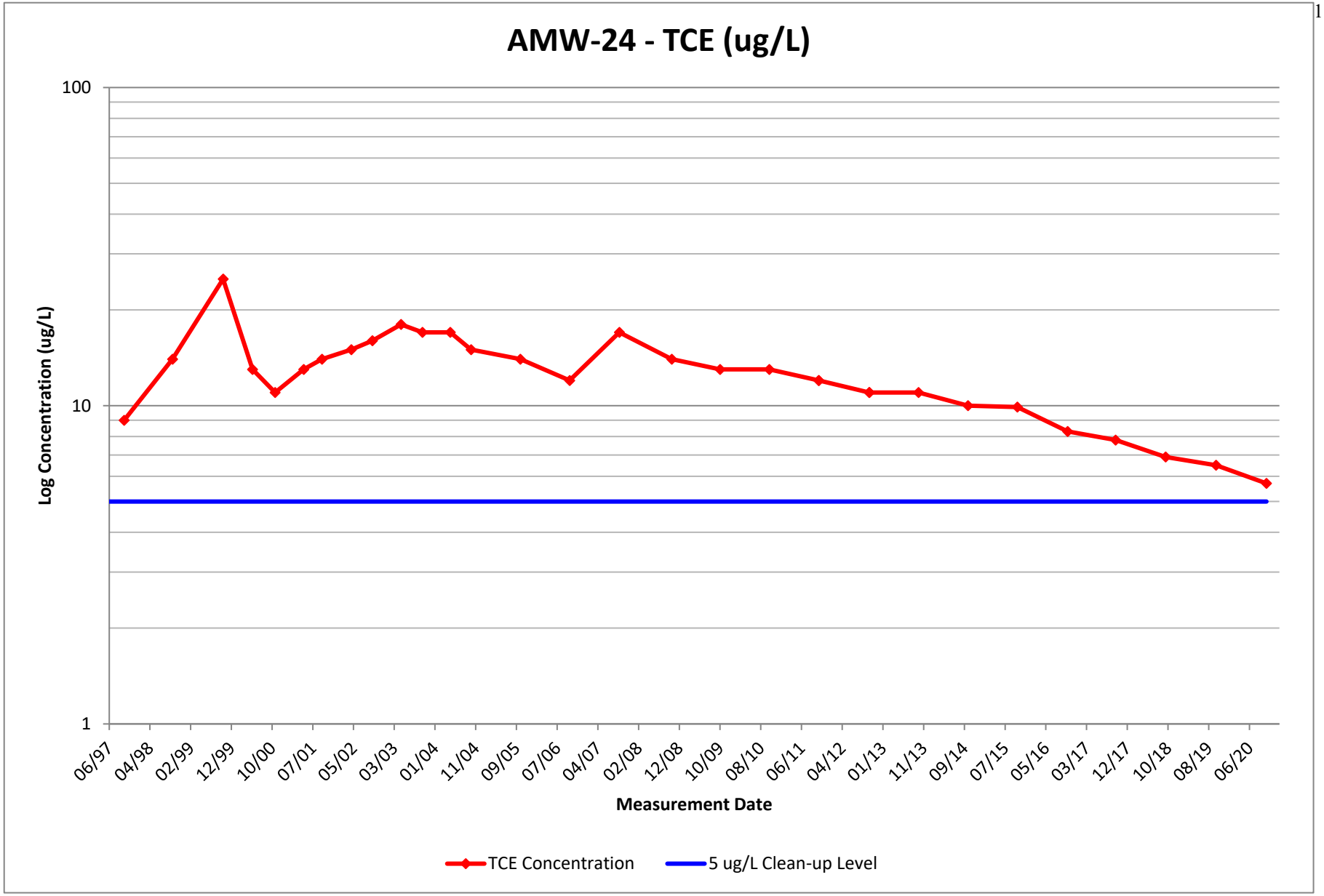

AMW-12A - TCE (ug/L)
Log Concentration (ug/L)
100000
10000
1000
100
10
1
01/95
07/95
02/96
08/96
03/97
09/97
04/98
11/98
05/99
12/99
06/00
01/01
07/01
02/02
09/02
03/03
10/03
04/04
11/04
05/05
12/05
07/06
01/07
08/07
02/08
09/08
03/09
10/09
05/10
11/10
06/11
12/11
07/12
01/13
08/13
03/14
09/14
04/15
10/15
05/16
11/16
06/17
12/17
07/18
02/19
08/19
03/20
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

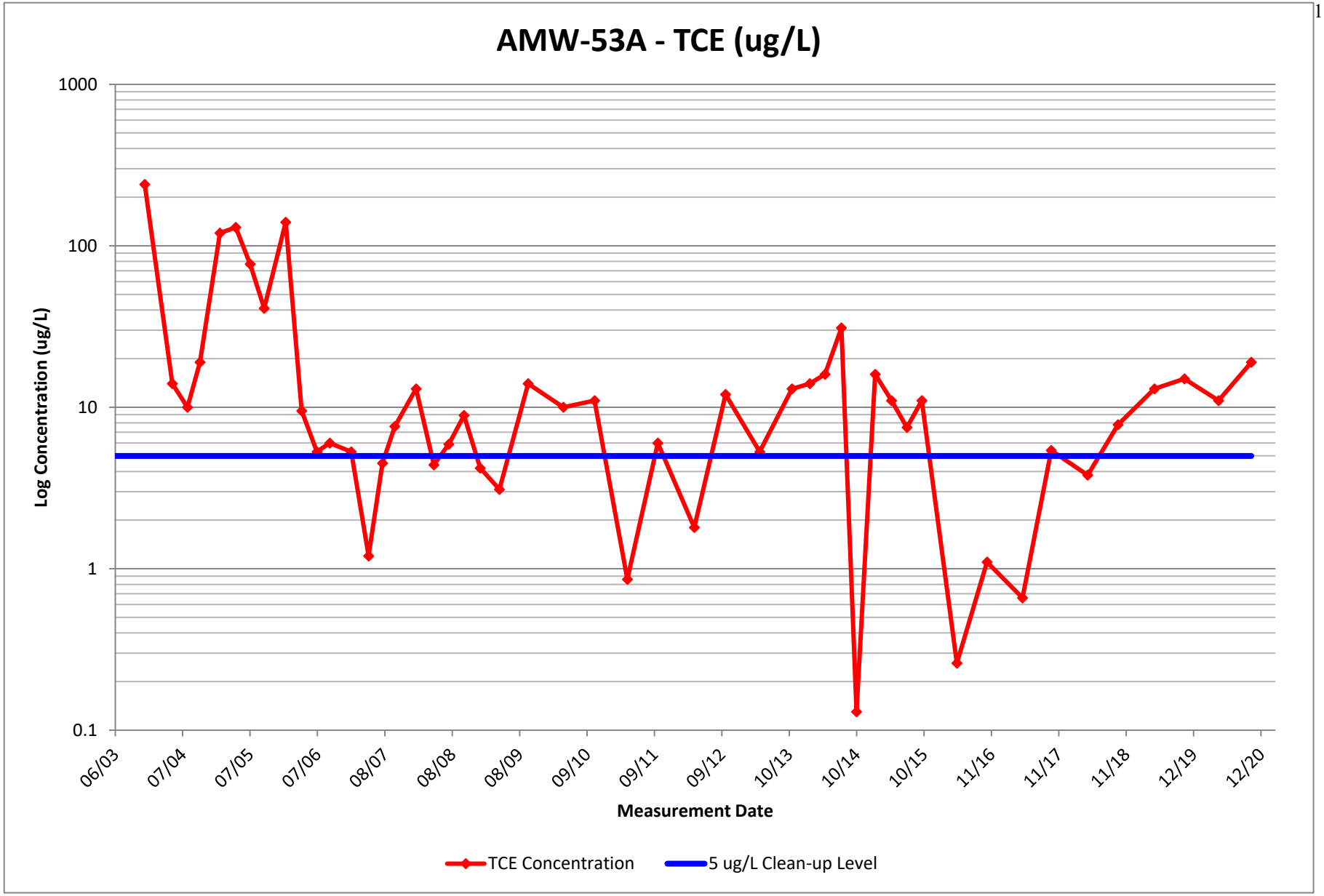

AMW-16 - TCE (ug/L)
Log Concentration (ug/L)
100
10
1
0.1
01/95
07/95
02/96
08/96
03/97
09/97
04/98
11/98
05/99
12/99
06/00
01/01
07/01
02/02
09/02
03/03
10/03
04/04
11/04
05/05
12/05
07/06
01/07
08/07
02/08
09/08
03/09
10/09
05/10
11/10
06/11
12/11
07/12
01/13
08/13
03/14
09/14
04/15
10/15
05/16
11/16
06/17
12/17
07/18
02/19
08/19
03/20
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

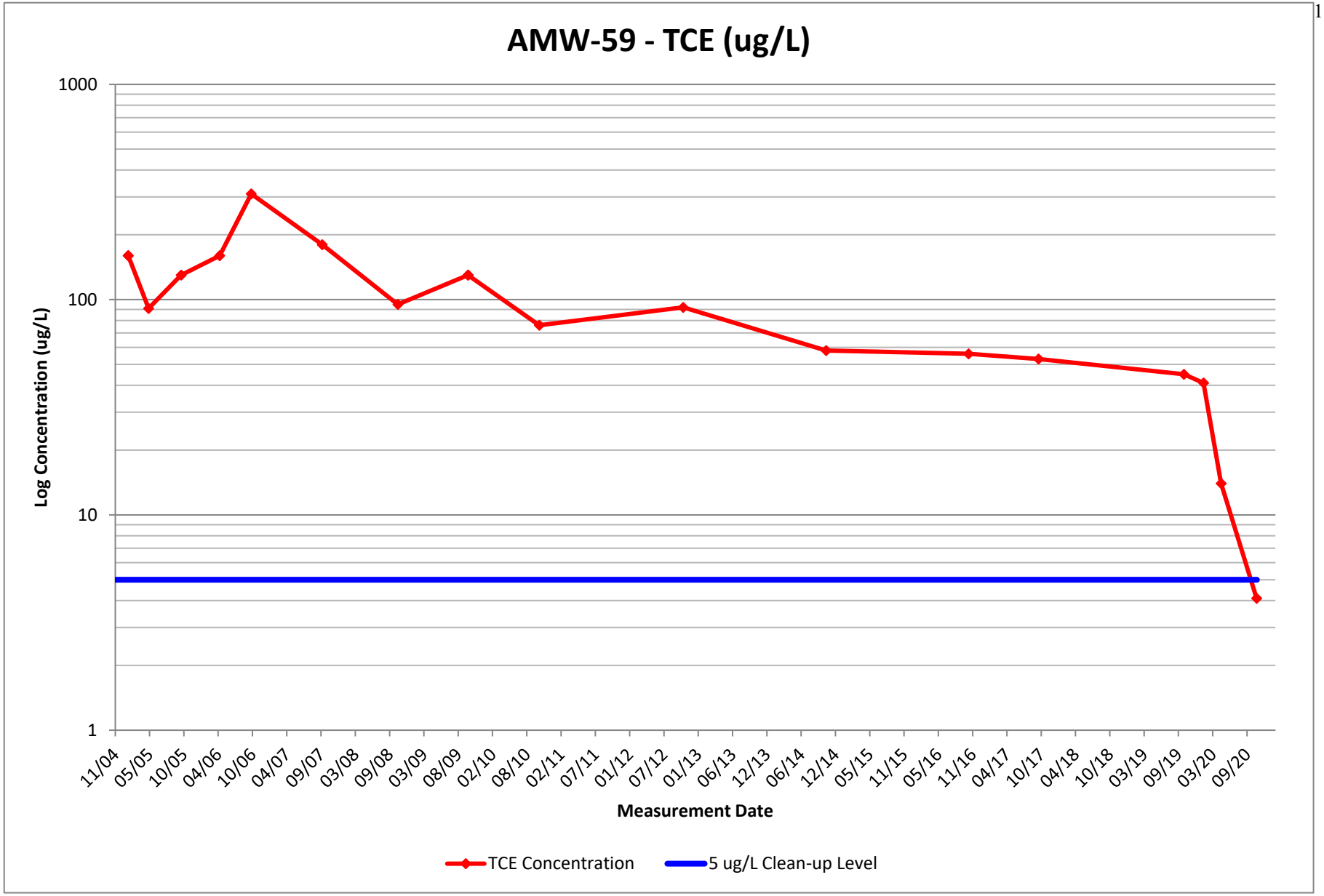

AMW-17 - TCE (ug/L)
Log Concentration (ug/L)
1000
100
10
1
01/95
07/95
02/96
08/96
03/97
09/97
04/98
11/98
05/99
12/99
06/00
01/01
07/01
02/02
09/02
03/03
10/03
04/04
11/04
05/05
12/05
07/06
01/07
08/07
02/08
09/08
03/09
10/09
05/10
11/10
06/11
12/11
07/12
01/13
08/13
03/14
09/14
04/15
10/15
05/16
11/16
06/17
12/17
07/18
02/19
08/19
03/20
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

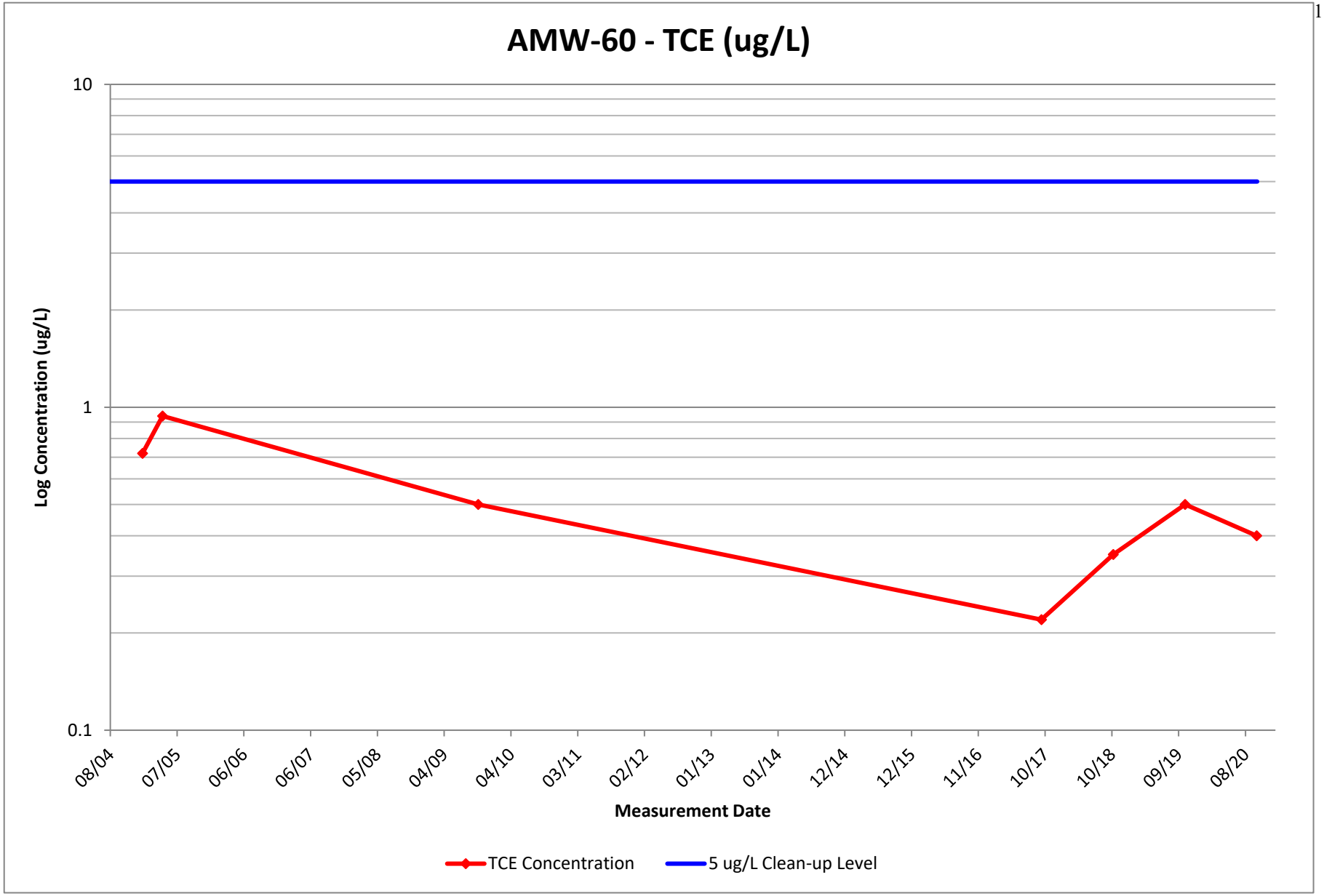

AMW-18 - TCE (ug/L)
Log Concentration (ug/L)
1000
100
10
1
0.1
01/95
07/95
02/96
08/96
03/97
09/97
04/98
11/98
05/99
12/99
06/00
01/01
07/01
02/02
09/02
03/03
10/03
04/04
11/04
05/05
12/05
07/06
01/07
08/07
02/08
09/08
03/09
10/09
05/10
11/10
06/11
12/11
07/12
01/13
08/13
03/14
09/14
04/15
10/15
05/16
11/16
06/17
12/17
07/18
02/19
08/19
03/20
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

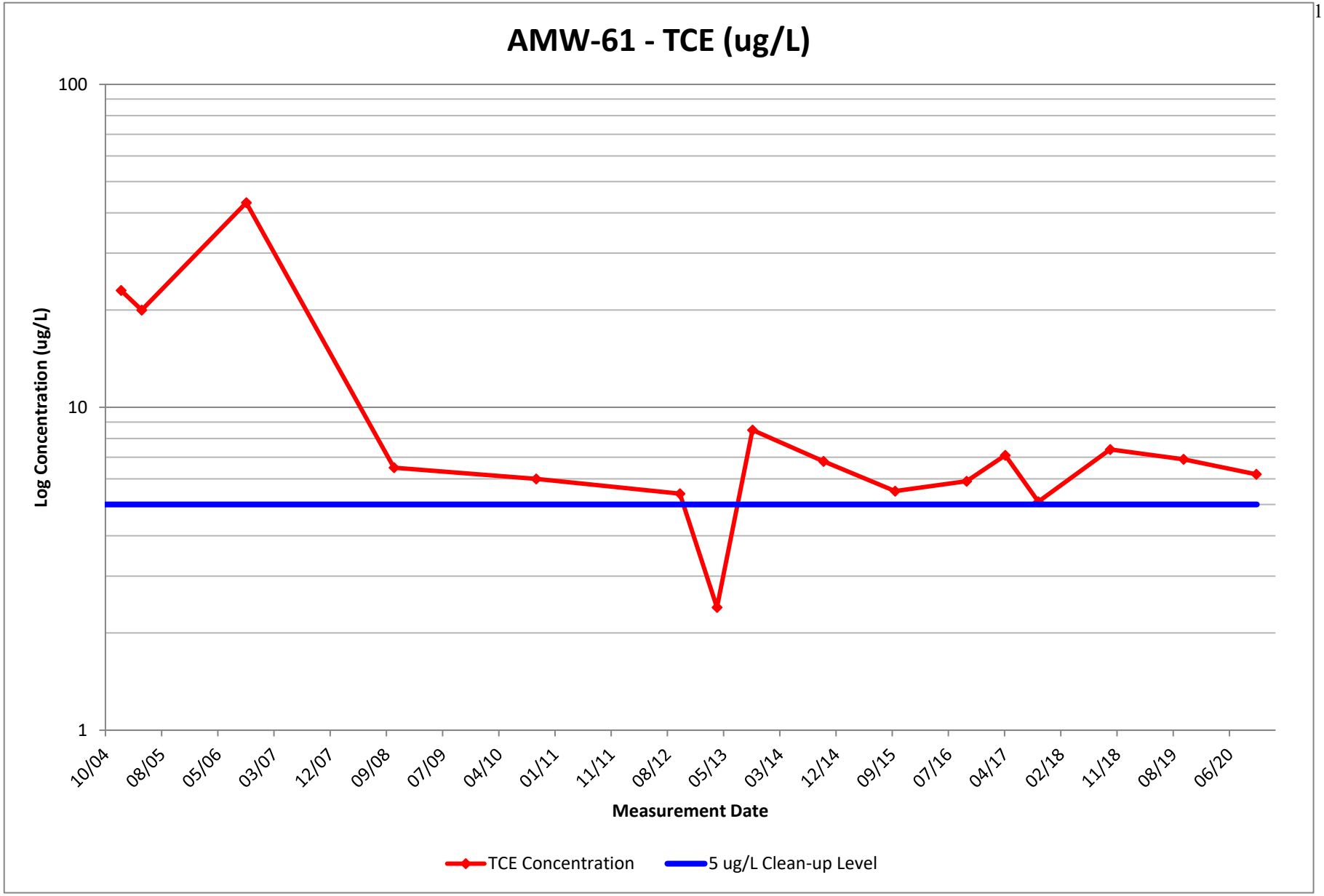

AMW-23 - TCE (ug/L)
Log Concentration (ug/L)
10
1
0.1
01/98
10/98
07/99
04/00
01/01
10/01
07/02
04/03
01/04
10/04
07/05
04/06
01/07
10/07
07/08
04/09
01/10
10/10
07/11
04/12
01/13
10/13
07/14
05/15
01/16
11/16
08/17
05/18
02/19
11/19
08/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

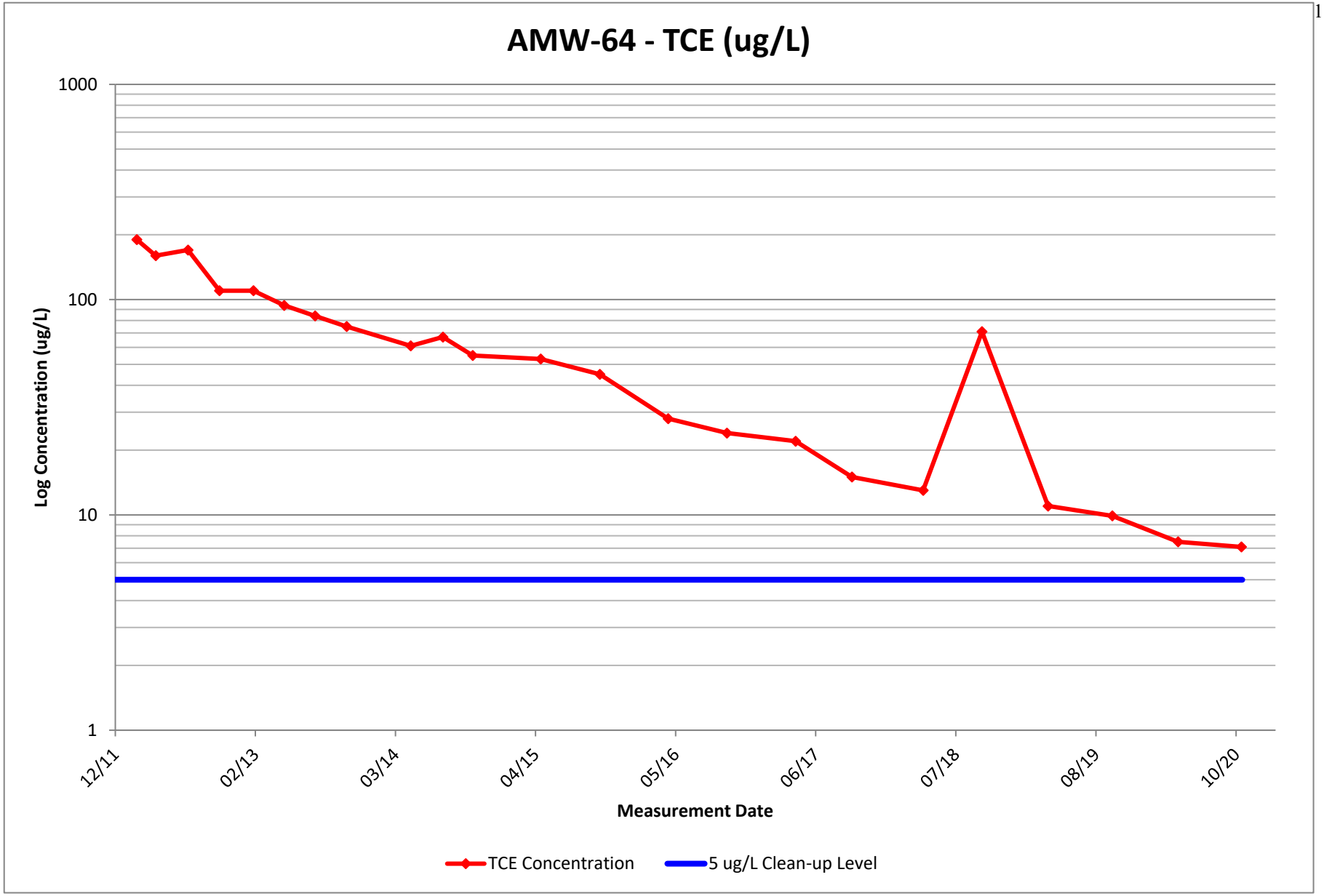

AMW-24 - TCE (ug/L)
100
10
1
Log Concentration (ug/L)
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

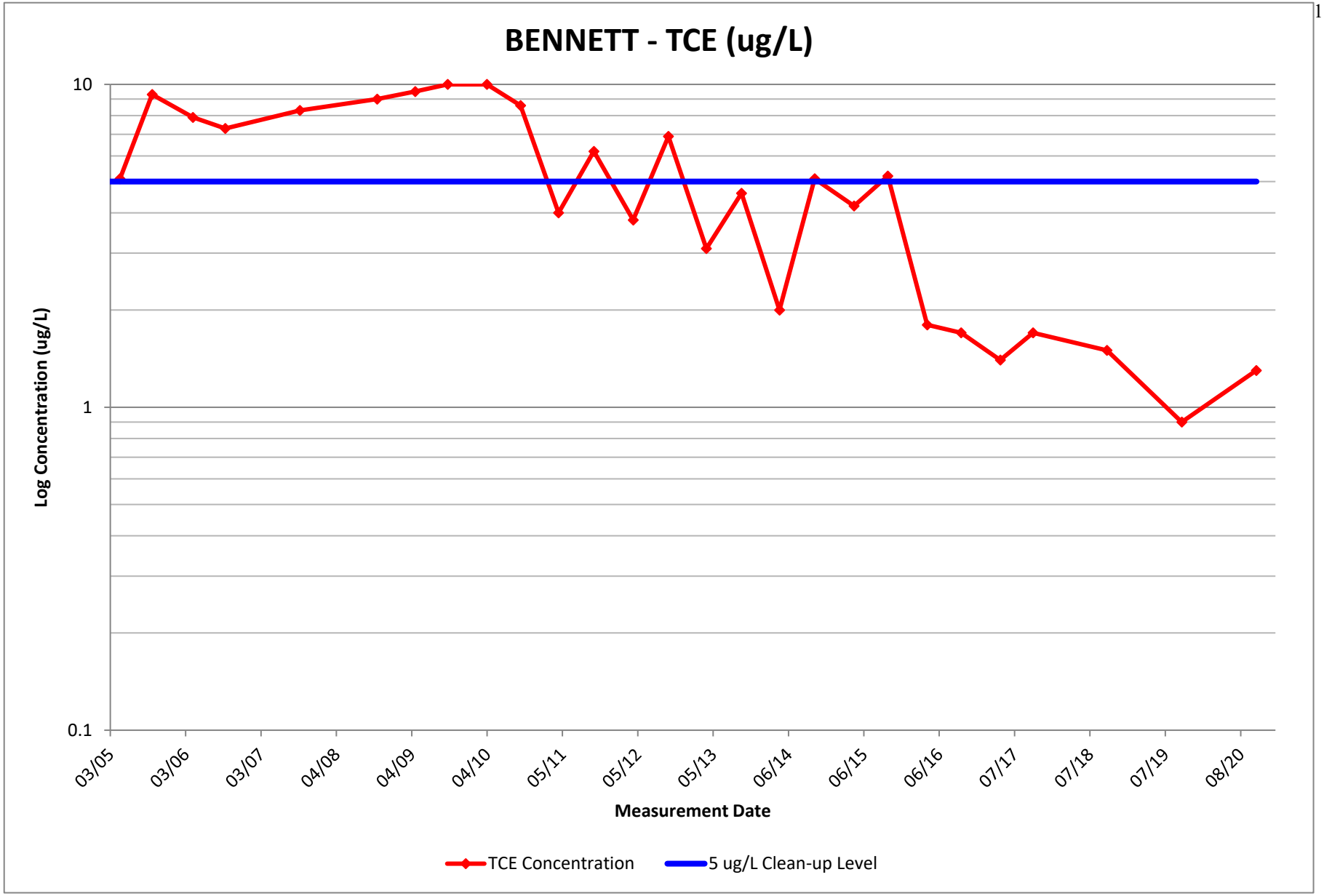

AMW-53A - TCE (ug/L)
Log Concentration (ug/L)
1000
100
10
1
0.1
06/03
07/04
07/05
07/06
08/07
08/08
08/09
09/10
09/11
09/12
10/13
10/14
10/15
11/16
11/17
11/18
12/19
12/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

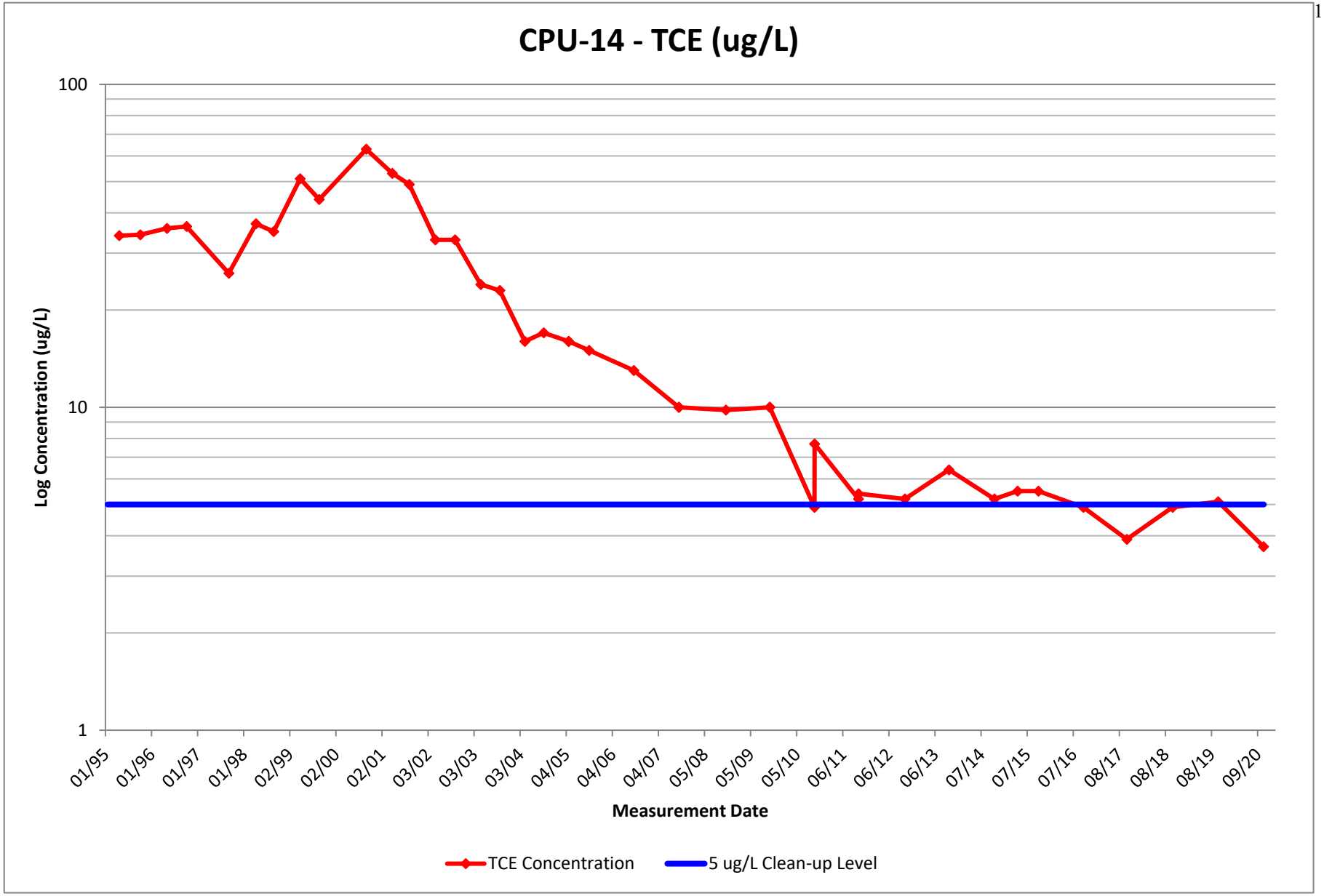

AMW-59 - TCE (ug/L)
Log Concentration (ug/L)
1000
100
10
1
11/04
05/05
10/05
04/06
10/06
04/07
09/07
03/08
09/08
03/09
08/09
02/10
08/10
02/11
07/11
01/12
07/12
01/13
06/13
12/13
06/14
12/14
05/15
11/15
05/16
11/16
04/17
10/17
04/18
10/18
03/19
09/19
03/20
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

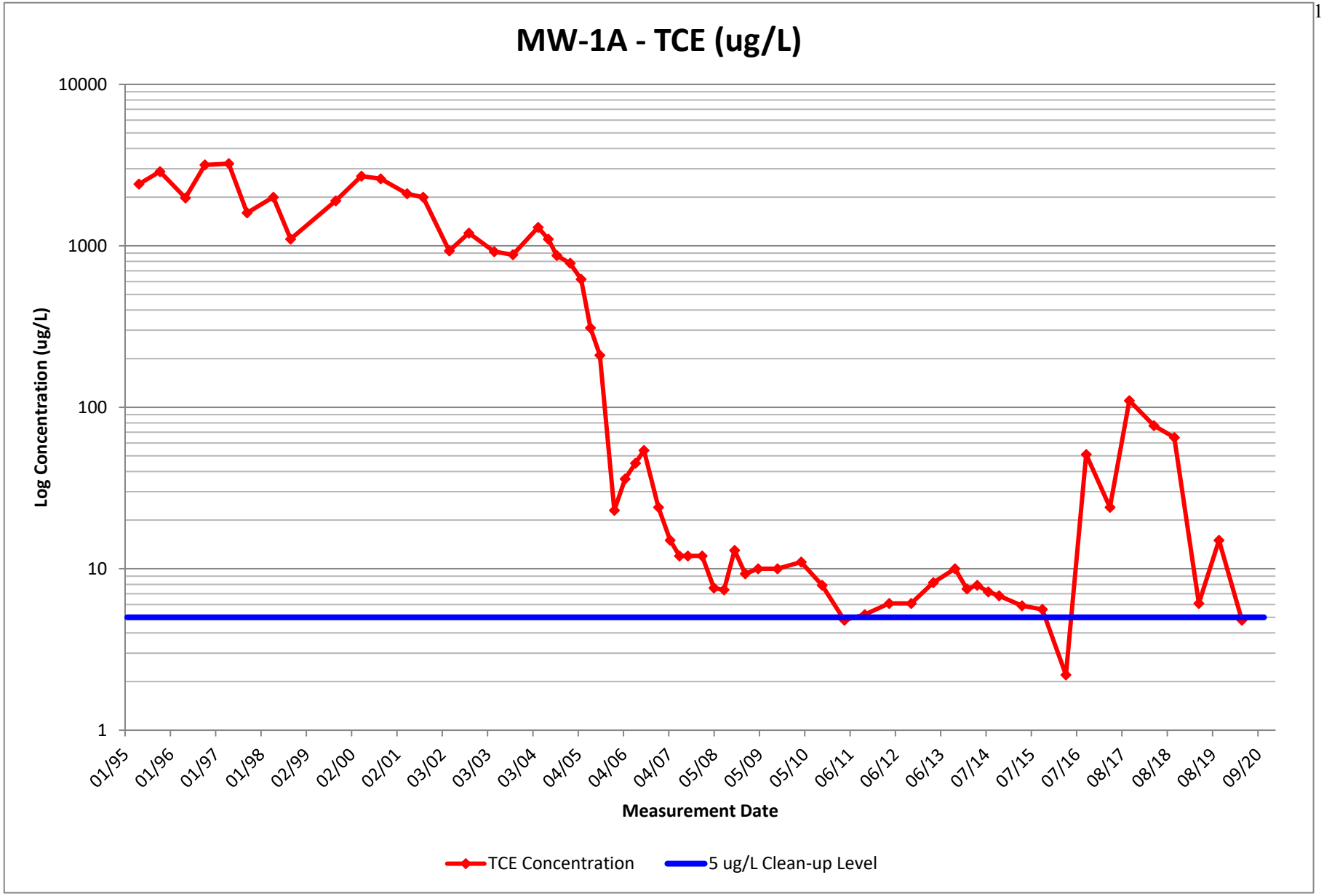

AMW-60 - TCE (ug/L)
10
1
0.1
Log Concentration (ug/L)
08/04
07/05
06/06
06/07
05/08
04/09
04/10
03/11
02/12
01/13
01/14
12/14
12/15
11/16
10/17
10/18
09/19
08/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

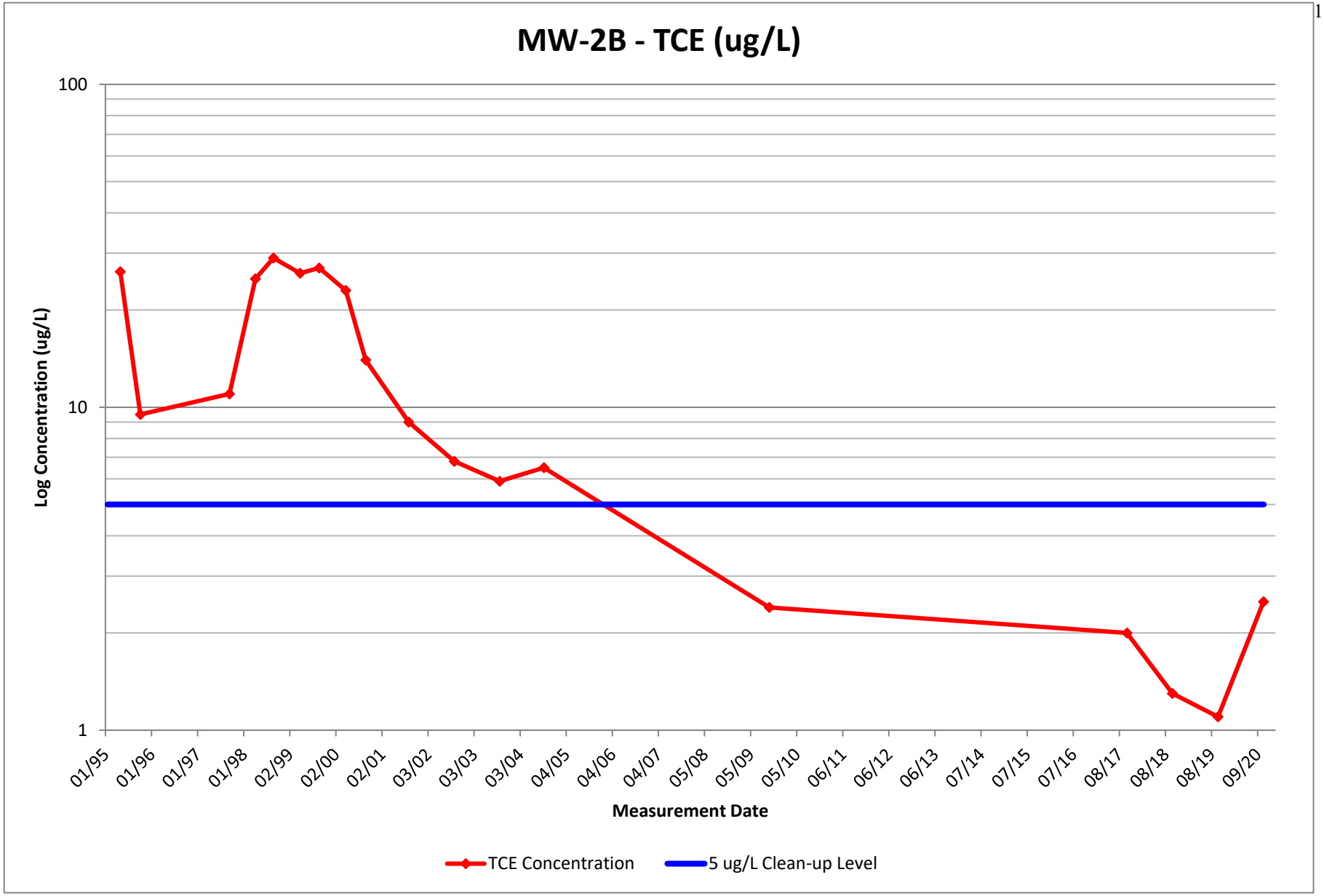

AMW-61 - TCE (ug/L)
100
10
1
Log Concentration (ug/L)
10/04
08/05
05/06
03/07
12/07
09/08
07/09
04/10
01/11
11/11
08/12
05/13
03/14
12/14
09/15
07/16
04/17
02/18
11/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

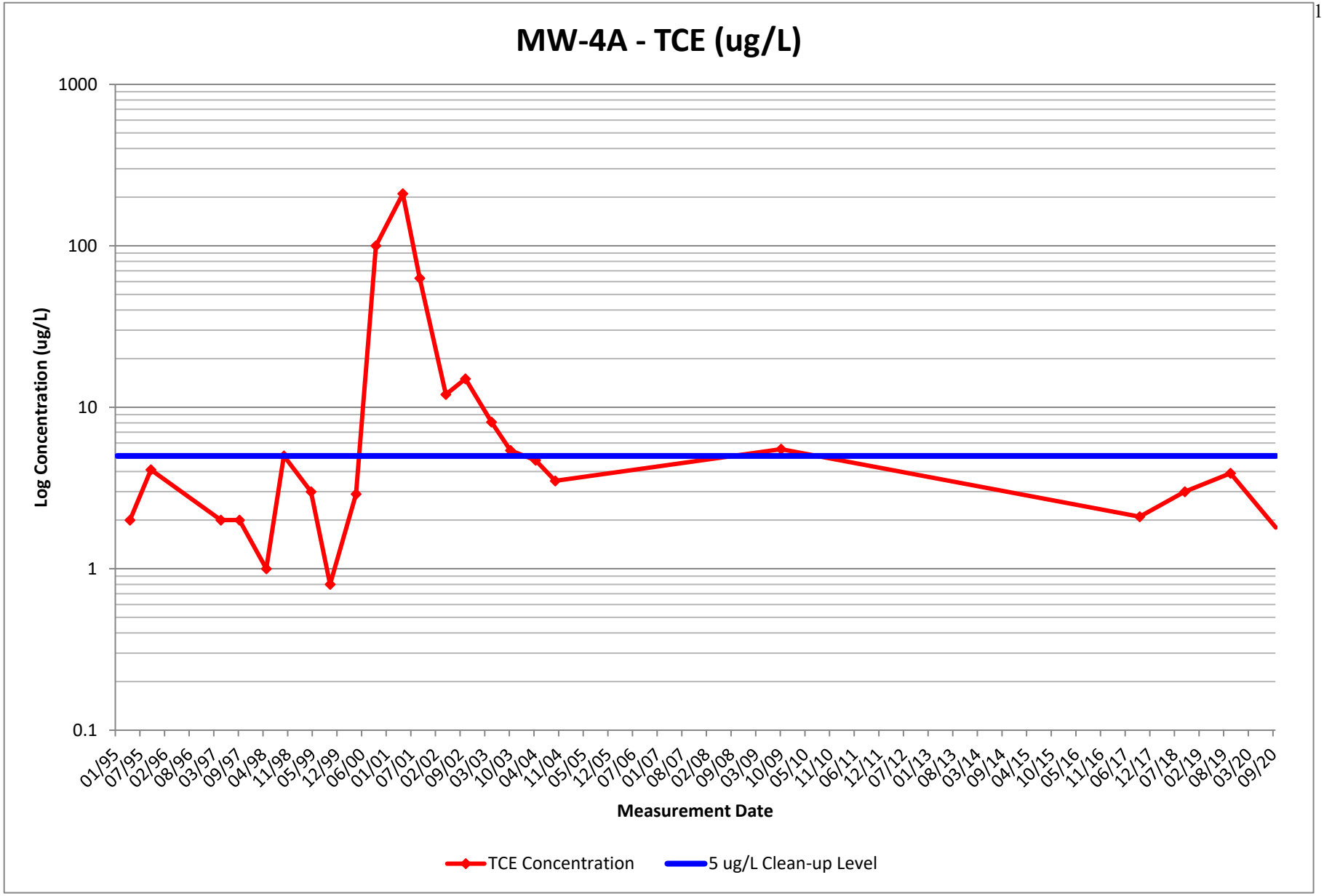

AMW-64 - TCE (ug/L)
1000
100
10
1
Log Concentration (ug/L)
12/11
02/13
03/14
04/15
05/16
06/17
07/18
08/19
10/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

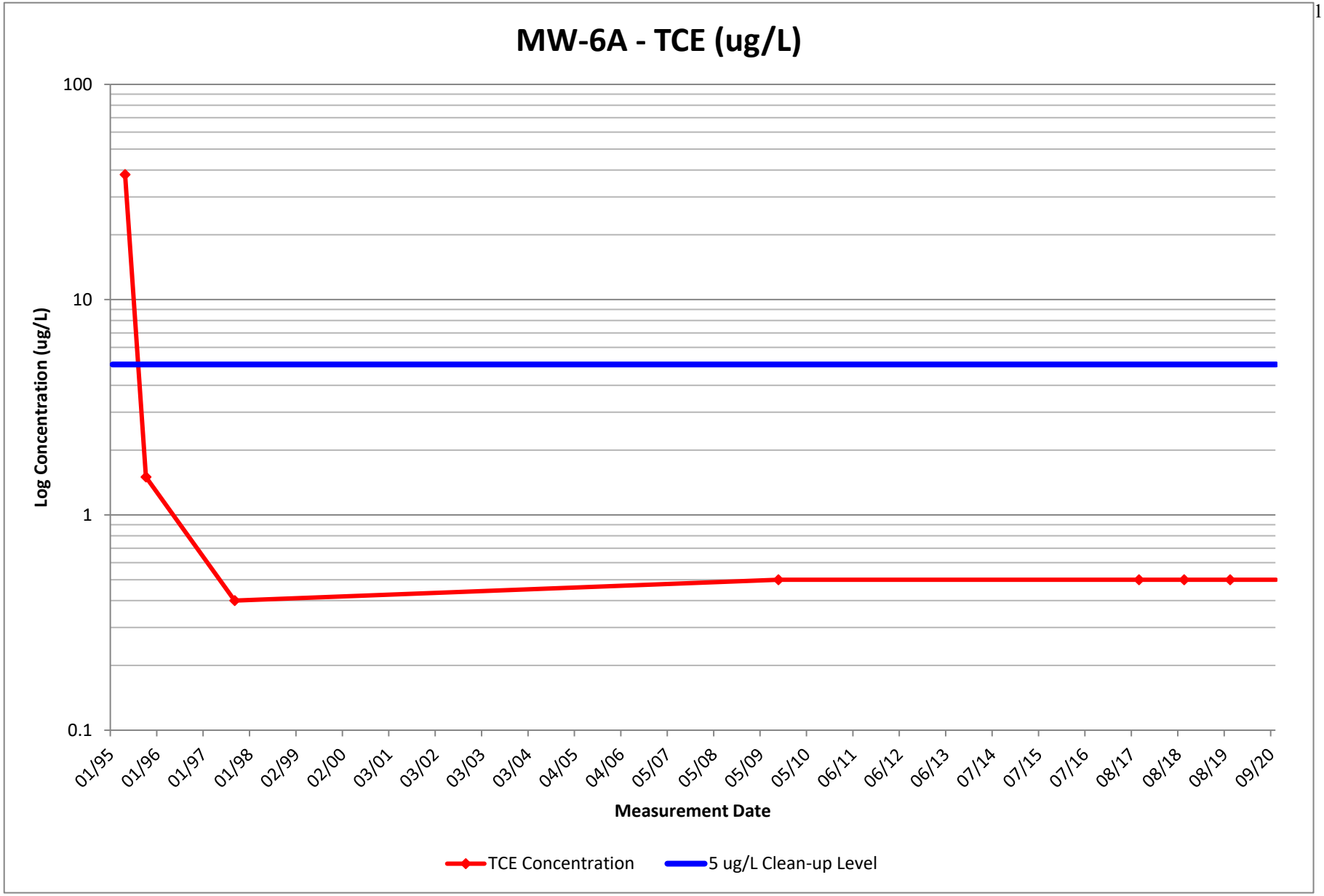

BENNETT - TCE (ug/L)
10
1
0.1
Log Concentration (ug/L)
03/05
03/06
03/07
04/08
04/09
04/10
05/11
05/12
05/13
06/14
06/15
06/16
07/17
07/18
07/19
08/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

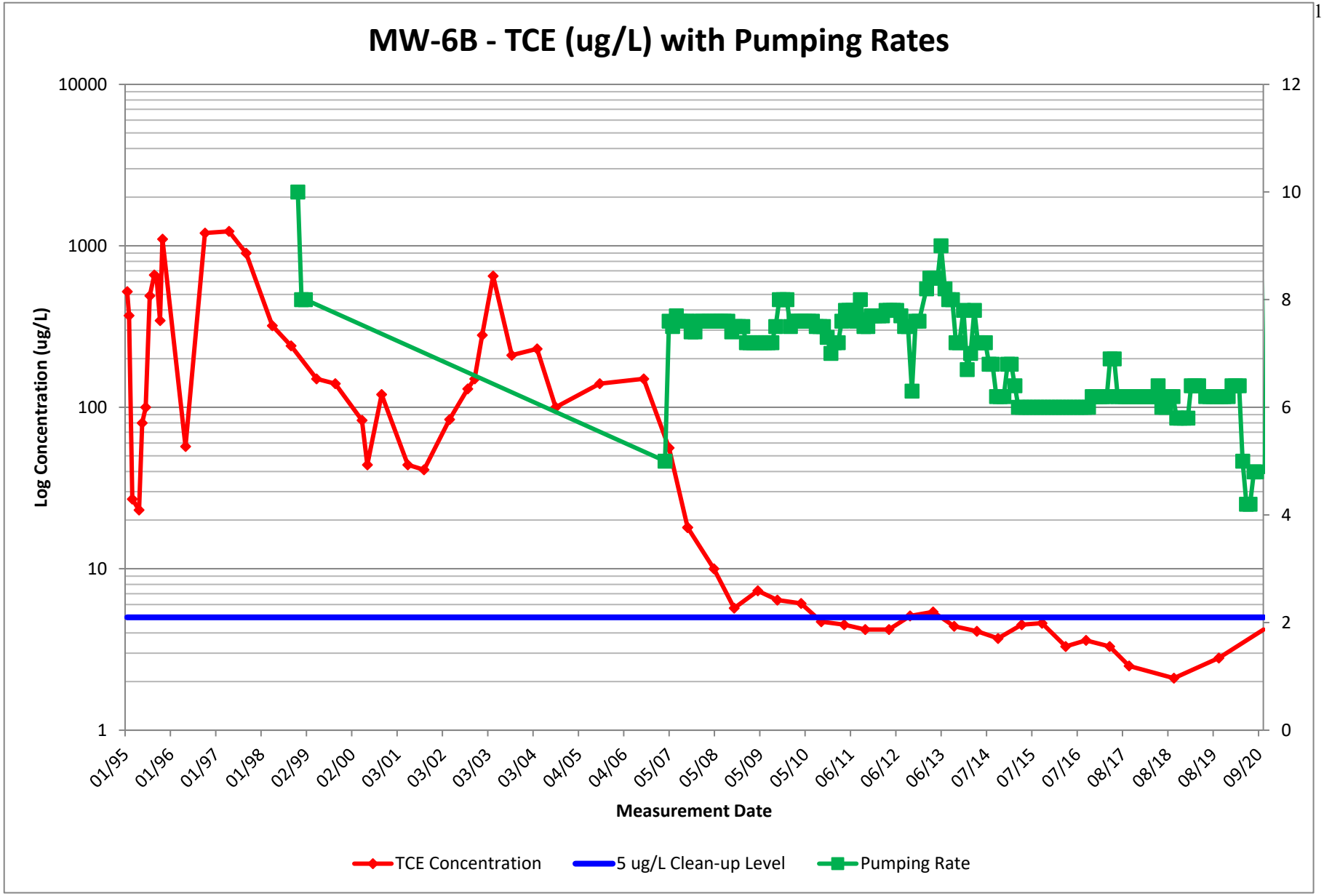

CPU-14 - TCE (ug/L)
100
10
1
Log Concentration (ug/L)
01/95
01/96
01/97
01/98
02/99
02/00
02/01
03/02
03/03
03/04
04/05
04/06
04/07
05/08
05/09
05/10
06/11
06/12
06/13
07/14
07/15
07/16
08/17
08/18
08/19
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

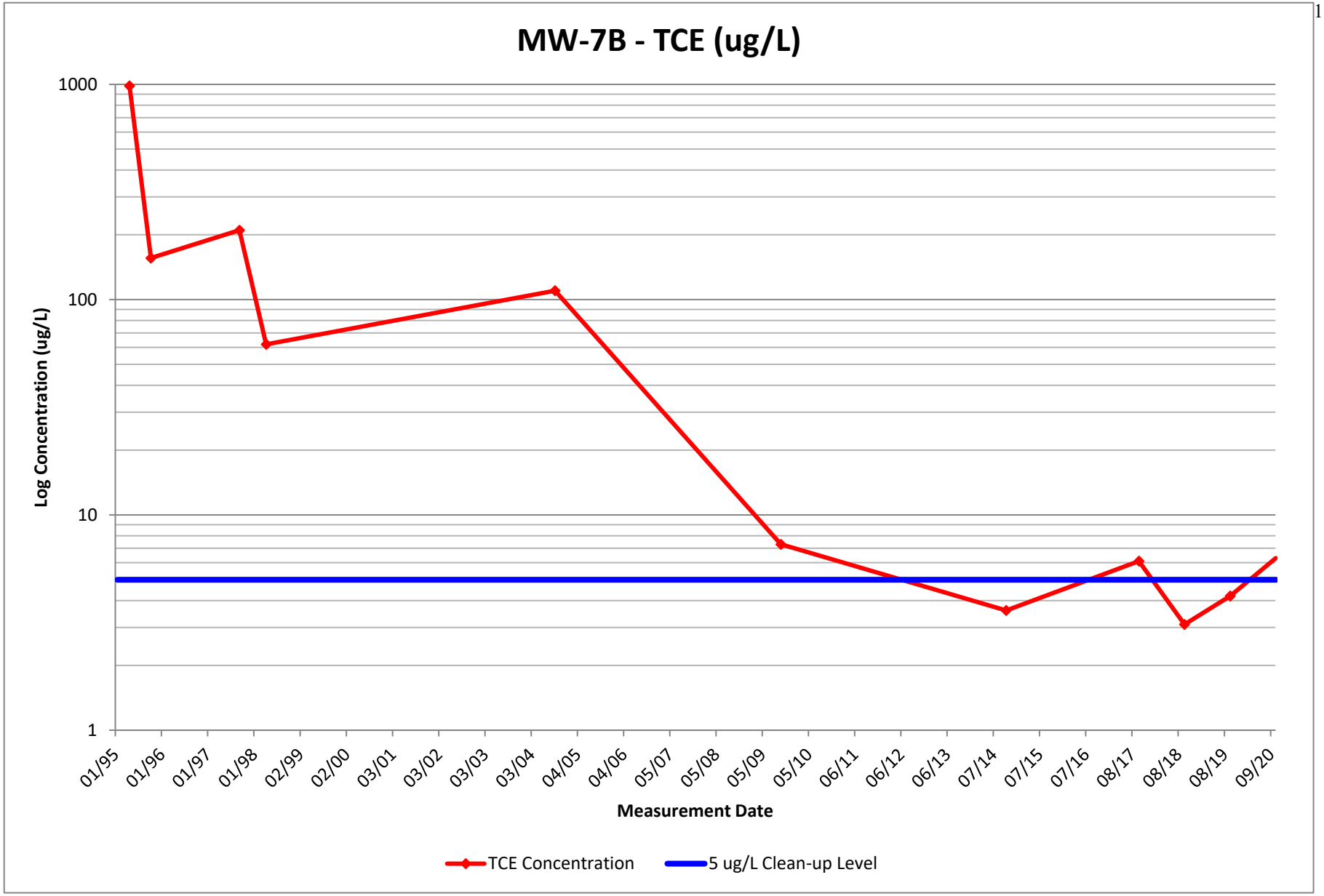

MW-1A - TCE (ug/L)
Log Concentration (ug/L)
10000
1000
100
10
1
01/95
01/96
01/97
01/98
02/99
02/00
02/01
03/02
03/03
03/04
04/05
04/06
04/07
05/08
05/09
05/10
06/11
06/12
06/13
07/14
07/15
07/16
08/17
08/18
08/19
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

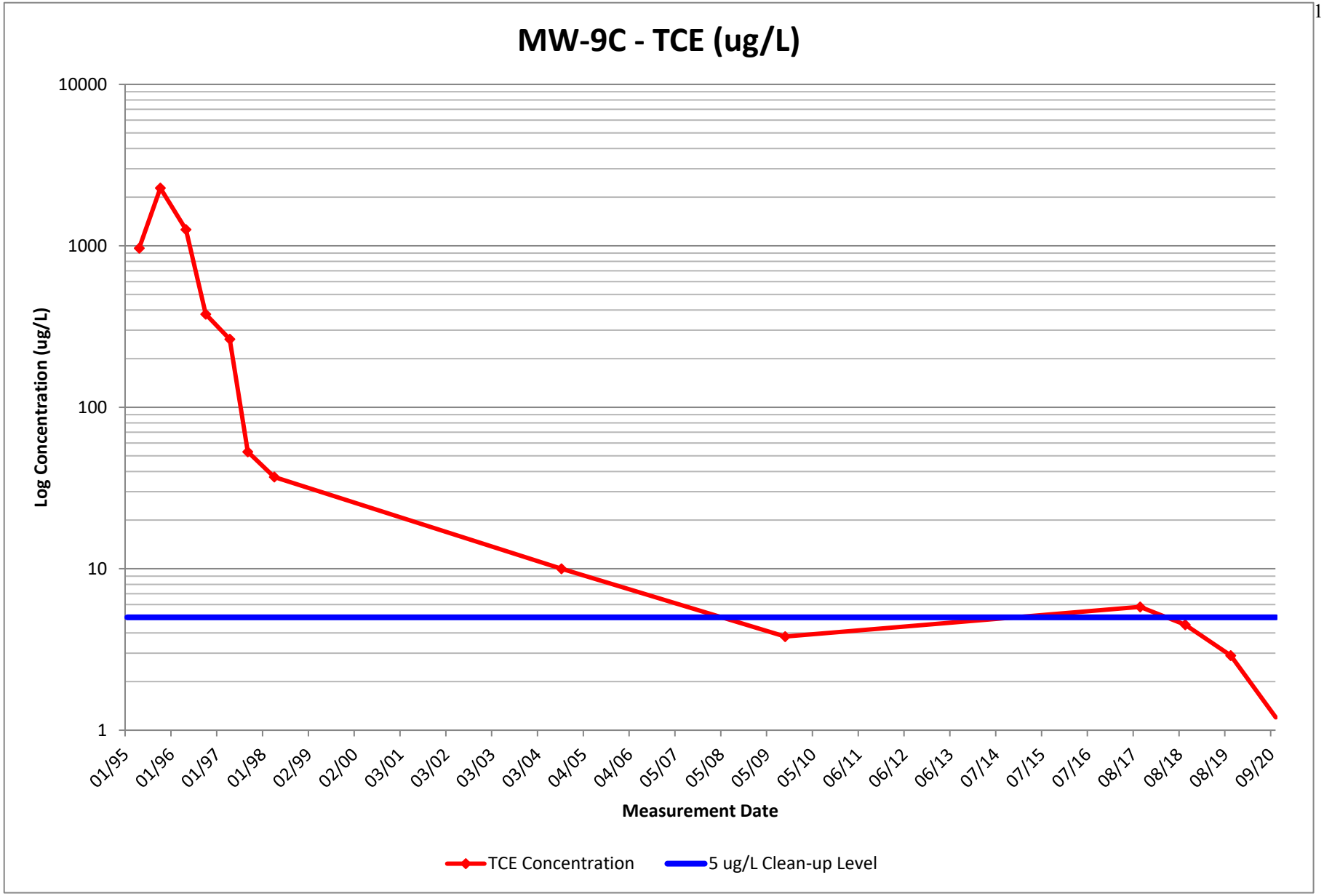

MW-2B - TCE (ug/L)
100
10
1
Log Concentration (ug/L)
01/95
01/96
01/97
01/98
02/99
02/00
02/01
03/02
03/03
03/04
04/05
04/06
04/07
05/08
05/09
05/10
06/11
06/12
06/13
07/14
07/15
07/16
08/17
08/18
08/19
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

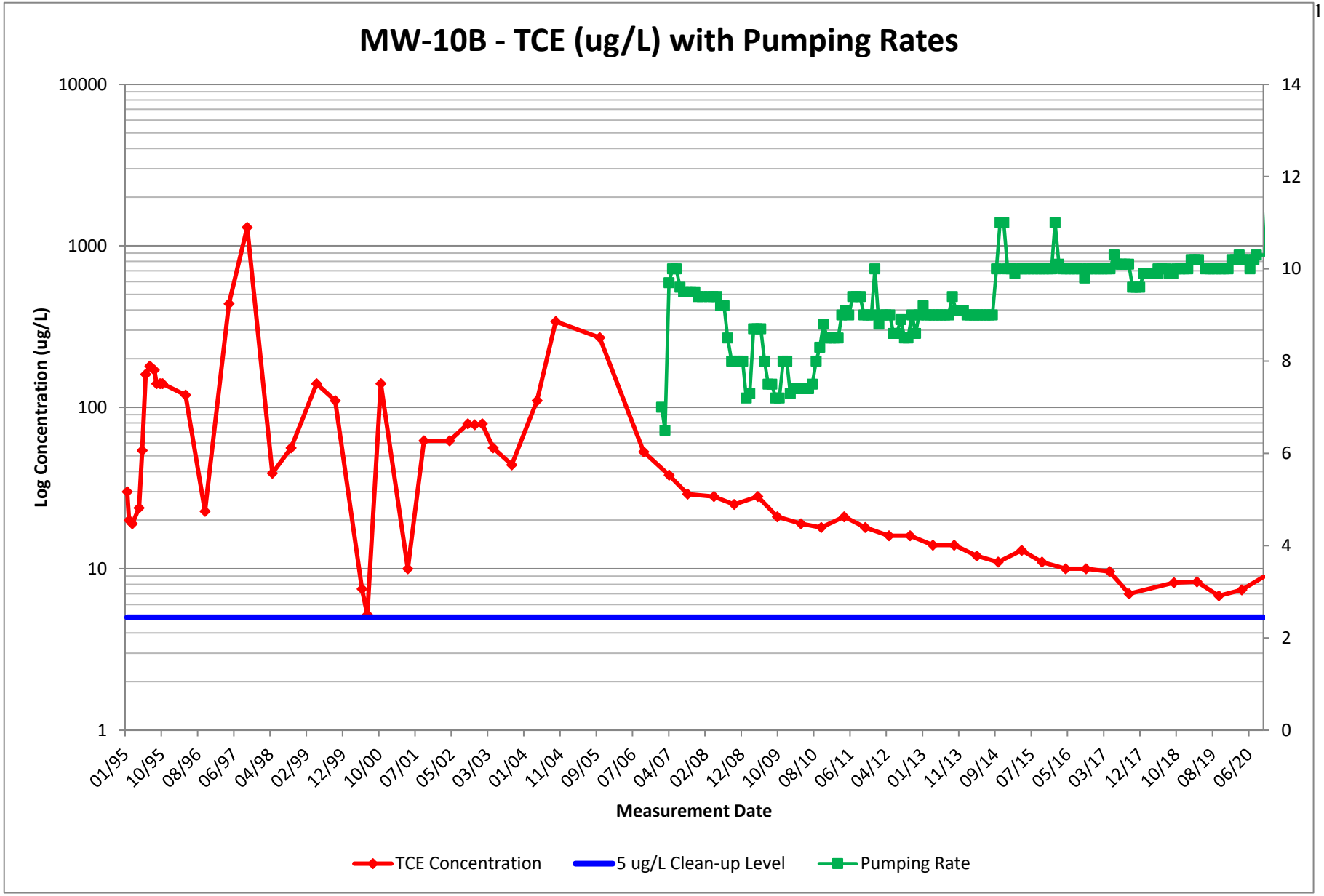

MW-4A - TCE (ug/L)
Log Concentration (ug/L)
1000
100
10
1
0.1
01/95
07/95
02/96
08/96
03/97
09/97
04/98
11/98
05/99
12/99
06/00
01/01
07/01
02/02
09/02
03/03
10/03
04/04
11/04
05/05
12/05
07/06
01/07
08/07
02/08
09/08
03/09
10/09
05/10
11/10
06/11
12/11
07/12
01/13
08/13
03/14
09/14
04/15
10/15
05/16
11/16
06/17
12/17
07/18
02/19
08/19
03/20
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

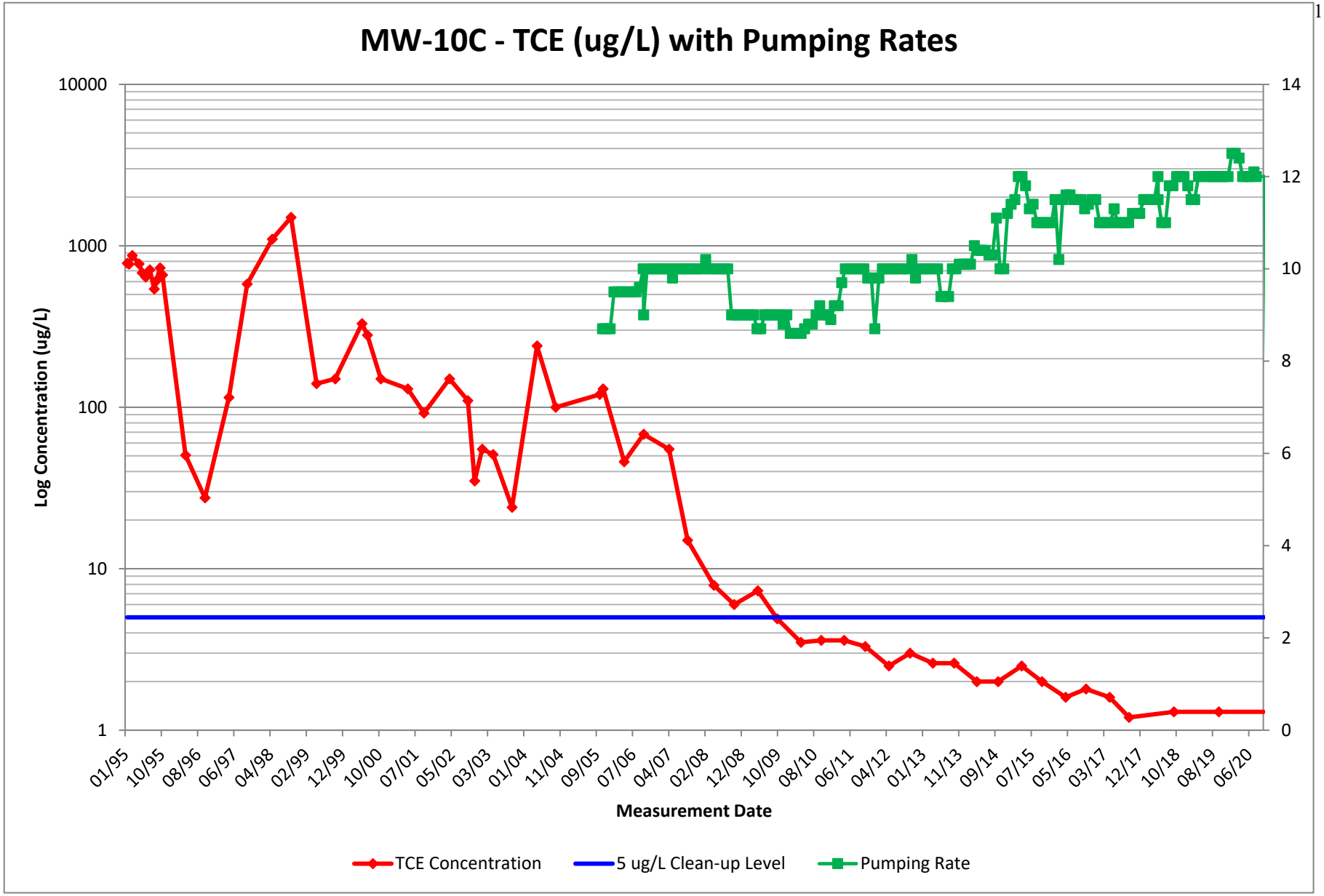

MW-6A - TCE (ug/L)
100
10
1
0.1
Log Concentration (ug/L)
01/95
01/96
01/97
01/98
02/99
02/00
03/01
03/02
03/03
03/04
04/05
04/06
05/07
05/08
05/09
05/10
06/11
06/12
06/13
07/14
07/15
07/16
08/17
08/18
08/19
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

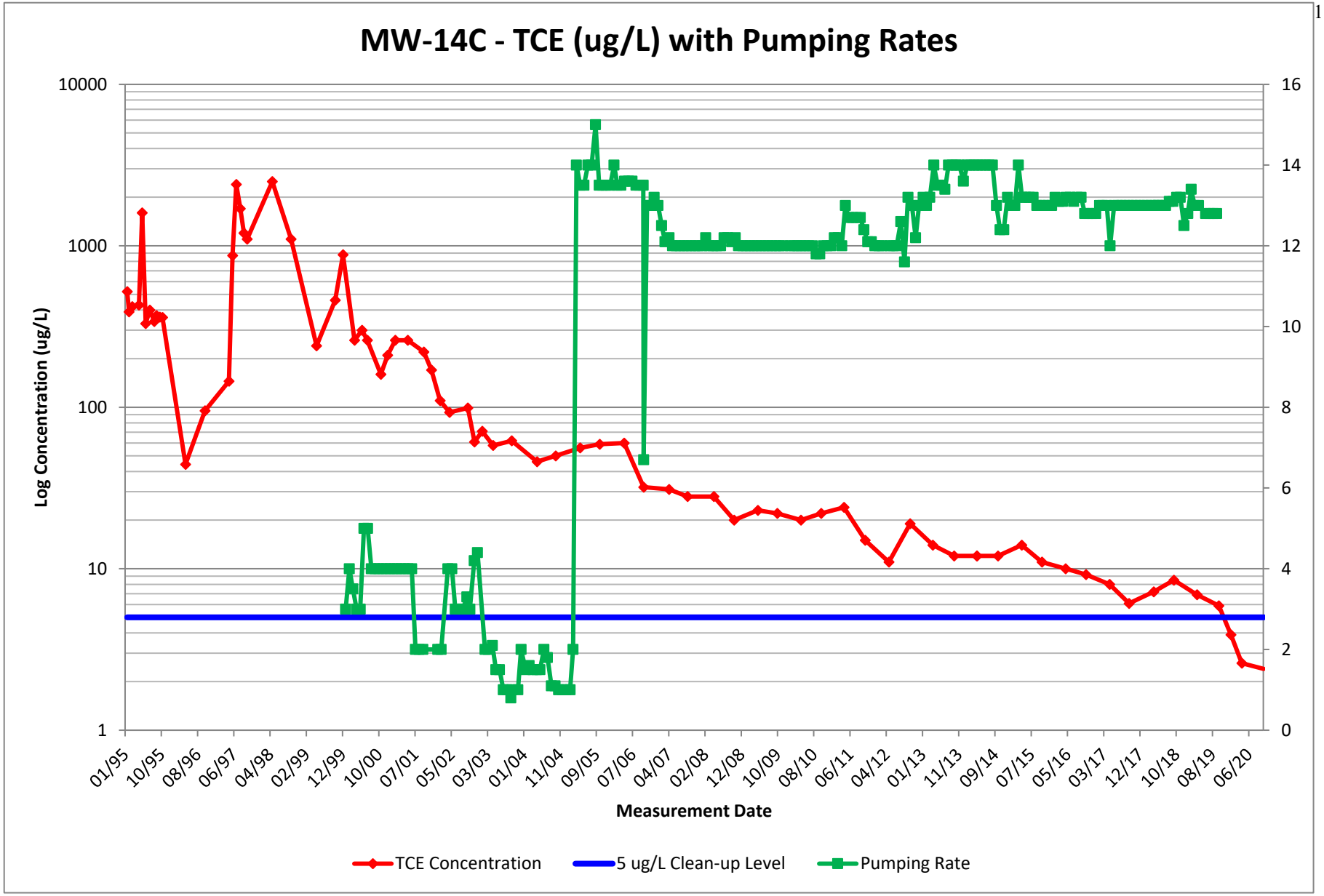

MW-6B - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
10000
1000
100
10
1
12
10
8
6
4
2
0
01/95
01/96
01/97
01/98
02/99
02/00
03/01
03/02
03/03
03/04
04/05
04/06
05/07
05/08
05/09
05/10
06/11
06/12
06/13
07/14
07/15
07/16
08/17
08/18
08/19
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate

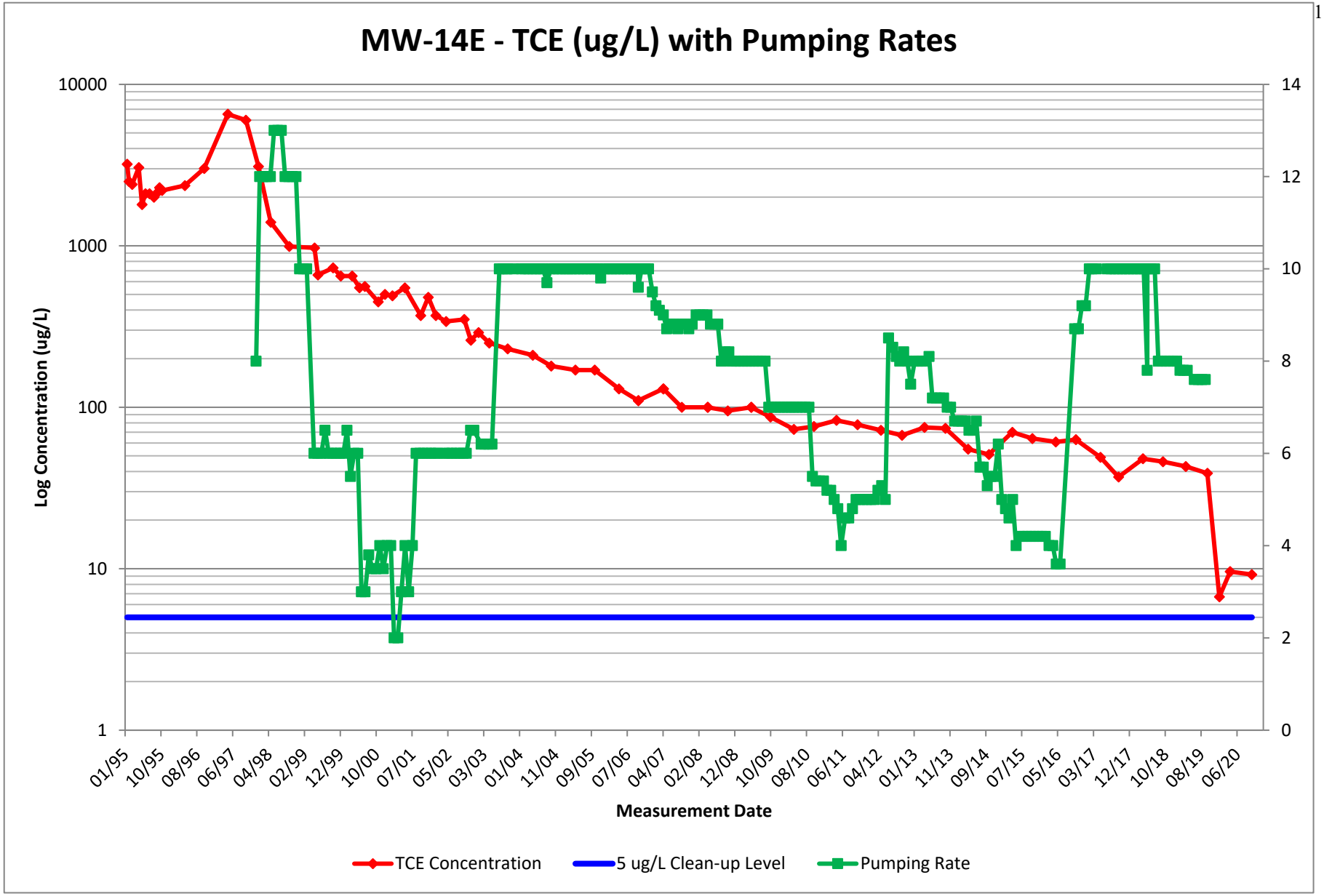

MW-7B - TCE (ug/L)
Log Concentration (ug/L)
1000
100
10
1
01/95
01/96
01/97
01/98
02/99
02/00
03/01
03/02
03/03
03/04
04/05
04/06
05/07
05/08
05/09
05/10
06/11
06/12
06/13
07/14
07/15
07/16
08/17
08/18
08/19
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

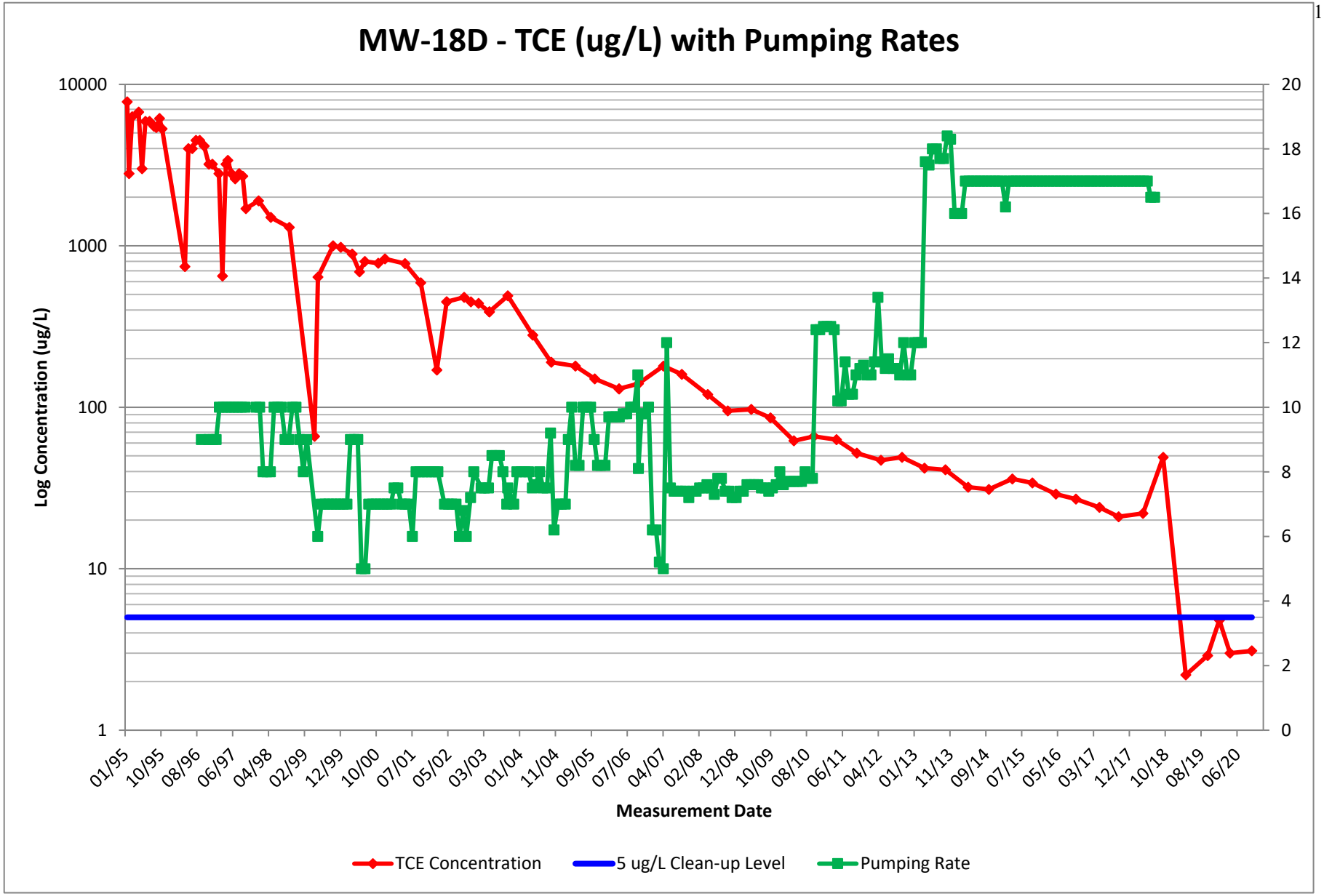

MW-9C - TCE (ug/L)
Log Concentration (ug/L)
10000
1000
100
10
1
01/95
01/96
01/97
01/98
02/99
02/00
03/01
03/02
03/03
03/04
04/05
04/06
05/07
05/08
05/09
05/10
06/11
06/12
06/13
07/14
07/15
07/16
08/17
08/18
08/19
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

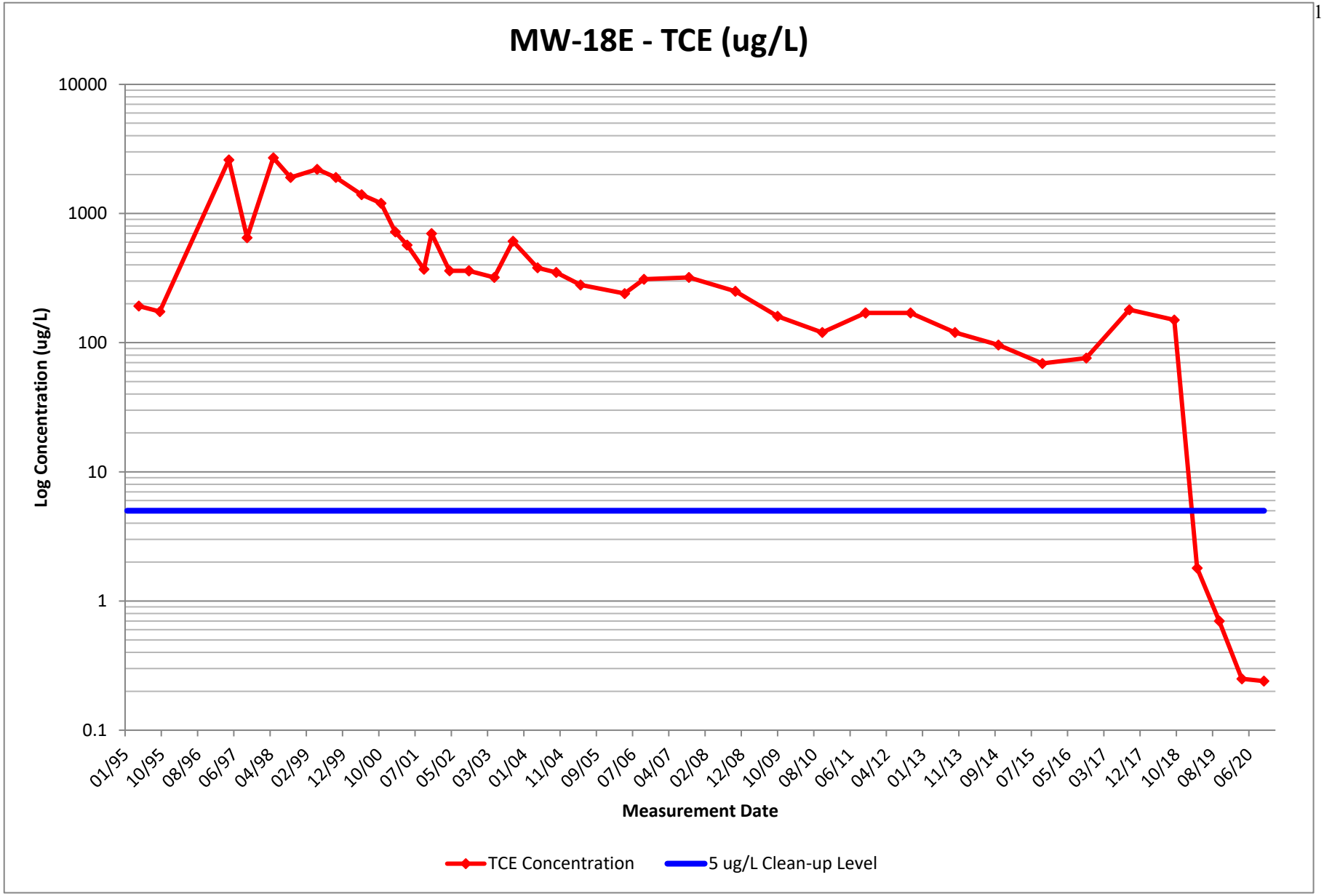

MW-10B - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
10000
1000
100
10
1
14
12
10
8
6
4
2
0
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate

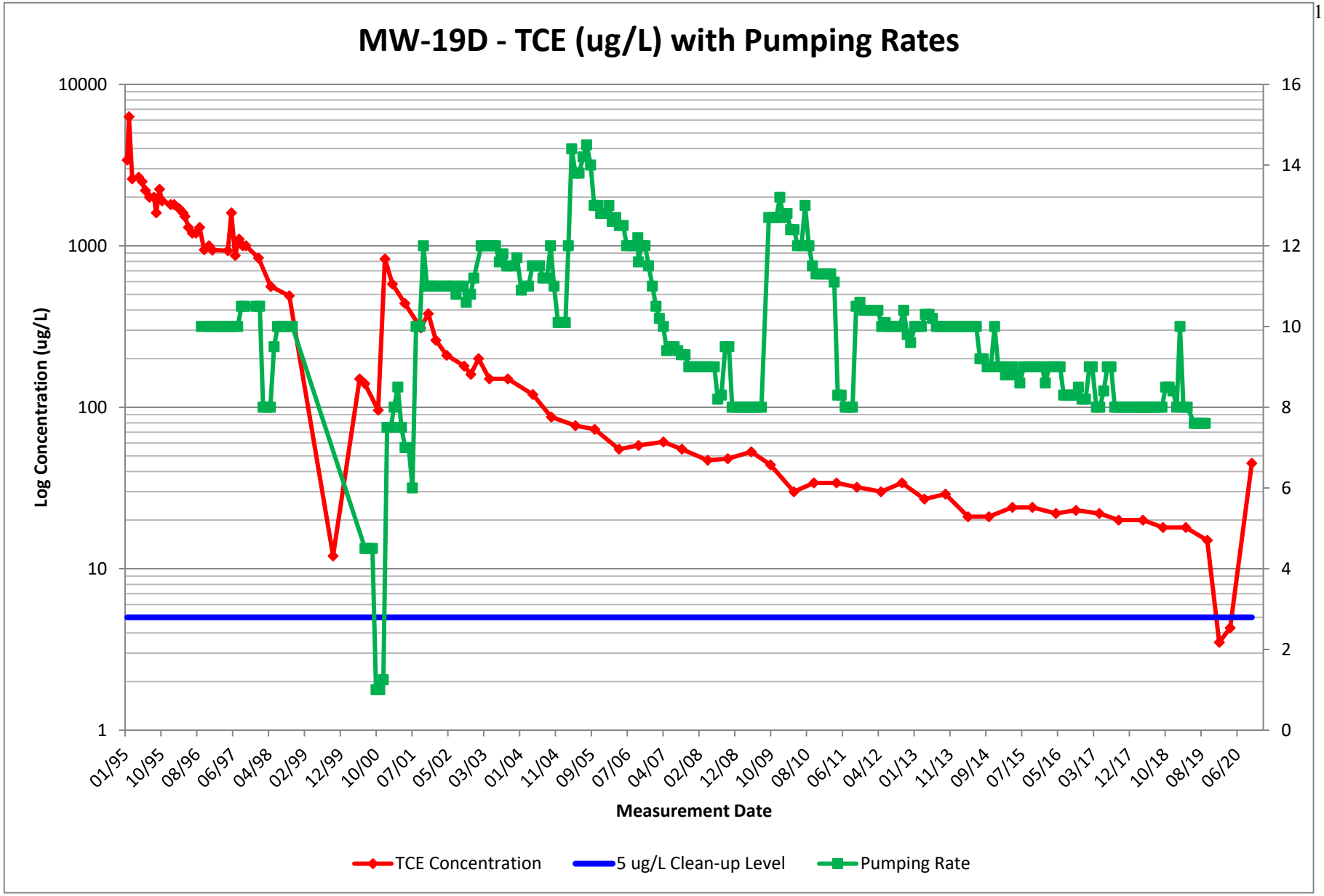

MW-10C - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
10000
1000
100
10
1
14
12
10
8
6
4
2
0
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate

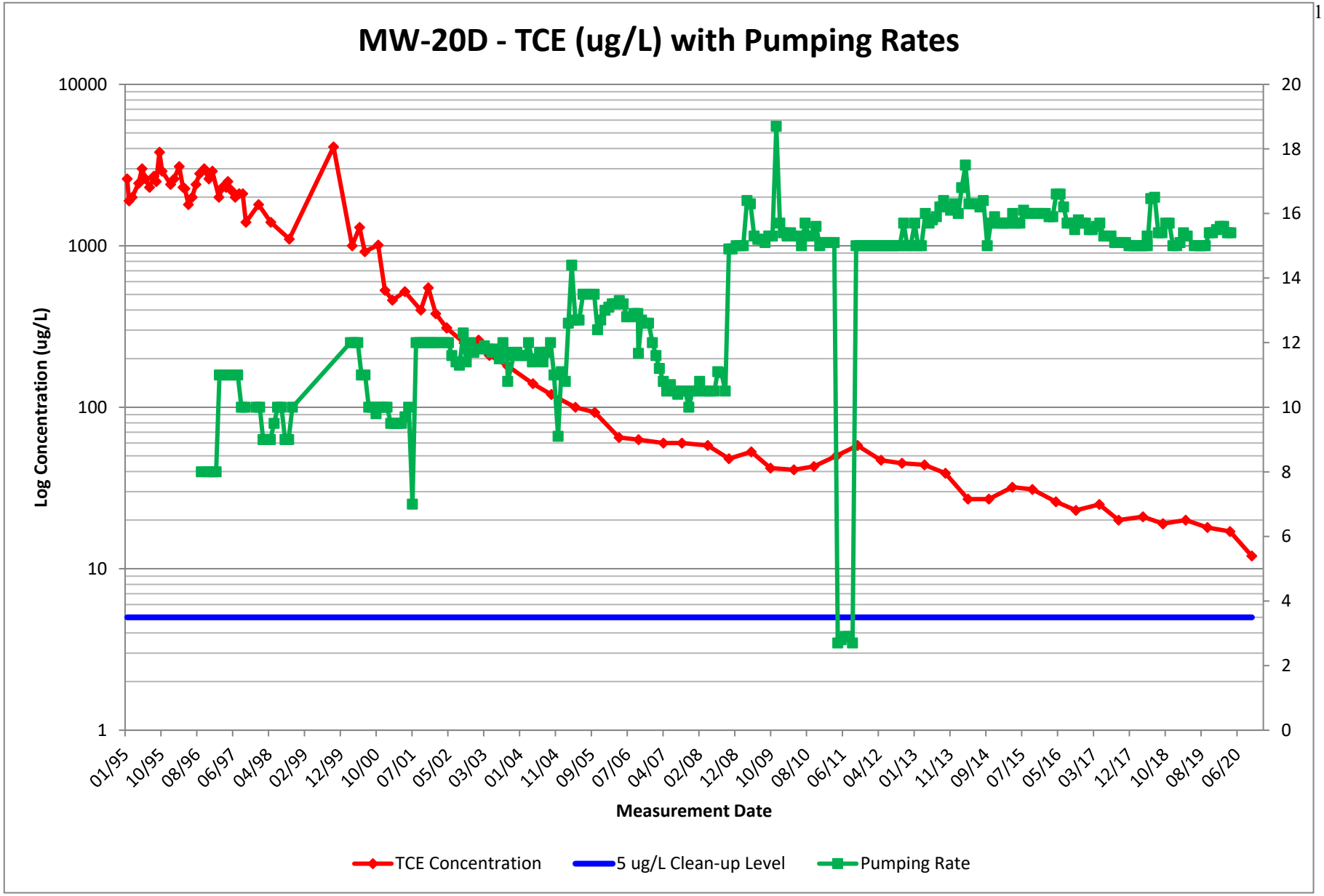

MW-14C - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
10000
1000
100
10
1
16
14
12
10
8
6
4
2
0
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate

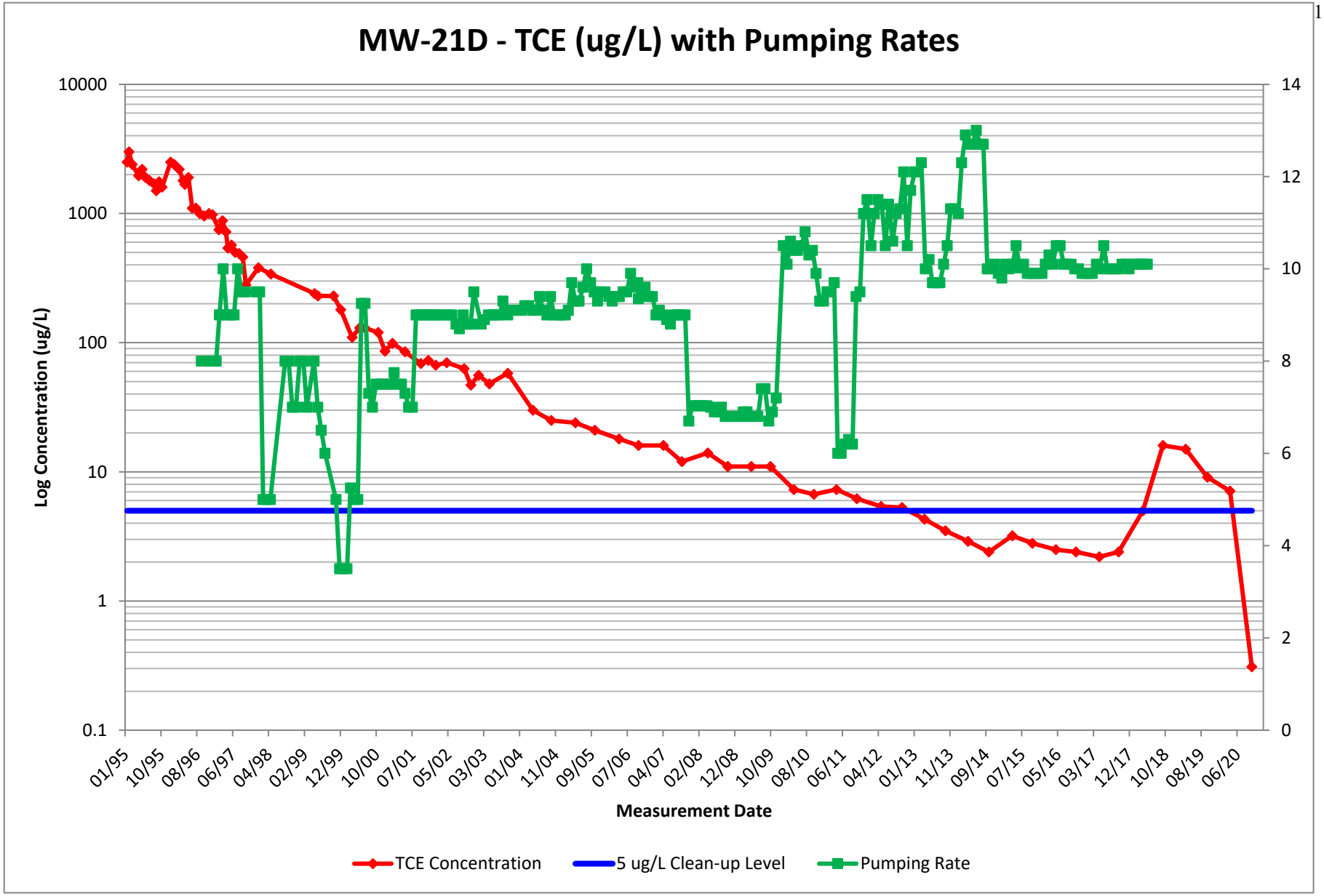

MW-14E - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
10000
1000
100
10
1
14
12
10
8
6
4
2
0
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate

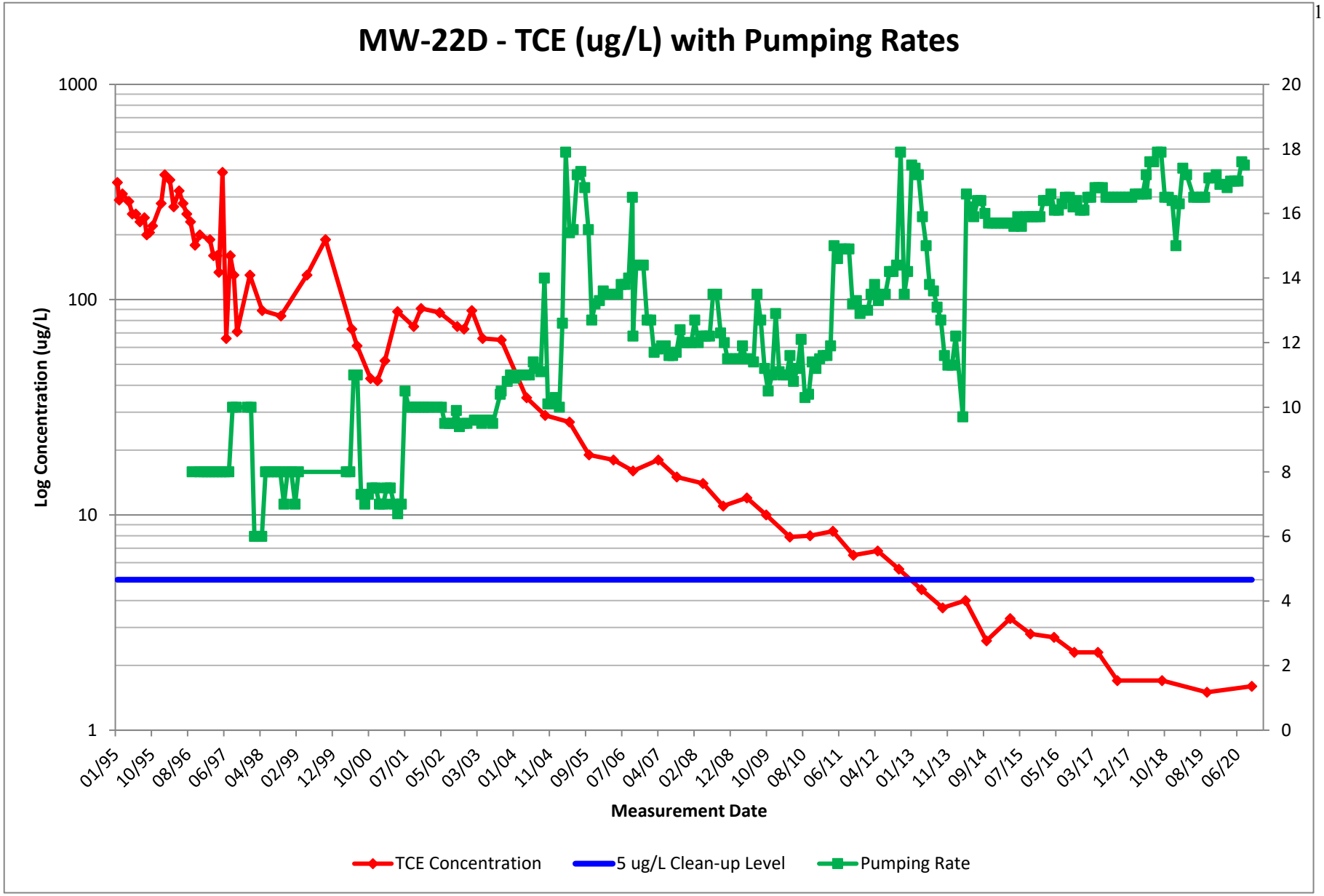

MW-18D - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
10000
1000
100
10
1
20
18
16
14
12
10
8
6
4
2
0
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate

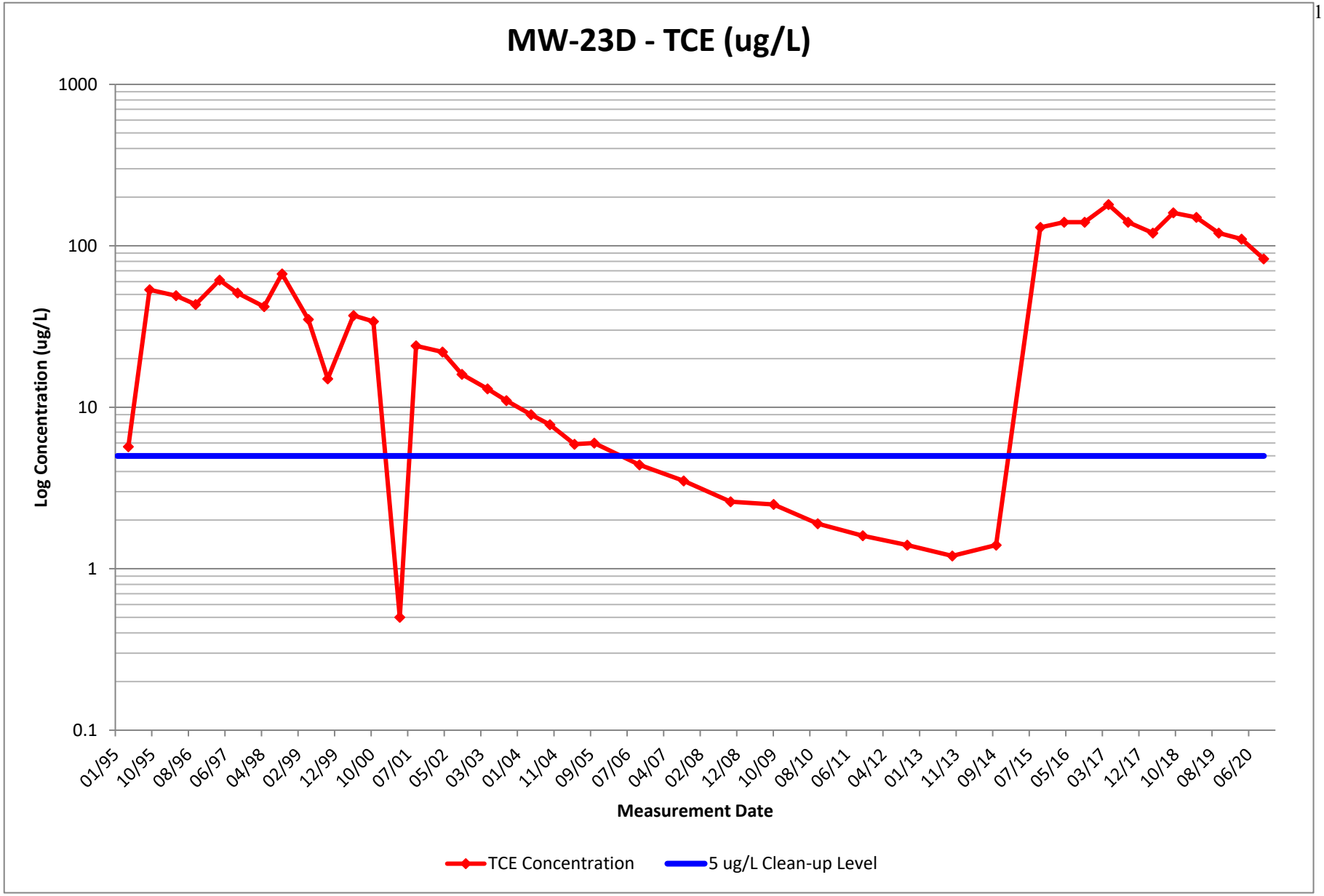

MW-18E - TCE (ug/L)
Log Concentration (ug/L)
10000
1000
100
10
1
0.1
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

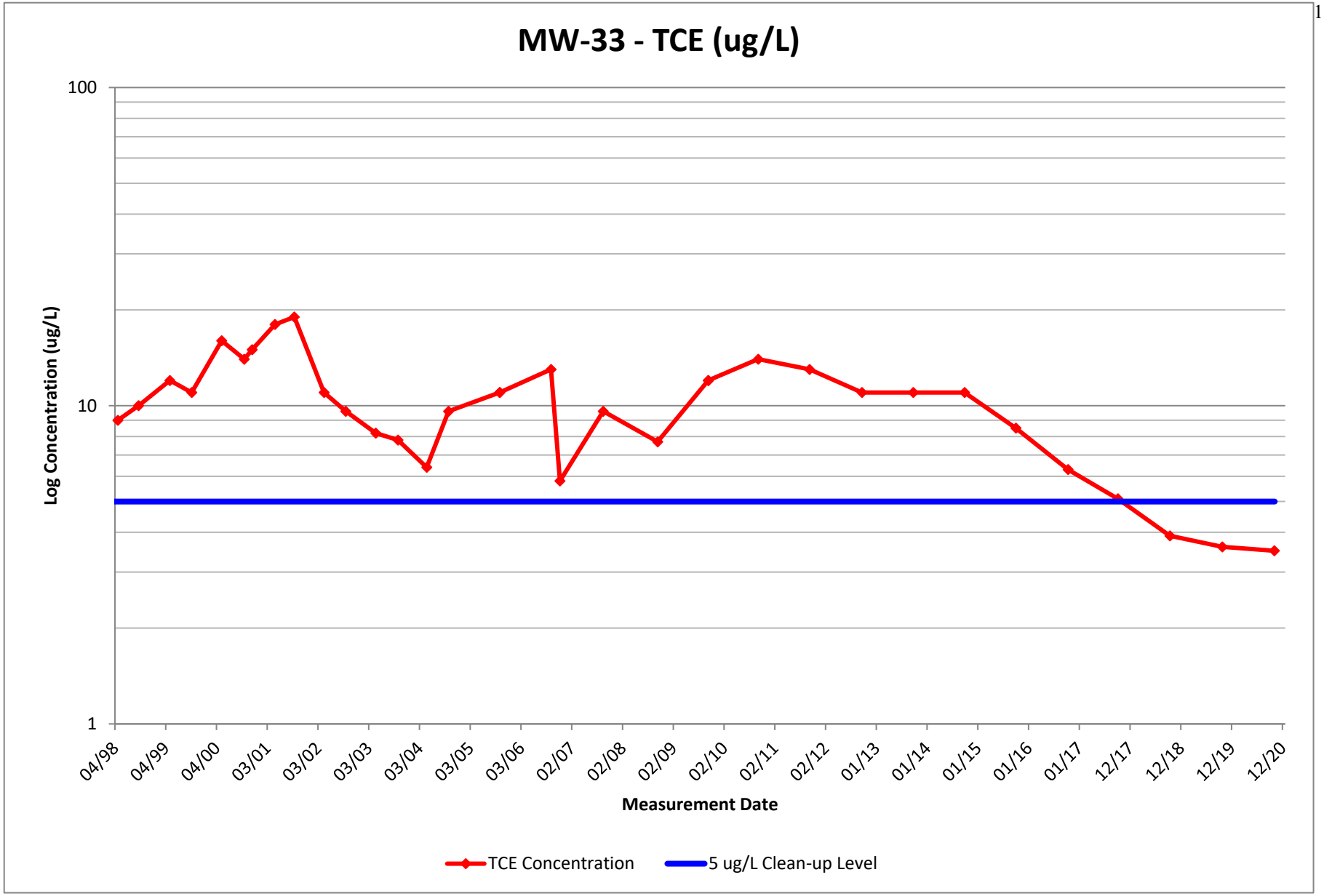

MW-19D - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
10000
1000
100
10
1
16
14
12
10
8
6
4
2
0
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate

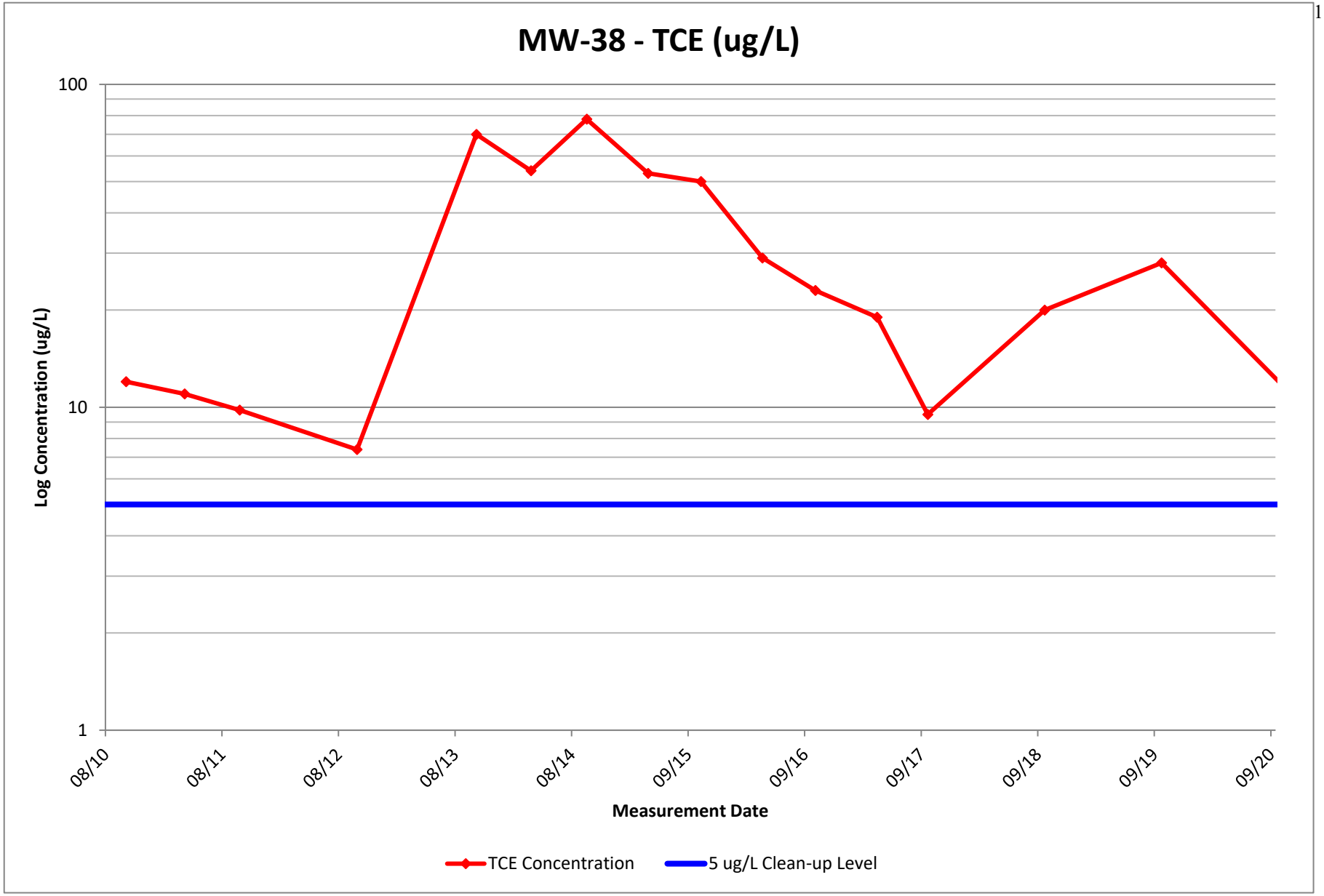

MW-20D - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
10000
1000
100
10
1
20
18
16
14
12
10
8
6
4
2
0
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate

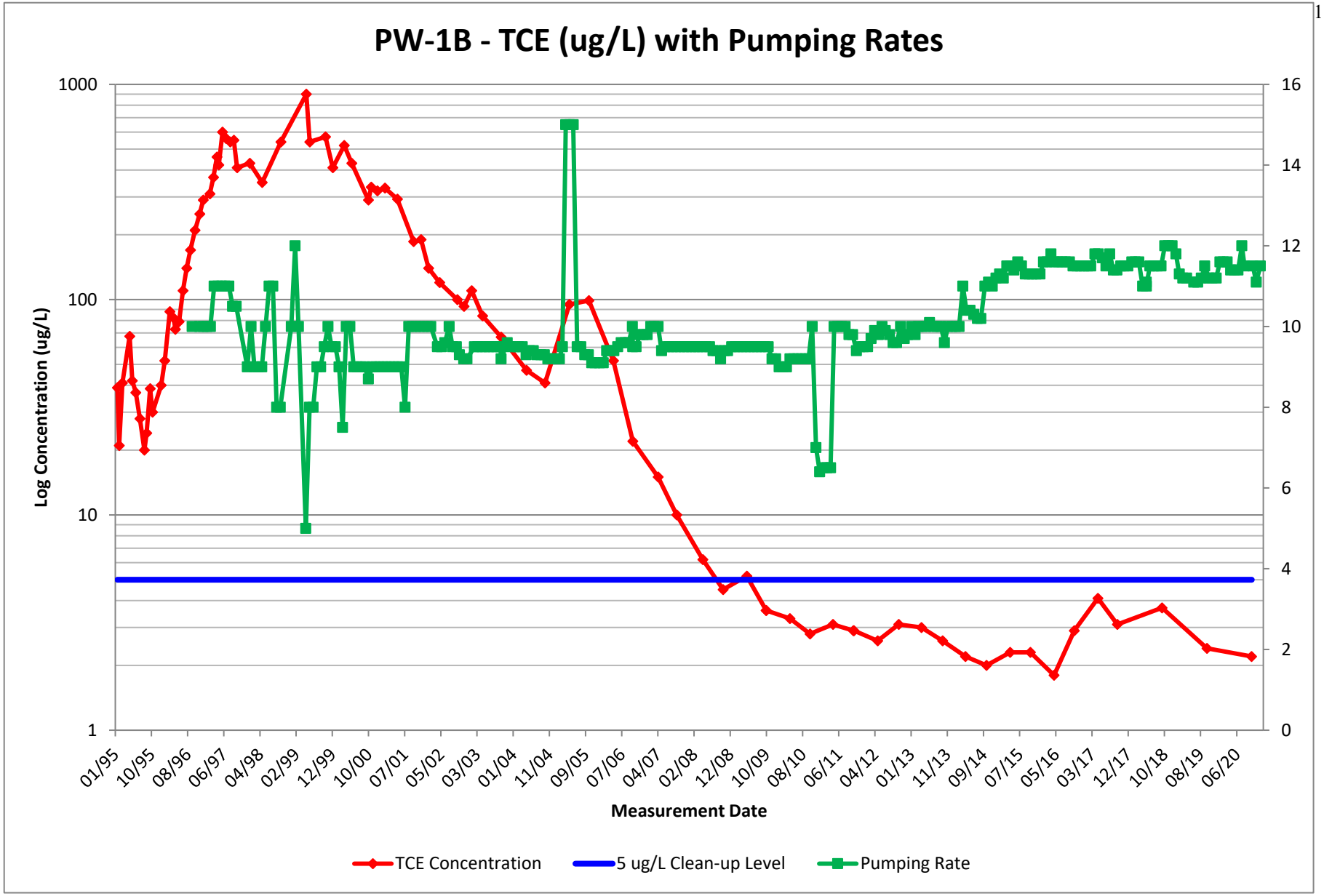

MW-21D - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
10000
1000
100
10
1
0.1
14
12
10
8
6
4
2
0
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate

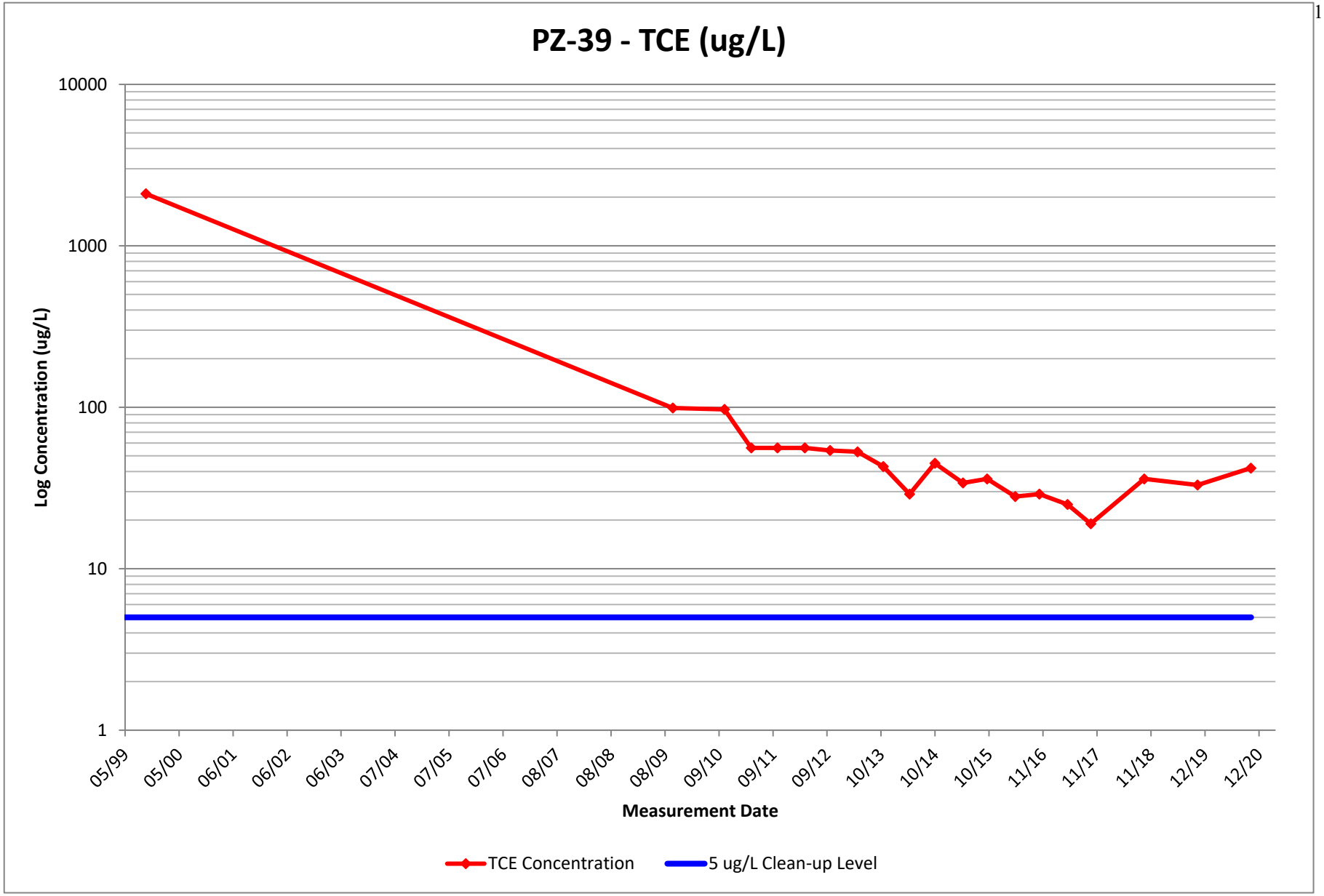

MW-22D - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
1000
100
10
1
20
18
16
14
12
10
8
6
4
2
0
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate


MW-23D - TCE (ug/L)
Log Concentration (ug/L)
1000
100
10
1
0.1
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level


MW-33 - TCE (ug/L)
100
10
1
Log Concentration (ug/L)
04/98
04/99
04/00
03/01
03/02
03/03
03/04
03/05
03/06
02/07
02/08
02/09
02/10
02/11
02/12
01/13
01/14
01/15
01/16
01/17
12/17
12/18
12/19
12/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level


MW-38 - TCE (ug/L)
100
10
1
Log Concentration (ug/L)
08/10
08/11
08/12
08/13
08/14
09/15
09/16
09/17
09/18
09/19
09/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level


PW-1B - TCE (ug/L) with Pumping Rates
Log Concentration (ug/L)
1000
100
10
1
16
14
12
10
8
6
4
2
0
01/95
10/95
08/96
06/97
04/98
02/99
12/99
10/00
07/01
05/02
03/03
01/04
11/04
09/05
07/06
04/07
02/08
12/08
10/09
08/10
06/11
04/12
01/13
11/13
09/14
07/15
05/16
03/17
12/17
10/18
08/19
06/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level
Pumping Rate


PZ-39 - TCE (ug/L)
Log Concentration (ug/L)
10000
1000
100
10
1
05/99
05/00
06/01
06/02
06/03
07/04
07/05
07/06
08/07
08/08
08/09
09/10
09/11
09/12
10/13
10/14
10/15
11/16
11/17
11/18
12/19
12/20
Measurement Date
TCE Concentration
5 ug/L Clean-up Level

Appendix G

Data for Closure Monitoring

This page intentionally left blank.

Appendix G-1

Wells Excluded from Closure Monitoring

This page intentionally left blank.

Appendix G-1. Wells Excluded from the Closure Monitoring Program

Well Name	Justification	Well ID	Justification
RAMW-2C	COC never detected above CUL	IWS-1	Remediation Well
AMW-5A	COC never detected above CUL	IWS-1PZ	Remediation Well
AMW-6A*	COC never detected above CUL	IWS-2	Remediation Well
AMW-7A*	COC never detected above CUL	IWS-2PZ	Remediation Well
AMW-9A	COC never detected above CUL	IWS-3	Remediation Well
AMW-10A*	COC never detected above CUL	IWS-3PZ	Remediation Well
AMW-11A*	COC never detected above CUL	IWS-4	Remediation Well
AMW-14	Abandoned	IWS-4PZ	Remediation Well
AMW-15	Abandoned	IWS-5	Remediation Well
AMW-16	Impacted by Northern Plume	IWS-5PZ	Remediation Well
AMW-17	Impacted by Northern Plume	IWS-6	Remediation Well
AMW-18	Impacted by Northern Plume	IWS-6PZ	Remediation Well
AMW-19B	COC never detected above CUL	IWS-7	Remediation Well
AMW-20	COC never detected above CUL	IWS-7PZ	Remediation Well
AMW-21	COC never detected above CUL	IWS-8	Remediation Well
AMW-22	Abandoned	IWS-8PZ	Remediation Well
AMW-23	Impacted by Northern Plume	IWS-9	Remediation Well
AMW-25	COC never detected above CUL	IWS-9PZ	Remediation Well
AMW-43	COC never detected above CUL	LAVALLEY	Never in monitoring program
AMW-44	COC never detected above CUL	LV	Never in monitoring program
AMW-45	COC never detected above CUL	MILLER	Never in monitoring program
AMW-50	COC never detected above CUL	MW-1	Never in monitoring program (Clark County well)
AMW-51	COC never detected above CUL	MW-2	Never in monitoring program (Clark County well)
AMW-52C	COC never detected above CUL	MW-3	Never in monitoring program (Clark County well)
AMW-53B	COC never detected above CUL	MW-4	Never in monitoring program (Clark County well)
AMW-53C	COC never detected above CUL	MW-5	Never in monitoring program (Clark County well)
AMW-54C	COC never detected above CUL	MW-5A	Abandoned
AMW-55C	COC never detected above CUL	MW-5B	Abandoned
AMW-56C	COC never detected above CUL	MW-11A	Abandoned
AMW-57	COC never detected above CUL	MW-11B	Abandoned
AMW-62	COC never detected above CUL	MW-17E	COC never detected above CUL
AMW-63	COC never detected above CUL	MW-21D	Impacted by Northern Plume
AMW-64	Impacted by Northern Plume	MW-23D	Impacted by Northern Plume
COLF	Never in monitoring program	MW-24D	Abandoned
COLUMBIA VET	Never in monitoring program	MW-28	Abandoned
CPU-1D	Abandoned	MW-29	Abandoned
CPU-1S	Abandoned	MW-30	COC never detected above CUL
CPU-2	COC never detected above CUL	MW-31	Abandoned
CPU-3D	COC never detected above CUL	MW-32	Abandoned
CPU-3S	COC never detected above CUL	MW-34	COC never detected above CUL
CPU-4D	Water levels only, never sampled	MW-35	Abandoned
CPU-4S	Water levels only, COC never detected above CUL	MW-36	Abandoned
CPU-10	COC never detected above CUL	MW-37	Abandoned
CPU-15	COC never detected above CUL	MW-38	Impacted by Northern Plume
CPU-16	Abandoned	MW-39	Never in monitoring program; pilot study well
CROCKFORD	Never in monitoring program	MW-46	COC never detected above CUL
EC-1	COC never detected above CUL	MW-47	COC never detected above CUL
FERGUSON	Never in monitoring program	PERMALUME	Never in monitoring program/abandoned
FITZGERALD	Never in monitoring program	PZ-1	Water levels only, COC never detected above CUL
GARRISON	Never in monitoring program	PZ-2	Water levels only, COC never detected above CUL
GRIMM	Never in monitoring program	PZ-40	Water levels only, COC never detected above CUL
GWSW-1	Production well, COC never detected above CUL	SW-1	Abandoned
GWSW-2	Production well, COC never detected above CUL	WELCH	Never in monitoring program
HASTAY	Never in monitoring program	WILLIAMS	Never in monitoring program
HORN	Never in monitoring program	WOODAEGE	Never in monitoring program
		ZENT	Never in monitoring program

Notes:
COC = Contaminant of Concern identified for the Site.
CUL = Cleanup level identified in the Site Record of Decision.
* = Well sampled as part of the Messer infiltration gallery monitoring.

Appendix G-2

Remediation Monitoring Analysis

This page intentionally left blank.

Appendix G-2.6 - Remediation Monitoring Analysis
BROMODICHLOROMETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed ? [a]
Closure Monitoring Program Wells									
Upgradient Wells									
AMW-8A	M	37	10/2014	10/2019	U	U	U	4	YES
TCE Source Wells									
AMW-1A	M	61	10/2018	04/2020	U	U	U	4	YES
AMW-1B	M	31	01/2009	10/2010	U	U	U	4	YES
AMW-1C	M	24	10/2007	10/2009	U	0.25	U	4	YES
AMW-2A	M	64	10/2018	04/2020	U	U	U	4	YES
AMW-2B	M	36	10/2012	10/2015	U	U	U	4	YES
AMW-3A	M	47	10/2015	10/2019	U	0.18	0.12	4	YES
AMW-4A	M	16	10/2017	10/2020	U	1.3	U	2	NO
AMW-12A	M	64	04/2019	10/2020	U	U	U	4	YES
AMW-13A	M	44	10/2012	10/2015	0.17	0.28	0.23	4	YES
AMW-19A	M	43	10/2013	10/2017	U	0.12	0.037	4	YES
AMW-26	M	29	10/2010	10/2017	U	0.16	0.16	4	YES
AMW-52A	M	28	10/2012	10/2015	U	0.71	U	4	YES
AMW-53A	M	49	05/2019	10/2020	U	U	U	4	YES
AMW-54A	M	30	10/2013	10/2017	U	U	U	4	YES
AMW-55A	M	23	10/2012	10/2015	U	U	U	4	YES
AMW-56A	M	29	10/2013	10/2017	U	0.24	0.24	4	YES
MW-1A	M	62	10/2018	04/2020	U	U	U	4	YES
MW-1B	M	25	10/2006	10/2009	U	U	U	4	YES
MW-1C	M	20	10/2006	10/2009	U	U	U	4	YES
Proximal Wells									
AMW-58	M	9	10/2006	10/2012	U	U	U	4	YES
MW-2A	M	26	10/2011	10/2016	U	0.65	0.65	4	YES
MW-2B	M	17	10/2017	10/2020	U	0.035	U	4	YES
MW-2C	M	8	10/2002	10/2009	U	U	U	4	YES
MW-3A	M	18	05/2004	10/2008	U	U	U	4	YES
MW-3B	M	15	10/2010	10/2016	U	U	U	4	YES
MW-3C	M	10	10/2004	10/2019	U	U	U	4	YES
MW-4A	M	22	10/2017	10/2020	U	U	U	4	YES
MW-4B	M	16	10/2011	10/2016	U	0.1	0.1	4	YES
MW-4BSHED	M	16	10/2004	10/2019	U	0.048	U	4	YES
MW-4C	M	11	10/2009	10/2019	U	U	U	4	YES
MW-6A	M	8	10/2017	10/2020	U	U	U	4	YES
MW-6B	E	52	10/2017	10/2020	U	0.43	U	4	YES
MW-6C	M	13	10/2009	10/2019	U	0.13	U	4	YES
MW-6D	M	11	10/2009	10/2019	U	U	U	4	YES
MW-7B	M	11	10/2017	10/2020	U	0.46	U	4	YES
MW-7C	M	6	05/1995	10/2009	U	U	U	4	YES
MW-8B	M	15	10/2010	10/2017	U	0.56	0.56	4	YES

Appendix G-2.6 - Remediation Monitoring Analysis
BROMODICHLOROMETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed ? [a]
MW-9B	M	18	10/2012	10/2017	U	0.1	0.047	4	YES
MW-9C	M	13	10/2017	10/2020	U	U	U	4	YES
MW-10B	E	54	04/2019	10/2020	U	0.14	U	4	YES
MW-10C	E	54	10/2017	10/2020	0.13	0.3	0.13	4	YES
MW-12C	M	28	10/2014	10/2019	U	U	U	4	YES
MW-13C	M	31	10/2016	10/2019	0.13	0.68	0.25	4	YES
PW-1B	E	62	10/2017	10/2020	U	0.054	U	4	YES
Intermediate Wells									
AMW-59	E/O	18	10/2019	10/2020	U	U	U	4	YES
AMW-60	M	8	10/2017	10/2020	U	U	U	4	YES
CPU-14	M	38	10/2017	10/2020	U	0.07	U	4	YES
MW-14C*	E/M	63	10/2019	10/2020	0.16	0.83	0.25	4	YES
MW-14E*	E/M	65	10/2019	10/2020	U	U	U	4	YES
MW-15E	M	30	10/2015	10/2019	U	0.042	U	4	YES
MW-18D*	E/M	63	10/2019	10/2020	U	U	U	4	YES
MW-18E	E/O	39	04/2019	10/2020	U	U	U	4	YES
MW-19D	E/M	62	10/2019	10/2020	U	0.16	U	4	YES
MW-20D	E	62	04/2019	10/2020	U	U	U	4	YES
MW-38	M	16	10/2017	10/2020	U	U	U	4	YES
MW-40	M	9	10/2008	10/2019	U	0.15	U	4	YES
PZ-39	PZ	20	10/2017	10/2020	U	U	U	4	YES
Church of God Wells									
AMW-27	M	51	04/2015	10/2016	U	U	U	4	YES
AMW-61	M	17	10/2017	10/2020	U	U	U	4	YES
CPU-12	M	35	10/2015	10/2019	U	0.03	U	4	YES
CPU-13	E/O	52	04/2013	10/2014	U	0.1	U	4	YES
MW-21D	E/O	64	04/2019	10/2020	U	U	U	4	YES
MW-22D	E	57	10/2017	10/2020	U	U	U	4	YES
MW-25D	E/O	52	10/2012	10/2014	U	U	U	4	YES
MW-26D	E/O	51	10/2012	10/2014	U	U	U	4	YES
MW-27D	E/M	43	10/2011	10/2014	U	U	U	4	YES
MW-49	E/O	30	10/2012	10/2014	U	U	U	4	YES
Toe Wells									
AMW-42	M	38	10/2009	10/2014	U	U	U	4	YES
MW-31	M	25	10/2008	10/2012	U	U	U	4	YES
MW-35	M	42	10/2015	04/2017	U	U	U	4	YES
MW-41	M	44	10/2010	10/2017	U	U	U	4	YES
MW-48	M	30	10/2006	10/2009	U	U	U	4	YES
Troutdale Wells									
AMW-24	M/D	30	10/2017	10/2020	U	U	U	4	YES
MW-33	M/D	30	10/2017	10/2020	U	U	U	4	YES
BENNETT	M	27	10/2017	10/2020	U	U	U	4	YES

Appendix G-2.6 - Remediation Monitoring Analysis
BROMODICHLOROMETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed ? [a]

NOTES:

[a] The "Remediation Monitoring Phase is Completed" determinations are per EPA Guidance (EPA 2013) based on the most recent four sample data points for each COC. The remediation monitoring phase is completed when the last four sample concentrations are lower than the cleanup level.

* The pumps in wells MW-14C and MW14E were turned off and removed on 10/16/2019; and the pump in well MW-19D was turned off and removed 10/14/2019.

COC = Contaminant of Concern.
E = Extraction well.
E/M = Extraction well with pump pulled; now sampled as a monitoring well.
E/O = Extraction well with pump turned off; pump is turned on for sampling.
EPA = U.S. Environmental Protection Agency.
M = Monitoring well.
M/D = Monitoring well with dedicated pump installed.
U = Analyte not detected above the specified reporting limit.
µg/L = Micrograms per liter.

Appendix G-2.7 - Remediation Monitoring Analysis
TETRACHLOROETHENE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (5 ug/L)	Remediation Monitoring Phase is Completed ? [a]
Closure Monitoring Program Wells									
Upgradient Wells									
AMW-8A	M	38	10/2014	10/2019	U	0.025	U	4	YES
TCE Source Wells									
AMW-1A	M	62	10/2018	04/2020	0.33	1.3	0.33	4	YES
AMW-1B	M	31	01/2009	10/2010	U	U	U	4	YES
AMW-1C	M	24	10/2007	10/2009	U	U	U	4	YES
AMW-2A	M	65	10/2018	04/2020	0.73	0.96	0.96	4	YES
AMW-2B	M	36	10/2012	10/2015	U	U	U	4	YES
AMW-3A	M	48	10/2015	10/2019	0.3	0.51	0.3	4	YES
AMW-4A	M	16	10/2017	10/2020	U	U	U	4	YES
AMW-12A	M	64	04/2019	10/2020	0.41	0.62	0.41	4	YES
AMW-13A	M	45	10/2012	10/2015	U	0.11	0.11	4	YES
AMW-19A	M	43	10/2013	10/2017	0.29	0.33	0.29	4	YES
AMW-26	M	29	10/2010	10/2017	U	0.42	0.42	4	YES
AMW-52A	M	28	10/2012	10/2015	U	0.12	0.1	4	YES
AMW-53A	M	49	05/2019	10/2020	0.87	1.2	1.2	4	YES
AMW-54A	M	30	10/2013	10/2017	0.14	0.4	0.16	4	YES
AMW-55A	M	23	10/2012	10/2015	0.21	0.34	0.34	4	YES
AMW-56A	M	29	10/2013	10/2017	0.43	0.61	0.43	4	YES
MW-1A	M	63	10/2018	04/2020	0.64	0.79	0.77	4	YES
MW-1B	M	26	10/2006	10/2009	U	U	U	4	YES
MW-1C	M	20	10/2006	10/2009	U	U	U	4	YES
Proximal Wells									
AMW-58	M	9	10/2006	10/2012	U	U	U	4	YES
MW-2A	M	27	10/2011	10/2016	0.75	1.1	1.1	4	YES
MW-2B	M	18	10/2017	10/2020	0.28	0.36	0.3	4	YES
MW-2C	M	8	10/2002	10/2009	0.29	1.5	0.29	4	YES
MW-3A	M	19	05/2004	10/2008	0.21	0.4	0.21	4	YES
MW-3B	M	15	10/2010	10/2016	0.54	0.89	0.67	4	YES
MW-3C	M	10	10/2004	10/2019	0.25	1.6	0.25	4	YES
MW-4A	M	23	10/2017	10/2020	0.44	0.57	0.44	4	YES
MW-4B	M	16	10/2011	10/2016	0.5	0.64	0.62	4	YES
MW-4BSHED	M	16	10/2004	10/2019	0.51	1.6	0.51	4	YES
MW-4C	M	11	10/2009	10/2019	0.33	0.84	0.33	4	YES
MW-6A	M	8	10/2017	10/2020	U	U	U	4	YES
MW-6B	E	59	10/2017	10/2020	0.35	0.41	0.4	4	YES
MW-6C	M	13	10/2009	10/2019	U	0.19	U	4	YES
MW-6D	M	11	10/2009	10/2019	U	0.11	U	4	YES
MW-7B	M	11	10/2017	10/2020	0.39	0.63	0.63	4	YES
MW-7C	M	6	05/1995	10/2009	0.12	0.5	0.12	4	YES
MW-8B	M	15	10/2010	10/2017	0.77	1.6	0.77	4	YES

Appendix G-2.7 - Remediation Monitoring Analysis
TETRACHLOROETHENE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (5 ug/L)	Remediation Monitoring Phase is Completed ? [a]
MW-9B	M	18	10/2012	10/2017	0.95	2	0.95	4	YES
MW-9C	M	13	10/2017	10/2020	0.2	0.6	0.6	4	YES
MW-10B	E	61	04/2019	10/2020	0.68	0.78	0.71	4	YES
MW-10C	E	61	10/2017	10/2020	0.44	0.5	0.44	4	YES
MW-12C	M	29	10/2014	10/2019	0.29	0.36	0.29	4	YES
MW-13C	M	32	10/2016	10/2019	0.64	1	0.7	4	YES
PW-1B	E	87	10/2017	10/2020	0.29	0.38	0.29	4	YES
Intermediate Wells									
AMW-59	E/O	18	10/2019	10/2020	U	U	U	4	YES
AMW-60	M	8	10/2017	10/2020	U	U	U	4	YES
CPU-14	M	39	10/2017	10/2020	U	0.1	0.1	4	YES
MW-14C*	E/M	75	10/2019	10/2020	0.44	0.59	0.48	4	YES
MW-14E*	E/M	73	10/2019	10/2020	0.35	1.6	1.6	4	YES
MW-15E	M	30	10/2015	10/2019	0.31	0.42	0.31	4	YES
MW-18D	E/M	84	10/2019	10/2020	0.48	0.57	0.48	4	YES
MW-18E	E/O	40	04/2019	10/2020	U	0.63	U	4	YES
MW-19D*	E/M	83	10/2019	10/2020	0.56	1.9	1.9	4	YES
MW-20D	E	86	04/2019	10/2020	0.62	0.9	0.9	4	YES
MW-38	M	16	10/2017	10/2020	0.57	0.78	0.57	4	YES
MW-40	M	9	10/2008	10/2019	U	U	U	4	YES
PZ-39	PZ	20	10/2017	10/2020	0.63	0.89	0.68	4	YES
Church of God Wells									
AMW-27	M	52	04/2015	10/2016	0.92	1	1	4	YES
AMW-61	M	17	10/2017	10/2020	0.89	2.2	2.2	4	YES
CPU-12	M	36	10/2015	10/2019	U	U	U	4	YES
CPU-13	E/O	59	04/2013	10/2014	0.68	0.87	0.87	4	YES
MW-21D	E/O	89	04/2019	10/2020	U	0.12	U	4	YES
MW-22D	E	81	10/2017	10/2020	0.57	1.3	1.3	4	YES
MW-25D	E/O	77	10/2012	10/2014	U	U	U	4	YES
MW-26D	E/O	76	10/2012	10/2014	0.2	0.86	0.2	4	YES
MW-27D	E/M	50	10/2011	10/2014	U	U	U	4	YES
MW-49	E/O	35	10/2012	10/2014	0.27	0.49	0.49	4	YES
Toe Wells									
AMW-42	M	52	10/2009	10/2014	U	U	U	4	YES
MW-31	M	40	10/2008	10/2012	U	0.19	0.12	4	YES
MW-35	M	70	10/2015	04/2017	0.41	0.51	0.41	4	YES
MW-41	M	58	10/2010	10/2017	U	U	U	4	YES
MW-48	M	38	10/2006	10/2009	U	U	U	4	YES
Troutdale Wells									
AMW-24	M/D	32	10/2017	10/2020	U	0.12	0.1	4	YES
MW-33	M/D	32	10/2017	10/2020	U	0.15	0.13	4	YES
BENNETT	M	27	10/2017	10/2020	U	0.058	U	4	YES

Appendix G-2.7 - Remediation Monitoring Analysis
TETRACHLOROETHENE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (5 ug/L)	Remediation Monitoring Phase is Completed ? [a]

NOTES:

[a] The "Remediation Monitoring Phase is Completed" determinations are per EPA Guidance (EPA 2013) based on the most recent four sample data points for each COC. The remediation monitoring phase is completed when the last four sample concentrations are lower than the cleanup level.

* The pumps in wells MW-14C and MW14E were turned off and removed on 10/16/2019; and the pump in well MW-19D was turned off and removed 10/14/2019.

COC = Contaminant of Concern.
E = Extraction well.
E/M = Extraction well with pump pulled; now sampled as a monitoring well.
E/O = Extraction well with pump turned off; pump is turned on for sampling.
EPA = U.S. Environmental Protection Agency.
M = Monitoring well.
M/D = Monitoring well with dedicated pump installed.
U = Analyte not detected above the specified reporting limit.
µg/L = Micrograms per liter.

Appendix G-2.1 - Remediation Monitoring Analysis
CHLORODIBROMOMETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed? [a]
Closure Monitoring Program Wells									
Upgradient Wells									
AMW-8A	M	37	10/2014	10/2019	U	U	U	4	YES
TCE Source Wells									
AMW-1A	M	60	04/2018	10/2019	U	U	U	4	YES
AMW-1B	M	31	01/2009	10/2010	U	U	U	4	YES
AMW-1C	M	24	10/2007	10/2009	U	U	U	4	YES
AMW-2A	M	63	04/2018	10/2019	U	U	U	4	YES
AMW-2B	M	36	10/2012	10/2015	U	U	U	4	YES
AMW-3A	M	47	10/2015	10/2019	U	0.29	U	4	YES
AMW-4A	M	15	10/2009	10/2019	U	0.68	U	4	YES
AMW-12A	M	62	04/2018	10/2019	U	U	U	4	YES
AMW-13A	M	44	10/2012	10/2015	U	U	U	4	YES
AMW-19A	M	43	10/2013	10/2017	U	U	U	4	YES
AMW-26	M	29	10/2010	10/2017	U	U	U	4	YES
AMW-52A	M	28	10/2012	10/2015	U	0.29	U	4	YES
AMW-53A	M	47	04/2018	10/2019	U	U	U	4	YES
AMW-54A	M	30	10/2013	10/2017	U	U	U	4	YES
AMW-55A	M	23	10/2012	10/2015	U	U	U	4	YES
AMW-56A	M	29	10/2013	10/2017	U	U	U	4	YES
MW-1A	M	61	04/2018	10/2019	U	U	U	4	YES
MW-1B	M	25	10/2006	10/2009	U	U	U	4	YES
MW-1C	M	20	10/2006	10/2009	U	U	U	4	YES
Proximal Wells									
AMW-58	M	9	10/2006	10/2012	U	U	U	4	YES
MW-2A	M	26	10/2011	10/2016	U	0.32	0.32	4	YES
MW-2B	M	16	10/2009	10/2019	U	U	U	4	YES
MW-2C	M	8	10/2002	10/2009	U	U	U	4	YES
MW-3A	M	18	05/2004	10/2008	U	U	U	4	YES
MW-3B	M	15	10/2010	10/2016	U	U	U	4	YES
MW-3C	M	10	10/2004	10/2019	U	U	U	4	YES
MW-4A	M	21	10/2009	10/2019	U	U	U	4	YES
MW-4B	M	16	10/2011	10/2016	U	U	U	4	YES
MW-4BSHED	M	16	10/2004	10/2019	U	U	U	4	YES
MW-4C	M	11	10/2009	10/2019	U	U	U	4	YES
MW-6A	M	7	05/1995	10/2019	U	U	U	4	YES
MW-6B	E	51	04/2017	10/2019	U	0.14	U	4	YES
MW-6C	M	13	10/2009	10/2019	U	U	U	4	YES
MW-6D	M	11	10/2009	10/2019	U	U	U	4	YES
MW-7B	M	10	10/2014	10/2019	U	0.22	U	4	YES
MW-7C	M	6	05/1995	10/2009	U	U	U	4	YES
MW-8B	M	15	10/2010	10/2017	U	0.19	0.19	4	YES

Appendix G-2.1 - Remediation Monitoring Analysis
CHLORODIBROMOMETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed? [a]
MW-9B	M	18	10/2012	10/2017	U	U	U	4	YES
MW-9C	M	12	10/2009	10/2019	U	U	U	4	YES
MW-10B	E	52	10/2017	10/2019	U	U	U	4	YES
MW-10C	E	53	04/2017	10/2019	U	0.12	U	4	YES
MW-12C	M	28	10/2014	10/2019	U	U	U	4	YES
MW-13C	M	31	10/2016	10/2019	U	0.039	U	4	YES
PW-1B	E	61	04/2017	10/2019	U	U	U	4	YES
Intermediate Wells									
AMW-59	E/O	15	10/2014	10/2019	U	U	U	4	YES
AMW-60	M	7	11/2004	10/2019	U	U	U	4	YES
CPU-14	M	37	10/2016	10/2019	U	U	U	4	YES
MW-14C*	E/M	60	04/2018	10/2019	U	U	U	4	YES
MW-14E*	E/M	62	04/2018	10/2019	U	U	U	4	YES
MW-15E	M	30	10/2015	10/2019	U	U	U	4	YES
MW-18D*	E/M	60	04/2018	10/2019	U	U	U	4	YES
MW-18E	E/O	37	10/2017	10/2019	U	U	U	4	YES
MW-19D	E/M	59	04/2018	10/2019	U	U	U	4	YES
MW-20D	E	60	04/2018	10/2019	U	U	U	4	YES
MW-38	M	15	04/2017	10/2019	U	U	U	4	YES
MW-40	M	9	10/2008	10/2019	U	U	U	4	YES
PZ-39	PZ	19	04/2017	10/2019	U	U	U	4	YES
Church of God Wells									
AMW-27	M	51	04/2015	10/2016	U	U	U	4	YES
AMW-61	M	16	04/2017	10/2019	U	U	U	4	YES
CPU-12	M	35	10/2015	10/2019	U	U	U	4	YES
CPU-13	E/O	52	04/2013	10/2014	U	U	U	4	YES
MW-21D	E/O	62	04/2018	10/2019	U	U	U	4	YES
MW-22D	E	56	04/2017	10/2019	U	U	U	4	YES
MW-25D	E/O	52	10/2012	10/2014	U	U	U	4	YES
MW-26D	E/O	51	10/2012	10/2014	U	U	U	4	YES
MW-27D	E/M	43	10/2011	10/2014	U	U	U	4	YES
MW-49	E/O	30	10/2012	10/2014	U	U	U	4	YES
Toe Wells									
AMW-42	M	38	10/2009	10/2014	U	U	U	4	YES
MW-31	M	25	10/2008	10/2012	U	U	U	4	YES
MW-35	M	42	10/2015	04/2017	U	U	U	4	YES
MW-41	M	44	10/2010	10/2017	U	U	U	4	YES
MW-48	M	30	10/2006	10/2009	U	U	U	4	YES
Troutdale Wells									
AMW-24	M/D	29	10/2016	10/2019	U	U	U	4	YES
MW-33	M/D	29	10/2016	10/2019	U	U	U	4	YES
BENNETT	M	26	04/2017	10/2019	U	U	U	4	YES

Appendix G-2.1 - Remediation Monitoring Analysis
CHLORODIBROMOMETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed? [a]

NOTES:

[a] The "Remediation Monitoring Phase is Completed" determinations are per EPA Guidance (EPA 2013) based on the most recent four sample data points for each COC. The remediation monitoring phase is completed when the last four sample concentrations are lower than the cleanup level.

* The pumps in wells MW-14C and MW14E were turned off and removed on 10/16/2019; and the pump in well MW-19D was turned off and removed 10/14/2019.

COC = Contaminant of Concern.
E = Extraction well.
E/M = Extraction well with pump pulled; now sampled as a monitoring well.
E/O = Extraction well with pump turned off; pump is turned on for sampling.
EPA = U.S. Environmental Protection Agency.
M = Monitoring well.
M/D = Monitoring well with dedicated pump installed.
U = Analyte not detected above the specified reporting limit.
µg/L = Micrograms per liter.

Appendix G-2.2 - Remediation Monitoring Analysis
1,1-DICHLOROETHENE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed ? [a]
Closure Monitoring Program Wells									
Upgradient Wells									
AMW-8A	M	38	10/2014	10/2019	U	U	U	4	YES
TCE Source Wells									
AMW-1A	M	62	10/2018	04/2020	U	1	U	4	YES
AMW-1B	M	31	01/2009	10/2010	U	U	U	4	YES
AMW-1C	M	24	10/2007	10/2009	U	U	U	4	YES
AMW-2A	M	65	10/2018	04/2020	U	0.16	U	4	YES
AMW-2B	M	36	10/2012	10/2015	U	U	U	4	YES
AMW-3A	M	48	10/2015	10/2019	U	U	U	4	YES
AMW-4A	M	16	10/2017	10/2020	U	U	U	4	YES
AMW-12A	M	64	04/2019	10/2020	U	0.17	U	4	YES
AMW-13A	M	45	10/2012	10/2015	U	U	U	4	YES
AMW-19A	M	43	10/2013	10/2017	U	U	U	4	YES
AMW-26	M	29	10/2010	10/2017	U	0.2	0.2	4	YES
AMW-52A	M	28	10/2012	10/2015	U	U	U	4	YES
AMW-53A	M	49	05/2019	10/2020	U	0.49	U	4	YES
AMW-54A	M	30	10/2013	10/2017	U	U	U	4	YES
AMW-55A	M	23	10/2012	10/2015	U	U	U	4	YES
AMW-56A	M	29	10/2013	10/2017	U	0.037	0.037	4	YES
MW-1A	M	63	10/2018	04/2020	U	0.35	U	4	YES
MW-1B	M	26	10/2006	10/2009	U	U	U	4	YES
MW-1C	M	20	10/2006	10/2009	U	U	U	4	YES
Proximal Wells									
AMW-58	M	9	10/2006	10/2012	U	0.22	U	4	YES
MW-2A	M	27	10/2011	10/2016	U	U	U	4	YES
MW-2B	M	18	10/2017	10/2020	U	U	U	4	YES
MW-2C	M	8	10/2002	10/2009	U	U	U	4	YES
MW-3A	M	19	05/2004	10/2008	U	U	U	4	YES
MW-3B	M	15	10/2010	10/2016	U	U	U	4	YES
MW-3C	M	10	10/2004	10/2019	U	U	U	4	YES
MW-4A	M	23	10/2017	10/2020	U	U	U	4	YES
MW-4B	M	16	10/2011	10/2016	U	U	U	4	YES
MW-4BSHED	M	16	10/2004	10/2019	U	0.19	U	4	YES
MW-4C	M	11	10/2009	10/2019	U	U	U	4	YES
MW-6A	M	8	10/2017	10/2020	U	U	U	4	YES
MW-6B	E	53	10/2017	10/2020	U	U	U	4	YES
MW-6C	M	13	10/2009	10/2019	U	U	U	4	YES
MW-6D	M	11	10/2009	10/2019	U	0.75	0.25	4	YES
MW-7B	M	11	10/2017	10/2020	U	0.1	U	4	YES
MW-7C	M	6	05/1995	10/2009	U	U	U	4	YES

Appendix G-2.2 - Remediation Monitoring Analysis
1,1-DICHLOROETHENE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed ? [a]
MW-8B	M	15	10/2010	10/2017	U	0.079	0.079	4	YES
MW-9B	M	18	10/2012	10/2017	U	0.11	0.066	4	YES
MW-9C	M	13	10/2017	10/2020	U	U	U	4	YES
MW-10B	E	55	04/2019	10/2020	U	U	U	4	YES
MW-10C	E	55	10/2017	10/2020	U	U	U	4	YES
MW-12C	M	29	10/2014	10/2019	U	U	U	4	YES
MW-13C	M	32	10/2016	10/2019	U	U	U	4	YES
PW-1B	E	63	10/2017	10/2020	U	U	U	4	YES
Intermediate Wells									
AMW-59	E/O	18	10/2019	10/2020	U	4.6	U	3	NO
AMW-60	M	8	10/2017	10/2020	U	1.9	U	1	NO
CPU-14	M	39	10/2017	10/2020	U	0.11	U	4	YES
MW-14C*	E/M	64	10/2019	10/2020	U	U	U	4	YES
MW-14E*	E/M	66	10/2019	10/2020	U	1.4	U	3	NO
MW-15E	M	30	10/2015	10/2019	U	0.043	U	4	YES
MW-18D	E/M	63	10/2019	10/2020	U	U	U	4	YES
MW-18E	E/O	40	04/2019	10/2020	U	0.63	U	4	YES
MW-19D*	E/M	62	10/2019	10/2020	U	0.5	U	4	YES
MW-20D	E	62	04/2019	10/2020	U	1.2	U	3	NO
MW-38	M	16	10/2017	10/2020	U	0.13	U	4	YES
MW-40	M	9	10/2008	10/2019	U	0.1	U	4	YES
PZ-39	PZ	20	10/2017	10/2020	U	2.1	U	1	NO
Church of God Wells									
AMW-27	M	52	04/2015	10/2016	0.08	0.13	0.11	4	YES
AMW-61	M	17	10/2017	10/2020	U	0.33	U	4	YES
CPU-12	M	36	10/2015	10/2019	U	0.029	U	4	YES
CPU-13	E/O	53	04/2013	10/2014	U	U	U	4	YES
MW-21D	E/O	65	04/2019	10/2020	U	0.71	U	4	YES
MW-22D	E	58	10/2017	10/2020	U	0.058	U	4	YES
MW-25D	E/O	53	10/2012	10/2014	0.15	0.33	0.15	4	YES
MW-26D	E/O	52	10/2012	10/2014	U	U	U	4	YES
MW-27D	E/M	44	10/2011	10/2014	U	U	U	4	YES
MW-49	E/O	30	10/2012	10/2014	U	0.08	U	4	YES
Toe Wells									
AMW-42	M	39	10/2009	10/2014	U	U	U	4	YES
MW-31	M	26	10/2008	10/2012	U	U	U	4	YES
MW-35	M	43	10/2015	04/2017	U	0.09	0.09	4	YES
MW-41	M	45	10/2010	10/2017	U	U	U	4	YES
MW-48	M	31	10/2006	10/2009	U	U	U	4	YES
Troutdale Wells									
AMW-24	M/D	31	10/2017	10/2020	U	0.98	U	4	YES
MW-33	M/D	31	10/2017	10/2020	U	0.65	U	4	YES
BENNETT	0	27	10/2017	10/2020	U	0.25	U	4	YES

Appendix G-2.2 - Remediation Monitoring Analysis
1,1-DICHLOROETHENE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed ? [a]

NOTES:

[a] The "Remediation Monitoring Phase is Completed" determinations are per EPA Guidance (EPA 2013) based on the most recent four sample data points for each COC. The remediation monitoring phase is completed when the last four sample concentrations are lower than the cleanup level.

* The pumps in wells MW-14C and MW14E were turned off and removed on 10/16/2019; and the pump in well MW-19D was turned off and removed 10/14/2019.

COC = Contaminant of Concern.
E = Extraction well.
E/O = Extraction well with pump turned off; pump is turned on for sampling.
E/M = Extraction well with pump pulled; now sampled as a monitoring well.
EPA = U.S. Environmental Protection Agency.
M = Monitoring well.
M/D = Monitoring well with dedicated pump installed.
U = Analyte not detected above the specified reporting limit.
µg/L = Micrograms per liter.

Appendix G-2.3 - Remediation Monitoring Analysis
1,2-DICHLOROETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (5 ug/L)	Remediation Monitoring Phase is Completed ? [a]
Closure Monitoring Program Wells									
Upgradient Wells									
AMW-8A	M	38	10/2014	10/2019	U	U	U	4	YES
TCE Source Wells									
AMW-1A	M	62	10/2018	04/2020	U	0.09	U	4	YES
AMW-1B	M	31	01/2009	10/2010	U	U	U	4	YES
AMW-1C	M	24	10/2007	10/2009	U	U	U	4	YES
AMW-2A	M	65	10/2018	04/2020	U	U	U	4	YES
AMW-2B	M	36	10/2012	10/2015	U	U	U	4	YES
AMW-3A	M	48	10/2015	10/2019	U	U	U	4	YES
AMW-4A	M	16	10/2017	10/2020	U	U	U	4	YES
AMW-12A	M	64	04/2019	10/2020	U	U	U	4	YES
AMW-13A	M	45	10/2012	10/2015	U	U	U	4	YES
AMW-19A	M	43	10/2013	10/2017	U	U	U	4	YES
AMW-26	M	29	10/2010	10/2017	U	U	U	4	YES
AMW-52A	M	28	10/2012	10/2015	U	U	U	4	YES
AMW-53A	M	49	05/2019	10/2020	U	U	U	4	YES
AMW-54A	M	30	10/2013	10/2017	U	U	U	4	YES
AMW-55A	M	23	10/2012	10/2015	U	U	U	4	YES
AMW-56A	M	29	10/2013	10/2017	U	U	U	4	YES
MW-1A	M	63	10/2018	04/2020	U	U	U	4	YES
MW-1B	M	26	10/2006	10/2009	U	U	U	4	YES
MW-1C	M	20	10/2006	10/2009	U	U	U	4	YES
Proximal Wells									
AMW-58	M	9	10/2006	10/2012	U	U	U	4	YES
MW-2A	M	27	10/2011	10/2016	U	U	U	4	YES
MW-2B	M	18	10/2017	10/2020	U	U	U	4	YES
MW-2C	M	8	10/2002	10/2009	U	U	U	4	YES
MW-3A	M	19	05/2004	10/2008	U	U	U	4	YES
MW-3B	M	15	10/2010	10/2016	U	U	U	4	YES
MW-3C	M	10	10/2004	10/2019	U	0.02	U	4	YES
MW-4A	M	23	10/2017	10/2020	U	U	U	4	YES
MW-4B	M	16	10/2011	10/2016	U	U	U	4	YES
MW-4BSHED	M	16	10/2004	10/2019	U	U	U	4	YES
MW-4C	M	11	10/2009	10/2019	U	U	U	4	YES
MW-6A	M	8	10/2017	10/2020	U	U	U	4	YES
MW-6B	E	53	10/2017	10/2020	U	U	U	4	YES
MW-6C	M	13	10/2009	10/2019	U	U	U	4	YES
MW-6D	M	11	10/2009	10/2019	U	U	U	4	YES
MW-7B	M	11	10/2017	10/2020	U	U	U	4	YES
MW-7C	M	6	05/1995	10/2009	U	U	U	4	YES
MW-8B	M	15	10/2010	10/2017	U	U	U	4	YES

Appendix G-2.3 - Remediation Monitoring Analysis
1,2-DICHLOROETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (5 ug/L)	Remediation Monitoring Phase is Completed ? [a]
MW-9B	M	18	10/2012	10/2017	U	U	U	4	YES
MW-9C	M	13	10/2017	10/2020	U	U	U	4	YES
MW-10B	E	55	04/2019	10/2020	U	U	U	4	YES
MW-10C	E	55	10/2017	10/2020	U	U	U	4	YES
MW-12C	M	29	10/2014	10/2019	U	U	U	4	YES
MW-13C	M	32	10/2016	10/2019	U	U	U	4	YES
PW-1B	E	63	10/2017	10/2020	U	U	U	4	YES
Intermediate Wells									
AMW-59	E/O	18	10/2019	10/2020	U	U	U	4	YES
AMW-60	M	8	10/2017	10/2020	U	0.19	U	4	YES
CPU-14	M	39	10/2017	10/2020	U	U	U	4	YES
MW-14C	E/M	64	10/2019	10/2020	U	U	U	4	YES
MW-14E*	E/M	66	10/2019	10/2020	U	U	U	4	YES
MW-15E*	M	30	10/2015	10/2019	U	U	U	4	YES
MW-18D	E/M	63	10/2019	10/2020	U	U	U	4	YES
MW-18E	E/O	40	04/2019	10/2020	U	U	U	4	YES
MW-19D*	E/M	62	10/2019	10/2020	U	U	U	4	YES
MW-20D	E	62	04/2019	10/2020	U	U	U	4	YES
MW-38	M	16	10/2017	10/2020	U	U	U	4	YES
MW-40	M	9	10/2008	10/2019	U	U	U	4	YES
PZ-39	PZ	20	10/2017	10/2020	U	U	U	4	YES
Church of God Wells									
AMW-27	M	52	04/2015	10/2016	U	U	U	4	YES
AMW-61	M	17	10/2017	10/2020	U	0.08	U	4	YES
CPU-12	M	36	10/2015	10/2019	U	U	U	4	YES
CPU-13	E/O	53	04/2013	10/2014	U	U	U	4	YES
MW-21D	E/O	65	04/2019	10/2020	U	U	U	4	YES
MW-22D	E	58	10/2017	10/2020	U	U	U	4	YES
MW-25D	E/O	53	10/2012	10/2014	U	U	U	4	YES
MW-26D	E/O	52	10/2012	10/2014	U	U	U	4	YES
MW-27D	E/M	44	10/2011	10/2014	U	0.09	U	4	YES
MW-49	E/O	30	10/2012	10/2014	U	U	U	4	YES
Toe Wells									
AMW-42	M	39	10/2009	10/2014	U	U	U	4	YES
MW-31	M	26	10/2008	10/2012	U	U	U	4	YES
MW-35	M	43	10/2015	04/2017	U	0.08	U	4	YES
MW-41	M	45	10/2010	10/2017	U	U	U	4	YES
MW-48	M	31	10/2006	10/2009	U	U	U	4	YES
Troutdale Wells									
AMW-24	M/D	31	10/2017	10/2020	U	0.023	U	4	YES
MW-33	M/D	31	10/2017	10/2020	U	0.032	U	4	YES
BENNETT	M	27	10/2017	10/2020	U	U	U	4	YES

Appendix G-2.3 - Remediation Monitoring Analysis
1,2-DICHLOROETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (5 ug/L)	Remediation Monitoring Phase is Completed ? [a]

NOTES:

[a] The "Remediation Monitoring Phase is Completed" determinations are per EPA Guidance (EPA 2013) based on the most recent four sample data points for each COC. The remediation monitoring phase is completed when the last four sample concentrations are lower than the cleanup level.

* The pumps in wells MW-14C and MW14E were turned off and removed on 10/16/2019; and the pump in well MW-19D was turned off and removed 10/14/2019.

COC = Contaminant of Concern.
E = Extraction well.
E/O = Extraction well with pump turned off; pump is turned on for sampling.
E/M = Extraction well with pump pulled; now sampled as a monitoring well.
EPA = U.S. Environmental Protection Agency.
M = Monitoring well.
M/D = Monitoring well with dedicated pump installed.
U = Analyte not detected above the specified reporting limit.
µg/L = Micrograms per liter.

Appendix G-2.4 - Remediation Monitoring Analysis
1,1,1-TRICHLOROETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (200 ug/L)	Remediation Monitoring Phase is Completed ? [a]
Closure Monitoring Program Wells									
Upgradient Wells									
AMW-8A	M	38	10/2014	10/2019	U	U	U	4	YES
TCE Source Wells									
AMW-1A	M	62	10/2018	04/2020	1.2	8.8	1.2	4	YES
AMW-1B	M	31	01/2009	10/2010	U	U	U	4	YES
AMW-1C	M	24	10/2007	10/2009	U	U	U	4	YES
AMW-2A	M	65	10/2018	04/2020	0.14	1.3	1.3	4	YES
AMW-2B	M	36	10/2012	10/2015	U	U	U	4	YES
AMW-3A	M	48	10/2015	10/2019	U	U	U	4	YES
AMW-4A	M	16	10/2017	10/2020	U	U	U	4	YES
AMW-12A	M	64	04/2019	10/2020	0.36	0.57	0.57	4	YES
AMW-13A	M	45	10/2012	10/2015	U	0.11	U	4	YES
AMW-19A	M	43	10/2013	10/2017	U	U	U	4	YES
AMW-26	M	29	10/2010	10/2017	U	1.3	1.3	4	YES
AMW-52A	M	28	10/2012	10/2015	U	U	U	4	YES
AMW-53A	M	49	05/2019	10/2020	1.3	3.7	3.7	4	YES
AMW-54A	M	30	10/2013	10/2017	U	0.19	0.19	4	YES
AMW-55A	M	23	10/2012	10/2015	U	U	U	4	YES
AMW-56A	M	29	10/2013	10/2017	U	0.23	0.23	4	YES
MW-1A	M	63	10/2018	04/2020	U	1.8	U	4	YES
MW-1B	M	26	10/2006	10/2009	U	U	U	4	YES
MW-1C	M	20	10/2006	10/2009	U	U	U	4	YES
Proximal Wells									
AMW-58	M	9	10/2006	10/2012	U	U	U	4	YES
MW-2A	M	27	10/2011	10/2016	U	U	U	4	YES
MW-2B	M	18	10/2017	10/2020	U	U	U	4	YES
MW-2C	M	8	10/2002	10/2009	U	0.25	U	4	YES
MW-3A	M	19	05/2004	10/2008	U	U	U	4	YES
MW-3B	M	15	10/2010	10/2016	U	U	U	4	YES
MW-3C	M	10	10/2004	10/2019	U	0.17	U	4	YES
MW-4A	M	23	10/2017	10/2020	U	0.15	U	4	YES
MW-4B	M	16	10/2011	10/2016	U	0.09	0.09	4	YES
MW-4BSHED	M	16	10/2004	10/2019	U	0.18	U	4	YES
MW-4C	M	11	10/2009	10/2019	U	U	U	4	YES
MW-6A	M	8	10/2017	10/2020	U	U	U	4	YES
MW-6B	E	53	10/2017	10/2020	0.13	0.32	0.31	4	YES
MW-6C	M	13	10/2009	10/2019	U	U	U	4	YES
MW-6D	M	11	10/2009	10/2019	U	U	U	4	YES
MW-7B	M	11	10/2017	10/2020	U	0.27	0.19	4	YES
MW-7C	M	6	05/1995	10/2009	U	0.8	U	4	YES

Appendix G-2.4 - Remediation Monitoring Analysis
1,1,1-TRICHLOROETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (200 ug/L)	Remediation Monitoring Phase is Completed ? [a]
MW-8B	M	15	10/2010	10/2017	U	0.3	0.3	4	YES
MW-9B	M	18	10/2012	10/2017	0.19	0.29	0.22	4	YES
MW-9C	M	13	10/2017	10/2020	U	0.14	0.14	4	YES
MW-10B	E	55	04/2019	10/2020	U	0.09	U	4	YES
MW-10C	E	55	10/2017	10/2020	U	0.08	U	4	YES
MW-12C	M	29	10/2014	10/2019	U	U	U	4	YES
MW-13C	M	32	10/2016	10/2019	U	U	U	4	YES
PW-1B	E	63	10/2017	10/2020	U	0.17	U	4	YES
Intermediate Wells									
AMW-59	E/O	18	10/2019	10/2020	U	U	U	4	YES
AMW-60	M	8	10/2017	10/2020	U	U	U	4	YES
CPU-14	M	39	10/2017	10/2020	0.13	0.26	0.13	4	YES
MW-14C*	E/M	64	10/2019	10/2020	U	0.1	U	4	YES
MW-14E*	E/M	66	10/2019	10/2020	U	0.1	0.1	4	YES
MW-15E	M	30	10/2015	10/2019	U	0.41	U	4	YES
MW-18D	E/M	63	10/2019	10/2020	U	U	U	4	YES
MW-18E	E/O	40	04/2019	10/2020	U	U	U	4	YES
MW-19D*	E/M	62	10/2019	10/2020	U	U	U	4	YES
MW-20D	E	62	04/2019	10/2020	U	0.13	U	4	YES
MW-38	M	16	10/2017	10/2020	U	0.24	U	4	YES
MW-40	M	9	10/2008	10/2019	U	0.27	U	4	YES
PZ-39	PZ	20	10/2017	10/2020	0.46	0.61	0.61	4	YES
Church of God Wells									
AMW-27	M	52	04/2015	10/2016	U	0.16	0.16	4	YES
AMW-61	M	17	10/2017	10/2020	U	0.12	U	4	YES
CPU-12	M	36	10/2015	10/2019	U	0.12	0.09	4	YES
CPU-13	E/O	53	04/2013	10/2014	U	U	U	4	YES
MW-21D	E/O	65	04/2019	10/2020	U	0.48	U	4	YES
MW-22D	E	58	10/2017	10/2020	U	U	U	4	YES
MW-25D	E/O	53	10/2012	10/2014	0.11	0.17	0.11	4	YES
MW-26D	E/O	52	10/2012	10/2014	U	U	U	4	YES
MW-27D	E/M	44	10/2011	10/2014	U	0.1	U	4	YES
MW-49	E/O	30	10/2012	10/2014	U	0.09	U	4	YES
Toe Wells									
AMW-42	M	39	10/2009	10/2014	U	0.14	U	4	YES
MW-31	M	26	10/2008	10/2012	U	0.26	U	4	YES
MW-35	M	43	10/2015	04/2017	U	0.12	0.12	4	YES
MW-41	M	45	10/2010	10/2017	U	U	U	4	YES
MW-48	M	31	10/2006	10/2009	U	U	U	4	YES
Troutdale Wells									
AMW-24	M/D	31	10/2017	10/2020	0.1	0.12	0.11	4	YES
MW-33	M/D	31	10/2017	10/2020	U	0.082	U	4	YES
BENNETT	M	27	10/2017	10/2020	U	0.056	U	4	YES

Appendix G-2.4 - Remediation Monitoring Analysis
1,1,1-TRICHLOROETHANE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (200 ug/L)	Remediation Monitoring Phase is Completed ? [a]

NOTES:

[a] The "Remediation Monitoring Phase is Completed" determinations are per EPA Guidance (EPA 2013) based on the most recent four sample data points for each COC. The remediation monitoring phase is completed when the last four sample concentrations are lower than the cleanup level.

* The pumps in wells MW-14C and MW14E were turned off and removed on 10/16/2019; and the pump in well MW-19D was turned off and removed 10/14/2019.

COC = Contaminant of Concern.
E = Extraction well.
E/M = Extraction well with pump pulled; now sampled as a monitoring well.
E/O = Extraction well with pump turned off; pump is turned on for sampling.
EPA = U.S. Environmental Protection Agency.
M = Monitoring well.
M/D = Monitoring well with dedicated pump installed.
U = Analyte not detected above the specified reporting limit.
µg/L = Micrograms per liter.

Appendix G-2.5 - Remediation Monitoring Analysis
CARBON TETRACHLORIDE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed ? [a]
Closure Monitoring Program Wells									
Upgradient Wells									
AMW-8A	M	38	10/2014	10/2019	U	U	U	4	YES
TCE Source Wells									
AMW-1A	M	62	10/2018	04/2020	U	0.55	U	4	YES
AMW-1B	M	31	01/2009	10/2010	U	U	U	4	YES
AMW-1C	M	24	10/2007	10/2009	U	U	U	4	YES
AMW-2A	M	65	10/2018	04/2020	U	0.16	U	4	YES
AMW-2B	M	36	10/2012	10/2015	U	U	U	4	YES
AMW-3A	M	48	10/2015	10/2019	U	U	U	4	YES
AMW-4A	M	16	10/2017	10/2020	U	U	U	4	YES
AMW-12A	M	64	04/2019	10/2020	U	U	U	4	YES
AMW-13A	M	45	10/2012	10/2015	U	U	U	4	YES
AMW-19A	M	43	10/2013	10/2017	U	U	U	4	YES
AMW-26	M	29	10/2010	10/2017	U	U	U	4	YES
AMW-52A	M	28	10/2012	10/2015	U	U	U	4	YES
AMW-53A	M	49	05/2019	10/2020	U	U	U	4	YES
AMW-54A	M	30	10/2013	10/2017	U	U	U	4	YES
AMW-55A	M	23	10/2012	10/2015	U	U	U	4	YES
AMW-56A	M	29	10/2013	10/2017	U	U	U	4	YES
MW-1A	M	63	10/2018	04/2020	U	U	U	4	YES
MW-1B	M	26	10/2006	10/2009	U	U	U	4	YES
MW-1C	M	20	10/2006	10/2009	U	U	U	4	YES
Proximal Wells									
AMW-58	M	9	10/2006	10/2012	U	U	U	4	YES
MW-2A	M	27	10/2011	10/2016	U	U	U	4	YES
MW-2B	M	18	10/2017	10/2020	U	U	U	4	YES
MW-2C	M	8	10/2002	10/2009	U	U	U	4	YES
MW-3A	M	19	05/2004	10/2008	U	U	U	4	YES
MW-3B	M	15	10/2010	10/2016	U	U	U	4	YES
MW-3C	M	10	10/2004	10/2019	U	U	U	4	YES
MW-4A	M	23	10/2017	10/2020	U	U	U	4	YES
MW-4B	M	16	10/2011	10/2016	U	U	U	4	YES
MW-4BSHED	M	16	10/2004	10/2019	U	U	U	4	YES
MW-4C	M	11	10/2009	10/2019	U	U	U	4	YES
MW-6A	M	8	10/2017	10/2020	U	U	U	4	YES
MW-6B	E	53	10/2017	10/2020	U	U	U	4	YES
MW-6C	M	13	10/2009	10/2019	U	U	U	4	YES
MW-6D	M	11	10/2009	10/2019	U	U	U	4	YES
MW-7B	M	11	10/2017	10/2020	U	U	U	4	YES
MW-7C	M	6	05/1995	10/2009	U	U	U	4	YES
MW-8B	M	15	10/2010	10/2017	U	U	U	4	YES

Appendix G-2.5 - Remediation Monitoring Analysis
CARBON TETRACHLORIDE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed ? [a]
MW-9B	M	18	10/2012	10/2017	U	U	U	4	YES
MW-9C	M	13	10/2017	10/2020	U	U	U	4	YES
MW-10B	E	55	04/2019	10/2020	U	U	U	4	YES
MW-10C	E	55	10/2017	10/2020	U	U	U	4	YES
MW-12C	M	29	10/2014	10/2019	U	U	U	4	YES
MW-13C	M	32	10/2016	10/2019	U	U	U	4	YES
PW-1B	E	63	10/2017	10/2020	U	U	U	4	YES
Intermediate Wells									
AMW-59	E/O	18	10/2019	10/2020	U	U	U	4	YES
AMW-60	M	8	10/2017	10/2020	U	U	U	4	YES
CPU-14	M	39	10/2017	10/2020	U	U	U	4	YES
MW-14C*	E/M	64	10/2019	10/2020	U	U	U	4	YES
MW-14E*	E/M	66	10/2019	10/2020	U	U	U	4	YES
MW-15E	M	30	10/2015	10/2019	U	U	U	4	YES
MW-18D	E/M	63	10/2019	10/2020	U	U	U	4	YES
MW-18E	E/O	40	04/2019	10/2020	U	U	U	4	YES
MW-19D*	E/M	62	10/2019	10/2020	U	U	U	4	YES
MW-20D	E	62	04/2019	10/2020	U	U	U	4	YES
MW-38	M	16	10/2017	10/2020	U	U	U	4	YES
MW-40	M	9	10/2008	10/2019	U	U	U	4	YES
PZ-39	PZ	20	10/2017	10/2020	U	U	U	4	YES
Church of God Wells									
AMW-27	M	52	04/2015	10/2016	U	U	U	4	YES
AMW-61	M	17	10/2017	10/2020	U	U	U	4	YES
CPU-12	M	36	10/2015	10/2019	U	U	U	4	YES
CPU-13	E/O	53	04/2013	10/2014	U	U	U	4	YES
MW-21D	E/O	65	04/2019	10/2020	U	U	U	4	YES
MW-22D	E	58	10/2017	10/2020	U	U	U	4	YES
MW-25D	E/O	53	10/2012	10/2014	U	U	U	4	YES
MW-26D	E/O	52	10/2012	10/2014	U	U	U	4	YES
MW-27D	E/M	44	10/2011	10/2014	U	U	U	4	YES
MW-49	E/O	30	10/2012	10/2014	U	U	U	4	YES
Toe Wells									
AMW-42	M	39	10/2009	10/2014	U	U	U	4	YES
MW-31	M	26	10/2008	10/2012	U	U	U	4	YES
MW-35	M	43	10/2015	04/2017	U	U	U	4	YES
MW-41	M	45	10/2010	10/2017	U	U	U	4	YES
MW-48	M	31	10/2006	10/2009	U	U	U	4	YES
Troutdale Wells									
AMW-24	M/D	31	10/2017	10/2020	U	U	U	4	YES
MW-33	M/D	31	10/2017	10/2020	U	U	U	4	YES
BENNETT	M	27	10/2017	10/2020	U	U	U	4	YES

Appendix G-2.5 - Remediation Monitoring Analysis
CARBON TETRACHLORIDE (Last 4 Samples)

Well Name	Well Type	Total Number of Datapoints	Date of First of the Most Recent Four Samples	Most Recent Sample Date	Min. Conc. (ug/L)	Max. Conc. (ug/L)	Most Recent Conc. (ug/L)	Number of Conc. < Cleanup Goal (1 ug/L)	Remediation Monitoring Phase is Completed ? [a]

NOTES:

[a] The "Remediation Monitoring Phase is Completed" determinations are per EPA Guidance (EPA 2013) based on the most recent four sample data points for each COC. The remediation monitoring phase is completed when the last four sample concentrations are lower than the cleanup level.

* The pumps in wells MW-14C and MW14E were turned off and removed on 10/16/2019; and the pump in well MW-19D was turned off and removed 10/14/2019.

COC = Contaminant of Concern.
E = Extraction well.
E/M = Extraction well with pump pulled; now sampled as a monitoring well.
E/O = Extraction well with pump turned off; pump is turned on for sampling.
EPA = U.S. Environmental Protection Agency.
M = Monitoring well.
M/D = Monitoring well with dedicated pump installed.
U = Analyte not detected above the specified reporting limit.
µg/L = Micrograms per liter.

Appendix H

Northern Plume Monitoring Summary

This page intentionally left blank.

APPENDIX H
NORTHERN PLUME MONITORING SUMMARY

1. INTRODUCTION

This summary presents the analytical results from the latest round of sampling of monitoring wells in the area of the Northern Plume. This plume is north of the Boomsnub/Airco Superfund Site (Site) Operable Unit (OU)-3 trichloroethene (TCE) and chromium plumes, which are referred to collectively as the OU-3 plume. Previous sampling results for wells in the Northern Plume area were reported in Appendix G of the *Boomsnub/Airco Superfund Site Progress and Groundwater Monitoring Reports and Appendix D of Annual Status Reports for the Boomsnub/Airco Superfund Site* [1]. Northern Plume monitoring well locations are shown on Figure H-1.

Monitoring data indicate that the OU-3 TCE and chromium plumes had shown significant decreases in concentration and size since 1995[2]. In 2007 and 2008, however, routine monitoring data showed an unexpected increase in the TCE concentration in groundwater samples from well AMW-18, located north of the boundary of the OU-3 plume.

In May 2008, a direct push drilling and sampling investigation was performed to evaluate the depth and concentration of TCE in groundwater in the vicinity of well AMW-18, and to evaluate possible source areas for the TCE detected in this well. The source of the TCE groundwater contamination in this area was not identified; however, based on the data, it was concluded that the source was not from the same source as the OU-3 plume[3]. The Work Plan[4] for this investigation noted that an offsite source of TCE originating from the Permalume property immediately east and upgradient of the Messer gas plant property impacted monitoring well AMW-8A, which is located at the eastern boundary of the Messer Property and is approximately 700 feet northeast of the Boomsnub/Airco Site TCE Source Area. AMW-8A and the Permalume property are located upgradient of Northern Plume well AMW-18, and the results of the AMW-18 Area Investigation support a finding of the Permalume property as the source of the Northern Plume.

Well AMW-17 is located approximately 400 feet downgradient of well AMW-18. TCE concentrations in this well had been below the Site-specific cleanup level of 5 micrograms per liter (µg/L) since 1999. However, in Fall 2010, TCE in groundwater from this well increased to a concentration exceeding the cleanup level, indicating the apparent arrival of the Northern Plume at the AMW-17 location.

---

[1] *Boomsnub/Airco Superfund Site Progress and Groundwater Monitoring Reports: April-June 2016; July-December 2016; April-June 2017; July-December 2017; 2018 Annual Status Report for the Boomsnub/Airco Superfund Site,* Revision 0. March 2019. 2019 *Annual Status Report for the Boomsnub/Airco Superfund Site,* Revision 0. March 2020.

[2] *2019 Annual Status Report for the Boomsnub/Airco Superfund Site,* Revision 0. March 2020.

[3] *AMW-18 Area Investigation Report, Boomsnub/Airco Superfund Site*. Revision 0. August 2008.

[4] *Work Plan, AMW-18 Area Investigation, Boomsnub/Airco Superfund Site,* Revision 0. April 2008.

The U.S. Environmental Protection Agency (EPA) and Messer LLC (Messer), formerly Linde LLC (Linde) performed a joint investigation of the Northern Plume area in May 2011 to get a better understanding of the source, extent, and concentrations of volatile organic compounds (VOCs) in this plume. Results were provided in a separate report[5]. The report concluded that the Northern Plume contamination is not the result of actions by Messer or its predecessors. Therefore, EPA is leading efforts to characterize and remediate the Northern Plume.

A new monitoring well (AMW-64) was installed in February 2012, at the request of the EPA, to monitor the Northern Plume northwest of well AMW-17. Analytical results for groundwater samples collected from this well shortly after installation indicated TCE concentrations above the Site cleanup level.

Well MW-38 is located approximately 400 feet west-southwest (generally downgradient) of well AMW-17. Well MW-38 was installed as part of a groundwater treatment pilot study in 1998; this well has not been sampled historically as part of the OU-3 monitoring. However, beginning in October 2010, EPA requested that Messer sample well MW-38 as part of the Northern Plume investigation/monitoring. TCE concentrations detected in groundwater samples from well MW-38 during October 2010 through October 2012 were above the Site-specific cleanup level, but on a decreasing trend (based on four groundwater samples). However, in October 2013, the TCE concentration increased approximately one order of magnitude, indicating the apparent arrival of the Northern Plume at well MW-38.

Well AMW-16 is located approximately 600 feet west-northwest (downgradient) of well AMW-17. Well AMW-16 is located near the northern edge of the historic OU-3 TCE plume. TCE concentrations in groundwater from this well had been on a decreasing trend since the well was first sampled in 1995. TCE concentrations had been below the Site-specific cleanup level since 2005. However, in Spring 2014, TCE in groundwater from this well increased to a concentration exceeding the cleanup level, indicating the apparent arrival of the Northern Plume at the AMW-16 location.

Well MW-23D is located approximately 500 feet west-northwest (downgradient) of well AMW-16. Well MW-23D is located near the northern edge of the historic OU-3 TCE plume. TCE concentrations in groundwater from this well had been on a decreasing trend since the late 1990s. TCE concentrations had been below the Site-specific cleanup level since 2006. However, during the Fall 2015 sampling event, TCE in groundwater from this well increased to a concentration exceeding the cleanup level, indicating the apparent arrival of the Northern Plume at the MW-23D location. AMW-23 is the next well downgradient from MW-23D, located approximately 1,300 feet northwest of MW-23D. Concentrations of TCE in this well were below the cleanup level for TCE until October 2018, when the measured concentration was 8 µg/L. The TCE concentration in this well was below the cleanup level again in 2019.
Well MW-21D is located approximately 200 feet south of well MW-23D. TCE concentrations in groundwater from this were on a decreasing trend from 1995 to 2017, with concentrations dropping below the 5 µg/L MCL in 2013. In 2018, concentrations began rising above the MCL,

[5] *Northern Plume Investigation Report, Hazel Dell, Washington*. Revision 1. December 2011.

indicating the arrival of the Northern Plume at the MW-21D location.

The Northern Plume continues to be monitored along with the OU-3 plume to evaluate potential impacts to the Site and treatment system. Wells AMW-16, AMW-17, AMW-18, AMW-23, AMW-64, and MW-23D are currently being sampled using passive diffusion bag samplers. Wells MW-21D and MW-38 are currently being sampled using low-flow techniques with a submersible pump.

Well construction details, along with water level measurements during the Fall 20020 sampling event, are summarized in Table H-1. Water levels measured during Fall 2020 were approximately 2 to 3½ feet higher than those measured during Fall 2019.

2. ANALYTICAL RESULTS

A summary of the VOCs detected in Fall (October) 2020 Northern Plume area monitoring well groundwater samples is provided in Table H-2. All eight Northern Plume impacted monitoring wells (AMW-16, AMW-17, AMW-18, AMW-23, AMW-64, MW-21D, MW-23D and MW-38) were sampled during the 2020 reporting period. TCE concentrations exceeded the Site-specific cleanup level of 5 µg/L in groundwater samples from six of the eight Northern Plume impacted monitoring wells period (AMW-16, AMW-17, AMW-18, AMW-64, MW-23D and MW-38).

MW-38 and MW-21D both experienced rising TCE values between 2017 and 2019, and then decreasing TCE values between 2019 and 2020. Given their location at the edge of the Northern Plume it was determined that incursion of the Northern Plume into these wells was the logical and most-probable cause, and after discussion with the EPA they were moved into the Northern Plume monitoring program in 2019. Further monitoring will be needed to determine if the return to decreasing values seen in 2020 are a temporary or a lasting trend.

Historical VOC analytical results for Northern Plume wells, and wells potentially impacted by the Northern Plume are summarized in Tables H-3 (AMW-16), H-4 (AMW-17), H-5 (AMW-18), H-6 (AMW-23), H-7 (AMW-64), H-8 (MW-21D), H-9 (MW-23D), and H-10 (MW-38). The Fall 2020 TCE results for these eight wells are also indicated on Figure H-1. No quality assurance/quality control issues were noted which would impact the analytical results.

2.1 Well AMW-16

TCE was detected at a concentration of 36 µg/L in the groundwater sample collected from well AMW-16 in Fall 2019 and dropped to a concentration of 23 µg/L during the Fall 2020 sampling event (Table H-3). TCE concentrations in this well appear to be fluctuating. 1,1,1-trichloroethane (TCA) and 1,1-DCE were the other VOCs detected, but at concentrations below the cleanup levels.

2.2 Well AMW-17

TCE was detected at a concentration of 55 µg/L in the groundwater sample collected from well AMW-17 in Fall 2020 (Table H-4). This is an increase from the concentration detected in Spring 2019 (48 µg/L). TCE concentrations in this well appear to be fluctuating. Tetrachloroethane (PCE) and 1,1,1-TCA were the other VOCs detected, but at concentrations below the cleanup level.

2.3 Well AMW-18

TCE concentrations in groundwater collected from well AMW-18 dropped below the cleanup level (5 µg/L) in Fall 2018 (Table H-5), for the first time since it exceeded the cleanup level in Fall 2006. TCE concentrations were above the cleanup level in Fall 2019 (18 µg/L) and remained above the cleanup level during Fall 2020 (16 µg/L). No other VOCs were detected in Fall 2020.

2.4 Well AMW-23

Concentrations in well AMW-23 exceeded the cleanup level for TCE for the first time in October 2018 at 8 µg/L, potentially indicating the arrival of the Northern Plume. Well AMW-23 had TCE concentrations below the cleanup level in Spring and Fall 2019 and in Fall 2020.

2.5 Well AMW-64

TCE was detected at a concentration of 13 µg/L in the groundwater sample collected from well AMW-64 in Spring 2018, significantly increased to a concentration of 71 µg/L in Fall 2018, then significantly decreased to 9.9 µg/L in Fall 2019 and decreased again to 7.1 µg/L in Fall 2020 (Table H-7). Historically, concentrations in this well have steadily decreased. No other VOCs were detected in Fall 2020.

2.6 Well MW-21D

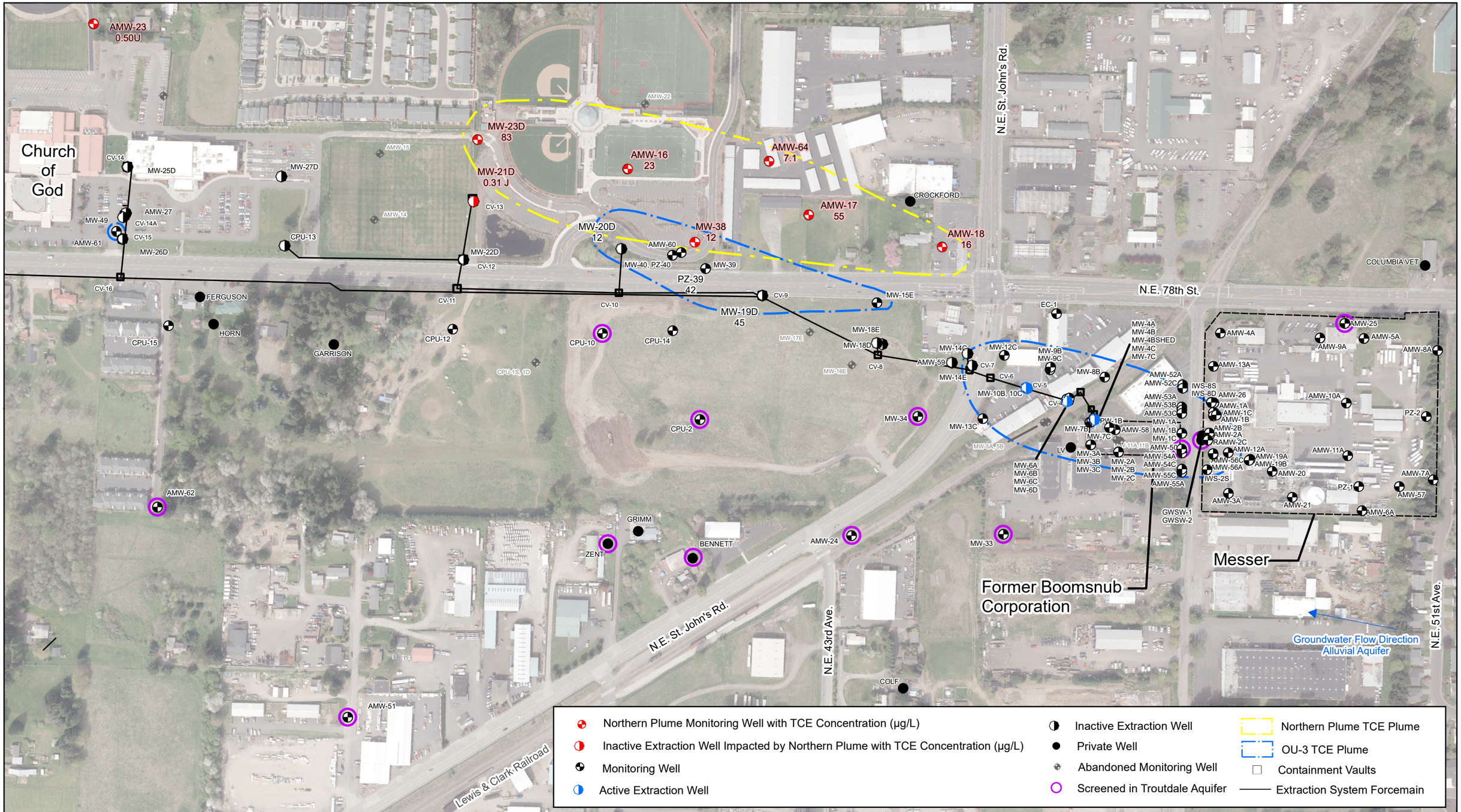
TCE was detected at a concentration of 15 µg/L in the groundwater sample collected from well MW-21D in in October 2018, potentially indicating influence of the Northern Plume in this well. TCE concentrations remained above the cleanup level in 2019 (15 µg/L and 9.1 µg/L) and Spring 2020 (7.1 µg/L) but decreased to 0.31 J µg/L in the groundwater sample collected in Fall 2020 (Table H-8). No other VOCs were detected in Fall 2020.

2.7 Well MW-23D

TCE was detected at a concentration of 83 µg/L in the groundwater sample collected from well MW-23D in Fall 2020 (Table H-9). This is a decrease from the concentration detected in Fall 2019 (130 µg/L). 1,1-DCE and 1,1,1-TCA were the other VOC detected, but at concentrations below the cleanup level.

2.8 Well MW-38

TCE was detected at a concentration of 12 µg/L in the groundwater sample collected from well MW-38 in Fall 2020 (Table H-10). This is a decrease from the concentrations detected in Fall 2019 (28 µg/L). 1,1-DCE, PCE, and CFC-11 were the other VOC detected, but at concentrations below the cleanup level.



EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121
Phone: (206) 452-5350
Fax: (206) 443-7646

Feet
0 140 280 560

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 1611303
File Location: \\seattlefp\Projects\0_Messer GIS\Messer Reports\ANNUAL2020_Maps\Fig_H1_TCE_NorthPlume_2020_10.7.mxd
File Name: Fig_H1_TCE_NorthPlume_2020_10.7

FIGURE H-1
NORTHERN PLUME MONITORING WELL LOCATIONS AND TRICHLOROETHENE CONCENTRATIONS, FALL 2020

Table H-1. Summary of Water Level Gauging Data and Groundwater Surface Elevations – Fall 2020

Well ID	Well Type	Total Depth (ft btoc)	Screened Interval (ft btoc)	Screen Length (ft)	PDB Sampler Interval (ft btoc)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
AMW-16	M	92.13	81.13 – 91.13	10	87.28 – 89.28	266.11	20.70	248.25
AMW-17	M/D	90.55	81 – 91	10	87 – 89	260.42	12.92	250.44
AMW-18	M	103.65	92.65 – 102.65	10	99.5 – 101.5	278.80	30.16	251.51
AMW-23	M	85	75 – 85	10	79 – 81.06	278.26	40.40	241.06
AMW-64	M	98.7	88.4 – 98.4	10	92.9 – 94.9	266.13	19.32	249.75
MW-23D	M	88.06	71.86 – 86.86	15	78.65 – 80.65	265.33	21.72	246.37
MW-21D	E	75.4	64.4 – 74.4	10	NA	265.98	23.92	231.05
MW-38	M	81.92	76.92 – 81.92	5	78 – 80	263.92	17.63	249.07

NOTES:

btoc	=	Below top of casing
ft	=	Feet
E	=	Extraction Well
M	=	Monitoring well
M/D	=	Monitoring well with dedicated pump
MSL	=	Mean sea level
NA	=	Not applicable
PDB	=	Passive diffusion bag
TOC	=	Top of casing

Groundwater surface elevation is determined by subtracting the depth to water from the top-of-casing elevation.

Table H-2. Volatile Organic Compounds Detected in Groundwater Samples (in µg/L) Fall 2020

Well ID	Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
AMW-16	Fall 2020	**23**	0.5 U	0.29 J	0.22 J	0.5 U	0.5 U
AMW-17	Fall 2020	**55**	0.25 J	0.11 J	0.5 U	0.5 U	0.5 U
AMW-18	Fall 2020	**16**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AMW-23	Fall 2020	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AMW-64	Fall 2020	**7.1**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-21D	Fall 2020	0.31 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-23D	Fall 2020	**83**	0.5 U	0.61	0.91	0.5 U	0.5 U
MW-38	Fall 2020	**12**	0.57	0.5 U	0.32 J	0.5 U	0.2 J
Cleanup Level		5	5	200	1	70	2400

NOTES:

Only detected compounds are shown.

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

µg/L = Micrograms per liter

Table H-3. Historical VOC Concentrations in Well AMW-16 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-95	**87**	1 U	7.7	**16.6**	23.4	365 J
Oct-95	**68.7**	1 U	7.2	**16.8**	29.5	345 J
May-96	**73.8**	1 U	5.8	**12.2**	24.5	243
Oct-96	**65.2**	1 U	5	**8.8**	29.5	70.7
May-97	**50.4**	1 U	3.1	**4.8**	29.2	88.6 J
Oct-97	**52**	0.4 U	2	0.4 U	--	50
May-98	**47**	0.6 U	2 U	**2**	15	20
Sep-98	**37**	0.6 UJ	2 U	**3**	14	14
May-00	**31**	0.5 U	3.5	**1.8**	4.5	15
Oct-00	**23**	0.5 U	2.3	**1.4**	2.9	6.4
Oct-01	**13**	0.5 U	2.4	0.99	0.84	1.3
Oct-02	**9**	0.5 U	1.2	0.97	0.56	0.58
Oct-03	**7**	0.5 U	0.69	0.91	0.59	0.53
Oct-04	**5.1**	0.5 U	0.63	0.64	0.5	0.29 J
Oct-05	5	0.5 U	0.38 J	0.49 J	0.52	0.33 J
Oct-06	3.6	0.5 U	0.17 J	0.38 J	0.36 J	0.26 J
Oct-07	2.7	0.5 U	0.12 J	0.26 J	0.31 J	0.5 U
Oct-08	2.7	0.5 U	0.1 J	0.22 J	0.27 J	0.12 J
Oct-09	2.2	0.5 U	0.09 J	0.25 J	0.23 J	0.23 J
Oct-10	1.7	0.5 U	0.5 U	0.5 U	0.19 J	0.5 U
Oct-11	1.6	0.5 U	0.13 J	0.14 J	0.12 J	0.5 U
Apr-12	0.17 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Oct-12	1.8	0.5 U	2.2	0.66	0.23 J	0.5 U
Apr-13	2	0.5 U	2.8	**1.4**	0.16 J	0.5 U
Oct-13	4.4	0.5 U	1.9	**2**	0.15 J	0.5 U
Apr-14	**27**	0.5 U	1.1	**1.2**	0.11 J	0.5 U
Oct-14	**72**	0.5 U	1.1	**1.3**	0.15 J	0.5 U
Apr-15	**94**	0.5 U	0.53	0.85	0.11 J	0.5 U
Oct-15	**80**	0.5 U	0.34 J	0.65	0.12 J	0.5 U
Apr-16	**71**	0.5 U	0.20 J	0.47 J	0.1 J	0.5 U
Oct-16	**67**	0.5 U	0.19 J	0.48 J	0.08 J	0.5 U
Apr-17	**53**	0.5 U	0.16 J	0.43 J	0.09 J	0.5 U
Oct-17	**41**	0.083 J	0.15 J	0.36 J	0.5 U	0.5 U
Apr-18	**45**	0.5 U	0.12 J	0.35 J	0.07 J	0.5 U
Oct-18	**13**	0.5 U	0.5 U	0.5 U	0.17 J	0.5 U
Apr-19	**39**	0.5 U	0.23 J	0.35 J	0.12 J	0.5 U
Oct-19	**36**	0.5 U	0.19 J	0.35 J	0.09 J	0.5 U
Oct-20	**23**	0.5 U	0.29 J	0.22 J	0.5 U	0.5 U
Cleanup Level	5	5	200	1	70	2,400

Table H-3. Historical VOC Concentrations in Well AMW-16 Groundwater Samples (in µg/L)

NOTES:

Only detected compounds are included in this table.

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

Concentrations presented are the highest of the sample and duplicate results, where applicable.

-- = Not available

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

UJ = The analyte was not detected, but the associated limit of quantitation is estimated.

µg/L = Micrograms per liter

VOC = Volatile organic compound

Table H-4. Historical VOC Concentrations in Well AMW-17 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-95	**66.9**	1 U	5.8	**1.6 J**	21	10.6
Oct-95	**42.5**	1 U	36.1	**5.4**	12.7	19.2 J
May-96	**39.6**	1 U	52.6	**9.7**	9.2	10.1
Oct-96	**20.5**	1 U	169	**25.9**	3.5	19.7
May-97	**17.3**	1 U	89.6	**23.8**	2.1	23.3
Oct. 97	**12**	0.4 U	67	**9**	--	14
May-98	**7**	0.6 U	48	**9**	0.7 U	9
Sep-98	**8**	0.6 U	52	**9**	0.7 U	6
May-99	**5**	0.6 UJ	12 J	**8.0 J**	0.7 UJ	5 J
Oct-99	3.4	0.5 U	3	**1.2**	0.5 U	0.5
Oct-01	2.7	0.5 U	4.2	**1.8**	0.39 J	0.52
Oct-02	2.3	0.5 U	2.2	0.74	0.22 J	0.35 J
Oct-03	2.2	0.5 U	1.1	0.45 J	0.12 J	0.25 J
Oct-04	1.8	0.5 U	0.9	0.32 J	0.5 U	0.19 J
Oct-05	1.9	0.5 U	0.85	0.29 J	0.5 U	0.5 U
Oct-06	1.5	0.5 U	0.69	0.23 J	0.5 U	0.5 U
Oct-07	1.5	0.5 U	1.1	0.5 U	0.5 U	0.5 U
Oct-08	1.2	0.09 J	0.2 J	0.5 U	0.5 U	0.5 U
Jan-09	1.1	0.09 J	0.17 J	0.5 U	0.5 U	0.5 U
May-09	1.3	0.08 J	0.31 J	0.13 J	0.5 U	0.5 U
Oct-09	1.2	0.07 J	0.8	0.22 J	0.5 U	0.5 U
Apr-10	1.1	0.09 J	1	0.33 J	0.5 U	0.5 U
Oct-10	**28**	0.21 J	2.6	**1.4**	0.5 U	0.5 U
Apr-11	**29**	0.27 J	1.3	0.89	0.5 U	0.5 U
Oct-11	**140**	0.68	2.3	1	0.5 U	0.5 U
Mar-12	**160**	0.81	1.5	0.82	0.5 U	0.5 U
Apr-12	**160**	0.85	1.3	0.76	0.5 U	0.5 U
Jul-12	**210**	1	2.3	**1.1**	0.5 U	0.5 U
Oct-12	**210**	0.90	2.5	**1.2**	0.5 U	0.5 U
Jan-13	**220**	0.87	1.8	**1.1**	0.5 U	0.5 U
Apr-13	**240**	0.83	2	1	0.5 U	0.5 U
Jul-13	**230**	0.82	2	0.94	0.5 U	0.5 U
Oct-13	**180**	0.59	1.4	0.69	0.5 U	0.5 U
Jan-14	**180**	0.54	0.97	0.55	0.5 U	0.5 U
Apr-14	**130**	0.46 J	0.82	0.34 J	0.5 U	0.5 U
Jul-14	**150**	0.67	1.1	0.54	0.5 U	0.5 U
Oct-14	**120**	0.57	0.86	0.41 J	0.5 U	0.5 U
Apr-15	**120**	0.49 J	0.75	0.33 J	0.5 U	0.5 U

Table H-4. Historical VOC Concentrations in Well AMW-17 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Oct-15	**110**	0.40 J	0.57	0.29 J	0.5 U	0.5 U
Apr-16 upper[a]	**63**	0.34 J	0.35 J	0.17 J	0.5 U	0.5 U
Apr-16 lower[a]	**64**	0.35 J	0.34 J	0.17 J	0.5 U	0.5 U
Oct-16 upper[a]	**74**	0.35 J	0.28 J	0.15 J	0.5 U	0.5 U
Oct-16 lower[a]	**96**	0.44 J	0.34 J	0.27 J	0.5 U	0.5 U
Apr-17	**70**	0.38 J	0.39 J	0.12 J	0.5 U	0.5 U
Oct-17	**79**	0.37 J	0.25 J	0.12 J	0.5 U	0.5 U
Apr-18	**65**	0.3 J	0.22 J	0.1 J	0.5 U	0.5 U
Oct-18	**23**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Apr-19	**66**	0.32 J	0.29 J	0.11 J	0.5 U	0.5 U
Oct-19	**48**	0.18 J	0.19 J	0.5 U	0.5 U	0.5 U
Oct-20	**55**	0.25 J	0.11 J	0.5 U	0.5 U	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

Only detected compounds are included in this table.

Concentrations presented are the highest of the sample and duplicate results, where applicable.

[a] = Two samplers were deployed in April and October 2016 - one near the top of the screened interval (upper) and one near the bottom (lower).

-- = Not available

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

UJ = The analyte was not detected, but the associated limit of quantitation is estimated.

µg/L = Micrograms per liter

VOC = Volatile organic compound

Table H-5. Historical VOC Concentrations in Well AMW-18 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-95	0.73 J	1 U	2.9	0.87 J	1 U	1 UJ
Oct-95	0.3 J	1 U	1	0.53 J	1 U	1 U
May-96	1 U	1 U	0.52 J	1 U	1 U	1 U
Oct-96	0.31 J	1 U	0.48 J	1 U	1 U	1 U
May-97	0.43 J	1 U	0.44 J	1 U	1 U	1 UJ
Oct. 97	0.3 U	0.4 U	0.4 U	0.4 U	--	0.5 U
May-98	0.5 U	0.6 U	2 U	1 U	0.7 U	2 U
Oct-01	1.1	0.15 J	0.19 J	0.12 J	0.5 U	0.5 U
Oct-02	1.1	0.26 J	0.25 J	0.5 U	0.5 U	0.5 U
Oct-03	0.95	0.29 J	0.17 J	0.5 U	0.5 U	0.5 U
Oct-04	0.64	0.28 J	0.17 J	0.5 U	0.5 U	0.5 U
Oct-05	0.62	0.24 J	0.78	0.13 J	0.5 U	0.5 U
Oct-06	**5.1**	0.43 J	2.4	0.78	0.5 U	0.5 U
Oct-07	**330**	1.6	6.5	**2.7**	0.5 U	0.5 U
Dec-07	**410**	2.1	7.5	**2.9**	0.5 U	0.5 U
Jan-08 upper [a]	**430**	1.9	6.9	**2.6**	1 U	1.0 U
Jan-08 lower [a]	**460**	1.9	6.9	**2.7**	1 U	1 U
May-08	**460**	2.3	6	**2.4**	0.5 U	0.5 U
Jul-08	**410**	1.4	4.8	**1.7**	1 U	1 U
Oct-08 [b]	**390**	1.4	4.5	**1.4**	1 U	1 U
Jan-09	**300**	1.5	3.2	**1.3**	0.5 U	0.5 U
May-09	**320**	1.4	2.6	**1.1**	0.5 U	0.5 U
Oct-09	**210**	0.75	1.8	0.75	0.5 U	0.5 U
Apr-10	**200**	0.66	2.1	0.61	0.5 U	0.5 U
Oct-10	**130**	0.47 J	0.85	0.35 J	0.5 U	0.5 U
Apr-11	**75**	0.31 J	0.71	0.18 J	0.5 U	0.5 U
Oct-11	**68**	0.29 J	0.56	0.18 J	0.5 U	0.22 J
Mar-12	**52**	0.2 J	0.37 J	0.09 J	0.5 U	1
Apr-12	**52**	0.19 J	0.29 J	0.09 J	0.5 U	0.53
Jul-12	**53**	0.22 J	0.3 J	0.5 U	0.5 U	0.6
Oct-12	**39**	0.15 J	0.16 J	0.5 U	0.5 U	0.43 J
Jan-13	**48**	0.17 J	0.1 J	0.5 U	0.5 U	0.4 J
Apr-13	**44**	0.15 J	0.08 J	0.5 U	0.5 U	0.26 J
Jul-13	**36**	0.2 J	0.11 J	0.5 U	0.5 U	0.19 J
Oct-13	**34**	0.15 J	0.11 J	0.5 U	0.5 U	0.15 J
Jan-14	**36**	0.11 J	0.09 J	0.5 U	0.5 U	0.5 U
Apr-14	**27**	0.5 U	0.08 J	0.5 U	0.5 U	0.5 U
Jul-14	**30**	0.18 J	0.16 J	0.5 U	0.5 U	0.5 U
Oct-14	**34**	0.12 J	0.16 J	0.5 U	0.5 U	0.5 U

Table H-5. Historical VOC Concentrations in Well AMW-18 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-15	**34**	0.11 J	0.18 J	0.5 U	0.5 U	0.5 U
Oct-15	**42**	0.11 J	0.17 J	0.5 U	0.5 U	0.5 U
Apr-16	**40**	0.14 J	0.1 J	0.5 U	0.5 U	0.5 U
Oct-16	**40**	0.1 J	0.09 J	0.5 U	0.5 U	0.5 U
Apr-17	**43**	0.14 J	0.13 J	0.5 U	0.5 U	0.5 U
Oct-17	**28**	0.13 J	0.081 J	0.5 U	0.5 U	0.062 J
Apr-18	**28**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Oct-18	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Apr-19	**20**	0.11 J	0.5 U	0.5 U	0.5 U	0.5 U
Oct-19	**18**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Oct-20	**16**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

Only detected compounds are included in this table.

Concentrations presented are the highest of the sample and duplicate results.

[a] = Two samplers were deployed in January 2008 - one near the top of the screened interval (upper) and one near the bottom (lower).

-- = Not available

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

UJ = The analyte was not detected, but the associated limit of quantitation is estimated.

µg/L = Micrograms per liter

VOC = Volatile organic compound

Table H-6. Historical VOC Concentrations in Well AMW-23 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Oct. 97	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U
May-98	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sep-98	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
May-99	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Oct-99	0.5 U	0.5 U	0.3 J	0.5 U	0.5 U	0.5 U
Oct-00	0.5 U	0.5 U	0.5 J	0.5 U	0.5 U	0.5 U
Oct-01	0.5 U	0.5 U	0.74	0.5 U	0.5 U	0.5 U
Oct-02	0.5 U	0.5 U	0.78	0.5 U	0.5 U	0.5 U
Oct-03	0.5 U	0.5 U	0.57	0.5 U	0.5 U	0.5 U
Oct-16	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Oct-17	0.1 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Oct-18	**8**	0.85	0.5 U	0.5 U	0.8 J	0.13 J
Apr-19	0.15 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Oct-19	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Oct-20	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:
Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.
Only detected compounds are included in this table.
Concentrations presented are the highest of the sample and duplicate results.
-- = Not available
CFC-11 = Trichlorofluoromethane
cis-1,2-DCE = cis-1,2-Dichloroethene
1,1-DCE = 1,1-Dichloroethene
J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
U = The analyte was not detected above the specified reporting limit.
UJ = The analyte was not detected, but the associated limit of quantitation is estimated.
µg/L = Micrograms per liter
VOC = Volatile organic compound

Table H-7. Historical VOC Concentrations in Well AMW-64 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Mar-12	**190**	0.27 J	3.5	**2.7**	0.11 J	0.5 U
Apr-12	**160**	0.31 J	1.7	**2.5**	0.43 J	0.5 U
Jul-12	**170**	0.4 J	2.4	**2.7**	0.68	0.5 U
Oct-12	**110**	0.27 J	1.2	**1.5**	1	0.5 U
Jan-13	**110**	0.24 J	0.79	**1.7**	1.2	0.5 U
Apr-13	**94**	0.23 J	0.57	**1.4**	1.4	0.5 U
Jul-13	**84**	0.26 J	0.33 J	**1.1**	1.5 *	0.5 U
Oct-13	**75**	0.29 J	0.24 J	1	1.5	0.5 U
Jan-14	Not Sampled (well inaccessible)					
Apr-14	**61**	0.18 J	0.1 J	0.59	1.6 *	0.5 U
Jul-14	**67**	0.26 J	0.16 J	0.65	1.8 *	0.5 U
Oct-14	**55**	0.2 J	0.16 J	0.46 J	1.6 *	0.5 U
Apr-15	**53**	0.21 J	0.12 J	0.35 J	1.3 *	0.5 U
Oct-15	**45**	0.21 J	0.09 J	0.2 J	1.2 *	0.5 U
Apr-16	**28**	0.18 J	0.5 U	0.11 J	0.65	0.5 U
Oct-16	**24**	0.18 J	0.5 U	0.09 J	0.61	0.5 U
Apr-17	**22**	0.17 J	0.13 J	0.5 U	0.39 J	0.5 U
Oct-17	**15**	0.15 J	0.5 U	0.034 J	0.35 J	0.5 U
Apr-18	**13**	0.5 U	0.11 J	0.5 U	0.22 J	0.5 U
Oct-18	**71**	0.24 J	0.16 J	0.17 J	0.5 U	0.23 J
Apr-19	**11**	0.11 J	0.14 J	0.5 U	0.07 J	0.5 U
Oct-19	**9.9**	0.1 U	0.11 J	0.5 U	0.09 J	0.5 U
Oct-20	**7.1**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

Concentrations presented are the highest of the sample and duplicate results, where applicable.

* Trans-1,2-dichloroethene was also detected during the following events: July 2013 at 0.28 J µg/L, April 2014 at 0.30 J µg/L, July 2014 at 0.32 J µg/L, October 2014 at 0.21 J µg/L, April 2015 at 0.15 J µg/L, and October 2015 at 0.080 J µg/L.

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

µg/L = Micrograms per liter

VOC = Volatile organic compound

Table H-8. Historical VOC Concentrations in Well MW-21D Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Jan-95	2,500 J	200 U	200 U	46 J	--	--
Feb-95	3,000 J	33 J	38 J	78	--	--
Mar-95	2,400	28	40	50	--	--
Apr-95	1,960	35.5	46.3	57.7 J	2.9	6.1
May-95	2,200 J	31	--	--	--	--
Jun-95	1,900	27	--	--	--	--
Jul-95	1,800	24	--	--	--	--
Aug-95	1,700	14	--	--	--	--
Sep-95	1,500	22	--	--	--	--
Oct-95	1,760	24.8	34.6	52.7	2.8	18.8 J
Nov-95	1,600	21	--	--	--	--
Jan-96	2,500	23	--	--	--	--
Feb-96	2,400	33	--	--	--	--
Mar-96	2,200	24	--	--	--	--
Apr-96	1,800	17	--	--	--	--
May-96	1,680	26.3	25.8	50.7	3.1	24.3 J
Jun-96	1,900	18	--	--	--	--
Jul-96	1,100	13	--	--	--	--
Aug-96	1,100	12	--	--	--	--
Sep-96	1,000	11	--	--	--	--
Oct-96	958	13.8	15.6	19	10 U	90.4
Dec-96	1,000	12	--	--	--	--
Dec-96	980	14	--	--	--	--
Feb-97	750	10	--	--	--	--
Mar-97	880	15	--	--	--	--
Apr-97	720	12	--	--	--	--
May-97	540	2.9 J	20 U	1.7 J	20 U	127
Jun-97	570	8	--	--	--	--
Jul-97	500	10	--	--	--	--
Aug-97	490	9	--	--	--	--
Sep-97	460	8	--	--	--	--
Oct-97	280	4	8	13	1	91
Jan-98	380	6	--	--	--	--
May-98	340	2	6	21	0.7 U	150
Oct-98	320 J	3	10	21	0.7 U	120
May-99	240 D	0.6 UJ	14	46	0.7 U	180

Table H-8. Historical VOC Concentrations in Well MW-21D Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Jun-99	220	2.7	13	18	1.5	68
Oct-99	230	1.8	43	18	1.7	88
Dec-99	180	1.6	20 J	17	1.3	74
Mar-00	110	1.2	18	12	1.2	39
May-00	130 D	ND	23 D	19 D	ND	75 D
Jun-00	130	1.8	16 J	16 J	1.4	70
Oct-00	120	1.8	15	13	1.9	53
Dec-00	86	1.2	13	10	1.6	53
Feb-01	99	1.2	13	13	2.2	65
May-01	85	1.3	15	12	2.3	64
Oct-01	69	1.2	11	9	2.1	39
Dec-01	73	0 U	10	7.9	1.9	45
Feb-02	90	9.69	9.5	6.59	1.6	51
May-02	70 D	1.1	14	8.4	2.2	41
Oct-02	75	1	15	8.9	2.3	39
Oct-02	63 D	1	14	8.2	2.1	34
Dec-02	47	0.85	12	7	1.8	24
Feb-03	56 D	0.82	17	11	2	37 J
May-03	48	0.87	15	12	1.8	27
Oct-03	58	0.65	14	7.9	1.4	24
May-04	30	0.6	8.2	6.2	1.5	12
Oct-04	25	0.48 J	5.9	4.6	1.2	8.5
Apr-05	24	0.42 J	5.1	4.6	1.3	8.2
Oct-05	21	0.33 J	3.7	3.4	1	6.4
Apr-06	18	0.32 J	2.6	3	0.87	5.4
Oct-06	16	0.34 J	2.2	2.7	0.77	3.9
Oct-06	15	0.33 J	2	2.6	0.75	3.8
May-07	16 J	0.28 J	2.1	2.7	0.79	4.9 J
Oct-07	12	0.23 J	1.5	2.2	0.58	3.2
May-08	14	0.21 J	1.4	2.2	0.69	3.3
Oct-08	11	0.22 J	0.8	2.1	0.55	2.7
Oct-08	11	0.23 J	0.82	2.2	0.56	2.8
May-09	11	0.18 J	0.86	2.1	0.63	2.5
Oct-09	11	0.21 J	0.59 J	2.1 J	0.58	2.3 J
Oct-09	9.9	0.18 J	0.53 J	1.7 J	0.49 J	1.9 J
Apr-10	7.3	0.15 J	0.31 J	1.3	0.39 J	1.1
Oct-10	7	0.16 J	0.29 J	1	0.41 J	0.9
Apr-11	7.3	0.19 J	0.21 J	1.3	0.49 J	0.74

Table H-8. Historical VOC Concentrations in Well MW-21D Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Oct-11	**6.2**	0.13 J	0.25 J	**1.1**	0.48 J	0.59
Apr-12	**5.4**	0.15 J	0.16 J	0.99	0.48 J	0.44 J
Oct-12	**5.2**	0.13 J	0.20 J	1	0.61	0.32 J
Oct-12	**5.3**	0.13 J	0.18 J	1	0.61	0.32 J
Apr-13	4.3	0.10 J	0.12 J	0.85	0.44 J	0.25 J
Oct-13	3.5	0.13 J	0.13 J	0.71	0.32 J	0.18 J
Apr-14	2.9	0.5 U	0.5 U	0.5	0.29 J	0.14 J
Oct-14	2.4	0.11 J	0.08 J	0.43 J	0.29 J	0.5 U
Apr-15	3.2	0.10 J	0.090 J	0.51	0.33 J	0.5 U
Oct-15	2.8	0.5 U	0.5 U	0.44 J	0.26 J	0.5 U
Apr-16	2.5	0.5 U	0.090 J	0.45 J	0.27 J	0.5 U
Oct-16	2.4	0.5 U	0.10 J	0.36 J	0.25 J	0.5 U
Apr-17	2.2	0.11 J	0.18 J	0.41 J	0.25 J	0.5 U
Oct-17	2.4	0.11 J	0.17 J	0.42 J	0.24 J	0.075 J
Apr-18	5	0.5 U	0.10 J	0.44 J	0.21 J	0.5 U
Oct-18	**16**	0.50 U	0.45 J	0.95	0.39 J	0.14 J
Apr-19	**15**	0.12 J	0.48 J	0.71	0.29 J	0.17 J
Oct-19	**9.1**	0.50 U	0.19 J	0.41 J	0.22 J	0.12 J
Apr-20	**7.1**	0.50 U	0.21 J	0.47 J	0.23 J	0.12 J
Oct-20	0.31 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:
Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.
Only detected compounds are included in this table.
Concentrations presented are the highest of the sample and duplicate results, where applicable.
[a] = Two samplers were deployed in April and October 2016 - one near the top of the screened interval (upper) and one near the bottom
-- = Not available
CFC-11 = Trichlorofluoromethane
cis-1,2-DCE = cis-1,2-Dichloroethene
1,1-DCE = 1,1-Dichloroethene
J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
U = The analyte was not detected above the specified reporting limit.
UJ - The analyte was not detected, but the associated limit of quantitation is estimated.
µg/L = Micrograms per liter
VOC = Volatile organic compound

Table H-9. Historical VOC Concentrations in Well MW-23D Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-95	**5.7**	1 U	37.6	**56.8**	6.4	1.5 J
Oct-95	**53.4**	1 U	24.8	**55.1**	12.8	3.4
May-96	**49.1**	1 U	24.6	**52.6**	8.4	25.9 J
Oct-96	**43.3**	1 U	20	**32.6**	10	95.5
May-97	**61.3 J**	1 U	14.4	**36.4**	10.7	224 J
Oct-97	**51**	0.4 U	14	**30**	--	89
May-98	**42**	0.6 U	10	**28**	23	35
Oct-98	**67**	3 J	3	1 U	3	3
May-99	**35 J**	0.6 UJ	6 J	**45 J**	27 J	16 J
Oct-99	**15**	0.5 U	4.7	**8.4**	5.3	5.4
May-00	**37**	0.5 U	2.5	**8.1**	29	2.1
Oct-00	**34**	0.5 U	1.2	**4.4**	14	1.1
May-01	0.5 U	0.5 U	0.71	0.5 U	0.5 U	0.5 U
Oct-01	**24**	0.5 U	0.88	**3.5**	5	0.96
May-02	**22**	0.5 U	1.2	**4.4**	4.3	1.5
Oct-02	**16**	0.5 U	1.4	**2.8**	1.7	0.64
May-03	**13**	0.5 U	2.4	**2.7**	1.2	0.49 J
Oct-03	**11**	0.5 U	2.3	**3.2**	0.9	0.47 J
May-04	**9**	0.5 U	1.6	**2.5**	0.6	0.33 J
Oct-04	**7.8**	0.5 U	1.1	**2.4**	0.5	0.25 J
Apr-05	**5.9**	0.5 U	0.74	**2**	0.57	0.21 J
Oct-05	**6**	0.5 U	0.66	**2**	0.62	0.2 J
Oct-06	4.4	0.5 U	0.36 J	**1.6**	0.58	0.5 U
Oct-07	3.5	0.5 U	0.3 J	**1.1**	0.58	0.14 J
Oct-08	2.6	0.5 U	0.43 J	**1.4**	0.46 J	0.2 J
Oct-09	2.5	0.5 U	0.19 J	0.77	0.29 J	0.15 J
Oct-10	1.9	0.5 U	0.13 J	0.49 J	0.24 J	0.5 U
Oct-11	1.6	0.5 U	0.14 J	0.5	0.18 J	0.13 J
Oct-12	1.4	0.5 U	0.27 J	0.54	0.27 J	0.29 J
Oct-13	1.2	0.5 U	0.42 J	0.66	0.16 J	0.25 J
Oct-14	1.4	0.5 U	2.4	**2.7**	0.16 J	0.24 J
Oct-15	**130**	0.5 U	2.7	**2.7**	0.12 J	0.14 J
Apr-16 upper[a]	**140**	0.5 U	2.1	**2.3**	0.08 J	0.12 J
Apr-16 lower[a]	**62**	0.5 U	2.5	**2.3**	0.10 J	0.21 J
Oct-16 upper[a]	**140**	0.5 U	2.5	**2.9**	0.08 J	0.13 J
Oct-16 lower[a]	**84**	0.5 U	3.6	**3.3**	0.12 J	0.22 J
Apr-17	**180**	0.5 U	3.3	**3.1**	0.14 J	0.17 J
Oct-17	**140**	0.078 J	1.9	**1.8**	0.14 J	0.1 J

Table H-9. Historical VOC Concentrations in Well MW-23D Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-18	**120**	0.5 U	1	**1.4**	0.5 U	0.5 U
Oct-18	**160**	0.5 U	2.1	**2.2**	0.07 J	0.5 U
Apr-19	**150 E**	0.14 J	1.5	**1.5**	0.22 J	0.12 J
Oct-19	**130**	.05 U	1.1	**1.5**	0.08 J	0.5 U
Oct-20	**83**	0.5 U	0.61	0.91	0.5 U	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

Only detected compounds are included in this table.

Concentrations presented are the highest of the sample and duplicate results, where applicable.

[a] = Two samplers were deployed in April and October 2016 - one near the top of the screened interval (upper) and one near the bottom (lower).

-- = Not available

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

UJ - The analyte was not detected, but the associated limit of quantitation is estimated.

µg/L = Micrograms per liter

VOC = Volatile organic compound

Table H-10. Historical VOC Concentrations in Well MW-38 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Oct-10	**12**	0.77	0.33 J	0.68	0.21 J	0.47 J
Apr-11	**11**	1.0	0.21 J	0.23 J	0.19 J	0.19 J
Oct-11	**9.8**	1.1	0.28 J	0.20 J	0.14 J	0.26 J
Oct-12	**7.4**	1.7	0.69	0.33 J	0.24 J	0.22 J
Oct-13	**70 D**	2.0	1.8	**1.2**	0.12 J	0.32 J
Apr-14	**54**	1.4	0.68	0.47 J	0.080 J	0.25 J
Oct-14	**78**	1.9	0.64	0.43 J	0.09 J	0.19 J
Apr-15	**53**	1.3	0.40 J	0.30 J	0.070 J	0.20 J
Oct-15	**50**	1.3	0.40 J	0.22 J	0.50 U	0.15 J
Apr-16	**29**	1.0	0.26 J	0.19 J	0.50 U	0.50 U
Oct-16	**23**	0.85	0.25 J	0.15 J	0.50 U	0.50 U
Apr-17	**19**	0.75	0.33 J	0.16 J	0.50 U	0.50 U
Oct-17	**9.5**	0.78	0.24 J	0.13 J	0.50 U	0.50 U
Oct-18	**20**	0.6	0.19 J	0.09 J	0.50 U	0.50 U
Oct-19	**28**	0.65	0.12 J	0.08 J	0.50 U	0.50 U
Apr-19	**150 E**	0.14 J	1.5	**1.5**	0.22 J	0.12 J
Oct-20	**12**	0.57	0.5 U	0.32 J	0.5 U	0.2 J
Cleanup Level	5	5	200	1	70	2,400

NOTES:

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

Only detected compounds are included in this table.

Concentrations presented are the highest of the sample and duplicate results, where applicable.

-- = Not available

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

UJ - The analyte was not detected, but the associated limit of quantitation is estimated.

µg/L = Micrograms per liter

VOC = Volatile organic compound

(lower).