

# 2021 Annual Groundwater Monitoring and Corrective Action Report

Secondary Ash Pond  
Columbia Energy Center  
Pardeeville, Wisconsin

Prepared for:



Wisconsin Power and Light Company  
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**SCS ENGINEERS**

25221067.00 | July 29, 2022

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## OVERVIEW OF CURRENT STATUS

### Columbia Energy Center, Secondary Ash Pond 2021 Annual Report

In accordance with §257.90(e)(6), this section at the beginning of the annual report provides an overview of the current status of groundwater monitoring and corrective action programs for the coal combustion residual (CCR) units. Supporting information is provided in the text of the annual report.

Category	Rule Requirement	Site Status
<b>Monitoring Status – Start of Year</b>	(i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	Assessment
<b>Monitoring Status – End of Year</b>	(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	Assessment
<b>Statistically Significant Increases (SSIs)</b>	(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in appendix III to this part pursuant to §257.94(e):	
	(A) Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase; and	<u>April 2021</u> Boron: MW-306, MW-307, MW-308  <u>October 2021</u> Boron: MW-306, MW-307, MW-308 Sulfate: MW-307
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	January 13, 2020

Category	Rule Requirement	Site Status
<b>Statistically Significant Levels (SSL) Above Groundwater Protection Standard</b>	(iv) If it was determined that there was a statistically significant level above the groundwater protection standard (GPS) for one or more constituents listed in appendix IV to this part pursuant to §257.95(g) include all of the following:	
	(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;	None
	(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	Not applicable – No SSLs above GPSs
	(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	Not applicable – ACM not required
	(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	Not applicable – ACM not required
<b>Selection of Remedy</b>	(v) Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection; and	Not applicable – Selection of remedy not required
<b>Corrective Action</b>	(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	Not applicable – Selection of remedy not required

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## 1.0 INTRODUCTION

This 2021 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the Coal Combustion Residuals (CCR) Rule [40 CFR 257.50-107]. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.100 and 40 CFR 257.90(e) for inactive CCR surface impoundments. The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2021 Annual Groundwater Monitoring and Corrective Action Report for the CCR unit.

This report covers the period of groundwater monitoring from January 1, 2021, through December 31, 2021.

The groundwater monitoring system for the Secondary Ash Pond at the Columbia Energy Center (COL) monitors a single inactive CCR unit:

- COL Secondary Ash Pond (inactive surface impoundment)

The system is designed to detect monitored constituents at the waste boundary of the COL Secondary Ash Pond as required by 40 CFR 257.91(d). The groundwater monitoring system consists of two background wells and three downgradient monitoring wells (**Table 1**, **Figure 1**, and **Figure 2**).

Other CCR units at the COL facility include the COL Primary Ash Pond, the COL Dry Ash Disposal Facility Modules 1-3, and the COL Dry Ash Disposal Facility Modules 4-6. Annual groundwater monitoring and corrective action reports for these existing CCR units are submitted separately on January 31 of each year in accordance with 40 CFR 257.90(e).

## 2.0 BACKGROUND

To provide context for the annual report, the following background information is provided in this section of the report, prior to the annual report requirement sections:

- Geologic and hydrogeologic setting
- CCR Rule monitoring system

### 2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

#### 2.1.1 Regional Information

For the purposes of groundwater monitoring, the surficial sand and gravel aquifer is considered to be the uppermost aquifer unit, as defined under 40 CFR 257.53, at the COL Secondary Ash Pond. Immediately underlying the surficial sand and gravel aquifer is the Cambrian-Ordovician sandstone aquifer. A summary of the regional hydrogeologic stratigraphy is presented in **Appendix A**.

The sand and gravel aquifer is capable of producing sufficient water for industrial or municipal use in some parts of Columbia County and is capable of producing sufficient water for domestic use in many areas, including along the Wisconsin River near the Columbia Energy Center (Harr et. al, 1978). A map showing expected well yields within the sand and gravel aquifer in Columbia County is included in **Appendix A**.

Regional groundwater flow in the site vicinity is generally west toward the Wisconsin River. A map showing the regional water table elevations is included with the regional hydrogeologic information in **Appendix A**.

### **2.1.2 Site Information**

Soils at the site are primarily sand to a depth of approximately 50 to 100 feet and overlie sandstone bedrock. Soils encountered during the site feasibility study for the COL Ash Disposal Facility were described as generally sandy with interbedded silty clay lenses up to 20 feet thick (Warzyn, 1978). During drilling of CCR wells MW-301, MW-306, MW-307, and MW-308, the unconsolidated materials were identified as consisting primarily of silty sand and sand. Boring logs for previously-installed monitoring well MW-84A show silty sand and sand as the primary unconsolidated materials at these locations. The boring logs for the Secondary Ash Pond CCR monitoring wells are provided in **Appendix C**. All CCR monitoring wells are screened within the unconsolidated sand unit. The groundwater monitoring network and sample summary are provided in **Table 1** and **Table 2**, respectively. All boring logs are provided in **Appendix B**.

In the vicinity of the ash ponds, groundwater flow appears to be radially away from the ponds in all directions. The water table elevations and estimated groundwater flow directions for April 2021 are shown on **Figure 3**. The water table elevations and estimated groundwater flow directions for October 2021 are shown on **Figure 4**. The groundwater elevation data for the CCR monitoring wells are provided in **Table 3** and horizontal gradients and flow velocities are provided in **Table 4** and **Appendix C**.

## **2.2 CCR RULE MONITORING SYSTEM**

The groundwater monitoring system established in accordance with the CCR Rule consists of two upgradient (background) monitoring wells and three downgradient monitoring wells. The background wells include MW-84A and MW-301. The background wells are shared with other CCR units at COL. The downgradient wells include MW-306, MW-307, and MW-308. The CCR Rule wells are installed in the surficial sand aquifer. Well depths range from approximately 26.4 to 37 feet, measured from the top of the well casing.

## **3.0 §257.100(E)(5) GROUNDWATER MONITORING AND CORRECTIVE ACTION FOR INACTIVE CCR SURFACE IMPOUNDMENTS**

*The owner or operator of the inactive CCR surface impoundment must: (i) No later than April 17, 2020, comply with groundwater monitoring requirements set forth in §§ 257.90(b) and 257.94(b); and (ii) No later than August 1, 2020, prepare the initial groundwater monitoring and corrective action report as set forth in § 257.90(e).*

This report is submitted to fulfill the annual reporting requirement.

## **4.0 §257.90(E) ANNUAL REPORT REQUIREMENTS**

*Annual groundwater monitoring and corrective action report. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, and discuss actions to resolve the problems, and project key activities for the upcoming year. For*

purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

#### **4.1 §257.90(E)(1) SITE MAP**

*A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;*

A map of the location of the site is provided as **Figure 1**. A map showing the inactive COL Secondary Ash Pond and all background (or upgradient) and downgradient monitoring wells with identification numbers for the groundwater monitoring program is provided as **Figure 2**. Other CCR units are also shown on **Figure 2**.

#### **4.2 §257.90(E)(2) MONITORING SYSTEM CHANGES**

*Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;*

No new monitoring wells were installed, and no wells were decommissioned as part of the groundwater monitoring program for the CCR unit in 2021.

#### **4.3 §257.90(E)(3) SUMMARY OF SAMPLING EVENTS**

*In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;*

Two groundwater sampling events were completed for the inactive COL Secondary Ash Pond in 2021. The established semiannual sampling schedule for the site was followed, and sampling occurred in April 2021 and October 2021. As described in **Section 4.4**, the site transitioned to an assessment monitoring program in 2019. The first round of assessment monitoring sampling was completed in December 2019. A summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the assessment monitoring program is included in **Table 2**.

The sampling results for Appendix III and Appendix IV parameters in 2021 are summarized in **Table 5**. Field parameter results for the 2021 sampling events are provided in **Table 6**. The analytical laboratory reports for 2021 are provided in **Appendix D**. Historical results for each monitoring well are summarized in **Appendix E**.

#### **4.4 §257.90(E)(4) MONITORING TRANSITION NARRATIVE**

*A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels);*

There was no monitoring program transition in 2021.



Assessment monitoring for the COL Secondary Ash Pond was initiated in January 2020 in response to statistically significant increases (SSIs) in detection monitoring constituents identified at downgradient wells. SSIs were identified for boron, chloride, and sulfate at one or more wells based on the April 2019 detection monitoring event. Wisconsin Power and Light Company (WPL) collected the first round of assessment monitoring samples in December 2019 and established an assessment monitoring program on January 13, 2020, in accordance with §257.95(b).

The initial evaluation of assessment groundwater monitoring performed at COL Secondary Ash Pond included the December 2019, February 2020, and April 2020 results and was completed in July 2020. Evaluation of the October 2020 and April 2021 results was completed in 2021.

No Appendix IV parameters were detected at statistically significant levels (SSLs) above the groundwater protection standards (GPSs) in 2021. None of the individual results in 2021 exceeded the GPS values; therefore, statistical evaluation of the significance of levels above the GPS was not required. Based on the results of the assessment monitoring conducted in 2021, WPL will continue assessment monitoring in accordance with 40 CFR 257.95(f).

For comparison of the assessment monitoring results to background concentrations, upper prediction limits (UPLs) for detection and assessment monitoring parameters were calculated based on a 1-of-2 resampling approach. In January 2021, the UPLs for Appendix III and Appendix IV parameters were updated to include background monitoring well data collected through October 2020 (**Appendix F**). The UPL update analysis was provided in the 2020 Annual Groundwater Monitoring and Corrective Action Report. As shown in **Table 5**, concentrations of several Appendix III and Appendix IV parameters continue to be detected at levels that represent SSIs above background. Based on these results, the Secondary Ash Pond will continue in the assessment monitoring program.

## **4.5 §257.90(E)(5) OTHER REQUIREMENTS**

*Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.*

Additional potentially applicable requirements for the annual report, and the location of the requirement within the Rule, are provided in the following sections. For each cited section of the Rule, the portion referencing the annual report requirement is provided below in *italics*, followed by applicable information relative to the 2021 Annual Groundwater Monitoring and Corrective Action Report for the CCR unit.

### **4.5.1 §257.90(e) General Requirements**

*For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year.*

**Status of Groundwater Monitoring and Corrective Action Program.** The groundwater monitoring and corrective action program is currently in assessment monitoring after transitioning from detection monitoring in January 2020.

### Summary of Key Actions Completed.

- Statistical evaluation and determination of any statistically significant levels exceeding the GPS for the October 2020 and April 2021 monitoring events.
- Two semiannual groundwater sampling and analysis events (April and October 2021).

**Description of Any Problems Encountered.** No problems were encountered in 2021.

**Discussion of Actions to Resolve the Problems.** Not applicable.

### Projection of Key Activities for the Upcoming Year (2022).

- Two Semiannual Groundwater Sampling and Analysis Events (April and October 2022)
- Statistical evaluation and determination of any statistically significant levels exceeding the GPS for the October 2021 and April 2022 monitoring events.
- If one or more Appendix IV constituents is detected at a statistically significant level above the GPS, then within 30 days WPL will prepare a notification in accordance with §257.95(g) and within 90 days complete an alternative source demonstration or initiate an assessment of corrective measures (§257.95(g)(3)). WPL will also characterize the release pursuant to §257.95(g)(1) and provide notice pursuant to §257.95(g)(2).

#### **4.5.2 §257.94(d) Alternative Detection Monitoring Frequency**

*The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).*

Not applicable. The COL Secondary Ash Pond is no longer in detection monitoring.

#### **4.5.3 §257.94(e)(2) Alternative Source Demonstration for Detection Monitoring**

*The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.*

Not applicable. The COL Secondary Ash Pond is no longer in detection monitoring.

#### **4.5.4 §257.95(c) Alternative Assessment Monitoring Frequency**

*The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).*

Not applicable. Assessment monitoring has been initiated, and no alternative assessment monitoring frequency has been proposed at this time.

#### **4.5.5 §257.95(d)(3) Assessment Monitoring Results and Standards**

*Include the recorded concentrations required by paragraph (d)(1) of this section, identify the background concentrations established under § 257.94(b), and identify the groundwater protection standards established under paragraph (d)(2) of this section in the annual groundwater monitoring and corrective action report required by § 257.90(e).*

The 2021 assessment monitoring results, background UPLs, and GPSs established for the site are provided in **Table 5**. The laboratory reports are provided in **Appendix C**. Historical monitoring results are summarized in **Appendix D**.

#### **4.5.6 §257.95(g)(3)(ii) Alternative Source Demonstration for Assessment Monitoring**

*The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.*

Not applicable. No alternative source demonstration for assessment monitoring was completed in 2021.

#### **4.5.7 §257.96(a) Extension of Time for Corrective Measures Assessment**

*The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measure due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer attesting that the demonstration is accurate. The 90-day deadline to complete the assessment of corrective measures may be extended for longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.*

Not applicable. Corrective measures assessment has not been initiated.

### **4.6 §257.90(E)(6) OVERVIEW**

*A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit.*

The specific requirements for the overview under §257.90(e)(6) are listed and the information is provided at the beginning of this report, before the Table of Contents.

## **5.0 REFERENCES**

Harr, C.A., L.C. Trotta, and R.G. Borman, 1978, "Ground-Water Resources and Geology of Columbia County, Wisconsin," University of Wisconsin-Extension Geological and Natural History Survey Information Circular Number 37, 1978.

Warzyn Engineering, Inc., 1978, Feasibility Study, Proposed Fly Ash and/or Scrubber Sludge Disposal Facility – Columbia Site, Wisconsin Power and Light Company, Town of Pacific, Columbia County, WI, January 1978.

## Tables

- 1 Groundwater Monitoring Well Network
- 2 CCR Rule Groundwater Samples Summary
- 3 Groundwater Elevation - State Monitoring Program and CCR Well Network
- 4 Horizontal Gradients and Flow Velocity
- 5 2021 Groundwater Analytical Results Summary
- 6 2021 Groundwater Field Data Summary

**Table 1. Groundwater Monitoring Well Network  
Columbia Energy Center Secondary Ash Pond / SCS Engineers Project #25221067.00**

<b>Monitoring Well</b>	<b>Location in Monitoring Network</b>	<b>Role in Monitoring Network</b>
MW-84A	Upgradient	Background
MW-301	Upgradient	Background
MW-306	Downgradient	Compliance
MW-307	Downgradient	Compliance
MW-308	Downgradient	Compliance

Created by: RM  
 Last revision by: RM  
 Checked by: NDK

Date: 12/14/2020  
 Date: 1/31/2021  
 Date: 2/8/2021

**Table 2. CCR Rule Groundwater Samples Summary  
Columbia Energy Center Secondary Pond / SCS Engineers Project #25221067.00**

Sample Dates	Compliance Wells			Background Wells	
	MW-306	MW-307	MW-308	MW-84A	MW-301
4/12/2021	A	A	A	A	A
10/12/2021	A	A	A	A	A
Total Samples	2	2	2	2	2

Abbreviations:

A = Assessment Monitoring Program

Created by:	<u>ACW</u>	Date:	<u>11/18/2019</u>
Last revision by:	<u>JAO</u>	Date:	<u>12/16/2021</u>
Checked by:	<u>RM</u>	Date:	<u>12/22/2021</u>

**Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network  
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25221067.00**

Well Number	MW-1AR	MW-4	MW-5R	MW-33AR	MW-33BR	MW-34A	MW-34B	MW-37A	MW-83	MW-84A	MW-84B	MW-86	MW-91AR	MW-91B	MW-92A	MW-92B
	<b>Top of Casing Elevation (feet amsl)</b>	822.55	819.74	805.44	808.29	808.39	805.95	806.05	813.04	807.96	814.28	814.26	824.79	809.03	808.45	808.47
<b>Total Depth (ft from top of casing)</b>	44.40	39.58	25.97	31.08	57.50	35.43	56.95	31.80	25.42	40.21	52.02	45.43	32.90	52.38	28.94	51.75
<b>Measurement Date</b>																
October 2, 2012	783.41	783.70	784.96	782.38	782.23	783.03	782.99	782.66	dry	783.84	783.94	783.81	784.09	783.90	784.49	784.06
April 15, 2013	785.44	784.02	786.09	784.16	784.14	784.74	784.79	783.87	784.49	785.83	785.76	785.22	785.14	785.01	785.75	785.34
October 8, 2013													785.66	785.42	785.97	785.52
October 15, 2013	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.66	785.42	785.97	785.52
April 14, 2014	784.95	784.09	785.63	783.74	783.91	784.63	784.70	783.45	783.73	785.58	785.52	784.96	785.04	784.96	785.99	785.54
October 2-3, 2014	785.03	785.39	786.08	784.37	784.28	784.57	784.54	784.56	dry	785.24	785.18	785.19	785.47	785.28	785.75	785.33
April 13-14, 2015	783.96	783.63	785.25	783.01	782.74	783.65	783.95	782.87	dry	784.43	784.51	784.17	784.48	784.37	785.07	784.66
October 6-7, 2015	784.28	784.44	785.72	783.68	783.33	784.05	784.02	783.66	dry	784.80	784.76	784.66	784.89	784.70	785.20	784.76
April 4-6, 2016	785.82	aband	787.02	785.29	785.07	785.63	785.67	784.76	785.43	786.37	786.26	785.89	786.05	785.95	786.61	786.21
October 11-13, 2016	786.64	aband	788.00	787.36	786.46	786.45	786.32	786.40	786.81	787.22	787.11	786.96	787.17	786.81	787.68	787.25
April 10-13, 2017	786.96	aband	788.13	786.39	785.99	786.30	786.28	786.34	786.23	787.16	787.06	786.96	787.24	787.03	787.90	787.60
October 3-5, 2017	785.48	aband	786.66	784.51	784.22	784.67	784.63	784.86	784.29	NM	786.49	785.58	786.08	785.83	786.47	786.02
October 9-10, 2017	NM	aband	NM	NM	NM	NM	NM	NM	NM	785.56 <sup>(6)</sup>	NM	NM	NM	NM	NM	NM
February 21, 2018	783.97	aband	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	784.68	784.46	NM	NM
April 23-25, 2018	783.99	aband	785.36	783.09	786.36	781.77	780.79	783.28	783.32	785.88	784.91	782.54	784.71	784.53	785.23	784.81
October 23-25, 2018	788.25	aband	789.71	788.77	787.96	787.88	787.73	787.62	788.26	788.32	788.19	788.21	788.59	788.31	789.32	788.87
April 1-4, 2019	787.05	aband	788.64	786.63	786.54	786.82	786.92	786.47	786.78	787.35	787.34	787.16	787.45	787.18	788.04	787.63
October 7-9, 2019	787.26	aband	789.23	788.26	787.64	787.92	787.74	786.77	788.90	787.79	787.73	787.44	787.78	787.62	788.63	788.17
May 27-28, 2020	786.92	aband	788.34	786.01	785.75	785.98	785.99	786.22	786.03	787.02	786.99	786.94	787.26	787.05	787.86	787.47
October 7-8, 2020	785.95	aband	787.76	785.91	785.45	785.70	785.68	785.52	785.72	786.10	786.06	786.10	786.55	786.33	786.85	786.38
February 25, 2021	NM	aband	NM	NM	NM	NM	784.75	NM	NM	NM	NM	NM	NM	NM	NM	NM
April 14, 2021	785.11	aband	787.29	784.27	784.05	784.77	784.77	784.46	c	785.84	785.81	785.60	785.86	785.69	786.47	786.06
June 11, 2021	NM	aband	NM	784.19	NM	784.66	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
October 11-12, 14, 2021	784.47	adand	786.78	783.73	783.60	784.42	784.41	783.88	783.87	784.96	784.88	784.79	785.14	784.94	785.55	785.11
October 17, 2021	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
<b>Bottom of Well Elevation (ft)</b>	778.15	780.16	779.47	777.21	750.89	770.52	749.10	781.24	782.54	774.07	762.24	779.36	776.13	756.07	779.53	756.66

Well Number	M-3	M-4R	MW-39A	MW-39B	MW-48A	MW-48B	MW-57	MW-59	MW-216R	MW-217	MW-220RR	SG-1	SG-2	SG-3	SG-4
	<b>Top of Casing Elevation (feet amsl)</b>	788.23	806.10	809.62	809.50	828.86	828.84	786.29	815.48	814.21	791.55	792.90	792.06	795.25	808.60
<b>Total Depth (ft from top of casing)</b>	16.90	25.55	34.80	76.07	51.88	75.80	14.40	38.50	37.85	37.37	18.96	--	--	--	--
<b>Measurement Date</b>															
October 2, 2012	780.13	786.76	781.49	781.34	782.03	781.93	780.58	779.88	781.91	780.95	780.55	789.14	793.85	dry	dry
April 15, 2013	785.16	788.39	783.97	784.00	783.77	783.78	784.69	783.66	784.09	784.75	785.02	789.5 <sup>(1)</sup>	NM	dry	dry
October 8, 2013	781.22	786.67	NM	NM	783.69	783.58	NM	NM	783.39	782.27	782.36	789.5 <sup>(1)</sup>	791.33	dry	dry
October 15, 2013	NM	NM	782.94	782.81	NM	NM	782.47	783.49	NM	NM	NM	NM	NM	NM	NM
April 14, 2014	786.04	788.96	783.57	783.68	783.56	783.57	785.51	783.41	783.73	785.25	785.87	788.90	dry	dry	dry
October 1-3, 2014	781.16	787.55	783.42	783.32	784.05	783.94	782.32	783.55	783.79	782.63	783.03	NM	dry	dry	dry
April 13-14, 2015	783.08	786.83	782.77	782.68	782.80	782.82	782.81	782.83	782.93	783.34	783.42	789.3	791.70	dry	dry
October 6-7, 2015	780.66	786.12	782.97	782.81	783.10	783.01	781.82	783.25	783.18	781.95	782.26	788.48	791.58	dry	dry
April 4-6, 2016	784.21	789.09	785.27	785.27	784.79	784.76	783.21	784.97	785.68	785.02	784.36	NM	793.40	dry	dry
October 11-13, 2016	781.88	787.88	785.75	785.52	785.73	785.61	783.12	786.51	786.16	783.75	784.09	788.32	792.52	dry	dry
April 10-13, 2017	782.94	787.95	785.44	785.20	785.82	785.69	782.77	786.09	785.95	784.29	784.09	788.31	793.85	dry	dry
October 3-5, 2017	780.93	787.04	783.35	783.18	784.30	784.19	782.37	784.23	783.89	782.48	782.61	788.3	793.45	dry	dry
April 23-25, 2018	782.89	790.43	782.86	782.87	783.14	783.09	783.04	783.02	783.23	783.26	783.45	788.38	>795.25	dry	dry
October 23-25, 2018	782.95	788.47	787.12	786.88	787.12	786.99	783.48	787.73	787.49	784.90	784.52	787.76	793.25	dry	dry
April 1-4, 2019	785.68	789.44	786.28	786.31	786.56	786.45	785.27	787.39	786.53	786.33	785.46	788.40	794.60	dry	dry
October 7-9, 2019	785.33	790.65	787.10	787.02	786.68	786.65	785.29	786.68	787.07	786.01	785.42	748.48	795.20	dry	dry
May 27-29, 2020	781.80	787.73	785.12	784.92	785.74	785.59	783.11	785.89	785.60	783.41	783.89	748.48	>795.25	dry	dry
October 7-8 & 17, 2020	781.42	787.74	784.74	784.64	785.03	784.96	782.83	785.43	785.10	783.06	783.49	788.34	793.32	dry	NM
April 12, 2021	782.30	786.34	783.66	783.65	784.13	784.08	782.79	784.08	783.97	783.15	783.49	788.03	793.45	below gauge	dry
October 11-12, 14, 2021	781.03	786.33	782.94	782.85	783.09	783.03	781.94	783.11	783.04	782.15	782.66	788.59	795.13	dry	dry
<b>Bottom of Well Elevation (ft)</b>	771.33	780.55	774.82	733.43	776.98	753.04	771.89	776.98	776.36	754.18	773.94	--	--	--	--



**Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network  
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25221067.00**

Well Number	MW-301	MW-302	MW-303	MW-304	MW-305	M-4R	MW-33AR	MW-34A	MW-84A	MW-306	MW-307	MW-308	MW-309	MW-310	MW-311
<b>Top of Casing Elevation (feet amsl)</b>	806.89	813.00	811.52	805.42	806.32	806.10	808.29	805.95	814.28	807.63	806.89	806.9	813.27	813.62	809.74
<b>Screen Length (ft)</b>	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
<b>Total Depth (ft from top of casing)</b>	29.40	33.6	35.80	25.7	25.6	39.58	31.08	35.43	40.21	27	26.5	28	37.67	38.41	36.19
<b>Top of Well Screen Elevation (ft)</b>	787.49	789.40	785.72	789.72	790.72	776.52	787.21	780.52	784.07	790.63	790.39	788.90	785.60	785.21	783.55
<b>Measurement Date</b>													--	--	--
December 21-22, 2015	NM	784.78	784.11	786.13	788.96	787.58	783.77	783.50	785.31	--	--	--	--	--	--
May 27-29, 2020	787.77	787.29	785.56	789.30	787.78	787.73	786.01	785.98	787.02	785.77	785.35	786.28	785.98	785.81	785.85
June 30, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.18	NM	NM
August 6, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.93	NM	NM
October 7-8, 2020	786.53	786.74	785.16	788.52	787.96	787.74	785.91	785.70	786.10	785.39	784.71	785.68	785.47	785.56	785.83
December 11, 2020	--	--	--	--	788.19	--	--	--	--	--	--	--	785.26	785.26	--
February 25, 2021	--	--	784.27	--	788.36	--	--	784.75	--	--	--	--	--	--	--
April 12, 2021	786.50	785.77	784.07	787.99	788.11	786.34	784.27	784.77	785.84	784.32	784.21	785.55	784.29	784.24	784.15
June 11, 2021	--	--	--	--	--	--	784.19	784.66	--	--	--	--	784.20	784.05	--
July 20, 2021	--	--	783.64	--	788.39	--	--	--	--	--	--	--	--	--	--
October 11-12, 14, 2021	785.28	785.09	783.09	787.78	787.75	786.33	783.73	784.42	784.96	782.93	782.44	783.76	783.65	783.48	783.48
<b>Bottom of Well Elevation (ft)</b>	771.33	780.55	774.82	733.43	776.98	753.04	771.89	776.98	776.36	780.63	780.39	778.90	775.60	775.21	773.55

CCR Rule Wells

Notes: Created by: MDB Date: 5/6/2013  
 NM = not measured Last revision by: ACW Date: 10/15/2021  
 Checked by: RM Date: 10/18/2021

- (1) The elevation for SG-1 is read off of the staff gauge (rather than measured from the top of the gauge).
- (2) SG-2 could not be located during the April 2013 event.
- (3) SG-3 could not be located during the October 2013 event. SG-1 could not be safely accessed during the October 2013 event.
- (4) LH-2 measurements are given as leachate depth, measured by a transducer.
- (5) LH-2 and LH-3 measurements were collected by WPL staff on October 9, 2017.
- (6) The depth to water at MW-84A was not measured prior to purging for sampling during the October 3-5 sampling event. The level was allowed to return to static and was measured on 10/10/2017.
- (7) BC = Brian Clepper; NS= Nate Sievers - Columbia Site employees.

\\Mad-fs01\data\Projects\25221067.00\Data and Calculations\Tables\[wlstat\_Columbia.xls]levels

**Table 4. Horizontal Gradients and Flow Velocity  
Columbia Energy Center - Secondary Pond /  
SCS Engineers Project #25221067.00  
January - December 2021**

<b>East</b>					
<b>Sampling Dates</b>	<b>h1 (ft)</b>	<b>h2 (ft)</b>	<b>Δl (ft)</b>	<b>Δh/Δl (ft/ft)</b>	<b>V (ft/d)</b>
4/12/2021	786.00	782.79	335.39	0.010	0.12
10/11-14/2021	784.00	782.44	58.37	0.027	0.33

<b>Southwest</b>					
<b>Sampling Dates</b>	<b>h1 (ft)</b>	<b>h2 (ft)</b>	<b>Δl (ft)</b>	<b>Δh/Δl (ft/ft)</b>	<b>V (ft/d)</b>
4/12/2021	786.00	784.07	488.55	0.004	0.05
10/11-14/2021	784.00	783.09	483.81	0.002	0.02

<b>Wells</b>	<b>K Values (cm/sec)</b>	<b>K Values (ft/d)</b>	<b>Assumed Porosity, n</b>
MW-306	4.36E-03	12.4	
MW-307	1.74E-03	4.9	0.40
MW-308	7.03E-04	2.0	
Geometric Mean	1.75E-03	5.0	

Groundwater flow velocity equation:  $V = [K*(\Delta h/\Delta l)] / n$

ft = feet

ft/d = feet per day

K = hydraulic conductivity

n = effective porosity

V = groundwater flow velocity

h1, h2 = point interpreted groundwater elevation at locations 1 and 2

Δl = distance between location 1 and 2

Δh/Δl = hydraulic gradient

Created by: RM

Date: 12/29/2020

Last revision by: RM

Date: 1/3/2022


Checked by: MDB

Date: 1/4/2022

**Table 5. 2021 Groundwater Analytical Results Summary  
Columbia Energy Center - Secondary Pond / SCS Engineers Project #25221067.00**

Parameter Name	UPL Method	UPL	GPS	Background Wells				Compliance Wells					
				MW-84A		MW-301		MW-306		MW-307		MW-308	
				4/14/2021	10/14/2021	4/14/2021	10/14/2021	4/12/2021	10/12/2021	4/12/2021	10/12/2021	4/12/2021	10/12/2021
<b>Appendix III</b>													
Boron, µg/L	P	35		14.3	11.1	22.2	31.4	101	114	201	327	463	704
Calcium, µg/L	NP	129,000		69,100	75,300	117,000 P6	67,800 P6	80,400	77,000	61,900	74,600	120,000	115,000
Chloride, mg/L	P	6.02		4.40	3.5	1.50 J	2.7	0.71 J	0.98 J	7.0 J	9.8 J, D3	0.96 J	3.6 J, D3
Fluoride, mg/L	DQ	DQ		<0.095	<0.095	<0.095	<0.095	<0.095	<0.095	<0.48	<0.48 D3	<0.095	<0.48 D3, M0
Field pH, Std. Units	P	7.76		7.34	7.42	6.66	7.01	7.22	7.40	7.32	7.11	7.25	7.11
Sulfate, mg/L	P	30.8		1.4 J	1.3 J	8.5	17.4	7.2	8.5	16.9	92.9	<0.44	<2.2 D3
Total Dissolved Solids, mg/L	NP	514		328	326	472	334	310	282	312	388	470	460
<b>Appendix IV</b>													
		UPL	GPS										
Antimony, µg/L	NP*	0.4	6	0.55 J	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Arsenic, µg/L	P*	0.507	10	0.91 J	0.41 J	<0.28	0.35 J	<0.28	<0.28	2.00	1.8	2.8	6.3
Barium, µg/L	P	16.9	2000	13.4	12.9	8.9	7.7	11.0	11.5	7.80	13.1	52.6	59.2
Beryllium, µg/L	NP*	0.37	4	0.47 J	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Cadmium, µg/L	NP*	0.32	5	0.53 J	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Chromium, µg/L	P*	2.36	100	2.6 J	1.9 J	<1.0	<1.0	2.7 J	2.8 J	<1.0	<1.0	<1.0	<1.0
Cobalt, µg/L	NP*	0.38	6	0.52 J	0.12 J	<0.12	0.34 J	<0.12	<0.12	0.26 J	0.68 J	<0.12	0.22 J
Fluoride, mg/L	DQ	DQ	4	<0.095	<0.095	<0.095	<0.095	<0.095	<0.095	<0.48	<0.48 D3	<0.095	<0.48 D3, M0
Lead, µg/L	NP*	0.90	15	0.55 J	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	0.24 J
Lithium, µg/L	P*	0.827	40	1.0	0.28 J	0.58 J	0.46 J	7.2	9.2	<0.22	<0.22	<0.22	0.23 J
Mercury, µg/L	DQ	DQ	2	<0.066	<0.093	<0.066	<0.093	<0.066	<0.066	<0.066	<0.066	<0.066	<0.066
Molybdenum, µg/L	NP*	0.44	100	0.62 J	<0.44	<0.44	<0.44	8.3	9.7	0.83 J	0.91 J	0.86 J	7.1
Selenium, µg/L	NP*	0.71	50	0.48 J	<0.32	<0.32	<0.32	0.87 J	1.0 J	<0.32	<0.32	<0.32	<0.32
Thallium, µg/L	NP*	0.48	2	0.66 J	0.19 J	<0.14	0.17 J	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Radium 226/228 Combined, pCi/L	P	1.76	5	0.285	0.243	1.160	0.172	0.180	0.784	0.241	0.842	0.151	0.517

 Blue shaded cell indicates the compliance well result exceeds the UPL and the LOQ.

 Yellow shaded cell indicates the compliance well result exceeded the GPS.

Abbreviations:

UPL = Upper Prediction Limit  
mg/L = milligrams per liter

GPS = Groundwater Protection Standard  
µg/L = micrograms per liter

-- = Not Analyzed

P = Parametric UPL with 1-of-2 retesting

NP = Nonparametric UPL (highest background value) with 1-of-2- retesting

J = Estimated concentration at or above the LOD and below the LOQ.

D3 = Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

M0 = Matrix spike recovery and/or matrix spike duplicate was outside laboratory control limits.

P6 = Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

\* = UPL is below the LOQ for background sampling. For compliance wells, only results confirmed above the LOQ are evaluated as potential Statistically Significant Increases above background.

DQ = Double Quantification Rule (not detected in background)

Notes:

1. An individual result above the UPL or GPS does not constitute an SSI above background or statistically significant level above the GPS. See the accompanying letter text for identification of statistically significant results.
2. GPS is the United States Environmental Protection Agency (USEPA) Maximum Contamination Level (MCLs), if established; otherwise, the values from 40 CFR 257.95(h)(2).
3. Interwell UPLs calculated based on results from background wells MW-84 and MW-301.

Created by: <u>NDK</u>	Date: <u>5/17/2021</u>
Last revision by: <u>JAO</u>	Date: <u>12/16/2021</u>
Checked by: <u>RM</u>	Date: <u>12/22/2021</u>
Proj Mgr QA/QC: <u>TK</u>	Date: <u>3/19/2022</u>

**Table 6. 2021 Groundwater Field Data Summary**  
**Columbia Energy Center - Secondary Ash Pond / SCS Engineers Project #25221067.00**

Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Oxygen, Dissolved (mg/L)	Field Specific Conductance (umhos/cm)	Field Oxidation Potential (mV)	Turbidity (NTU)
MW-84A	4/14/2021	785.84	10.2	7.34	9.80	610.9	95.6	2.45
	10/14/2021	784.96	12.5	7.42	9.25	598.9	89.7	3.41
MW-301	4/14/2021	786.50	7.4	6.66	3.90	857.0	102.9	2.41
	10/14/2021	785.28	11.1	7.01	0.25	597.2	57.8	3.21
MW-306	4/12/2021	784.32	9.7	7.22	8.91	552.4	116.7	5.52
	10/12/2021	782.93	12.7	7.40	7.97	543.1	90.9	0.51
MW-307	4/12/2021	784.21	9.4	7.32	0.17	575.7	-120.4	2.83
	10/12/2021	782.44	14.2	7.11	NR	709.0	-85.0	2.18
MW-308	4/12/2021	785.55	9.8	7.25	0.13	864.0	-136.9	1.87
	10/12/2021	783.76	15.8	7.11	NR	894.0	-110.8	11.07

Notes/Abbreviations:

NR = Not Reported

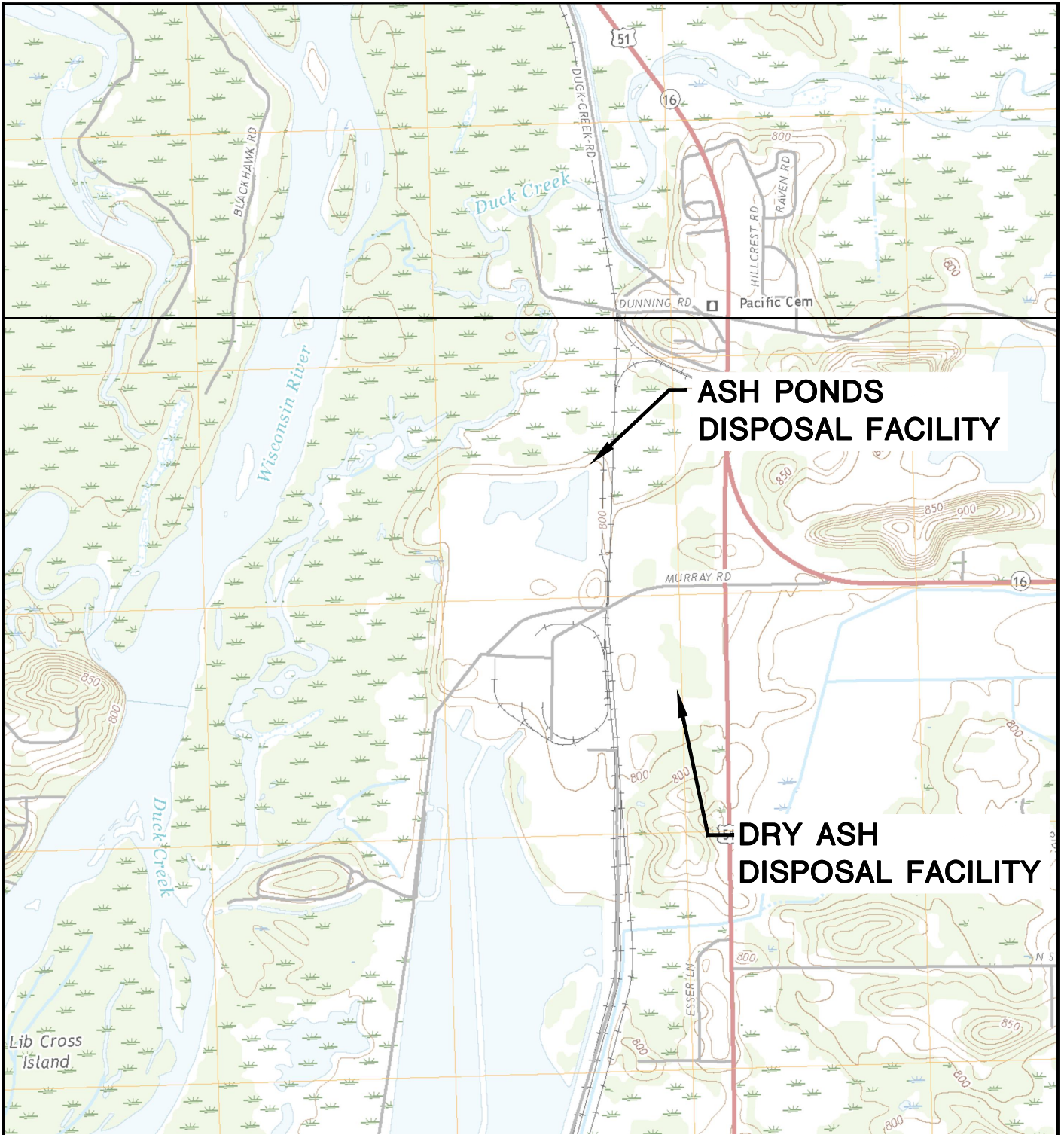
1) October 2021 Dissolved Oxygen results for MW-307, and MW-308 not reported due to instrument calibration issues that resulted in rejection of the field-recorded results.

Created by: NDK  
 Last revision by: JAO  
 Checked by: RM

Date: 4/19/2021  
 Date: 12/16/2021  
 Date: 12/22/2021

## Figures

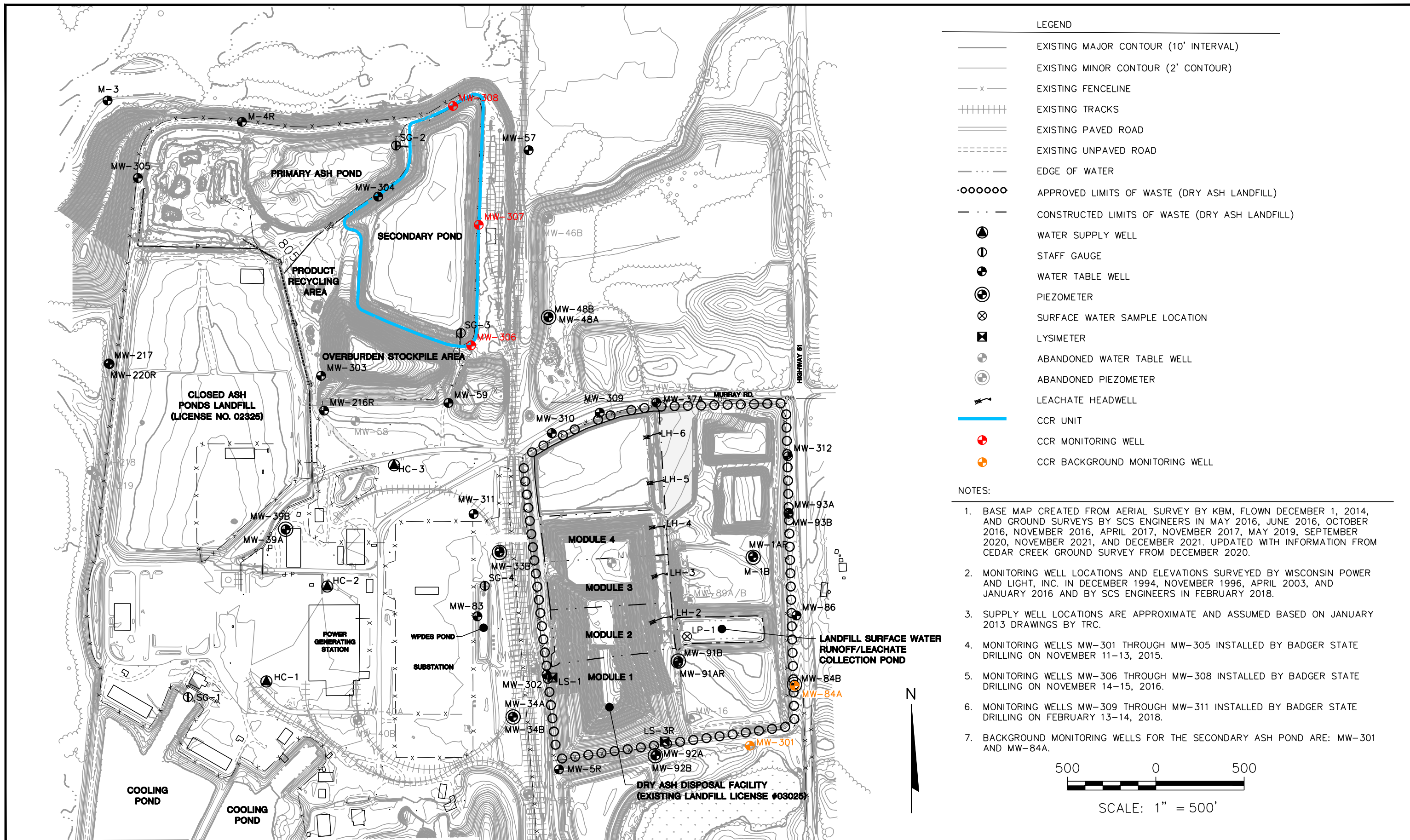
- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations
- 3 Water Table Map April 2021
- 4 Water Table Map October 2021



POYNETTE QUADRANGLE  
 WISCONSIN-COLUMBIA CO.  
 7.5 MINUTE SERIES (TOPOGRAPHIC)  
 2018  
 SCALE: 1" = 2,000'

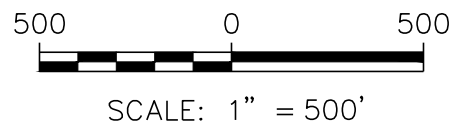


CLIENT	ALLIANT ENERGY COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WI 53954		SITE	ALLIANT ENERGY COLUMBIA ENERGY CENTER PARDEEVILLE, WI		ENGINEER	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830		FIGURE 1
	PROJECT NO.	25219067.00		DRAWN BY:	BSS		APPROVED BY:	TK 01/30/2020	
	DRAWN:	12/02/2019	CHECKED BY:	MDB					
	REVISED:	01/10/2020	APPROVED BY:	TK 01/30/2020					

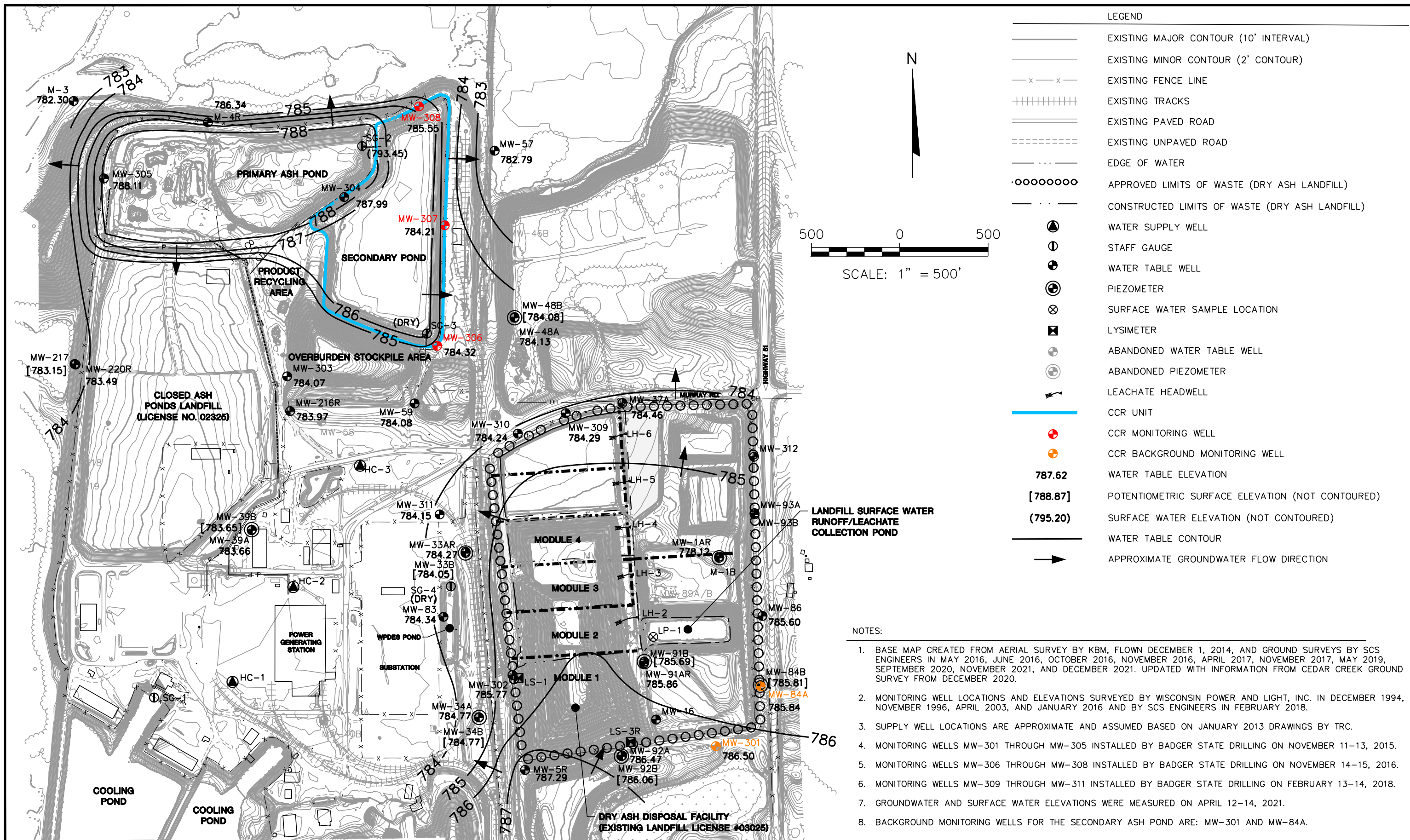


- LEGEND
- EXISTING MAJOR CONTOUR (10' INTERVAL)
  - EXISTING MINOR CONTOUR (2' CONTOUR)
  - x - EXISTING FENCELINE
  - ||||| EXISTING TRACKS
  - ==== EXISTING PAVED ROAD
  - EXISTING UNPAVED ROAD
  - . . - EDGE OF WATER
  - APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
  - . . - CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL)
  - ⊕ WATER SUPPLY WELL
  - ⊕ STAFF GAUGE
  - ⊕ WATER TABLE WELL
  - ⊕ PIEZOMETER
  - ⊗ SURFACE WATER SAMPLE LOCATION
  - ⊗ LYSIMETER
  - ⊕ ABANDONED WATER TABLE WELL
  - ⊕ ABANDONED PIEZOMETER
  - ⚡ LEACHATE HEADWELL
  - CCR UNIT
  - ⊕ CCR MONITORING WELL
  - ⊕ CCR BACKGROUND MONITORING WELL

- NOTES:
1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014, AND GROUND SURVEYS BY SCS ENGINEERS IN MAY 2016, JUNE 2016, OCTOBER 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, MAY 2019, SEPTEMBER 2020, NOVEMBER 2021, AND DECEMBER 2021. UPDATED WITH INFORMATION FROM CEDAR CREEK GROUND SURVEY FROM DECEMBER 2020.
  2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND JANUARY 2016 AND BY SCS ENGINEERS IN FEBRUARY 2018.
  3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY TRC.
  4. MONITORING WELLS MW-301 THROUGH MW-305 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 11-13, 2015.
  5. MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15, 2016.
  6. MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING ON FEBRUARY 13-14, 2018.
  7. BACKGROUND MONITORING WELLS FOR THE SECONDARY ASH POND ARE: MW-301 AND MW-84A.



PROJECT NO. 25220067.00	DRAWN BY: BSS/ZTW	 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT ALLIANT ENERGY COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WI 53954	SITE ALLIANT ENERGY COLUMBIA ENERGY CENTER SECONDARY ASH DISPOSAL FACILITY PARDEEVILLE, WI	FIGURE 2
DRAWN: 12/02/2019	CHECKED BY: TK				
REVISED: 07/09/2022	APPROVED BY: TK, 7/28/2022				

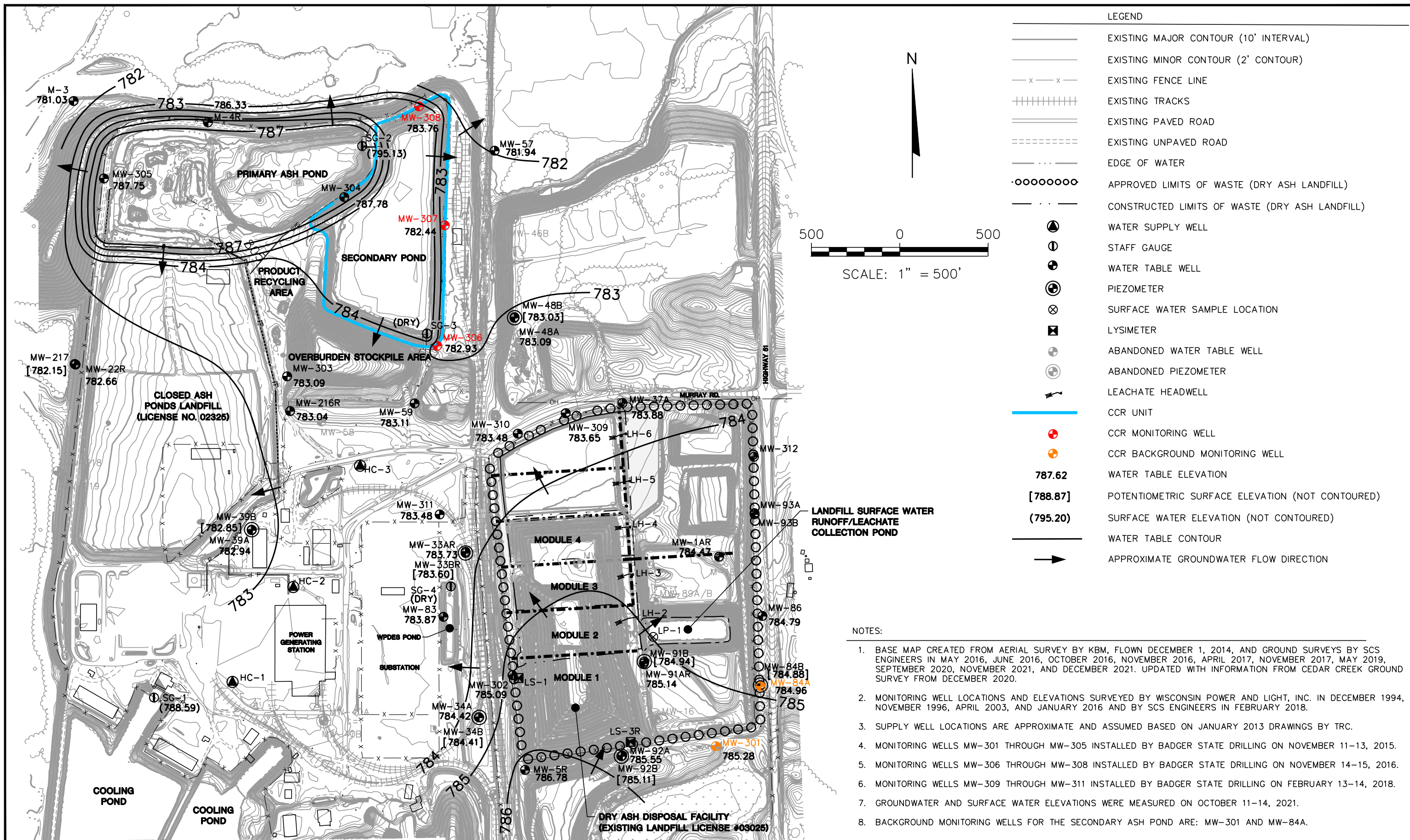


LEGEND	
	EXISTING MAJOR CONTOUR (10' INTERVAL)
	EXISTING MINOR CONTOUR (2' CONTOUR)
	EXISTING FENCE LINE
	EXISTING TRACKS
	EXISTING PAVED ROAD
	EXISTING UNPAVED ROAD
	EDGE OF WATER
	APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
	CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL)
	WATER SUPPLY WELL
	STAFF GAUGE
	WATER TABLE WELL
	PIEZOMETER
	SURFACE WATER SAMPLE LOCATION
	LYSIMETER
	ABANDONED WATER TABLE WELL
	ABANDONED PIEZOMETER
	LEACHATE HEADWELL
	CCR UNIT
	CCR MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	787.62 WATER TABLE ELEVATION
	[788.87] POTENTIOMETRIC SURFACE ELEVATION (NOT CONTOURED)
	(795.20) SURFACE WATER ELEVATION (NOT CONTOURED)
	WATER TABLE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION

- NOTES:
1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014, AND GROUND SURVEYS BY SCS ENGINEERS IN MAY 2016, JUNE 2016, OCTOBER 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, MAY 2019, SEPTEMBER 2020, NOVEMBER 2021, AND DECEMBER 2021. UPDATED WITH INFORMATION FROM CEDAR CREEK GROUND SURVEY FROM DECEMBER 2020.
  2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND JANUARY 2016 AND BY SCS ENGINEERS IN FEBRUARY 2018.
  3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY TRC.
  4. MONITORING WELLS MW-301 THROUGH MW-305 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 11-13, 2015.
  5. MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15, 2016.
  6. MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING ON FEBRUARY 13-14, 2018.
  7. GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED ON APRIL 12-14, 2021.
  8. BACKGROUND MONITORING WELLS FOR THE SECONDARY ASH POND ARE: MW-301 AND MW-84A.

PROJECT NO. 25221067.00	DRAWN BY: KP	 SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT ALLIANT ENERGY COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WI 53954	SITE ALLIANT ENERGY COLUMBIA ENERGY CENTER SECONDARY ASH DISPOSAL FACILITY PARDEEVILLE, WI	WATER TABLE MAP APRIL 2021	FIGURE
DRAWN: 06/29/2021	CHECKED BY: NDK					3
REVISED: 07/09/2022	APPROVED BY: TK, 7/28/2022					






LEGEND	
	EXISTING MAJOR CONTOUR (10' INTERVAL)
	EXISTING MINOR CONTOUR (2' CONTOUR)
	EXISTING FENCE LINE
	EXISTING TRACKS
	EXISTING PAVED ROAD
	EXISTING UNPAVED ROAD
	EDGE OF WATER
	APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
	CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL)
	WATER SUPPLY WELL
	STAFF GAUGE
	WATER TABLE WELL
	PIEZOMETER
	SURFACE WATER SAMPLE LOCATION
	LYSIMETER
	ABANDONED WATER TABLE WELL
	ABANDONED PIEZOMETER
	LEACHATE HEADWELL
	CCR UNIT
	CCR MONITORING WELL
	CCR BACKGROUND MONITORING WELL
<b>787.62</b>	WATER TABLE ELEVATION
<b>[788.87]</b>	POTENTIOMETRIC SURFACE ELEVATION (NOT CONTOURED)
<b>(795.20)</b>	SURFACE WATER ELEVATION (NOT CONTOURED)
	WATER TABLE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION

- NOTES:
1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014, AND GROUND SURVEYS BY SCS ENGINEERS IN MAY 2016, JUNE 2016, OCTOBER 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, MAY 2019, SEPTEMBER 2020, NOVEMBER 2021, AND DECEMBER 2021. UPDATED WITH INFORMATION FROM CEDAR CREEK GROUND SURVEY FROM DECEMBER 2020.
  2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND JANUARY 2016 AND BY SCS ENGINEERS IN FEBRUARY 2018.
  3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY TRC.
  4. MONITORING WELLS MW-301 THROUGH MW-305 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 11-13, 2015.
  5. MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15, 2016.
  6. MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING ON FEBRUARY 13-14, 2018.
  7. GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED ON OCTOBER 11-14, 2021.
  8. BACKGROUND MONITORING WELLS FOR THE SECONDARY ASH POND ARE: MW-301 AND MW-84A.

PROJECT NO. 25221067.00	DRAWN BY: KP	 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT ALLIANT ENERGY COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WI 53954	SITE ALLIANT ENERGY COLUMBIA ENERGY CENTER SECONDARY ASH DISPOSAL FACILITY PARDEEVILLE, WI	WATER TABLE MAP OCTOBER 2021	FIGURE
DRAWN: 10/26/2021	CHECKED BY: NDK					4
REVISED: 07/09/2022	APPROVED BY: TK, 7/28/2022					



Appendix A

Summary of Regional Hydrogeologic Stratigraphy

**Table COL-3. Regional Hydrogeologic Stratigraphy  
Columbia Energy Center / SCS Engineers Project #25215053**

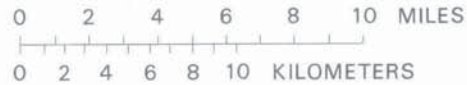
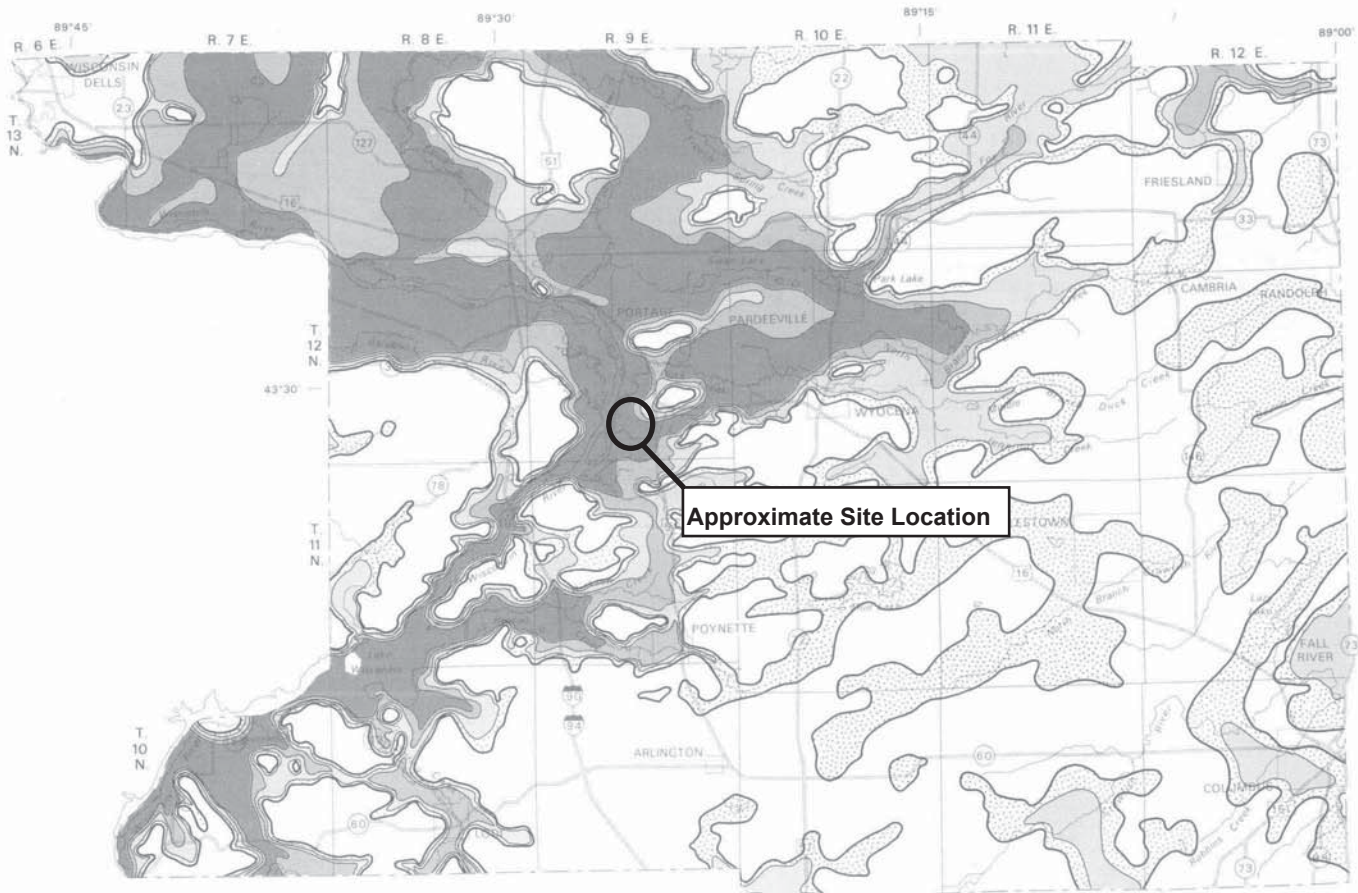
Approximate Age	Hydrogeologic Unit	General Thickness (feet)	Name of Rock Unit*	Predominant Lithology
Quaternary (0-1 million years old)	Surficial Aquifer	0 to 300+	Holocene & Pleistocene Deposits	<ul style="list-style-type: none"> <li>• Unconsolidated clay, silt, sand, gravel, cobbles, boulders, and organic matter</li> </ul>
Ordovician (460 to 490 million years old)	Sandstone Aquifer	0 to 800+	Galena Decorah Platteville St. Peter Prairie du Chien	<ul style="list-style-type: none"> <li>• Dolomite and shaley dolomite</li> <li>• Sandstone</li> </ul>
Cambrian (490 to 500 million years old)			Trempeleau Franconia Galesville Eau Claire Mt. Simon	<ul style="list-style-type: none"> <li>• Sandstone</li> </ul>
Precambrian (more than 1 billion years old)	Used for domestic supply in some areas	--	Precambrian	<ul style="list-style-type: none"> <li>• Igneous and metamorphic rocks</li> </ul>

\*This nomenclature and classification of rock units in this report are those of the Wisconsin Geological and Natural History Survey and do not necessarily coincide with those accepted by the U.S. Geological Survey.

Sources:





Harr, C.A., L.C. Trotta, and R.G. Borman, "Ground-Water Resources and Geology of Columbia County, Wisconsin," University of Wisconsin-Extension Geological and Natural History Survey Information Circular Number 37, 1978.  
Wisconsin Geological and Natural History Survey, Bedrock Stratigraphic Units in Wisconsin, UW Extension Educational Series 51, ISSN: 1052-2115, 2011.

I:\25215053\Reports\Report 3 - Columbia\Tables\Table\_2\_Regional\_Hydrogeologic\_Stratigraphy.doc



EXPLANATION

Probable well yields

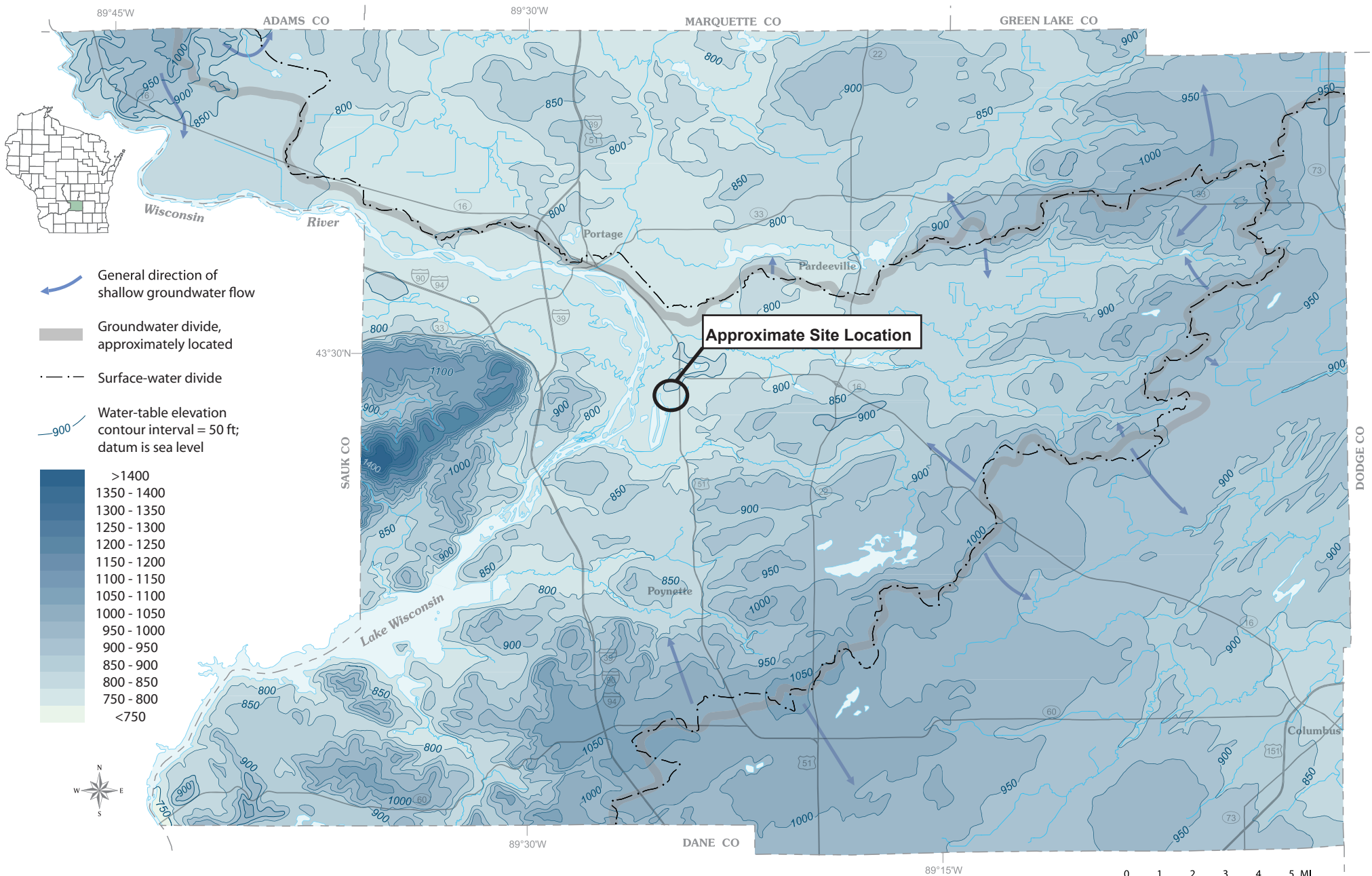
-   
 Chances of more than 100 gallons per minute are poor
-   
 Chances of 500-1000 gallons per minute are good
-   
 Chances of 100-500 gallons per minute are good
-   
 Chances of more than 1000 gallons per minute are good


Boundary of saturated sand-and-gravel aquifer

Figure 9. Probably well yields from the sand-and-gravel aquifer.

Source: Harr, C.A., L.C. Trotta, and R.G. Borman, "Ground-Water Resources and Geology of Columbia County, Wisconsin," University of Wisconsin-Extension Geological and Natural History Survey Information Circular Number 37, 1978.

# Generalized water-table elevation in Columbia County, Wisconsin





Appendix B  
Boring Logs and Well Construction Documentation

**WARZYN**



**ENGINEERING INC**

# LOG OF TEST BORING

Project Wisconsin Power & Light

Boring No. MW-84A

Surface Elevation 813.4

Job No. C 7134

Location Columbia Generating Station

Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		q <sub>c</sub>	W	LL	PL	D
No.	Type	↓	↓								
						Dark Brown Silty SAND (SM)					
					5	Brown Fine to Medium SAND, Little Silt, Trace to Little Gravel and Boulders (SM)					
					10						
					15						
					20						
					25						
					30						
					35						
					40						
							End Boring at 37'				
							Well Installed at 37'				

### WATER LEVEL OBSERVATIONS

While Drilling \_\_\_\_\_

Upon Completion of Drilling \_\_\_\_\_

Time After Drilling \_\_\_\_\_

Depth to Water \_\_\_\_\_

Depth to Cave In \_\_\_\_\_

### GENERAL NOTES

Start 10/5/83 Complete 10/5/83

Crew Chief JVS Rig B-40

Drilling Method ED 0-37'

WELL DETAIL INFORMATION SHEET

JOB NO. C 7134

BORING NO. MW-84A

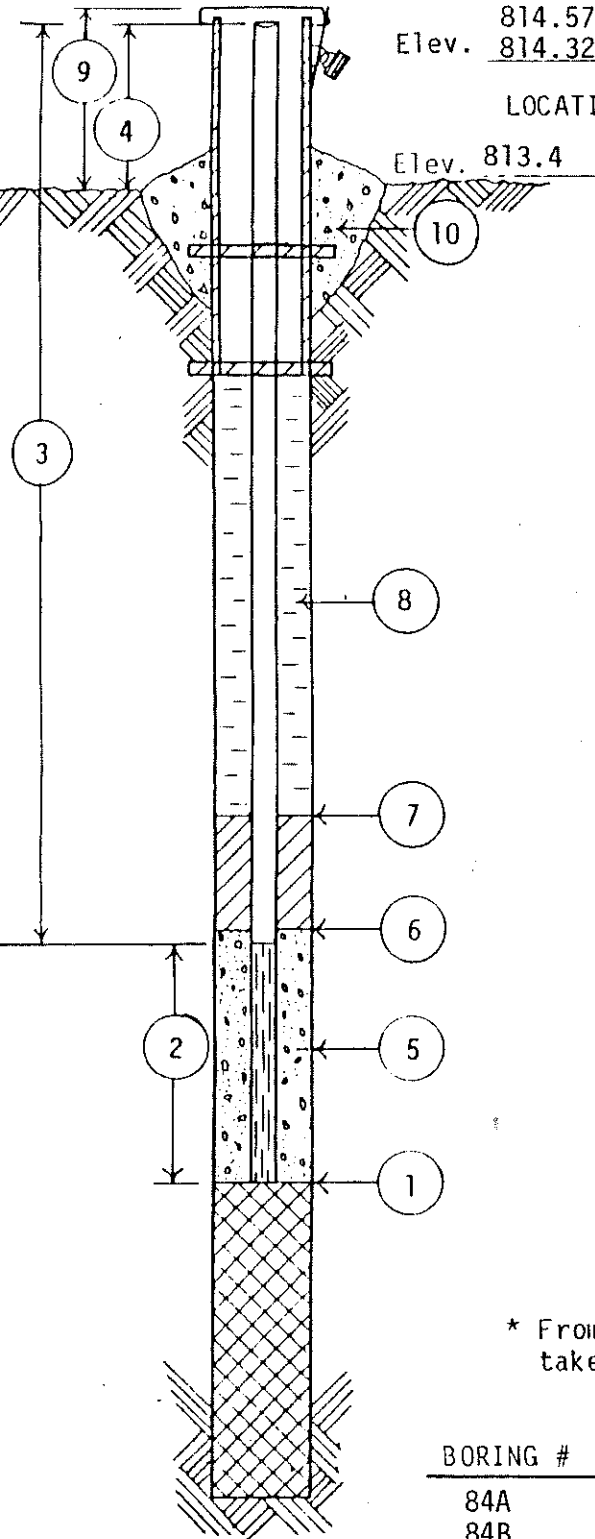
DATE 10/5/83

Elev. 814.57 Steel  
Elev. 814.32 PVC CHIEF JS

LOCATION WP&L-Columbia Generating Station

Elev. 813.4

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



- ① DEPTH TO BOTTOM OF BOREHOLE  
37 FEET
- ② LENGTH OF WELL POINT, WELL SCREEN,  
OR SLOTTED PIPE 10 FEET
- ③ TOTAL LENGTH OF SOLID PIPE 29  
FEET @ 2 IN. DIAMETER
- ④ HEIGHT OF WELL CASING ABOVE GROUND  
2 FEET
- ⑤ TYPE OF FILTER MATERIAL AROUND WELL  
POINT OR SLOTTED PIPE Flint Sand
- ⑥ DEPTH OF LOWER OR BOTTOM SEAL  
3 FEET
- ⑦ DEPTH OF UPPER OR TOP SEAL  
0 FEET
- ⑧ TYPE OF BACKFILL Spoils (Sand)
- ⑨ PROTECTIVE CASING YES NO  
HEIGHT ABOVE GROUND 2'
- LOCKING CAP YES NO
- ⑩ CONCRETE CAP YES NO

WATER LEVEL CHECKS

\* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
84A	10/7/83	3 days	21'	
84B	10/7/83	3 days	19'6"	





State of Wisconsin  
Department of Natural Resources

Route to:  Watershed/Wastewater  Waste Management   
Remediation/Redevelopment  Other

MONITORING WELL CONSTRUCTION  
Form 4400-113A Rev. 7-98

Facility/Project Name WPL-Columbia	Local Grid Location of Well _____ ft. _____ ft. _____ ft.	Well Name MW-301
Facility License, Permit or Monitoring No.	Local Grid Origin _____ (estimated: _____) or Well Location _____ Lat. _____ " Long. _____ or _____	Wis. Unique Well No. VY701 DNR Well ID No. _____
Facility ID	St. Plane 541562.2 ft. N, 2125001 ft. E. S/C/N	Date Well Installed 11 / 11 / 2015 m m d d y y y y
Type of Well Well Code 11 / MW	Section Location of Waste/Source SW 1/4 of SE 1/4 of Sec. 27, T. 12 N, R. 9 <input checked="" type="checkbox"/> E <input type="checkbox"/> W	Well Installed By: Name (first, last) and Firm Kevin Duerst Badger State Drilling
Distance from Waste/Source _____ ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	

A. Protective pipe, top elevation	807.16 ft. MSL	1. Cap and lock?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
B. Well casing, top elevation	806.89 ft. MSL	2. Protective cover pipe:	
C. Land surface elevation	803.69 ft. MSL	a. Inside diameter:	6 in.
D. Surface seal, bottom	791.69 ft. MSL or 12 ft.	b. Length:	5 ft.
12. USCS classification of soil near screen:		c. Material:	Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SP <input type="checkbox"/> SM <input checked="" type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input type="checkbox"/>		d. Additional protection?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: bumper posts
13. Sieve analysis performed?	<input type="checkbox"/> Yes <input type="checkbox"/> No	3. Surface seal:	Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
14. Drilling method used:	Rotary <input type="checkbox"/> 50 Hollow Stem Auger <input checked="" type="checkbox"/> 41 Other <input type="checkbox"/>	4. Material between well casing and protective pipe:	Bentonite <input checked="" type="checkbox"/> 30 Bentonite to grade, sand above Other <input type="checkbox"/>
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input type="checkbox"/> 03 None <input checked="" type="checkbox"/> 99		5. Annular space seal:	a. Granular/Chipped Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight . . . . Bentonite slurry <input type="checkbox"/> 31 d. _____ % Bentonite . . . . . Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft <sup>3</sup> volume added for any of the above
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		f. How installed:	Tremie <input type="checkbox"/> 01 Tremie pumped <input type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
17. Source of water (attach analysis, if required):		6. Bentonite seal:	a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite chips <input checked="" type="checkbox"/> 32 c. 4 ft <sup>3</sup> Other <input type="checkbox"/>
E. Bentonite seal, top	803.69 ft. MSL or 0 ft.	7. Fine sand material: Manufacturer, product name & mesh size	
F. Fine sand, top	791.69 ft. MSL or 12 ft.	a. RW Sidley Inc. #7	<input type="checkbox"/>
G. Filter pack, top	789.69 ft. MSL or 14 ft.	b. Volume added	0.5 ft <sup>3</sup>
H. Screen joint, top	787.69 ft. MSL or 16 ft.	8. Filter pack material: Manufacturer, product name & mesh size	
I. Well bottom	777.69 ft. MSL or 26 ft.	a. RW Sidley #5	<input type="checkbox"/>
J. Filter pack, bottom	776.69 ft. MSL or 27 ft.	b. Volume added	2 ft <sup>3</sup>
K. Borehole, bottom	775.69 ft. MSL or 28 ft.	9. Well casing:	Flush threaded PVC schedule 40 <input checked="" type="checkbox"/> 23 Flush threaded PVC schedule 80 <input type="checkbox"/> 24 Other <input type="checkbox"/>
L. Borehole, diameter	8.5 in.	10. Screen material: PVC	
M. O.D. well casing	2.4 in.	a. Screen type:	Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
N. I.D. well casing	2.0 in.	b. Manufacturer	Johnson
		c. Slot size:	0.01 in.
		d. Slotted length:	10 ft.
		11. Backfill material (below filter pack):	None <input type="checkbox"/> 14 Native <input checked="" type="checkbox"/>

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: *[Handwritten Signature]* Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718-6751

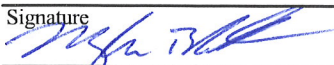
Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

Route To: Watershed/Wastewater  Waste Management   
Remediation/Redevelopment  Other

Facility/Project Name <b>WPL-Columbia</b>		SCS#: 25215135.00		License/Permit/Monitoring Number		Boring Number <b>MW-301</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Kevin Durst Badger State Drilling</b>				Date Drilling Started <b>11/11/2015</b>		Date Drilling Completed <b>11/11/2015</b>	
Drilling Method <b>hollow stem auger</b>		WI Unique Well No. <b>VY701</b>		DNR Well ID No.		Common Well Name	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/>		State Plane <b>541562.2 N, 2025001.0 E</b>		S/C/N		Local Grid Location	
1/4 of		1/4 of Section <b>27</b> ,		T <b>12</b> N, R <b>9</b> E		Lat _____ ' _____ "	
Facility ID		County <b>Columbia</b>		County Code <b>11</b>		Civil Town/City/ or Village <b>Portage</b>	
Final Static Water Level <b>Feet</b>		Surface Elevation <b>803.69 Feet</b>		Borehole Diameter <b>8.5 in.</b>			
Long _____ ' _____ "		Feet <input type="checkbox"/> N		Feet <input type="checkbox"/> S		Feet <input type="checkbox"/> E	
Feet <input type="checkbox"/> W							

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
									Pocket Penetration (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200		
S1	21	7 6 9 10	1 2	SILTY SAND, yellowish brown (10YR 5/6), fine to medium grained.											
S2	20	6 7 9 10	3 4	Same as above except, 10YR 5/4 (top section), 10YR 3/6 (bottom section), trace gravel.											
S3	22	7 6 9 6	5 6	Same as above except, 10YR 3/4 (bottom), 10YR 5/4 (top), trace little roots and sticks, trace gravel.	SM										
S4	21	4 5 6 5	7 8	Same as above except, 10YR (top), 10YR 4/6 (bottom), trace clay at bottom.											
S5	18	2 2 4 5	9 10	Same as above except, fine to coarse grained sand, little gravel, trace clay in top half, 10YR 3/6.											
S6	20	2 3 3 3	11 12	Same as above except, 10YR 6/8.											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm <b>SCS Engineers</b> 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
--	--	-----------------------------

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.



Route to: Watershed/Wastewater  Waste Management   
Remediation/Redevelopment  Other

Facility/Project Name Alliant-Columbia	County Name Columbia	Well Name MW-301	
Facility License, Permit or Monitoring Number	County Code 11	Wis. Unique Well Number VY701	DNR Well ID Number

1. Can this well be purged dry?  Yes  No

2. Well development method

- surged with bailer and bailed  4 1
- surged with bailer and pumped  6 1
- surged with block and bailed  4 2
- surged with block and pumped  6 2
- surged with block, bailed and pumped  7 0
- compressed air  2 0
- bailed only  1 0
- pumped only  5 1
- pumped slowly  5 0
- Other

3. Time spent developing well \_\_\_\_\_ 120 min.

4. Depth of well (from top of well casing) \_\_\_\_\_ 29 . 4 ft.

5. Inside diameter of well \_\_\_\_\_ 2 . 00 in.

6. Volume of water in filter pack and well casing \_\_\_\_\_ 7 . 6 gal.

7. Volume of water removed from well \_\_\_\_\_ 84 . 0 gal.

8. Volume of water added (if any) \_\_\_\_\_ gal.

9. Source of water added \_\_\_\_\_

10. Analysis performed on water added?  Yes  No  
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. _____ 21 . 72 ft.	_____ 21 . 77 ft.
Date	b. <u>12</u> / <u>02</u> / <u>2015</u>	<u>12</u> / <u>02</u> / <u>2015</u>
	m m d d y y y y	m m d d y y y y
Time	c. _____ 08 : 30 <input checked="" type="checkbox"/> a.m. <input type="checkbox"/> p.m.	_____ 10 : 30 <input checked="" type="checkbox"/> a.m. <input type="checkbox"/> p.m.
12. Sediment in well bottom	_____ 0 . inches	_____ 0 . inches
13. Water clarity	Clear <input type="checkbox"/> 1 0 Turbid <input checked="" type="checkbox"/> 1 5 (Describe)	Clear <input checked="" type="checkbox"/> 2 0 Turbid <input type="checkbox"/> 2 5 (Describe)
Fill in if drilling fluids were used and well is at solid waste facility:		
14. Total suspended solids	_____ mg/l	_____ mg/l
15. COD	_____ mg/l	_____ mg/l
16. Well developed by: Name (first, last) and Firm		
First Name:	Gary	Last Name: Sterkel
Firm:	SCS ENGINEERS	

17. Additional comments on development:

Name and Address of Facility Contact /Owner/Responsible Party

First Name: Nate Last Name: Sievers

Facility/Firm: Wisconsin Power and Light

Street: W8375 Murray Rd.

City/State/Zip: Pardeville, WI 53954

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: *[Handwritten Signature]* for Gary Sterkel

Print Name: Gary Sterkel

Firm: SCS ENGINEERS

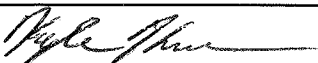
NOTE: See instructions for more information including a list of county codes and well type codes.

Route To: Watershed/Wastewater  Waste Management   
Remediation/Redevelopment  Other

Facility/Project Name WPL- Columbia SCS#: 25216146.00		License/Permit/Monitoring Number		Boring Number MW-306	
Boring Drilled By: Name of crew chief (first, last) and Firm Kevin Duerst Badger State Drilling			Date Drilling Started 11/14/2016	Date Drilling Completed 11/14/2016	Drilling Method hollow stem auger
WI Unique Well No. VY812	DNR Well ID No.	Common Well Name MW-306	Final Static Water Level Feet	Surface Elevation 805.30 Feet	Borehole Diameter 8.5 in.
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/> State Plane 543,829 N, 2,123,424 E S/C/N SE 1/4 of NW 1/4 of Section 27, T 12 N, R 9 E			Local Grid Location Lat _____ " _____ " Long _____ " _____ " Feet <input type="checkbox"/> N _____ Feet <input type="checkbox"/> E <input type="checkbox"/> S _____ <input type="checkbox"/> W		
Facility ID		County Columbia	County Code 11	Civil Town/City/ or Village Portage	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
				TOPSOIL.											
				SILTY SAND, yellowish brown (10YR 5/4), medium grained.											
S1	23	8 13 11 11	4								M				
S2	16	7 5 5 5	6		SM						M				
S3	16	2 4 8 14	9								M				
S4	16	7 10 7 10	11								M				
S5	23	9 22 31 39	14	POORLY GRADED SAND, light yellowish brown (10YR 6/4), medium grained, dense.	SP						M				

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
---	--	-----------------------------

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

Boring Number **MW-306**

Use only as an attachment to Form 4400-122.

Page **2** of **2**

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
S6	22	17 29 40 42	16 17	SILTY SAND, yellowish brown (10YR 5/4), fine to medium grained.	SP										
S7	24	26 41 47 44	18 19												
S8	20	11 25 37 46	20 21 22												
S9	24	8 19 31 44	23 24 25 26 27 28		SM										
				End of boring at 28 ft bgs.											

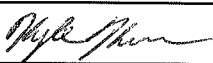
wi= 20 ft bgs.

Route To: Watershed/Wastewater  Waste Management   
Remediation/Redevelopment  Other

Facility/Project Name WPL- Columbia SCS#: 25216146.00		License/Permit/Monitoring Number		Boring Number MW-307	
Boring Drilled By: Name of crew chief (first, last) and Firm Kevin Duerst Badger State Drilling		Date Drilling Started 11/14/2016		Date Drilling Completed 11/15/2016	
WI Unique Well No. VY813		DNR Well ID No.		Common Well Name MW-307	
Final Static Water Level Feet		Surface Elevation 804.53 Feet		Borehole Diameter 8.5 in.	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/>		State Plane 544,511 N, 2,123,467 E S/C/N		Local Grid Location Feet <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
SE 1/4 of NW 1/4 of Section 27, T 12 N, R 9 E		Lat _____ ' _____ "		Long _____ ' _____ "	
Facility ID		County Columbia		County Code 11	
				Civil Town/City/ or Village Portage	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties						RQD/ Comments
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
				TOPSOIL.											
			1	SILTY SAND, yellowish brown (10YR 5/4), medium grained.											
S1	23	55 714	4							M					
S2	22	1122 2438	7	Same as above except, pale brown (10YR 6/3).	SM					M					
S3	22	725 3340	9							M					rock in spoon.
S4	22	1418 2226	12							M					
S5	24	1218 1922	14							M					

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel. (608) 224-2830 Fax:
---	--	-----------------------------

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.



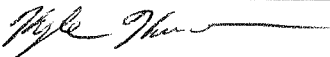


Route To: Watershed/Wastewater  Waste Management   
Remediation/Redevelopment  Other

Facility/Project Name WPL- Columbia		SCS#: 25216146.00		License/Permit/Monitoring Number		Boring Number MW-308	
Boring Drilled By: Name of crew chief (first, last) and Firm Kevin Duerst Badger State Drilling				Date Drilling Started 11/15/2016		Date Drilling Completed 11/15/2016	
WI Unique Well No. VY814		DNR Well ID No.		Common Well Name MW-308		Final Static Water Level Feet	
				Surface Elevation 804.54 Feet		Borehole Diameter 8.5 in.	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/>				Local Grid Location			
State Plane 545,184 N, 2,123,321 E S/C/N				Lat _____"		Feet <input type="checkbox"/> N	
NE 1/4 of NW 1/4 of Section 27, T 12 N, R 9 E				Long _____"		Feet <input type="checkbox"/> E	
Facility ID		County Columbia		County Code 11		Civil Town/City/ or Village Portage	

Sample	Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
										Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
				1	POORLY GRADED GRAVEL.	GP									
				2	SILTY SAND, brown (10YR 5/3), medium grained.										
	S1	23	5 17 23 25	4							M				
	S2	23	10 21 17 19	6							M				
	S3	24	10 15 18 26	9		SM					M				
	S4	24	11 23 19 23	11							M				
	S5	19	9 12 16 16	14	Same as above except, brown (10YR 4/3).						M				

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm <b>SCS Engineers</b> 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
---	---	-----------------------------

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.



Facility/Project Name WPL- Columbia	Local Grid Location of Well ft. <input type="checkbox"/> N. <input type="checkbox"/> E. <input type="checkbox"/> S. <input type="checkbox"/> W.	Well Name MW-306
Facility License, Permit or Monitoring No.	Local Grid Origin (estimated: <input type="checkbox"/> ) or Well Location <input checked="" type="checkbox"/> Lat. " Long. " or "	Wis. Unique Well No. VY812 DNR Well ID No.
Facility ID	St. Plane 543828.99 ft. N. 2123423.65 ft. E. S/C/N	Date Well Installed 11 / 14 / 2016 m m d d y y v v y y
Type of Well Well Code 11 / MW	Section Location of Waste/Source SE <sub>1</sub> / <sub>4</sub> of NW <sub>1</sub> / <sub>4</sub> of Sec. 27, T. 12 N, R. 9 <input checked="" type="checkbox"/> E <input checked="" type="checkbox"/> W	Well Installed By: Name (first, last) and Firm Kevin Duerst
Distance from Waste/Source ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Badger State Drilling

A. Protective pipe, top elevation --- 807.88 ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation --- 807.66 ft. MSL	2. Protective cover pipe: a. Inside diameter: --- 6 in. b. Length: --- 5 ft. c. Material: Steel <input checked="" type="checkbox"/> 0 4 Other <input type="checkbox"/>
C. Land surface elevation --- 805.30 ft. MSL	d. Additional protection? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: bumper posts
D. Surface seal, bottom --- 804.8 ft. MSL or --- 0.5 ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 3 0 Concrete <input type="checkbox"/> 0 1 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input checked="" type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 3 0 Bentonite to grade, sand above Other <input type="checkbox"/>
13. Sieve analysis performed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular/Chipped Bentonite <input type="checkbox"/> 3 3 b. ___ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 3 5 c. ___ Lbs/gal mud weight ... Bentonite slurry <input type="checkbox"/> 3 1 d. ___ % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 5 0 e. ___ Ft <sup>3</sup> volume added for any of the above
14. Drilling method used: Rotary <input type="checkbox"/> 5 0 Hollow Stem Auger <input checked="" type="checkbox"/> 4 1 Other <input type="checkbox"/>	f. How installed: Tremie <input type="checkbox"/> 0 1 Tremie pumped <input type="checkbox"/> 0 2 Gravity <input checked="" type="checkbox"/> 0 8
15. Drilling fluid used: Water <input type="checkbox"/> 0 2 Air <input type="checkbox"/> 0 1 Drilling Mud <input type="checkbox"/> 0 3 None <input checked="" type="checkbox"/> 9 9	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 3 3 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite chips <input checked="" type="checkbox"/> 3 2 c. Other <input type="checkbox"/>
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7. Fine sand material: Manufacturer, product name & mesh size a. RW Sidley Inc. #7 <input type="checkbox"/>
17. Source of water (attach analysis, if required):	b. Volume added 0.5 ft <sup>3</sup> <input type="checkbox"/>
E. Bentonite seal, top --- 804.8 ft. MSL or --- 0.5 ft.	8. Filter pack material: Manufacturer, product name & mesh size a. RW Sidley #5 <input type="checkbox"/>
F. Fine sand, top --- 791.3 ft. MSL or --- 14 ft.	b. Volume added 3 ft <sup>3</sup> <input type="checkbox"/>
G. Filter pack, top --- 790.3 ft. MSL or --- 15 ft.	9. Well casing: Flush threaded PVC schedule 40 <input checked="" type="checkbox"/> 2 3 Flush threaded PVC schedule 80 <input type="checkbox"/> 2 4 Other <input type="checkbox"/>
H. Screen joint, top --- 788.3 ft. MSL or --- 17 ft.	10. Screen material: PVC
I. Well bottom --- 778.3 ft. MSL or --- 27 ft.	a. Screen type: Factory cut <input checked="" type="checkbox"/> 1 1 Continuous slot <input type="checkbox"/> 0 1 Other <input type="checkbox"/>
J. Filter pack, bottom --- 778.3 ft. MSL or --- 27 ft.	b. Manufacturer Johnson
K. Borehole, bottom --- 777.3 ft. MSL or --- 28 ft.	c. Slot size: 0.01 in.
L. Borehole, diameter --- 8.5 in.	d. Slotted length: --- 10 ft.
M. O.D. well casing --- 2.4 in.	11. Backfill material (below filter pack): None <input type="checkbox"/> 1 4 Other <input checked="" type="checkbox"/>
N. I.D. well casing --- 2.0 in.	RW Sidley #5

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature *Myke M...* Firm SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

Facility/Project Name WPL- Columbia	Local Grid Location of Well ft. <input type="checkbox"/> N. <input type="checkbox"/> E. <input type="checkbox"/> S. <input type="checkbox"/> W.	Well Name MW-307
Facility License, Permit or Monitoring No.	Local Grid Origin (estimated: <input type="checkbox"/> ) or Well Location <input checked="" type="checkbox"/> Lat. " Long. " or	Wis. Unique Well No. VY813 DNR Well ID No.
Facility ID	St. Plane 544510.95 ft. N, 2123466.6 ft. E. S/C/N	Date Well Installed 11 / 15 / 2016 m m d d y y y y
Type of Well Well Code 11 / MW	Section Location of Waste/Source SE 1/4 of NW 1/4 of Sec. 27, T. 12 N, R. 9 E W	Well Installed By: Name (first, last) and Firm Kevin Duerst
Distance from Waste/Source _____ ft.	Enf. Stds. Apply <input checked="" type="checkbox"/> Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Gov. Lot Number Badger State Drilling

A. Protective pipe, top elevation --- 807.16 ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation --- 806.96 ft. MSL	2. Protective cover pipe: a. Inside diameter: --- 6 in. b. Length: --- 5 ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/> d. Additional protection? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: bumper posts
C. Land surface elevation --- 804.53 ft. MSL	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
D. Surface seal, bottom --- 804.03 ft. MSL or --- 0.5 ft.	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Bentonite to grade, sand above Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input checked="" type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input type="checkbox"/>	5. Annular space seal: a. Granular/Chipped Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight . . . . . Bentonite slurry <input type="checkbox"/> 31 d. _____ % Bentonite . . . . . Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft <sup>3</sup> volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input type="checkbox"/> 02 Gravity <input checked="" type="checkbox"/> 08
13. Sieve analysis performed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite chips <input checked="" type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
14. Drilling method used: Rotary <input type="checkbox"/> 50 Hollow Stem Auger <input checked="" type="checkbox"/> 41 Other <input type="checkbox"/>	7. Fine sand material: Manufacturer, product name & mesh size a. RW Sidley Inc. #7 <input type="checkbox"/> b. Volume added _____ 0.5 ft <sup>3</sup>
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input type="checkbox"/> 03 None <input checked="" type="checkbox"/> 99	8. Filter pack material: Manufacturer, product name & mesh size a. RW Sidley #5 <input type="checkbox"/> b. Volume added _____ 3.5 ft <sup>3</sup>
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Describe _____	9. Well casing: Flush threaded PVC schedule 40 <input checked="" type="checkbox"/> 23 Flush threaded PVC schedule 80 <input type="checkbox"/> 24 Other <input type="checkbox"/>
17. Source of water (attach analysis, if required): _____	10. Screen material: PVC a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/> b. Manufacturer Johnson c. Slot size: 0.01 in. d. Slotted length: --- 10 ft.
E. Bentonite seal, top --- 804.03 ft. MSL or --- 0.5 ft.	11. Backfill material (below filter pack): None <input type="checkbox"/> 14 Other <input checked="" type="checkbox"/>
F. Fine sand, top --- 791.03 ft. MSL or --- 13.5 ft.	
G. Filter pack, top --- 790.03 ft. MSL or --- 14.5 ft.	
H. Screen joint, top --- 788.03 ft. MSL or --- 16.5 ft.	
I. Well bottom --- 778.03 ft. MSL or --- 26.5 ft.	
J. Filter pack, bottom --- 777.03 ft. MSL or --- 27.5 ft.	
K. Borehole, bottom --- 777.03 ft. MSL or --- 27.5 ft.	
L. Borehole, diameter --- 8.5 in.	
M. O.D. well casing --- 2.4 in.	
N. I.D. well casing --- 2.0 in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature *Wyle Thur* Firm SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

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Route to: Watershed/Wastewater  Waste Management   
Remediation/Redevelopment  Other


Facility/Project Name WPL- Columbia	Local Grid Location of Well ft. <input type="checkbox"/> N. <input type="checkbox"/> E. ft. <input type="checkbox"/> S. <input type="checkbox"/> W.	Well Name MW-308
Facility License, Permit or Monitoring No.	Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Well Location <input checked="" type="checkbox"/> Lat. " Long. " or " "	Wis. Unique Well No. <u>VY814</u> DNR Well ID No. _____
Facility ID	St. Plane <u>545183.88</u> ft. N. <u>2123320.76</u> ft. E. S/C/N	Date Well Installed <u>11</u> / <u>15</u> / <u>2016</u> m m d d y y v v y y
Type of Well Well Code <u>11</u> / MW	Section Location of Waste/Source <u>NE 1/4 of NW 1/4 of Sec. 27, T. 12 N, R. 9</u> <input checked="" type="checkbox"/> E <input type="checkbox"/> W	Well Installed By: Name (first, last) and Firm <u>Kevin Duerst</u>
Distance from Waste/Source _____ ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Gov. Lot Number _____ Badger State Drilling

A. Protective pipe, top elevation _____ 807.10 ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation _____ 806.92 ft. MSL	2. Protective cover pipe: a. Inside diameter: _____ 6 in. b. Length: _____ 5 ft. c. Material: Steel <input checked="" type="checkbox"/> 0 4 Other <input type="checkbox"/>
C. Land surface elevation _____ 804.54 ft. MSL	d. Additional protection? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: <u>bumper posts</u>
D. Surface seal, bottom _____ 804.04 ft. MSL or _____ 0.5 ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 3 0 Concrete <input type="checkbox"/> 0 1 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input checked="" type="checkbox"/> SC <input type="checkbox"/> ML <input checked="" type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 3 0 Bentonite to grade, sand above Other <input type="checkbox"/>
13. Sieve analysis performed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular/Chipped Bentonite <input type="checkbox"/> 3 3 b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry <input type="checkbox"/> 3 5 c. _____ Lbs/gal mud weight . . . . . Bentonite slurry <input type="checkbox"/> 3 1 d. _____ % Bentonite . . . . . Bentonite-cement grout <input type="checkbox"/> 5 0 e. _____ Ft <sup>3</sup> volume added for any of the above
14. Drilling method used: Rotary <input type="checkbox"/> 5 0 Hollow Stem Auger <input checked="" type="checkbox"/> 4 1 Other <input type="checkbox"/>	f. How installed: Tremie <input type="checkbox"/> 0 1 Tremie pumped <input type="checkbox"/> 0 2 Gravity <input checked="" type="checkbox"/> 0 8
15. Drilling fluid used: Water <input type="checkbox"/> 0 2 Air <input type="checkbox"/> 0 1 Drilling Mud <input type="checkbox"/> 0 3 None <input checked="" type="checkbox"/> 9 9	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 3 3 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite chips <input checked="" type="checkbox"/> 3 2 c. _____ Other <input type="checkbox"/>
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7. Fine sand material: Manufacturer, product name & mesh size a. <u>RW Sidley Inc. #7</u> <input type="checkbox"/>
17. Source of water (attach analysis, if required): _____	b. Volume added _____ 0.5 ft <sup>3</sup> <input type="checkbox"/>
E. Bentonite seal, top _____ 804.04 ft. MSL or _____ 0.5 ft.	8. Filter pack material: Manufacturer, product name & mesh size a. <u>RW Sidley #5</u> <input type="checkbox"/>
F. Fine sand, top _____ 789.54 ft. MSL or _____ 15.0 ft.	b. Volume added _____ 3 ft <sup>3</sup> <input type="checkbox"/>
G. Filter pack, top _____ 788.54 ft. MSL or _____ 16.0 ft.	9. Well casing: Flush threaded PVC schedule 40 <input checked="" type="checkbox"/> 2 3 Flush threaded PVC schedule 80 <input type="checkbox"/> 2 4 Other <input type="checkbox"/>
H. Screen joint, top _____ 786.54 ft. MSL or _____ 18.0 ft.	10. Screen material: _____ PVC
I. Well bottom _____ 776.54 ft. MSL or _____ 28.0 ft.	a. Screen type: Factory cut <input checked="" type="checkbox"/> 1 1 Continuous slot <input type="checkbox"/> 0 1 Other <input type="checkbox"/>
J. Filter pack, bottom _____ 775.54 ft. MSL or _____ 29.0 ft.	b. Manufacturer <u>Johnson</u>
K. Borehole, bottom _____ 775.54 ft. MSL or _____ 29.0 ft.	c. Slot size: _____ 0. <u>01</u> in.
L. Borehole, diameter _____ 8.5 in.	d. Slotted length: _____ 10 ft.
M. O.D. well casing _____ 2.4 in.	11. Backfill material (below filter pack): None <input type="checkbox"/> 1 4 Other <input checked="" type="checkbox"/>
N. I.D. well casing _____ 2.0 in.	<u>RW Sidley #5</u>

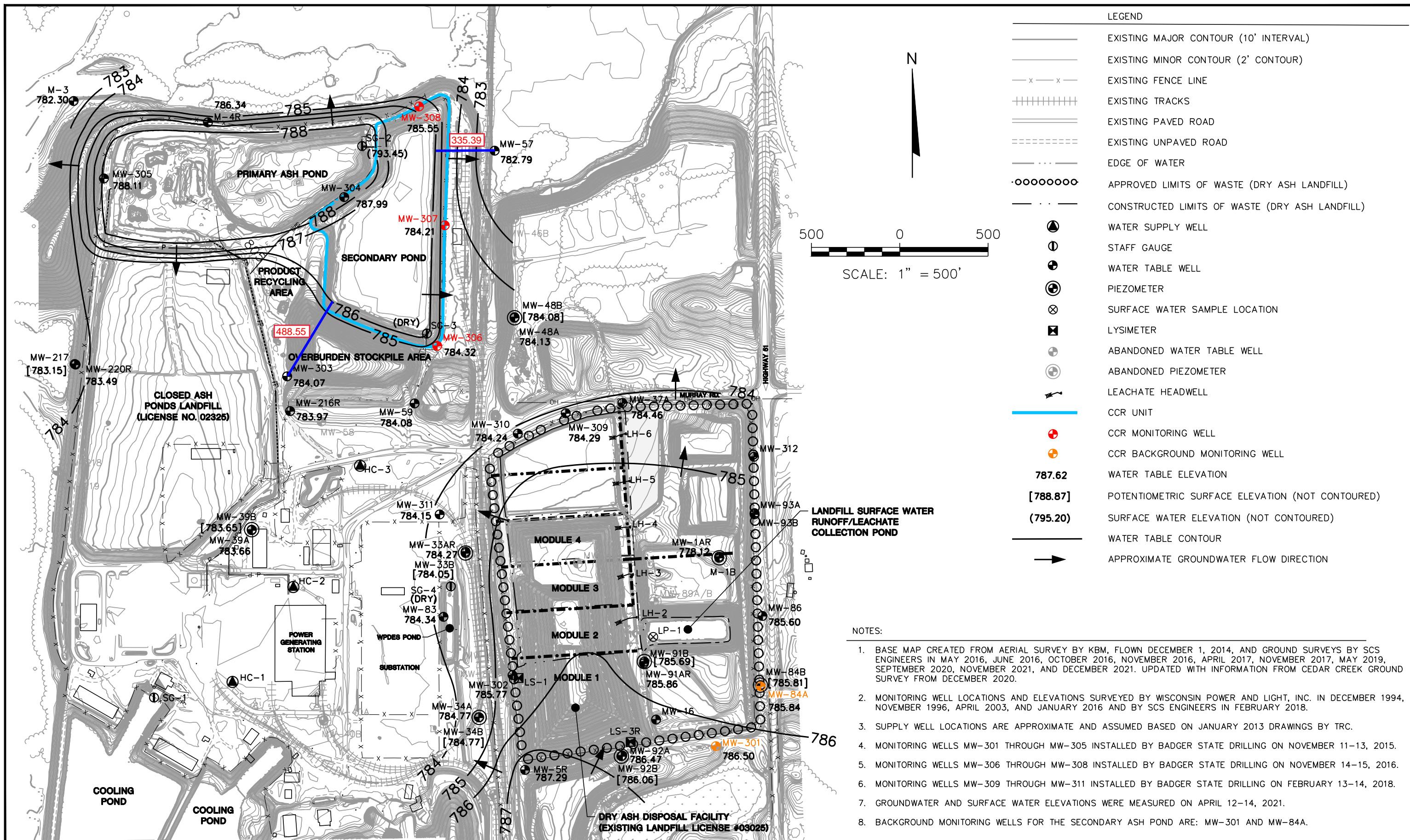
I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [Signature] Firm SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

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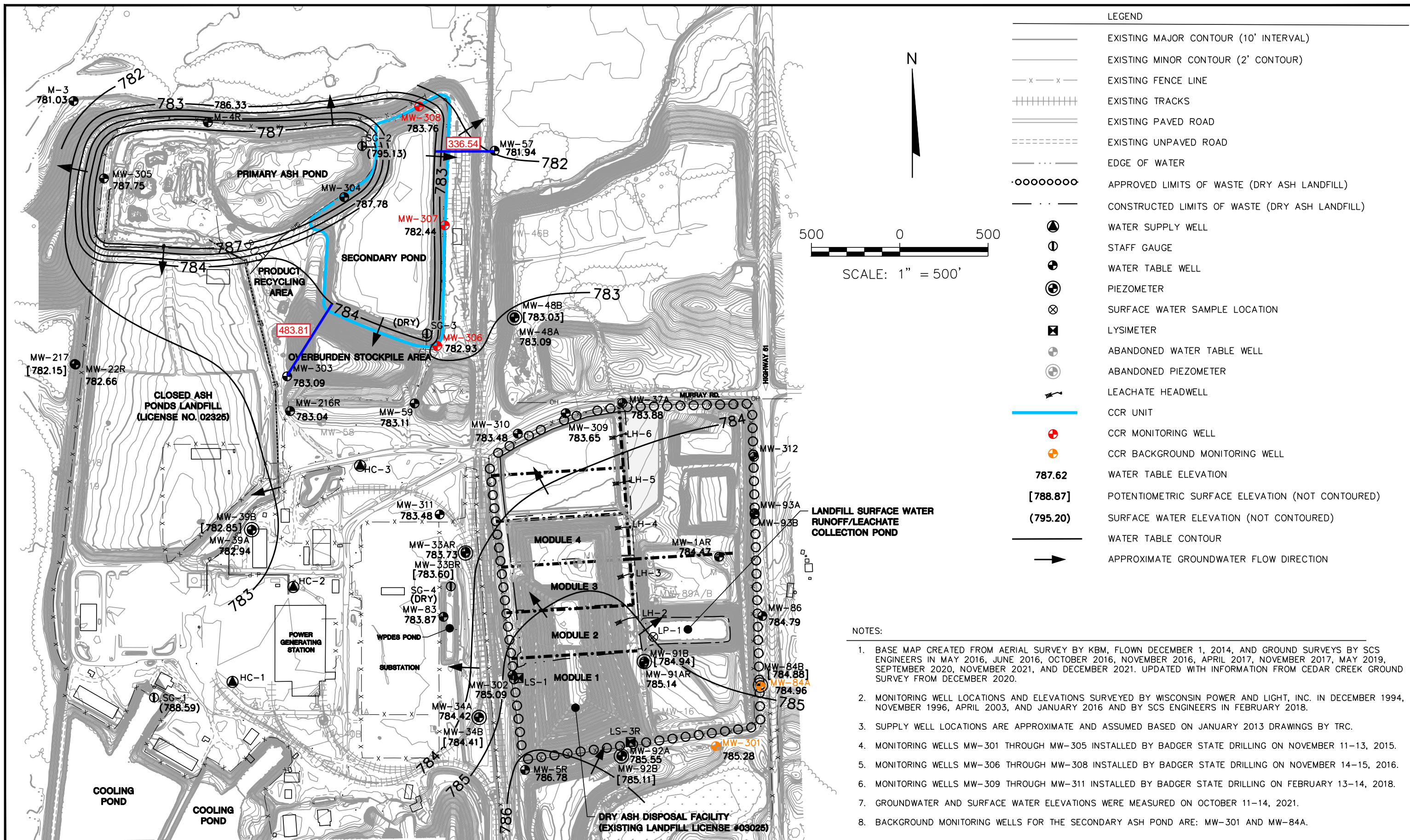
Appendix C  
Horizontal Gradient Measurement Locations



LEGEND	
	EXISTING MAJOR CONTOUR (10' INTERVAL)
	EXISTING MINOR CONTOUR (2' CONTOUR)
	EXISTING FENCE LINE
	EXISTING TRACKS
	EXISTING PAVED ROAD
	EXISTING UNPAVED ROAD
	EDGE OF WATER
	APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
	CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL)
	WATER SUPPLY WELL
	STAFF GAUGE
	WATER TABLE WELL
	PIEZOMETER
	SURFACE WATER SAMPLE LOCATION
	LYSIMETER
	ABANDONED WATER TABLE WELL
	ABANDONED PIEZOMETER
	LEACHATE HEADWELL
	CCR UNIT
	CCR MONITORING WELL
	CCR BACKGROUND MONITORING WELL
<b>787.62</b>	WATER TABLE ELEVATION
<b>[788.87]</b>	POTENTIOMETRIC SURFACE ELEVATION (NOT CONTOURED)
<b>(795.20)</b>	SURFACE WATER ELEVATION (NOT CONTOURED)
	WATER TABLE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION


- NOTES:
1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014, AND GROUND SURVEYS BY SCS ENGINEERS IN MAY 2016, JUNE 2016, OCTOBER 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, MAY 2019, SEPTEMBER 2020, NOVEMBER 2021, AND DECEMBER 2021. UPDATED WITH INFORMATION FROM CEDAR CREEK GROUND SURVEY FROM DECEMBER 2020.
  2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND JANUARY 2016 AND BY SCS ENGINEERS IN FEBRUARY 2018.
  3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY TRC.
  4. MONITORING WELLS MW-301 THROUGH MW-305 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 11-13, 2015.
  5. MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15, 2016.
  6. MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING ON FEBRUARY 13-14, 2018.
  7. GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED ON APRIL 12-14, 2021.
  8. BACKGROUND MONITORING WELLS FOR THE SECONDARY ASH POND ARE: MW-301 AND MW-84A.

PROJECT NO. 25221067.00	DRAWN BY: KP	 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT ALLIANT ENERGY COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WI 53954	SITE ALLIANT ENERGY COLUMBIA ENERGY CENTER SECONDARY ASH DISPOSAL FACILITY PARDEEVILLE, WI	WATER TABLE MAP APRIL 2021	FIGURE 3
DRAWN: 06/29/2021	CHECKED BY: NDK					
REVISED: 07/09/2022	APPROVED BY:					



PROJECT NO.	25221067.00	DRAWN BY:	KP	 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT ALLIANT ENERGY COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WI 53954	SITE ALLIANT ENERGY COLUMBIA ENERGY CENTER SECONDARY ASH DISPOSAL FACILITY PARDEEVILLE, WI	WATER TABLE MAP OCTOBER 2021	FIGURE
DRAWN:	10/26/2021	CHECKED BY:	NDK					4
REVISED:	07/09/2022	APPROVED BY:						





Appendix D  
Laboratory Reports

## D1 April 2021 Compliance Well Assessment Monitoring

May 11, 2021

Meghan Blodgett  
SCS ENGINEERS  
2830 Dairy Drive  
Madison, WI 53718

RE: Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on April 16, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Green Bay
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Dan Milewsky  
dan.milewsky@pacelabs.com  
(920)469-2436  
Project Manager

Enclosures

cc: Tom Karwoski, SCS ENGINEERS  
Nicole Kron, SCS ENGINEERS  
Jeff Maxted, ALLIANT ENERGY  
Marc Morandi, ALLIANT ENERGY



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

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### **Pace Analytical Services Pennsylvania**

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601  
ANAB DOD-ELAP Rad Accreditation #: L2417  
Alabama Certification #: 41590  
Arizona Certification #: AZ0734  
Arkansas Certification  
California Certification #: 04222CA  
Colorado Certification #: PA01547  
Connecticut Certification #: PH-0694  
Delaware Certification  
EPA Region 4 DW Rad  
Florida/TNI Certification #: E87683  
Georgia Certification #: C040  
Florida: Cert E871149 SEKS WET  
Guam Certification  
Hawaii Certification  
Idaho Certification  
Illinois Certification  
Indiana Certification  
Iowa Certification #: 391  
Kansas/TNI Certification #: E-10358  
Kentucky Certification #: KY90133  
KY WW Permit #: KY0098221  
KY WW Permit #: KY0000221  
Louisiana DHH/TNI Certification #: LA180012  
Louisiana DEQ/TNI Certification #: 4086  
Maine Certification #: 2017020  
Maryland Certification #: 308  
Massachusetts Certification #: M-PA1457  
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235  
Montana Certification #: Cert0082  
Nebraska Certification #: NE-OS-29-14  
Nevada Certification #: PA014572018-1  
New Hampshire/TNI Certification #: 297617  
New Jersey/TNI Certification #: PA051  
New Mexico Certification #: PA01457  
New York/TNI Certification #: 10888  
North Carolina Certification #: 42706  
North Dakota Certification #: R-190  
Ohio EPA Rad Approval: #41249  
Oregon/TNI Certification #: PA200002-010  
Pennsylvania/TNI Certification #: 65-00282  
Puerto Rico Certification #: PA01457  
Rhode Island Certification #: 65-00282  
South Dakota Certification  
Tennessee Certification #: 02867  
Texas/TNI Certification #: T104704188-17-3  
Utah/TNI Certification #: PA014572017-9  
USDA Soil Permit #: P330-17-00091  
Vermont Dept. of Health: ID# VT-0282  
Virgin Island/PADEP Certification  
Virginia/VELAP Certification #: 9526  
Washington Certification #: C868  
West Virginia DEP Certification #: 143  
West Virginia DHHR Certification #: 9964C  
Wisconsin Approve List for Rad  
Wyoming Certification #: 8TMS-L

### **Pace Analytical Services Green Bay**

1241 Bellevue Street, Green Bay, WI 54302  
Florida/NELAP Certification #: E87948  
Illinois Certification #: 200050  
Kentucky UST Certification #: 82  
Louisiana Certification #: 04168  
Minnesota Certification #: 055-999-334  
New York Certification #: 12064  
North Dakota Certification #: R-150

Virginia VELAP ID: 460263  
South Carolina Certification #: 83006001  
Texas Certification #: T104704529-14-1  
Wisconsin Certification #: 405132750  
Wisconsin DATCP Certification #: 105-444  
USDA Soil Permit #: P330-16-00157  
Federal Fish & Wildlife Permit #: LE51774A-0

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40225240

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40225240001	MW-306	Water	04/12/21 10:25	04/16/21 07:40
40225240002	MW-307	Water	04/12/21 11:30	04/16/21 07:40
40225240003	MW-308	Water	04/12/21 15:15	04/16/21 07:40
40225240004	FIELD BLANK-SCPOND	Water	04/12/21 11:30	04/16/21 07:40

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40225240001	MW-306	EPA 6020	DS1, KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			VGC	7	PASI-G
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	HNT	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		40225240002	MW-307	EPA 6020	DS1, KXS
EPA 7470	AJT			1	PASI-G
	VGC			7	PASI-G
EPA 903.1	MK1			1	PASI-PA
EPA 904.0	VAL			1	PASI-PA
Total Radium Calculation	RMK			1	PASI-PA
SM 2540C	HNT			1	PASI-G
EPA 9040	ALY			1	PASI-G
EPA 300.0	HMB			3	PASI-G
40225240003	MW-308			EPA 6020	DS1
		EPA 7470	AJT	1	PASI-G
			VGC	7	PASI-G
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	HNT	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		40225240004	FIELD BLANK-SCPOND	EPA 6020	DS1, KXS
EPA 7470	AJT			1	PASI-G
EPA 903.1	MK1			1	PASI-PA
EPA 904.0	VAL			1	PASI-PA
Total Radium Calculation	RMK			1	PASI-PA
SM 2540C	HNT			1	PASI-G
EPA 9040	ALY			1	PASI-G
EPA 300.0	HMB			3	PASI-G

PASI-G = Pace Analytical Services - Green Bay  
PASI-PA = Pace Analytical Services - Greensburg

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40225240

**Sample: MW-306**      **Lab ID: 40225240001**      Collected: 04/12/21 10:25      Received: 04/16/21 07:40      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>									
Analytical Method: EPA 6020    Preparation Method: EPA 3010									
Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	04/20/21 06:41	04/22/21 20:33	7440-36-0	
Arsenic	<0.28	ug/L	1.0	0.28	1	04/20/21 06:41	04/22/21 20:33	7440-38-2	
Barium	11.0	ug/L	2.3	0.70	1	04/20/21 06:41	04/22/21 20:33	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	04/20/21 06:41	04/22/21 20:33	7440-41-7	
Boron	101	ug/L	10.0	3.0	1	04/20/21 06:41	04/22/21 20:33	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	04/20/21 06:41	04/22/21 20:33	7440-43-9	
Calcium	80400	ug/L	254	76.2	1	04/20/21 06:41	04/24/21 03:44	7440-70-2	
Chromium	2.7J	ug/L	3.4	1.0	1	04/20/21 06:41	04/24/21 03:44	7440-47-3	
Cobalt	<0.12	ug/L	1.0	0.12	1	04/20/21 06:41	04/24/21 03:44	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	04/20/21 06:41	04/22/21 20:33	7439-92-1	
Lithium	7.2	ug/L	1.0	0.22	1	04/20/21 06:41	04/22/21 20:33	7439-93-2	
Molybdenum	8.3	ug/L	1.5	0.44	1	04/20/21 06:41	04/22/21 20:33	7439-98-7	
Selenium	0.87J	ug/L	1.1	0.32	1	04/20/21 06:41	04/22/21 20:33	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	04/20/21 06:41	04/22/21 20:33	7440-28-0	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470									
Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	04/26/21 11:55	04/27/21 08:32	7439-97-6	
<b>Field Data</b>									
Analytical Method:									
Pace Analytical Services - Green Bay									
Field pH	7.22	Std. Units			1		04/12/21 10:25		
Field Specific Conductance	552.4	umhos/cm			1		04/12/21 10:25		
Oxygen, Dissolved	8.91	mg/L			1		04/12/21 10:25	7782-44-7	
REDOX	116.7	mV			1		04/12/21 10:25		
Turbidity	5.52	NTU			1		04/12/21 10:25		
Static Water Level	784.32	feet			1		04/12/21 10:25		
Temperature, Water (C)	9.7	deg C			1		04/12/21 10:25		
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C									
Pace Analytical Services - Green Bay									
Total Dissolved Solids	310	mg/L	20.0	8.7	1		04/16/21 16:53		
<b>9040 pH</b>									
Analytical Method: EPA 9040									
Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.5	Std. Units	0.10	0.010	1		04/19/21 09:45		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0									
Pace Analytical Services - Green Bay									
Chloride	0.71J	mg/L	2.0	0.43	1		04/28/21 20:34	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		04/28/21 20:34	16984-48-8	
Sulfate	7.2	mg/L	2.0	0.44	1		04/28/21 20:34	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

**Sample: MW-307**      **Lab ID: 40225240002**      Collected: 04/12/21 11:30      Received: 04/16/21 07:40      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>									
Analytical Method: EPA 6020    Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	04/20/21 06:41	04/22/21 20:40	7440-36-0	
Arsenic	2.0	ug/L	1.0	0.28	1	04/20/21 06:41	04/22/21 20:40	7440-38-2	
Barium	7.8	ug/L	2.3	0.70	1	04/20/21 06:41	04/22/21 20:40	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	04/20/21 06:41	04/22/21 20:40	7440-41-7	
Boron	201	ug/L	10.0	3.0	1	04/20/21 06:41	04/22/21 20:40	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	04/20/21 06:41	04/22/21 20:40	7440-43-9	
Calcium	61900	ug/L	254	76.2	1	04/20/21 06:41	04/24/21 03:51	7440-70-2	
Chromium	<1.0	ug/L	3.4	1.0	1	04/20/21 06:41	04/24/21 03:51	7440-47-3	
Cobalt	0.26J	ug/L	1.0	0.12	1	04/20/21 06:41	04/24/21 03:51	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	04/20/21 06:41	04/22/21 20:40	7439-92-1	
Lithium	<0.22	ug/L	1.0	0.22	1	04/20/21 06:41	04/22/21 20:40	7439-93-2	
Molybdenum	0.83J	ug/L	1.5	0.44	1	04/20/21 06:41	04/22/21 20:40	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	04/20/21 06:41	04/22/21 20:40	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	04/20/21 06:41	04/22/21 20:40	7440-28-0	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	04/26/21 11:55	04/27/21 08:34	7439-97-6	
<b>Field Data</b>									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.32	Std. Units			1		04/12/21 11:30		
Field Specific Conductance	575.7	umhos/cm			1		04/12/21 11:30		
Oxygen, Dissolved	0.17	mg/L			1		04/12/21 11:30	7782-44-7	
REDOX	-120.4	mV			1		04/12/21 11:30		
Turbidity	2.83	NTU			1		04/12/21 11:30		
Static Water Level	784.21	feet			1		04/12/21 11:30		
Temperature, Water (C)	9.4	deg C			1		04/12/21 11:30		
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	312	mg/L	20.0	8.7	1		04/16/21 16:54		
<b>9040 pH</b>									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.2	Std. Units	0.10	0.010	1		04/19/21 09:47		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	7.0J	mg/L	10.0	2.2	5		04/28/21 20:48	16887-00-6	
Fluoride	<0.48	mg/L	1.6	0.48	5		04/28/21 20:48	16984-48-8	
Sulfate	16.9	mg/L	10.0	2.2	5		04/28/21 20:48	14808-79-8	

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

**Sample: MW-308**      **Lab ID: 40225240003**      Collected: 04/12/21 15:15      Received: 04/16/21 07:40      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>									
Analytical Method: EPA 6020    Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	04/20/21 06:41	04/22/21 21:01	7440-36-0	
Arsenic	2.8	ug/L	1.0	0.28	1	04/20/21 06:41	04/22/21 21:01	7440-38-2	
Barium	52.6	ug/L	2.3	0.70	1	04/20/21 06:41	04/22/21 21:01	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	04/20/21 06:41	04/22/21 21:01	7440-41-7	
Boron	463	ug/L	10.0	3.0	1	04/20/21 06:41	04/22/21 21:01	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	04/20/21 06:41	04/22/21 21:01	7440-43-9	
Calcium	120000	ug/L	254	76.2	1	04/20/21 06:41	04/22/21 21:01	7440-70-2	
Chromium	<1.0	ug/L	3.4	1.0	1	04/20/21 06:41	04/22/21 21:01	7440-47-3	
Cobalt	<0.12	ug/L	1.0	0.12	1	04/20/21 06:41	04/22/21 21:01	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	04/20/21 06:41	04/22/21 21:01	7439-92-1	
Lithium	<0.22	ug/L	1.0	0.22	1	04/20/21 06:41	04/22/21 21:01	7439-93-2	
Molybdenum	0.86J	ug/L	1.5	0.44	1	04/20/21 06:41	04/22/21 21:01	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	04/20/21 06:41	04/22/21 21:01	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	04/20/21 06:41	04/22/21 21:01	7440-28-0	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	04/26/21 11:55	04/27/21 08:37	7439-97-6	
<b>Field Data</b>									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.25	Std. Units			1		04/12/21 15:15		
Field Specific Conductance	864.0	umhos/cm			1		04/12/21 15:15		
Oxygen, Dissolved	0.13	mg/L			1		04/12/21 15:15	7782-44-7	
REDOX	-136.9	mV			1		04/12/21 15:15		
Turbidity	1.87	NTU			1		04/12/21 15:15		
Static Water Level	785.55	feet			1		04/12/21 15:15		
Temperature, Water (C)	9.8	deg C			1		04/12/21 15:15		
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	470	mg/L	20.0	8.7	1		04/16/21 16:54		
<b>9040 pH</b>									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.4	Std. Units	0.10	0.010	1		04/19/21 09:50		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	0.96J	mg/L	2.0	0.43	1		04/28/21 21:03	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		04/28/21 21:03	16984-48-8	
Sulfate	<0.44	mg/L	2.0	0.44	1		04/28/21 21:03	14808-79-8	

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

**Sample: FIELD BLANK-SCPOND**    **Lab ID: 40225240004**    Collected: 04/12/21 11:30    Received: 04/16/21 07:40    Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>									
Analytical Method: EPA 6020    Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	04/20/21 06:41	04/22/21 18:24	7440-36-0	
Arsenic	<0.28	ug/L	1.0	0.28	1	04/20/21 06:41	04/22/21 18:24	7440-38-2	
Barium	<0.70	ug/L	2.3	0.70	1	04/20/21 06:41	04/22/21 18:24	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	04/20/21 06:41	04/22/21 18:24	7440-41-7	
Boron	<3.0	ug/L	10.0	3.0	1	04/20/21 06:41	04/22/21 18:24	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	04/20/21 06:41	04/22/21 18:24	7440-43-9	
Calcium	<76.2	ug/L	254	76.2	1	04/20/21 06:41	04/24/21 02:09	7440-70-2	
Chromium	<1.0	ug/L	3.4	1.0	1	04/20/21 06:41	04/24/21 02:09	7440-47-3	
Cobalt	<0.12	ug/L	1.0	0.12	1	04/20/21 06:41	04/24/21 02:09	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	04/20/21 06:41	04/22/21 18:24	7439-92-1	
Lithium	<0.22	ug/L	1.0	0.22	1	04/20/21 06:41	04/22/21 18:24	7439-93-2	
Molybdenum	<0.44	ug/L	1.5	0.44	1	04/20/21 06:41	04/22/21 18:24	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	04/20/21 06:41	04/22/21 18:24	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	04/20/21 06:41	04/22/21 18:24	7440-28-0	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	04/26/21 11:55	04/27/21 08:39	7439-97-6	
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	<b>14.0J</b>	mg/L	20.0	8.7	1		04/16/21 16:56		
<b>9040 pH</b>									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	<b>6.6</b>	Std. Units	0.10	0.010	1		04/19/21 09:53		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	<0.43	mg/L	2.0	0.43	1		04/28/21 21:17	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		04/28/21 21:17	16984-48-8	
Sulfate	<0.44	mg/L	2.0	0.44	1		04/28/21 21:17	14808-79-8	

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

QC Batch: 383422 Analysis Method: EPA 7470  
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury  
Laboratory: Pace Analytical Services - Green Bay  
Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

METHOD BLANK: 2212075 Matrix: Water  
Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.066	0.20	04/27/21 07:55	

LABORATORY CONTROL SAMPLE: 2212076

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.1	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2212077 2212078

Parameter	Units	2212077		2212078		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		40225338001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							MSD Result
Mercury	ug/L	<0.066	5	5	4.8	4.7	97	93	85-115	3	20	

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

QC Batch: 382878 Analysis Method: EPA 6020  
QC Batch Method: EPA 3010 Analysis Description: 6020 MET  
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

METHOD BLANK: 2208607 Matrix: Water  
Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	04/22/21 18:17	
Arsenic	ug/L	<0.28	1.0	04/22/21 18:17	
Barium	ug/L	<0.70	2.3	04/22/21 18:17	
Beryllium	ug/L	<0.25	1.0	04/22/21 18:17	
Boron	ug/L	<3.0	10.0	04/22/21 18:17	
Cadmium	ug/L	<0.15	1.0	04/22/21 18:17	
Calcium	ug/L	<76.2	254	04/24/21 01:55	
Chromium	ug/L	<1.0	3.4	04/24/21 01:55	
Cobalt	ug/L	<0.12	1.0	04/24/21 01:55	
Lead	ug/L	<0.24	1.0	04/22/21 18:17	
Lithium	ug/L	<0.22	1.0	04/22/21 18:17	
Molybdenum	ug/L	<0.44	1.5	04/22/21 18:17	
Selenium	ug/L	<0.32	1.1	04/22/21 18:17	
Thallium	ug/L	<0.14	1.0	04/22/21 18:17	

LABORATORY CONTROL SAMPLE: 2208608

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	498	100	80-120	
Arsenic	ug/L	500	483	97	80-120	
Barium	ug/L	500	500	100	80-120	
Beryllium	ug/L	500	462	92	80-120	
Boron	ug/L	500	460	92	80-120	
Cadmium	ug/L	500	503	101	80-120	
Calcium	ug/L	5000	4890	98	80-120	
Chromium	ug/L	500	505	101	80-120	
Cobalt	ug/L	500	496	99	80-120	
Lead	ug/L	500	492	98	80-120	
Lithium	ug/L	500	474	95	80-120	
Molybdenum	ug/L	500	488	98	80-120	
Selenium	ug/L	500	506	101	80-120	
Thallium	ug/L	500	469	94	80-120	

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40225240

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2208609		2208610		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40225233001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Antimony	ug/L	0.93J	500	500	498	508	99	101	75-125	2	20		
Arsenic	ug/L	10.4	500	500	488	492	96	96	75-125	1	20		
Barium	ug/L	7.8	500	500	500	504	99	99	75-125	1	20		
Beryllium	ug/L	<0.25	500	500	434	431	87	86	75-125	1	20		
Boron	ug/L	2440	500	500	2810	2960	74	104	75-125	5	20	P6	
Cadmium	ug/L	0.67J	500	500	493	505	98	101	75-125	2	20		
Calcium	ug/L	10400	5000	5000	14900	15100	90	93	75-125	1	20		
Chromium	ug/L	44.1	500	500	548	546	101	100	75-125	0	20		
Cobalt	ug/L	0.70J	500	500	506	505	101	101	75-125	0	20		
Lead	ug/L	0.76J	500	500	496	501	99	100	75-125	1	20		
Lithium	ug/L	0.93J	500	500	454	440	91	88	75-125	3	20		
Molybdenum	ug/L	67.1	500	500	565	569	100	100	75-125	1	20		
Selenium	ug/L	22.4	500	500	509	505	97	97	75-125	1	20		
Thallium	ug/L	0.89J	500	500	475	479	95	96	75-125	1	20		

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

QC Batch: 382705 Analysis Method: SM 2540C  
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids  
Laboratory: Pace Analytical Services - Green Bay  
Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

METHOD BLANK: 2207610 Matrix: Water  
Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	04/16/21 16:51	

LABORATORY CONTROL SAMPLE: 2207611

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	564	542	96	80-120	

SAMPLE DUPLICATE: 2207612

Parameter	Units	40225251002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2940	3000	2	10	

SAMPLE DUPLICATE: 2207613

Parameter	Units	40225251004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2750	2750	0	10	

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

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QC Batch:	382734	Analysis Method:	EPA 9040
QC Batch Method:	EPA 9040	Analysis Description:	9040 pH
		Laboratory:	Pace Analytical Services - Green Bay

Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

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SAMPLE DUPLICATE: 2207891

Parameter	Units	40225153001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.1	7.2	0	20	H6

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SAMPLE DUPLICATE: 2207905

Parameter	Units	40225178001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.6	7.6	0	20	H6

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

QC Batch: 383574 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Laboratory: Pace Analytical Services - Green Bay  
Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

METHOD BLANK: 2212748 Matrix: Water  
Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	04/28/21 14:06	
Fluoride	mg/L	<0.095	0.32	04/28/21 14:06	
Sulfate	mg/L	<0.44	2.0	04/28/21 14:06	

LABORATORY CONTROL SAMPLE: 2212749

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.5	107	90-110	
Fluoride	mg/L	2	2.1	103	90-110	
Sulfate	mg/L	20	21.4	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2212750 2212751

Parameter	Units	40225233001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Chloride	mg/L	2.5	20	20	24.3	24.4	109	110	90-110	1	15		
Fluoride	mg/L	<0.95	20	20	22.2	19.8	111	99	90-110	11	15	M0	
Sulfate	mg/L	345	200	200	545	491	100	73	90-110	11	15	M0	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2212752 2212753

Parameter	Units	40225269001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Chloride	mg/L	1.5J	20	20	23.5	23.6	110	110	90-110	0	15		
Fluoride	mg/L	<0.095	2	2	2.2	2.2	107	108	90-110	1	15		
Sulfate	mg/L	4.4	20	20	26.5	26.6	111	111	90-110	0	15	M0	

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40225240

**Sample: MW-306**      **Lab ID: 40225240001**      Collected: 04/12/21 10:25      Received: 04/16/21 07:40      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	<b>0.130 ± 0.402 (0.779)</b> <b>C:NA T:90%</b>	pCi/L	05/10/21 17:00	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	<b>0.0499 ± 0.321 (0.738)</b> <b>C:68% T:90%</b>	pCi/L	05/11/21 11:28	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	<b>0.180 ± 0.723 (1.52)</b>	pCi/L	05/11/21 15:51	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40225240

**Sample: MW-307**      **Lab ID: 40225240002**      Collected: 04/12/21 11:30      Received: 04/16/21 07:40      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	<b>-0.179 ± 0.422 (0.947)</b> <b>C:NA T:92%</b>	pCi/L	05/10/21 17:00	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	<b>0.241 ± 0.421 (0.921)</b> <b>C:60% T:87%</b>	pCi/L	05/11/21 11:28	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	<b>0.241 ± 0.843 (1.87)</b>	pCi/L	05/11/21 15:51	7440-14-4	

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40225240

**Sample: MW-308**      **Lab ID: 40225240003**      Collected: 04/12/21 15:15      Received: 04/16/21 07:40      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	<b>0.0739 ± 0.561 (1.11)</b> <b>C:NA T:87%</b>	pCi/L	05/10/21 17:00	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	<b>0.0768 ± 0.333 (0.760)</b> <b>C:65% T:88%</b>	pCi/L	05/11/21 11:29	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	<b>0.151 ± 0.894 (1.87)</b>	pCi/L	05/11/21 15:51	7440-14-4	

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40225240

**Sample: FIELD BLANK-SCPOND**    **Lab ID: 40225240004**    Collected: 04/12/21 11:30    Received: 04/16/21 07:40    Matrix: Water  
PWS:    Site ID:    Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	<b>0.174 ± 0.302 (0.540)</b> <b>C:NA T:96%</b>	pCi/L	05/10/21 17:00	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	<b>0.177 ± 0.348 (0.767)</b> <b>C:67% T:82%</b>	pCi/L	05/11/21 11:29	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	<b>0.351 ± 0.650 (1.31)</b>	pCi/L	05/11/21 15:51	7440-14-4	

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40225240

QC Batch: 445313

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

METHOD BLANK: 2149681

Matrix: Water

Associated Lab Samples: 40225240001, 40225240002, 40225240003, 40225240004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.301 ± 0.462 (0.795) C:NA T:96%	pCi/L	05/10/21 16:18	

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## QUALIFIERS

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40225240

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### DEFINITIONS

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor, percent moisture, initial weight and final volume.

LOQ - Limit of Quantitation adjusted for dilution factor, percent moisture, initial weight and final volume.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### ANALYTE QUALIFIERS

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40225240

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40225240001	MW-306	EPA 3010	382878	EPA 6020	382964
40225240002	MW-307	EPA 3010	382878	EPA 6020	382964
40225240003	MW-308	EPA 3010	382878	EPA 6020	382964
40225240004	FIELD BLANK-SCPOND	EPA 3010	382878	EPA 6020	382964
40225240001	MW-306	EPA 7470	383422	EPA 7470	383484
40225240002	MW-307	EPA 7470	383422	EPA 7470	383484
40225240003	MW-308	EPA 7470	383422	EPA 7470	383484
40225240004	FIELD BLANK-SCPOND	EPA 7470	383422	EPA 7470	383484
40225240001	MW-306				
40225240002	MW-307				
40225240003	MW-308				
40225240001	MW-306	EPA 903.1	445313		
40225240002	MW-307	EPA 903.1	445313		
40225240003	MW-308	EPA 903.1	445313		
40225240004	FIELD BLANK-SCPOND	EPA 903.1	445313		
40225240001	MW-306	EPA 904.0	445315		
40225240002	MW-307	EPA 904.0	445315		
40225240003	MW-308	EPA 904.0	445315		
40225240004	FIELD BLANK-SCPOND	EPA 904.0	445315		
40225240001	MW-306	Total Radium Calculation	447513		
40225240002	MW-307	Total Radium Calculation	447513		
40225240003	MW-308	Total Radium Calculation	447513		
40225240004	FIELD BLANK-SCPOND	Total Radium Calculation	447513		
40225240001	MW-306	SM 2540C	382705		
40225240002	MW-307	SM 2540C	382705		
40225240003	MW-308	SM 2540C	382705		
40225240004	FIELD BLANK-SCPOND	SM 2540C	382705		
40225240001	MW-306	EPA 9040	382734		
40225240002	MW-307	EPA 9040	382734		
40225240003	MW-308	EPA 9040	382734		
40225240004	FIELD BLANK-SCPOND	EPA 9040	382734		
40225240001	MW-306	EPA 300.0	383574		
40225240002	MW-307	EPA 300.0	383574		
40225240003	MW-308	EPA 300.0	383574		
40225240004	FIELD BLANK-SCPOND	EPA 300.0	383574		

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Client Name: SCS Engineers

**Sample Preservation Receipt Form**

Project # 4025240

Pace Analytical Services, LLC  
1241 Bellevue Street, Suite 9  
Green Bay, WI 54302

All containers needing preservation have been checked and noted below:  Yes  No  N/A

Lab Lot# of pH paper: 1003401

Lab Std #ID of preservation (if pH adjusted):

Initial when completed: [Signature]

Date/Time:

Page Lab #	Glass	Plastic	Vials	Jars	General	VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001	AG1U	BP1U	VG9A	JGFU	SP5T							2.5/5/10
002	BG1U	BP3U	DG9T	JG9U	ZPLC					X		2.5/5/10
003	AG1H	BP3B	VG9U	WGFU	GN					X		2.5/5/10
004	AG4S	BP3N	VG9H	WPFU						X		2.5/5/10
005	AG4U	BP3S	VG9M									2.5/5/10
006	AG5U		VG9D									2.5/5/10
007	AG2S											2.5/5/10
008	BG3U											2.5/5/10
009												2.5/5/10
010												2.5/5/10
011												2.5/5/10
012												2.5/5/10
013												2.5/5/10
014												2.5/5/10
015												2.5/5/10
016												2.5/5/10
017												2.5/5/10
018												2.5/5/10
019												2.5/5/10
020												2.5/5/10

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: \_\_\_\_\_

Headspace in VOA Vials (>6mm) :  Yes  No  N/A \*If Yes look in headspace column

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	VG9A	40 mL clear ascorbic	JGFU	4 oz amber jar unpres
BG1U	1 liter clear glass	BP3U	250 mL plastic unpres	DG9T	40 mL amber Na Thio	JG9U	9 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP3B	250 mL plastic NaOH	VG9U	40 mL clear vial unpres	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9H	40 mL clear vial HCL	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3S	250 mL plastic H2SO4	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG5U	100 mL amber glass unpres			VG9D	40 mL clear vial DI	ZPLC	ziploc bag
AG2S	500 mL amber glass H2SO4					GN	BPIN
BG3U	250 mL clear glass unpres						



Document Name: <b>Sample Condition Upon Receipt (SCUR)</b>	Document Revised: 26Mar2020
Document No.: <b>ENV-FRM-GBAY-0014-Rev.00</b>	Author: Pace Green Bay Quality Office

### Sample Condition Upon Receipt Form (SCUR)

Project #: \_\_\_\_\_

Client Name: SCS Engineers

**WO# : 40225240**

Courier:  CS Logistics  Fed Ex  Speedee  UPS  Waltco  
 Client  Pace Other: \_\_\_\_\_



Tracking #: \_\_\_\_\_

Custody Seal on Cooler/Box Present:  yes  no Seals intact:  yes  no

Custody Seal on Samples Present:  yes  no Seals intact:  yes  no

Packing Material:  Bubble Wrap  Bubble Bags  None  Other \_\_\_\_\_

Thermometer Used SR-90 Type of Ice:  Wet  Blue  Dry  None  Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 1 ICorr: .5

Temp Blank Present:  yes  no Biological Tissue is Frozen:  yes  no

<b>Person examining contents:</b>
Date: <u>4/16/21</u> / Initials: <u>[Signature]</u>
Labeled By Initials: <u>[Signature]</u>

Temp should be above freezing to 6°C.  
 Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Chain of Custody Present: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2. <u>jr #</u>
Chain of Custody Relinquished: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3. <u>4/16/21</u>
Sampler Name & Signature on COC: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
- VOA Samples frozen upon receipt <input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr): <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume: <input type="checkbox"/> Yes <input type="checkbox"/> No	8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Correct Containers Used: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used: <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>W</u>	
Trip Blank Present: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

Client Notification/ Resolution: \_\_\_\_\_ If checked, see attached form for additional comments

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample logir

## D2 April 2021 Background Well Assessment Monitoring

May 11, 2021

Meghan Blodgett  
SCS ENGINEERS  
2830 Dairy Drive  
Madison, WI 53718

RE: Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40225276

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on April 16, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Green Bay
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Dan Milewsky  
dan.milewsky@pacelabs.com  
(920)469-2436  
Project Manager

Enclosures

cc: Tom Karwoski, SCS ENGINEERS  
Nicole Kron, SCS ENGINEERS  
Jeff Maxted, ALLIANT ENERGY  
Marc Morandi, ALLIANT ENERGY



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40225276

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### **Pace Analytical Services Pennsylvania**

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601  
ANAB DOD-ELAP Rad Accreditation #: L2417  
Alabama Certification #: 41590  
Arizona Certification #: AZ0734  
Arkansas Certification  
California Certification #: 04222CA  
Colorado Certification #: PA01547  
Connecticut Certification #: PH-0694  
Delaware Certification  
EPA Region 4 DW Rad  
Florida/TNI Certification #: E87683  
Georgia Certification #: C040  
Florida: Cert E871149 SEKS WET  
Guam Certification  
Hawaii Certification  
Idaho Certification  
Illinois Certification  
Indiana Certification  
Iowa Certification #: 391  
Kansas/TNI Certification #: E-10358  
Kentucky Certification #: KY90133  
KY WW Permit #: KY0098221  
KY WW Permit #: KY0000221  
Louisiana DHH/TNI Certification #: LA180012  
Louisiana DEQ/TNI Certification #: 4086  
Maine Certification #: 2017020  
Maryland Certification #: 308  
Massachusetts Certification #: M-PA1457  
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235  
Montana Certification #: Cert0082  
Nebraska Certification #: NE-OS-29-14  
Nevada Certification #: PA014572018-1  
New Hampshire/TNI Certification #: 297617  
New Jersey/TNI Certification #: PA051  
New Mexico Certification #: PA01457  
New York/TNI Certification #: 10888  
North Carolina Certification #: 42706  
North Dakota Certification #: R-190  
Ohio EPA Rad Approval: #41249  
Oregon/TNI Certification #: PA200002-010  
Pennsylvania/TNI Certification #: 65-00282  
Puerto Rico Certification #: PA01457  
Rhode Island Certification #: 65-00282  
South Dakota Certification  
Tennessee Certification #: 02867  
Texas/TNI Certification #: T104704188-17-3  
Utah/TNI Certification #: PA014572017-9  
USDA Soil Permit #: P330-17-00091  
Vermont Dept. of Health: ID# VT-0282  
Virgin Island/PADEP Certification  
Virginia/VELAP Certification #: 9526  
Washington Certification #: C868  
West Virginia DEP Certification #: 143  
West Virginia DHHR Certification #: 9964C  
Wisconsin Approve List for Rad  
Wyoming Certification #: 8TMS-L

### **Pace Analytical Services Green Bay**

1241 Bellevue Street, Green Bay, WI 54302  
Florida/NELAP Certification #: E87948  
Illinois Certification #: 200050  
Kentucky UST Certification #: 82  
Louisiana Certification #: 04168  
Minnesota Certification #: 055-999-334  
New York Certification #: 12064  
North Dakota Certification #: R-150

Virginia VELAP ID: 460263  
South Carolina Certification #: 83006001  
Texas Certification #: T104704529-14-1  
Wisconsin Certification #: 405132750  
Wisconsin DATCP Certification #: 105-444  
USDA Soil Permit #: P330-16-00157  
Federal Fish & Wildlife Permit #: LE51774A-0

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40225276001	MW-301	Water	04/14/21 14:55	04/16/21 07:40
40225276002	MW-84A	Water	04/14/21 13:40	04/16/21 07:40

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40225276001	MW-301	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			VGC	7	PASI-G
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JXM	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		40225276002	MW-84A	EPA 6020	KXS
EPA 7470	AJT			1	PASI-G
	VGC			7	PASI-G
EPA 903.1	MK1			1	PASI-PA
EPA 904.0	VAL			1	PASI-PA
Total Radium Calculation	RMK			1	PASI-PA
SM 2540C	JXM			1	PASI-G
EPA 9040	ALY			1	PASI-G
EPA 300.0	HMB			3	PASI-G

PASI-G = Pace Analytical Services - Green Bay

PASI-PA = Pace Analytical Services - Greensburg

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40225276

**Sample: MW-301**      **Lab ID: 40225276001**      Collected: 04/14/21 14:55      Received: 04/16/21 07:40      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>									
Analytical Method: EPA 6020    Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	04/21/21 06:55	04/21/21 21:48	7440-36-0	
Arsenic	<0.28	ug/L	1.0	0.28	1	04/21/21 06:55	04/21/21 21:48	7440-38-2	
Barium	8.9	ug/L	2.3	0.70	1	04/21/21 06:55	04/21/21 21:48	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	04/21/21 06:55	04/21/21 21:48	7440-41-7	
Boron	22.2	ug/L	10.0	3.0	1	04/21/21 06:55	04/21/21 21:48	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	04/21/21 06:55	04/21/21 21:48	7440-43-9	
Calcium	117000	ug/L	2540	762	10	04/21/21 06:55	04/21/21 19:30	7440-70-2	P6
Chromium	<1.0	ug/L	3.4	1.0	1	04/21/21 06:55	04/21/21 21:48	7440-47-3	
Cobalt	<0.12	ug/L	1.0	0.12	1	04/21/21 06:55	04/21/21 21:48	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	04/21/21 06:55	04/21/21 21:48	7439-92-1	
Lithium	0.58J	ug/L	1.0	0.22	1	04/21/21 06:55	04/21/21 21:48	7439-93-2	
Molybdenum	<0.44	ug/L	1.5	0.44	1	04/21/21 06:55	04/21/21 21:48	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	04/21/21 06:55	04/22/21 10:16	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	04/21/21 06:55	04/21/21 21:48	7440-28-0	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	04/22/21 11:00	04/23/21 09:30	7439-97-6	
<b>Field Data</b>									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	6.66	Std. Units			1		04/14/21 14:55		
Field Specific Conductance	857.0	umhos/cm			1		04/14/21 14:55		
Oxygen, Dissolved	3.90	mg/L			1		04/14/21 14:55	7782-44-7	
REDOX	102.9	mV			1		04/14/21 14:55		
Turbidity	2.41	NTU			1		04/14/21 14:55		
Static Water Level	786.50	feet			1		04/14/21 14:55		
Temperature, Water (C)	7.4	deg C			1		04/14/21 14:55		
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	472	mg/L	20.0	8.7	1		04/20/21 15:00		
<b>9040 pH</b>									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	6.9	Std. Units	0.10	0.010	1		04/19/21 10:15		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	1.5J	mg/L	2.0	0.43	1		04/30/21 16:37	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		04/30/21 16:37	16984-48-8	
Sulfate	8.5	mg/L	2.0	0.44	1		04/30/21 16:37	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40225276

**Sample: MW-84A**      **Lab ID: 40225276002**      Collected: 04/14/21 13:40      Received: 04/16/21 07:40      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>		Analytical Method: EPA 6020    Preparation Method: EPA 3010 Pace Analytical Services - Green Bay							
Antimony	<b>0.55J</b>	ug/L	1.0	0.15	1	04/21/21 06:55	04/21/21 22:15	7440-36-0	
Arsenic	<b>0.91J</b>	ug/L	1.0	0.28	1	04/21/21 06:55	04/21/21 22:15	7440-38-2	
Barium	<b>13.4</b>	ug/L	2.3	0.70	1	04/21/21 06:55	04/21/21 22:15	7440-39-3	
Beryllium	<b>0.47J</b>	ug/L	1.0	0.25	1	04/21/21 06:55	04/21/21 22:15	7440-41-7	
Boron	<b>14.3</b>	ug/L	10.0	3.0	1	04/21/21 06:55	04/21/21 22:15	7440-42-8	
Cadmium	<b>0.53J</b>	ug/L	1.0	0.15	1	04/21/21 06:55	04/21/21 22:15	7440-43-9	
Calcium	<b>69100</b>	ug/L	254	76.2	1	04/21/21 06:55	04/21/21 22:15	7440-70-2	
Chromium	<b>2.6J</b>	ug/L	3.4	1.0	1	04/21/21 06:55	04/21/21 22:15	7440-47-3	
Cobalt	<b>0.52J</b>	ug/L	1.0	0.12	1	04/21/21 06:55	04/21/21 22:15	7440-48-4	
Lead	<b>0.55J</b>	ug/L	1.0	0.24	1	04/21/21 06:55	04/21/21 22:15	7439-92-1	
Lithium	<b>1.0</b>	ug/L	1.0	0.22	1	04/21/21 06:55	04/21/21 22:15	7439-93-2	
Molybdenum	<b>0.62J</b>	ug/L	1.5	0.44	1	04/21/21 06:55	04/21/21 22:15	7439-98-7	
Selenium	<b>0.48J</b>	ug/L	1.1	0.32	1	04/21/21 06:55	04/22/21 10:44	7782-49-2	
Thallium	<b>0.66J</b>	ug/L	1.0	0.14	1	04/21/21 06:55	04/21/21 22:15	7440-28-0	
<b>7470 Mercury</b>		Analytical Method: EPA 7470    Preparation Method: EPA 7470 Pace Analytical Services - Green Bay							
Mercury	<b>&lt;0.066</b>	ug/L	0.20	0.066	1	04/22/21 11:00	04/23/21 09:32	7439-97-6	
<b>Field Data</b>		Analytical Method: Pace Analytical Services - Green Bay							
Field pH	<b>7.34</b>	Std. Units			1		04/14/21 13:40		
Field Specific Conductance	<b>610.9</b>	umhos/cm			1		04/14/21 13:40		
Oxygen, Dissolved	<b>9.80</b>	mg/L			1		04/14/21 13:40	7782-44-7	
REDOX	<b>95.6</b>	mV			1		04/14/21 13:40		
Turbidity	<b>2.45</b>	NTU			1		04/14/21 13:40		
Static Water Level	<b>785.84</b>	feet			1		04/14/21 13:40		
Temperature, Water (C)	<b>10.2</b>	deg C			1		04/14/21 13:40		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Green Bay							
Total Dissolved Solids	<b>328</b>	mg/L	20.0	8.7	1		04/20/21 15:01		
<b>9040 pH</b>		Analytical Method: EPA 9040 Pace Analytical Services - Green Bay							
pH at 25 Degrees C	<b>7.6</b>	Std. Units	0.10	0.010	1		04/19/21 10:17		H6
<b>300.0 IC Anions</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay							
Chloride	<b>4.4</b>	mg/L	2.0	0.43	1		04/30/21 16:52	16887-00-6	
Fluoride	<b>&lt;0.095</b>	mg/L	0.32	0.095	1		04/30/21 16:52	16984-48-8	
Sulfate	<b>1.4J</b>	mg/L	2.0	0.44	1		04/30/21 16:52	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40225276

QC Batch: 383173	Analysis Method: EPA 7470
QC Batch Method: EPA 7470	Analysis Description: 7470 Mercury
	Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40225276001, 40225276002

METHOD BLANK: 2210149 Matrix: Water

Associated Lab Samples: 40225276001, 40225276002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.066	0.20	04/23/21 08:32	

LABORATORY CONTROL SAMPLE: 2210150

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.7	93	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2210151 2210152

Parameter	Units	2210151		2210152		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40225233001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
Mercury	ug/L	<0.066	5	5	4.8	4.7	97	94	85-115	3	20

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40225276

QC Batch: 383007 Analysis Method: EPA 6020  
QC Batch Method: EPA 3010 Analysis Description: 6020 MET  
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40225276001, 40225276002

METHOD BLANK: 2209295 Matrix: Water  
Associated Lab Samples: 40225276001, 40225276002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	04/21/21 18:28	
Arsenic	ug/L	<0.28	1.0	04/21/21 18:28	
Barium	ug/L	<0.70	2.3	04/21/21 18:28	
Beryllium	ug/L	<0.25	1.0	04/21/21 18:28	
Boron	ug/L	<3.0	10.0	04/21/21 18:28	
Cadmium	ug/L	<0.15	1.0	04/21/21 18:28	
Calcium	ug/L	<76.2	254	04/21/21 18:28	
Chromium	ug/L	<1.0	3.4	04/21/21 18:28	
Cobalt	ug/L	<0.12	1.0	04/21/21 18:28	
Lead	ug/L	<0.24	1.0	04/21/21 18:28	
Lithium	ug/L	<0.22	1.0	04/21/21 18:28	
Molybdenum	ug/L	<0.44	1.5	04/21/21 18:28	
Selenium	ug/L	<0.32	1.1	04/21/21 18:28	
Thallium	ug/L	<0.14	1.0	04/21/21 18:28	

LABORATORY CONTROL SAMPLE: 2209296

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	517	103	80-120	
Arsenic	ug/L	500	492	98	80-120	
Barium	ug/L	500	490	98	80-120	
Beryllium	ug/L	500	477	95	80-120	
Boron	ug/L	500	486	97	80-120	
Cadmium	ug/L	500	509	102	80-120	
Calcium	ug/L	5000	4980	100	80-120	
Chromium	ug/L	500	502	100	80-120	
Cobalt	ug/L	500	486	97	80-120	
Lead	ug/L	500	487	97	80-120	
Lithium	ug/L	500	484	97	80-120	
Molybdenum	ug/L	500	494	99	80-120	
Selenium	ug/L	500	515	103	80-120	
Thallium	ug/L	500	491	98	80-120	

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40225276

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2209297		2209298		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40225276001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Antimony	ug/L	<0.15	500	500	531	529	106	106	75-125	0	20		
Arsenic	ug/L	<0.28	500	500	495	490	99	98	75-125	1	20		
Barium	ug/L	8.9	500	500	504	503	99	99	75-125	0	20		
Beryllium	ug/L	<0.25	500	500	475	472	95	94	75-125	1	20		
Boron	ug/L	22.2	500	500	519	512	99	98	75-125	1	20		
Cadmium	ug/L	<0.15	500	500	510	509	102	102	75-125	0	20		
Calcium	ug/L	117000	5000	5000	122000	120000	104	64	75-125	2	20	P6	
Chromium	ug/L	<1.0	500	500	511	511	102	102	75-125	0	20		
Cobalt	ug/L	<0.12	500	500	493	494	99	99	75-125	0	20		
Lead	ug/L	<0.24	500	500	512	504	102	101	75-125	2	20		
Lithium	ug/L	0.58J	500	500	487	482	97	96	75-125	1	20		
Molybdenum	ug/L	<0.44	500	500	514	518	103	103	75-125	1	20		
Selenium	ug/L	<0.32	500	500	483	484	97	97	75-125	0	20		
Thallium	ug/L	<0.14	500	500	526	523	105	105	75-125	0	20		

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

QC Batch: 382972	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
	Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40225276001, 40225276002

METHOD BLANK: 2209087 Matrix: Water

Associated Lab Samples: 40225276001, 40225276002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	04/20/21 14:59	

LABORATORY CONTROL SAMPLE: 2209088

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	564	554	98	80-120	

SAMPLE DUPLICATE: 2209089

Parameter	Units	40225276001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	472	486	3	10	

SAMPLE DUPLICATE: 2209090

Parameter	Units	40225343004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	850	808	5	10	

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

QC Batch: 382737

Analysis Method: EPA 9040

QC Batch Method: EPA 9040

Analysis Description: 9040 pH

Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40225276001, 40225276002

SAMPLE DUPLICATE: 2207896

Parameter	Units	40225270004 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.3	6.4	1	20	H6

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40225276

QC Batch: 383702 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40225276001, 40225276002

METHOD BLANK: 2213287 Matrix: Water

Associated Lab Samples: 40225276001, 40225276002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	04/30/21 01:17	
Fluoride	mg/L	<0.095	0.32	04/30/21 01:17	
Sulfate	mg/L	<0.44	2.0	04/30/21 01:17	

LABORATORY CONTROL SAMPLE: 2213288

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.5	108	90-110	
Fluoride	mg/L	2	2.1	107	90-110	
Sulfate	mg/L	20	21.6	108	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2213289 2213290

Parameter	Units	40225270001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	390	400	400	816	808	107	105	90-110	1	15	
Fluoride	mg/L	<0.095	2	2	1.8	1.9	91	93	90-110	1	15	
Sulfate	mg/L	30.3	20	20	50.5	50.7	101	102	90-110	0	15	

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### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

**Sample: MW-301**      **Lab ID: 40225276001**      Collected: 04/14/21 14:55      Received: 04/16/21 07:40      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Pace Analytical Services - Greensburg						
Radium-226	EPA 903.1	<b>0.418 ± 0.563 (0.946)</b> <b>C:NA T:91%</b>	pCi/L	05/10/21 16:44	13982-63-3	
Pace Analytical Services - Greensburg						
Radium-228	EPA 904.0	<b>0.739 ± 0.509 (0.983)</b> <b>C:66% T:83%</b>	pCi/L	05/07/21 15:44	15262-20-1	
Pace Analytical Services - Greensburg						
Total Radium	Total Radium Calculation	<b>1.16 ± 1.07 (1.93)</b>	pCi/L	05/11/21 15:49	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

**Sample: MW-84A**      **Lab ID: 40225276002**      Collected: 04/14/21 13:40      Received: 04/16/21 07:40      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	<b>-0.289 ± 0.530 (1.20)</b> <b>C:NA T:92%</b>	pCi/L	05/10/21 17:00	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	<b>0.285 ± 0.346 (0.732)</b> <b>C:73% T:95%</b>	pCi/L	05/11/21 11:28	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	<b>0.285 ± 0.876 (1.93)</b>	pCi/L	05/11/21 15:49	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

QC Batch: 445315

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40225276002

METHOD BLANK: 2149683

Matrix: Water

Associated Lab Samples: 40225276002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.373 ± 0.381 (0.787) C:76% T:77%	pCi/L	05/11/21 11:27	

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

QC Batch: 445314

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40225276001

METHOD BLANK: 2149682

Matrix: Water

Associated Lab Samples: 40225276001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.621 ± 0.331 (0.589) C:74% T:104%	pCi/L	05/07/21 12:16	

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

QC Batch: 445313

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40225276001, 40225276002

METHOD BLANK: 2149681

Matrix: Water

Associated Lab Samples: 40225276001, 40225276002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.301 ± 0.462 (0.795) C:NA T:96%	pCi/L	05/10/21 16:18	

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### REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40225276

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### DEFINITIONS

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor, percent moisture, initial weight and final volume.

LOQ - Limit of Quantitation adjusted for dilution factor, percent moisture, initial weight and final volume.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### ANALYTE QUALIFIERS

H6 Analysis initiated outside of the 15 minute EPA required holding time.

P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40225276

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40225276001	MW-301	EPA 3010	383007	EPA 6020	383093
40225276002	MW-84A	EPA 3010	383007	EPA 6020	383093
40225276001	MW-301	EPA 7470	383173	EPA 7470	383221
40225276002	MW-84A	EPA 7470	383173	EPA 7470	383221
40225276001	MW-301				
40225276002	MW-84A				
40225276001	MW-301	EPA 903.1	445313		
40225276002	MW-84A	EPA 903.1	445313		
40225276001	MW-301	EPA 904.0	445314		
40225276002	MW-84A	EPA 904.0	445315		
40225276001	MW-301	Total Radium Calculation	447511		
40225276002	MW-84A	Total Radium Calculation	447511		
40225276001	MW-301	SM 2540C	382972		
40225276002	MW-84A	SM 2540C	382972		
40225276001	MW-301	EPA 9040	382737		
40225276002	MW-84A	EPA 9040	382737		
40225276001	MW-301	EPA 300.0	383702		
40225276002	MW-84A	EPA 300.0	383702		

### REPORT OF LABORATORY ANALYSIS

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# Pace Container Order #800030 40225276

Addresses	Ship To :	Return To:
<b>Order By :</b>		
Company <u>SCS ENGINEERS</u>	Company <u>SCS ENGINEERS (Pace Analytical Green)</u>	Company <u>Pace Analytical Green Bay</u>
Contact <u>Blodgett, Meghan</u>	Contact <u>Paul Grover</u>	Contact <u>Milewsky, Dan</u>
Email <u>mblodgett@scsengineers.com</u>	Email <u>pgrover@scsengineers.com</u>	Email <u>dan.milewsky@pacelabs.com</u>
Address <u>2830 Dairy Drive</u>	Address <u>2830 Dairy Drive</u>	Address <u>1241 Bellevue Street</u>
Address 2 _____	Address 2 _____	Address 2 <u>Suite 9</u>
City <u>Madison</u>	City <u>Madison</u>	City <u>Green Bay</u>
State <u>WI</u> Zip <u>53718</u>	State <u>WI</u> Zip <u>53718</u>	State <u>WI</u> Zip <u>54302</u>
Phone <u>608-216-7362</u>	Phone <u>608-216-7362</u>	Phone <u>(920)469-2436</u>

Info			
<b>Project Name</b> <u>25219067 Columbia CCR Background</u>	<b>Due Date</b> <u>04/09/2021</u>	<b>Profile</b> <u>3946</u>	<b>Quote</b> _____
<b>Project Manager</b> <u>Milewsky, Dan</u>	<b>Return Date</b> _____	<b>Carrier</b> <u>Most Economical</u>	<b>Location</b> _____

**Trip Blanks**

Include Trip Blanks

**Bottle Labels**

Blank

Pre-Printed No Sample IDs

Pre-Printed With Sample IDs

**Bottles**

Boxed Cases

Individually Wrapped

Grouped By Sample ID/Matrix

**Return Shipping Labels**

No Shipper

With Shipper

**Misc**

Sampling Instructions

Custody Seal

Temp. Blanks

Coolers \_\_\_\_\_

Syringes \_\_\_\_\_

Extra Bubble Wrap

Short Hold/Rush Stickers

DI Water  Liter(s)

USDA Regulated Soils

**COC Options**

Number of Blanks

Pre-Printed

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
2	WT	Radium 226	1L Plastic HNO3 pres	2	0		
2	WT	Radium 228	1L Plastic HNO3 pres	2	0		
2	WT	Metals	250mL plastic w/HNO3	2	0	M-0-290-03BB	
2	WT	pH	250mL plastic unpres	2	0	M-0-290-04BB	
2	WT	TDS, Cl, F, SO4	250mL plastic unpres	2	0	M-0-290-04BB	

### Hazard Shipping Placard In Place : NA

\*Sample receiving hours are typically 8am-5pm, but may differ by location. Please check with your Pace Project Manager.

\*Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you.

\*Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage/disposal.

\*Payment term are net 30 days.

\*Please include the proposal number on the chain of custody to insure proper billing.

**LAB USE:**

**Ship Date :**

**Prepared By:**

**Verified By:**

### Sample

Full List Metals = B, Ca, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li Hg, Mo, Se, Tl

ALL SAMPLES UNFILTERED


**CLIENT USE (Optional):**

**Date Rec'd:**

**Received By:**

**Verified By:**



 1241 Bellevue Street, Green Bay, WI 54302	Document Name: <b>Sample Condition Upon Receipt (SCUR)</b>	Document Revised: 26Mar2020
	Document No.: <b>ENV-FRM-GBAY-0014-Rev.00</b>	Author: Pace Green Bay Quality Office

### Sample Condition Upon Receipt Form (SCUR)

**Client Name:** SCS Engineers  
**Courier:**  CS Logistics  Fed Ex  Speedee  UPS  Waltco  
 Client  Pace Other: \_\_\_\_\_

Project #: \_\_\_\_\_

**WO# : 40225276**



**Tracking #:** \_\_\_\_\_  
**Custody Seal on Cooler/Box Present:**  yes  no    **Seals intact:**  yes  no  
**Custody Seal on Samples Present:**  yes  no    **Seals intact:**  yes  no  
**Packing Material:**  Bubble Wrap  Bubble Bags  None  Other  
**Thermometer Used** SR - 99    **Type of Ice:**  Wet  Blue  Dry  None     Samples on ice, cooling process has begun  
**Cooler Temperature**    Uncorr: 1.0    I/Corr: 1.0  
**Temp Blank Present:**  yes  no    **Biological Tissue is Frozen:**  yes  no

**Person examining contents:**  
 Date: 4-16-21 / Initials: MLR  
 Labeled By Initials: MLR

Temp should be above freezing to 6°C.  
 Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	<u>sample MLR 4-16-21</u>
Chain of Custody Filled Out:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2.	<u>copy to info, proj. state, sample type MLR</u>
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.	<u>4-16-21</u>
Sampler Name & Signature on COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.	
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:	
Short Hold Time Analysis (<72hr):	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6.	
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.	
Sufficient Volume:		8.	
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No    MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A			
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.	
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.	
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.	
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.	
-Includes date/time/ID/Analysis    Matrix: <u>W</u>			
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.	
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		
Pace Trip Blank Lot # (if purchased):			

**Client Notification/ Resolution:** \_\_\_\_\_ If checked, see attached form for additional comments   
 Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Comments/ Resolution: \_\_\_\_\_

## D3 October 2021 Compliance Well Assessment Monitoring

November 05, 2021

Meghan Blodgett  
SCS ENGINEERS  
2830 Dairy Drive  
Madison, WI 53718

RE: Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on October 14, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Green Bay
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Dan Milewsky  
dan.milewsky@pacelabs.com  
(920)469-2436  
Project Manager

Enclosures

cc: Sherren Clark, SCS Engineers  
Tom Karwoski, SCS ENGINEERS  
Nicole Kron, SCS ENGINEERS  
Jeff Maxted, ALLIANT ENERGY  
Marc Morandi, ALLIANT ENERGY



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

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### **Pace Analytical Services Pennsylvania**

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601  
ANAB DOD-ELAP Rad Accreditation #: L2417  
Alabama Certification #: 41590  
Arizona Certification #: AZ0734  
Arkansas Certification  
California Certification #: 04222CA  
Colorado Certification #: PA01547  
Connecticut Certification #: PH-0694  
Delaware Certification  
EPA Region 4 DW Rad  
Florida/TNI Certification #: E87683  
Georgia Certification #: C040  
Florida: Cert E871149 SEKS WET  
Guam Certification  
Hawaii Certification  
Idaho Certification  
Illinois Certification  
Indiana Certification  
Iowa Certification #: 391  
Kansas/TNI Certification #: E-10358  
Kentucky Certification #: KY90133  
KY WW Permit #: KY0098221  
KY WW Permit #: KY0000221  
Louisiana DHH/TNI Certification #: LA180012  
Louisiana DEQ/TNI Certification #: 4086  
Maine Certification #: 2017020  
Maryland Certification #: 308  
Massachusetts Certification #: M-PA1457  
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235  
Montana Certification #: Cert0082  
Nebraska Certification #: NE-OS-29-14  
Nevada Certification #: PA014572018-1  
New Hampshire/TNI Certification #: 297617  
New Jersey/TNI Certification #: PA051  
New Mexico Certification #: PA01457  
New York/TNI Certification #: 10888  
North Carolina Certification #: 42706  
North Dakota Certification #: R-190  
Ohio EPA Rad Approval: #41249  
Oregon/TNI Certification #: PA200002-010  
Pennsylvania/TNI Certification #: 65-00282  
Puerto Rico Certification #: PA01457  
Rhode Island Certification #: 65-00282  
South Dakota Certification  
Tennessee Certification #: 02867  
Texas/TNI Certification #: T104704188-17-3  
Utah/TNI Certification #: PA014572017-9  
USDA Soil Permit #: P330-17-00091  
Vermont Dept. of Health: ID# VT-0282  
Virgin Island/PADEP Certification  
Virginia/VELAP Certification #: 9526  
Washington Certification #: C868  
West Virginia DEP Certification #: 143  
West Virginia DHHR Certification #: 9964C  
Wisconsin Approve List for Rad  
Wyoming Certification #: 8TMS-L

### **Pace Analytical Services Green Bay**

1241 Bellevue Street, Green Bay, WI 54302  
Florida/NELAP Certification #: E87948  
Illinois Certification #: 200050  
Kentucky UST Certification #: 82  
Louisiana Certification #: 04168  
Minnesota Certification #: 055-999-334  
New York Certification #: 12064  
North Dakota Certification #: R-150

Virginia VELAP ID: 460263  
South Carolina Certification #: 83006001  
Texas Certification #: T104704529-14-1  
Wisconsin Certification #: 405132750  
Wisconsin DATCP Certification #: 105-444  
USDA Soil Permit #: P330-16-00157  
Federal Fish & Wildlife Permit #: LE51774A-0

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40235135

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40235135001	MW-306	Water	10/12/21 15:45	10/14/21 09:10
40235135002	MW-307	Water	10/12/21 15:05	10/14/21 09:10
40235135003	MW-308	Water	10/12/21 12:45	10/14/21 09:10
40235135004	FIELD BLANK-SCPOND	Water	10/12/21 15:05	10/14/21 09:10

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40235135001	MW-306	EPA 6020B	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			MEA	7	PASI-G
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	HNT	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		40235135002	MW-307	EPA 6020B	KXS
EPA 7470	AJT			1	PASI-G
	MEA			7	PASI-G
EPA 903.1	MK1			1	PASI-PA
EPA 904.0	JC2			1	PASI-PA
Total Radium Calculation	JAL			1	PASI-PA
SM 2540C	HNT			1	PASI-G
EPA 9040	ALY			1	PASI-G
EPA 300.0	HMB			3	PASI-G
40235135003	MW-308			EPA 6020B	KXS
		EPA 7470	AJT	1	PASI-G
			MEA	7	PASI-G
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	HNT	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		40235135004	FIELD BLANK-SCPOND	EPA 6020B	KXS
EPA 7470	AJT			1	PASI-G
EPA 903.1	MK1			1	PASI-PA
EPA 904.0	JC2			1	PASI-PA
Total Radium Calculation	JAL			1	PASI-PA
SM 2540C	HNT			1	PASI-G
EPA 9040	ALY			1	PASI-G
EPA 300.0	HMB			3	PASI-G

PASI-G = Pace Analytical Services - Green Bay  
PASI-PA = Pace Analytical Services - Greensburg

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## ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

**Sample: MW-306**      **Lab ID: 40235135001**      Collected: 10/12/21 15:45      Received: 10/14/21 09:10      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020B MET ICPMS</b>									
Analytical Method: EPA 6020B    Preparation Method: EPA 3010A Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	10/18/21 06:03	10/28/21 14:30	7440-36-0	
Arsenic	<0.28	ug/L	1.0	0.28	1	10/18/21 06:03	10/28/21 14:30	7440-38-2	
Barium	11.5	ug/L	2.3	0.70	1	10/18/21 06:03	10/28/21 14:30	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/18/21 06:03	10/28/21 14:30	7440-41-7	
Boron	114	ug/L	10.0	3.0	1	10/18/21 06:03	10/28/21 14:30	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	10/18/21 06:03	10/28/21 14:30	7440-43-9	
Calcium	77000	ug/L	254	76.2	1	10/18/21 06:03	10/28/21 14:30	7440-70-2	
Chromium	2.8J	ug/L	3.4	1.0	1	10/18/21 06:03	10/28/21 14:30	7440-47-3	
Cobalt	<0.12	ug/L	1.0	0.12	1	10/18/21 06:03	10/28/21 14:30	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	10/18/21 06:03	10/28/21 14:30	7439-92-1	
Lithium	9.2	ug/L	1.0	0.22	1	10/18/21 06:03	10/28/21 14:30	7439-93-2	
Molybdenum	9.7	ug/L	1.5	0.44	1	10/18/21 06:03	10/28/21 14:30	7439-98-7	
Selenium	1.0J	ug/L	1.1	0.32	1	10/18/21 06:03	10/28/21 14:30	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	10/18/21 06:03	10/28/21 14:30	7440-28-0	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	11/01/21 11:24	11/02/21 06:42	7439-97-6	
<b>Field Data</b>									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.40	Std. Units			1		10/12/21 15:45		
Field Specific Conductance	543.1	umhos/cm			1		10/12/21 15:45		
Oxygen, Dissolved	7.97	mg/L			1		10/12/21 15:45	7782-44-7	
REDOX	90.9	mV			1		10/12/21 15:45		
Turbidity	0.51	NTU			1		10/12/21 15:45		
Static Water Level	782.93	feet			1		10/12/21 15:45		
Temperature, Water (C)	12.7	deg C			1		10/12/21 15:45		
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	282	mg/L	20.0	8.7	1		10/15/21 14:06		
<b>9040 pH</b>									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.7	Std. Units	0.10	0.010	1		10/22/21 10:13		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	0.98J	mg/L	2.0	0.43	1		10/28/21 00:07	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		10/28/21 00:07	16984-48-8	
Sulfate	8.5	mg/L	2.0	0.44	1		10/28/21 00:07	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

**Sample: MW-307**      **Lab ID: 40235135002**      Collected: 10/12/21 15:05      Received: 10/14/21 09:10      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020B MET ICPMS</b>									
Analytical Method: EPA 6020B    Preparation Method: EPA 3010A Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	10/18/21 06:03	10/28/21 14:01	7440-36-0	
Arsenic	1.8	ug/L	1.0	0.28	1	10/18/21 06:03	10/28/21 14:01	7440-38-2	
Barium	13.1	ug/L	2.3	0.70	1	10/18/21 06:03	10/28/21 14:01	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/18/21 06:03	10/28/21 14:01	7440-41-7	
Boron	327	ug/L	10.0	3.0	1	10/18/21 06:03	10/28/21 14:01	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	10/18/21 06:03	10/28/21 14:01	7440-43-9	
Calcium	74600	ug/L	254	76.2	1	10/18/21 06:03	10/28/21 14:01	7440-70-2	
Chromium	<1.0	ug/L	3.4	1.0	1	10/18/21 06:03	10/28/21 14:01	7440-47-3	
Cobalt	0.68J	ug/L	1.0	0.12	1	10/18/21 06:03	10/28/21 14:01	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	10/18/21 06:03	10/28/21 14:01	7439-92-1	
Lithium	<0.22	ug/L	1.0	0.22	1	10/18/21 06:03	10/28/21 14:01	7439-93-2	
Molybdenum	0.91J	ug/L	1.5	0.44	1	10/18/21 06:03	10/28/21 14:01	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	10/18/21 06:03	10/28/21 14:01	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	10/18/21 06:03	10/28/21 14:01	7440-28-0	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	11/01/21 11:24	11/02/21 06:44	7439-97-6	
<b>Field Data</b>									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.11	Std. Units			1		10/12/21 15:05		
Field Specific Conductance	709.0	umhos/cm			1		10/12/21 15:05		
Oxygen, Dissolved	0.46	mg/L			1		10/12/21 15:05	7782-44-7	
REDOX	-85.0	mV			1		10/12/21 15:05		
Turbidity	2.18	NTU			1		10/12/21 15:05		
Static Water Level	782.44	feet			1		10/12/21 15:05		
Temperature, Water (C)	14.2	deg C			1		10/12/21 15:05		
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	388	mg/L	20.0	8.7	1		10/15/21 14:06		
<b>9040 pH</b>									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.4	Std. Units	0.10	0.010	1		10/22/21 10:15		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	9.8J	mg/L	10.0	2.2	5		10/28/21 00:21	16887-00-6	D3
Fluoride	<0.48	mg/L	1.6	0.48	5		10/28/21 00:21	16984-48-8	D3
Sulfate	92.9	mg/L	10.0	2.2	5		10/28/21 00:21	14808-79-8	

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

**Sample: MW-308**      **Lab ID: 40235135003**      Collected: 10/12/21 12:45      Received: 10/14/21 09:10      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020B MET ICPMS</b>									
Analytical Method: EPA 6020B    Preparation Method: EPA 3010A Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	10/18/21 06:03	10/28/21 14:08	7440-36-0	
Arsenic	6.3	ug/L	1.0	0.28	1	10/18/21 06:03	10/28/21 14:08	7440-38-2	
Barium	59.2	ug/L	2.3	0.70	1	10/18/21 06:03	10/28/21 14:08	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/18/21 06:03	10/28/21 14:08	7440-41-7	
Boron	704	ug/L	50.0	15.2	5	10/18/21 06:03	10/28/21 15:07	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	10/18/21 06:03	10/28/21 14:08	7440-43-9	
Calcium	115000	ug/L	254	76.2	1	10/18/21 06:03	10/28/21 14:08	7440-70-2	
Chromium	<1.0	ug/L	3.4	1.0	1	10/18/21 06:03	10/28/21 14:08	7440-47-3	
Cobalt	0.22J	ug/L	1.0	0.12	1	10/18/21 06:03	10/28/21 14:08	7440-48-4	
Lead	0.24J	ug/L	1.0	0.24	1	10/18/21 06:03	10/28/21 14:08	7439-92-1	
Lithium	0.23J	ug/L	1.0	0.22	1	10/18/21 06:03	10/28/21 14:08	7439-93-2	
Molybdenum	7.1	ug/L	1.5	0.44	1	10/18/21 06:03	10/28/21 14:08	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	10/18/21 06:03	10/28/21 14:08	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	10/18/21 06:03	10/28/21 14:08	7440-28-0	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	11/01/21 11:24	11/02/21 06:47	7439-97-6	
<b>Field Data</b>									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.11	Std. Units			1		10/12/21 12:45		
Field Specific Conductance	894.0	umhos/cm			1		10/12/21 12:45		
Oxygen, Dissolved	0.09	mg/L			1		10/12/21 12:45	7782-44-7	
REDOX	-110.8	mV			1		10/12/21 12:45		
Turbidity	11.07	NTU			1		10/12/21 12:45		
Static Water Level	783.76	feet			1		10/12/21 12:45		
Temperature, Water (C)	15.8	deg C			1		10/12/21 12:45		
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	460	mg/L	20.0	8.7	1		10/15/21 14:06		
<b>9040 pH</b>									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.4	Std. Units	0.10	0.010	1		10/22/21 10:17		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	3.6J	mg/L	10.0	2.2	5		10/28/21 00:35	16887-00-6	D3
Fluoride	<0.48	mg/L	1.6	0.48	5		10/28/21 00:35	16984-48-8	D3,M0
Sulfate	<2.2	mg/L	10.0	2.2	5		10/28/21 00:35	14808-79-8	D3

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

**Sample: FIELD BLANK-SCPOND**    **Lab ID: 40235135004**    Collected: 10/12/21 15:05    Received: 10/14/21 09:10    Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020B MET ICPMS</b>									
Analytical Method: EPA 6020B    Preparation Method: EPA 3010A Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	10/18/21 06:03	10/28/21 11:56	7440-36-0	
Arsenic	<0.28	ug/L	1.0	0.28	1	10/18/21 06:03	10/28/21 11:56	7440-38-2	
Barium	<0.70	ug/L	2.3	0.70	1	10/18/21 06:03	10/28/21 11:56	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/18/21 06:03	10/28/21 11:56	7440-41-7	
Boron	<3.0	ug/L	10.0	3.0	1	10/18/21 06:03	10/28/21 11:56	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	10/18/21 06:03	10/28/21 11:56	7440-43-9	
Calcium	<76.2	ug/L	254	76.2	1	10/18/21 06:03	10/28/21 11:56	7440-70-2	
Chromium	<1.0	ug/L	3.4	1.0	1	10/18/21 06:03	10/28/21 11:56	7440-47-3	
Cobalt	<0.12	ug/L	1.0	0.12	1	10/18/21 06:03	10/28/21 11:56	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	10/18/21 06:03	10/28/21 11:56	7439-92-1	
Lithium	<0.22	ug/L	1.0	0.22	1	10/18/21 06:03	10/28/21 11:56	7439-93-2	
Molybdenum	<0.44	ug/L	1.5	0.44	1	10/18/21 06:03	10/28/21 11:56	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	10/18/21 06:03	10/28/21 11:56	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	10/18/21 06:03	10/28/21 11:56	7440-28-0	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	11/01/21 11:24	11/02/21 06:49	7439-97-6	
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	<b>12.0J</b>	mg/L	20.0	8.7	1		10/15/21 14:06		
<b>9040 pH</b>									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	<b>7.2</b>	Std. Units	0.10	0.010	1		10/22/21 10:24		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	<0.43	mg/L	2.0	0.43	1		11/02/21 21:52	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		11/02/21 21:52	16984-48-8	
Sulfate	<0.44	mg/L	2.0	0.44	1		11/02/21 21:52	14808-79-8	

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40235135

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QC Batch: 400243	Analysis Method: EPA 7470
QC Batch Method: EPA 7470	Analysis Description: 7470 Mercury
	Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

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METHOD BLANK: 2311667 Matrix: Water  
Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.066	0.20	11/02/21 06:05	

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LABORATORY CONTROL SAMPLE: 2311668

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.9	97	85-115	

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MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2311669 2311670

Parameter	Units	2311669		2311670		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40235131001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
Mercury	ug/L	<0.066	5	5	4.7	4.8	94	97	85-115	3	20

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

QC Batch: 398760 Analysis Method: EPA 6020B  
QC Batch Method: EPA 3010A Analysis Description: 6020B MET  
Laboratory: Pace Analytical Services - Green Bay  
Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

METHOD BLANK: 2302500 Matrix: Water  
Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	10/28/21 11:41	
Arsenic	ug/L	<0.28	1.0	10/28/21 11:41	
Barium	ug/L	<0.70	2.3	10/28/21 11:41	
Beryllium	ug/L	<0.25	1.0	10/28/21 11:41	
Boron	ug/L	<3.0	10.0	10/28/21 11:41	
Cadmium	ug/L	<0.15	1.0	10/28/21 11:41	
Calcium	ug/L	<76.2	254	10/28/21 11:41	
Chromium	ug/L	<1.0	3.4	10/28/21 11:41	
Cobalt	ug/L	<0.12	1.0	10/28/21 11:41	
Lead	ug/L	<0.24	1.0	10/28/21 11:41	
Lithium	ug/L	<0.22	1.0	10/28/21 11:41	
Molybdenum	ug/L	<0.44	1.5	10/28/21 11:41	
Selenium	ug/L	<0.32	1.1	10/28/21 11:41	
Thallium	ug/L	<0.14	1.0	10/28/21 11:41	

LABORATORY CONTROL SAMPLE: 2302501

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	250	250	100	80-120	
Arsenic	ug/L	250	251	100	80-120	
Barium	ug/L	250	240	96	80-120	
Beryllium	ug/L	250	255	102	80-120	
Boron	ug/L	250	246	98	80-120	
Cadmium	ug/L	250	246	98	80-120	
Calcium	ug/L	10000	9850	99	80-120	
Chromium	ug/L	250	246	98	80-120	
Cobalt	ug/L	250	244	98	80-120	
Lead	ug/L	250	244	98	80-120	
Lithium	ug/L	250	249	99	80-120	
Molybdenum	ug/L	250	247	99	80-120	
Selenium	ug/L	250	257	103	80-120	
Thallium	ug/L	250	247	99	80-120	

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40235135

Parameter	Units	2302502		2302503		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40235131001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Antimony	ug/L	0.55J	250	250	252	247	101	98	75-125	2	20		
Arsenic	ug/L	18.6	250	250	270	265	100	99	75-125	2	20		
Barium	ug/L	5.1	250	250	249	246	98	96	75-125	2	20		
Beryllium	ug/L	<0.25	250	250	255	243	102	97	75-125	5	20		
Boron	ug/L	2690	250	250	2990	2950	120	104	75-125	1	20		
Cadmium	ug/L	0.27J	250	250	245	238	98	95	75-125	3	20		
Calcium	ug/L	5530	10000	10000	15400	15200	98	96	75-125	1	20		
Chromium	ug/L	50.2	250	250	292	287	97	95	75-125	1	20		
Cobalt	ug/L	0.74J	250	250	242	238	97	95	75-125	2	20		
Lead	ug/L	0.32J	250	250	247	257	99	103	75-125	4	20		
Lithium	ug/L	0.62J	250	250	250	241	100	96	75-125	4	20		
Molybdenum	ug/L	78.0	250	250	329	322	100	98	75-125	2	20		
Selenium	ug/L	28.1	250	250	283	280	102	101	75-125	1	20		
Thallium	ug/L	0.30J	250	250	250	256	100	102	75-125	2	20		

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40235135

QC Batch: 398649	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
	Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

METHOD BLANK: 2301509 Matrix: Water  
Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	10/15/21 14:01	

LABORATORY CONTROL SAMPLE: 2301510

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	575	552	96	80-120	

SAMPLE DUPLICATE: 2301513

Parameter	Units	40235131001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	660	702	6	10	

SAMPLE DUPLICATE: 2301514

Parameter	Units	40235131003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	730	740	1	10	

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**QUALITY CONTROL DATA**

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40235135

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QC Batch:	399343	Analysis Method:	EPA 9040
QC Batch Method:	EPA 9040	Analysis Description:	9040 pH
		Laboratory:	Pace Analytical Services - Green Bay

Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

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SAMPLE DUPLICATE: 2305673

Parameter	Units	40235127001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.3	7.4	1	20	H6

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SAMPLE DUPLICATE: 2305674

Parameter	Units	40235131001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	9.2	9.3	1	20	H6

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

QC Batch: 399678 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Laboratory: Pace Analytical Services - Green Bay  
Associated Lab Samples: 40235135001, 40235135002, 40235135003

METHOD BLANK: 2307710 Matrix: Water  
Associated Lab Samples: 40235135001, 40235135002, 40235135003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	10/27/21 17:38	
Fluoride	mg/L	<0.095	0.32	10/27/21 17:38	
Sulfate	mg/L	<0.44	2.0	10/27/21 17:38	

LABORATORY CONTROL SAMPLE: 2307711

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.0	105	90-110	
Fluoride	mg/L	2	2.1	105	90-110	
Sulfate	mg/L	20	20.5	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2307712 2307713

Parameter	Units	40235074001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	Result	MSD Result	% Rec	MSD % Rec					
Chloride	mg/L	1780	2000	2000	3920	4060	107	114	90-110	4	15	M0	
Fluoride	mg/L	26.4J	200	200	373	388	173	181	90-110	4	15	M0	
Sulfate	mg/L	63.3	400	400	488	481	106	104	90-110	2	15		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2308300 2308301

Parameter	Units	40235135003		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	Result	MSD Result	% Rec	MSD % Rec					
Chloride	mg/L	3.6J	100	100	110	110	106	106	90-110	0	15		
Fluoride	mg/L	<0.48	10	10	11.1	11.1	111	111	90-110	0	15	M0	
Sulfate	mg/L	<2.2	100	100	107	107	105	105	90-110	0	15		

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

QC Batch: 400320 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40235135004

METHOD BLANK: 2311913 Matrix: Water  
Associated Lab Samples: 40235135004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	11/02/21 18:02	
Fluoride	mg/L	<0.095	0.32	11/02/21 18:02	
Sulfate	mg/L	<0.44	2.0	11/02/21 18:02	

LABORATORY CONTROL SAMPLE: 2311914

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.8	99	90-110	
Fluoride	mg/L	2	1.9	96	90-110	
Sulfate	mg/L	20	19.1	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2311915 2311916

Parameter	Units	40235505001		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual	
Chloride	mg/L	29.3	20	20	50.5	50.3	106	105	90-110	0	15		
Fluoride	mg/L	<1.9	40	40	44.2	42.8	111	107	90-110	3	15	M0	
Sulfate	mg/L	37.5	20	20	58.4	58.2	105	104	90-110	0	15		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2311917 2311918

Parameter	Units	40235583003		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual	
Chloride	mg/L	364	400	400	801	799	109	109	90-110	0	15		
Fluoride	mg/L	<1.9	40	40	43.7	43.6	109	109	90-110	0	15		
Sulfate	mg/L	151	400	400	577	574	106	106	90-110	0	15		

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### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40235135

**Sample: MW-306**      **Lab ID: 40235135001**      Collected: 10/12/21 15:45      Received: 10/14/21 09:10      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	<b>0.399 ± 0.415 (0.618)</b> <b>C:NA T:96%</b>	pCi/L	11/05/21 14:26	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	<b>0.385 ± 0.333 (0.674)</b> <b>C:75% T:102%</b>	pCi/L	11/03/21 14:31	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	<b>0.784 ± 0.748 (1.29)</b>	pCi/L	11/05/21 17:14	7440-14-4	

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40235135

**Sample: MW-307**      **Lab ID: 40235135002**      Collected: 10/12/21 15:05      Received: 10/14/21 09:10      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Pace Analytical Services - Greensburg						
Radium-226	EPA 903.1	<b>0.154 ± 0.363 (0.672)</b> <b>C:NA T:105%</b>	pCi/L	11/05/21 14:26	13982-63-3	
Pace Analytical Services - Greensburg						
Radium-228	EPA 904.0	<b>0.688 ± 0.416 (0.768)</b> <b>C:69% T:87%</b>	pCi/L	11/03/21 14:31	15262-20-1	
Pace Analytical Services - Greensburg						
Total Radium	Total Radium Calculation	<b>0.842 ± 0.779 (1.44)</b>	pCi/L	11/05/21 17:14	7440-14-4	

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40235135

**Sample: MW-308**      **Lab ID: 40235135003**      Collected: 10/12/21 12:45      Received: 10/14/21 09:10      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	<b>-0.114 ± 0.473 (0.991)</b> <b>C:NA T:99%</b>	pCi/L	11/05/21 14:26	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	<b>0.517 ± 0.399 (0.788)</b> <b>C:71% T:88%</b>	pCi/L	11/03/21 14:28	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	<b>0.517 ± 0.872 (1.78)</b>	pCi/L	11/05/21 17:14	7440-14-4	

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

**Sample: FIELD BLANK-SCPOND**    **Lab ID: 40235135004**    Collected: 10/12/21 15:05    Received: 10/14/21 09:10    Matrix: Water  
PWS:    Site ID:    Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	<b>0.305 ± 0.696 (0.413)</b> <b>C:NA T:92%</b>	pCi/L	11/05/21 14:44	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	<b>0.136 ± 0.347 (0.773)</b> <b>C:70% T:91%</b>	pCi/L	11/03/21 14:36	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	<b>0.441 ± 1.04 (1.19)</b>	pCi/L	11/05/21 17:14	7440-14-4	

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40235135

QC Batch: 469218

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

METHOD BLANK: 2265861

Matrix: Water

Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0433 ± 0.281 (0.567) C:NA T:97%	pCi/L	11/05/21 14:26	

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135

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QC Batch: 469221	Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0	Analysis Description: 904.0 Radium 228
	Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

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METHOD BLANK: 2265862 Matrix: Water  
Associated Lab Samples: 40235135001, 40235135002, 40235135003, 40235135004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.422 ± 0.350 (0.700) C:74% T:94%	pCi/L	11/03/21 14:35	

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## QUALIFIERS

Project: 25219067 COLUMBIA CCR SEC POND

Pace Project No.: 40235135

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### DEFINITIONS

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor, percent moisture, initial weight and final volume.

LOQ - Limit of Quantitation adjusted for dilution factor, percent moisture, initial weight and final volume.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### ANALYTE QUALIFIERS

D3 Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

## REPORT OF LABORATORY ANALYSIS

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**QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: 25219067 COLUMBIA CCR SEC POND  
Pace Project No.: 40235135


Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40235135001	MW-306	EPA 3010A	398760	EPA 6020B	398850
40235135002	MW-307	EPA 3010A	398760	EPA 6020B	398850
40235135003	MW-308	EPA 3010A	398760	EPA 6020B	398850
40235135004	FIELD BLANK-SCPOND	EPA 3010A	398760	EPA 6020B	398850
40235135001	MW-306	EPA 7470	400243	EPA 7470	400251
40235135002	MW-307	EPA 7470	400243	EPA 7470	400251
40235135003	MW-308	EPA 7470	400243	EPA 7470	400251
40235135004	FIELD BLANK-SCPOND	EPA 7470	400243	EPA 7470	400251
40235135001	MW-306				
40235135002	MW-307				
40235135003	MW-308				
40235135001	MW-306	EPA 903.1	469218		
40235135002	MW-307	EPA 903.1	469218		
40235135003	MW-308	EPA 903.1	469218		
40235135004	FIELD BLANK-SCPOND	EPA 903.1	469218		
40235135001	MW-306	EPA 904.0	469221		
40235135002	MW-307	EPA 904.0	469221		
40235135003	MW-308	EPA 904.0	469221		
40235135004	FIELD BLANK-SCPOND	EPA 904.0	469221		
40235135001	MW-306	Total Radium Calculation	471490		
40235135002	MW-307	Total Radium Calculation	471490		
40235135003	MW-308	Total Radium Calculation	471490		
40235135004	FIELD BLANK-SCPOND	Total Radium Calculation	471490		
40235135001	MW-306	SM 2540C	398649		
40235135002	MW-307	SM 2540C	398649		
40235135003	MW-308	SM 2540C	398649		
40235135004	FIELD BLANK-SCPOND	SM 2540C	398649		
40235135001	MW-306	EPA 9040	399343		
40235135002	MW-307	EPA 9040	399343		
40235135003	MW-308	EPA 9040	399343		
40235135004	FIELD BLANK-SCPOND	EPA 9040	399343		
40235135001	MW-306	EPA 300.0	399678		
40235135002	MW-307	EPA 300.0	399678		
40235135003	MW-308	EPA 300.0	399678		
40235135004	FIELD BLANK-SCPOND	EPA 300.0	400320		

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 1241 Bellevue Street, Green Bay, WI 54302	Document Name: <b>Sample Condition Upon Receipt (SCUR)</b>	Document Revised: 26Mar2020
	Document No.: <b>ENV-FRM-GBAY-0014-Rev.00</b>	Author: Pace Green Bay Quality Office

### Sample Condition Upon Receipt Form (SCUR)

Project #:

Client Name: SCS Engineers

Courier:  CS Logistics  Fed Ex  Speedee  UPS  Waltco  
 Client  Pace Other: \_\_\_\_\_

**WO#: 40235135**



Tracking #: \_\_\_\_\_

Custody Seal on Cooler/Box Present:  yes  no Seals intact:  yes  no

Custody Seal on Samples Present:  yes  no Seals intact:  yes  no

Packing Material:  Bubble Wrap  Bubble Bags  None  Other

Thermometer Used SR - 98 Type of Ice:  Wet  Blue  Dry  None

Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 1.0 /Corr: 1.0

Temp Blank Present:  yes  no

Biological Tissue is Frozen:  yes  no

Person examining contents: Date: <u>10/14/21</u> /Initials: <u>SRK</u> Labeled By Initials: <u>ALW</u>
--

Temp should be above freezing to 6°C.  
 Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2. <u>Proj. State, filter</u> <span style="float: right;"><u>10/14/21 SRK</u></span>
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume:		8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>W</u>		
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

**Client Notification/ Resolution:** \_\_\_\_\_ If checked, see attached form for additional comments

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample logir

## D4 October 2021 Background Well Assessment Monitoring

December 08, 2021

Meghan Blodgett  
SCS ENGINEERS  
2830 Dairy Drive  
Madison, WI 53718

RE: Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40235317

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on October 16, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Green Bay
- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Dan Milewsky  
dan.milewsky@pacelabs.com  
(920)469-2436  
Project Manager

Enclosures

cc: Sherren Clark, SCS Engineers  
Tom Karwoski, SCS ENGINEERS  
Nicole Kron, SCS ENGINEERS  
Ryan Matzuk, SCS Engineers  
Jeff Maxted, ALLIANT ENERGY  
Marc Morandi, ALLIANT ENERGY



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40235317

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### **Pace Analytical Services Pennsylvania**

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601  
ANAB DOD-ELAP Rad Accreditation #: L2417  
Alabama Certification #: 41590  
Arizona Certification #: AZ0734  
Arkansas Certification  
California Certification #: 04222CA  
Colorado Certification #: PA01547  
Connecticut Certification #: PH-0694  
Delaware Certification  
EPA Region 4 DW Rad  
Florida/TNI Certification #: E87683  
Georgia Certification #: C040  
Florida: Cert E871149 SEKS WET  
Guam Certification  
Hawaii Certification  
Idaho Certification  
Illinois Certification  
Indiana Certification  
Iowa Certification #: 391  
Kansas/TNI Certification #: E-10358  
Kentucky Certification #: KY90133  
KY WW Permit #: KY0098221  
KY WW Permit #: KY0000221  
Louisiana DHH/TNI Certification #: LA180012  
Louisiana DEQ/TNI Certification #: 4086  
Maine Certification #: 2017020  
Maryland Certification #: 308  
Massachusetts Certification #: M-PA1457  
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235  
Montana Certification #: Cert0082  
Nebraska Certification #: NE-OS-29-14  
Nevada Certification #: PA014572018-1  
New Hampshire/TNI Certification #: 297617  
New Jersey/TNI Certification #: PA051  
New Mexico Certification #: PA01457  
New York/TNI Certification #: 10888  
North Carolina Certification #: 42706  
North Dakota Certification #: R-190  
Ohio EPA Rad Approval: #41249  
Oregon/TNI Certification #: PA200002-010  
Pennsylvania/TNI Certification #: 65-00282  
Puerto Rico Certification #: PA01457  
Rhode Island Certification #: 65-00282  
South Dakota Certification  
Tennessee Certification #: 02867  
Texas/TNI Certification #: T104704188-17-3  
Utah/TNI Certification #: PA014572017-9  
USDA Soil Permit #: P330-17-00091  
Vermont Dept. of Health: ID# VT-0282  
Virgin Island/PADEP Certification  
Virginia/VELAP Certification #: 9526  
Washington Certification #: C868  
West Virginia DEP Certification #: 143  
West Virginia DHHR Certification #: 9964C  
Wisconsin Approve List for Rad  
Wyoming Certification #: 8TMS-L

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### **Pace Analytical Services Green Bay**

1241 Bellevue Street, Green Bay, WI 54302  
Florida/NELAP Certification #: E87948  
Illinois Certification #: 200050  
Kentucky UST Certification #: 82  
Louisiana Certification #: 04168  
Minnesota Certification #: 055-999-334  
New York Certification #: 12064  
North Dakota Certification #: R-150

Virginia VELAP ID: 460263  
South Carolina Certification #: 83006001  
Texas Certification #: T104704529-14-1  
Wisconsin Certification #: 405132750  
Wisconsin DATCP Certification #: 105-444  
USDA Soil Permit #: P330-16-00157  
Federal Fish & Wildlife Permit #: LE51774A-0

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

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Lab ID	Sample ID	Matrix	Date Collected	Date Received
40235317001	MW-301	Water	10/14/21 17:05	10/16/21 08:35
40235317002	MW-84A	Water	10/14/21 15:20	10/16/21 08:35

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40235317001	MW-301	EPA 6020B	KXS	15	PASI-G
		EPA 7470	AJT	1	PASI-G
			MEA	7	PASI-G
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	HNT	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		40235317002	MW-84A	EPA 6020B	KXS
EPA 7470	AJT			1	PASI-G
	MEA			7	PASI-G
EPA 903.1	SLC			1	PASI-PA
EPA 904.0	VAL			1	PASI-PA
Total Radium Calculation	JAL			1	PASI-PA
SM 2540C	HNT			1	PASI-G
EPA 9040	ALY			1	PASI-G
EPA 300.0	HMB			3	PASI-G

PASI-G = Pace Analytical Services - Green Bay

PASI-PA = Pace Analytical Services - Greensburg

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

**Sample: MW-301**      **Lab ID: 40235317001**      Collected: 10/14/21 17:05      Received: 10/16/21 08:35      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020B MET ICPMS</b>									
Analytical Method: EPA 6020B    Preparation Method: EPA 3010A									
Pace Analytical Services - Green Bay									
Lithium	0.46J	ug/L	1.0	0.22	1	10/20/21 06:24	10/26/21 14:44	7439-93-2	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/20/21 06:24	10/26/21 14:44	7440-41-7	
Boron	31.4	ug/L	10.0	3.0	1	10/20/21 06:24	10/26/21 14:44	7440-42-8	
Calcium	67800	ug/L	254	76.2	1	10/20/21 06:24	10/26/21 14:44	7440-70-2	P6
Chromium	<1.0	ug/L	3.4	1.0	1	10/20/21 06:24	10/26/21 14:44	7440-47-3	
Cobalt	0.34J	ug/L	1.0	0.12	1	10/20/21 06:24	10/26/21 14:44	7440-48-4	
Arsenic	0.35J	ug/L	1.0	0.28	1	10/20/21 06:24	10/26/21 14:44	7440-38-2	
Selenium	<0.32	ug/L	1.1	0.32	1	10/20/21 06:24	10/26/21 14:44	7782-49-2	
Molybdenum	<0.44	ug/L	1.5	0.44	1	10/20/21 06:24	10/26/21 14:44	7439-98-7	
Cadmium	<0.15	ug/L	1.0	0.15	1	10/20/21 06:24	10/26/21 14:44	7440-43-9	
Antimony	<0.15	ug/L	1.0	0.15	1	10/20/21 06:24	10/26/21 14:44	7440-36-0	
Barium	7.7	ug/L	2.3	0.70	1	10/20/21 06:24	10/26/21 14:44	7440-39-3	
Mercury	<0.093	ug/L	0.31	0.093	1	10/20/21 06:24	10/26/21 14:44	7439-97-6	
Thallium	0.17J	ug/L	1.0	0.14	1	10/20/21 06:24	10/26/21 14:44	7440-28-0	
Lead	<0.24	ug/L	1.0	0.24	1	10/20/21 06:24	10/26/21 14:44	7439-92-1	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470									
Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	11/11/21 10:35	11/12/21 13:03	7439-97-6	H1,M0
<b>Field Data</b>									
Analytical Method:									
Pace Analytical Services - Green Bay									
Field pH	7.01	Std. Units			1		10/14/21 17:05		
Field Specific Conductance	597.2	umhos/cm			1		10/14/21 17:05		
Oxygen, Dissolved	0.25	mg/L			1		10/14/21 17:05	7782-44-7	
REDOX	57.8	mV			1		10/14/21 17:05		
Turbidity	3.21	NTU			1		10/14/21 17:05		
Static Water Level	785.28	feet			1		10/14/21 17:05		
Temperature, Water (C)	11.1	deg C			1		10/14/21 17:05		
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C									
Pace Analytical Services - Green Bay									
Total Dissolved Solids	334	mg/L	20.0	8.7	1		10/19/21 13:33		
<b>9040 pH</b>									
Analytical Method: EPA 9040									
Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.3	Std. Units	0.10	0.010	1		10/21/21 11:12		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0									
Pace Analytical Services - Green Bay									
Chloride	2.7	mg/L	2.0	0.43	1		11/09/21 02:59	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		11/09/21 02:59	16984-48-8	
Sulfate	17.4	mg/L	2.0	0.44	1		11/09/21 02:59	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40235317

**Sample: MW-84A**      **Lab ID: 40235317002**      Collected: 10/14/21 15:20      Received: 10/16/21 08:35      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020B MET ICPMS</b>									
Analytical Method: EPA 6020B    Preparation Method: EPA 3010A Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	10/20/21 06:24	10/26/21 15:28	7440-36-0	
Arsenic	0.41J	ug/L	1.0	0.28	1	10/20/21 06:24	10/26/21 15:28	7440-38-2	
Barium	12.9	ug/L	2.3	0.70	1	10/20/21 06:24	10/26/21 15:28	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/20/21 06:24	10/26/21 15:28	7440-41-7	
Boron	11.1	ug/L	10.0	3.0	1	10/20/21 06:24	10/26/21 15:28	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	10/20/21 06:24	10/26/21 15:28	7440-43-9	
Calcium	75300	ug/L	254	76.2	1	10/20/21 06:24	10/26/21 15:28	7440-70-2	
Chromium	1.9J	ug/L	3.4	1.0	1	10/20/21 06:24	10/26/21 15:28	7440-47-3	
Cobalt	0.12J	ug/L	1.0	0.12	1	10/20/21 06:24	10/26/21 15:28	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	10/20/21 06:24	10/26/21 15:28	7439-92-1	
Lithium	0.28J	ug/L	1.0	0.22	1	10/20/21 06:24	10/26/21 15:28	7439-93-2	
Mercury	<0.093	ug/L	0.31	0.093	1	10/20/21 06:24	10/26/21 15:28	7439-97-6	
Molybdenum	<0.44	ug/L	1.5	0.44	1	10/20/21 06:24	10/26/21 15:28	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	10/20/21 06:24	10/26/21 15:28	7782-49-2	
Thallium	0.19J	ug/L	1.0	0.14	1	10/20/21 06:24	10/26/21 15:28	7440-28-0	
<b>7470 Mercury</b>									
Analytical Method: EPA 7470    Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	11/11/21 10:35	11/12/21 13:10	7439-97-6	H1
<b>Field Data</b>									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.42	Std. Units			1		10/14/21 15:20		
Field Specific Conductance	598.9	umhos/cm			1		10/14/21 15:20		
Oxygen, Dissolved	9.25	mg/L			1		10/14/21 15:20	7782-44-7	
REDOX	89.7	mV			1		10/14/21 15:20		
Turbidity	3.41	NTU			1		10/14/21 15:20		
Static Water Level	784.96	feet			1		10/14/21 15:20		
Temperature, Water (C)	12.5	deg C			1		10/14/21 15:20		
<b>2540C Total Dissolved Solids</b>									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	326	mg/L	20.0	8.7	1		10/19/21 13:33		
<b>9040 pH</b>									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.8	Std. Units	0.10	0.010	1		10/21/21 11:15		H6
<b>300.0 IC Anions</b>									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	3.5	mg/L	2.0	0.43	1		11/09/21 03:56	16887-00-6	M0
Fluoride	<0.095	mg/L	0.32	0.095	1		11/09/21 03:56	16984-48-8	M0
Sulfate	1.3J	mg/L	2.0	0.44	1		11/09/21 03:56	14808-79-8	M0

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40235317

QC Batch: 401437 Analysis Method: EPA 7470  
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury  
Laboratory: Pace Analytical Services - Green Bay  
Associated Lab Samples: 40235317001, 40235317002

METHOD BLANK: 2317754 Matrix: Water  
Associated Lab Samples: 40235317001, 40235317002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.066	0.20	11/12/21 12:58	

LABORATORY CONTROL SAMPLE: 2317755

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.6	111	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2317756 2317757

Parameter	Units	40235317001		2317756		2317757		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec				
Mercury	ug/L	<0.066	5	5	6.2	6.2	123	123	85-115	0	20 M0

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40235317

QC Batch: 399050 Analysis Method: EPA 6020B  
QC Batch Method: EPA 3010A Analysis Description: 6020B MET  
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40235317001, 40235317002

METHOD BLANK: 2304130 Matrix: Water

Associated Lab Samples: 40235317001, 40235317002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	10/26/21 13:37	
Arsenic	ug/L	<0.28	1.0	10/26/21 13:37	
Barium	ug/L	<0.70	2.3	10/26/21 13:37	
Beryllium	ug/L	<0.25	1.0	10/26/21 13:37	
Boron	ug/L	<3.0	10.0	10/26/21 13:37	
Cadmium	ug/L	<0.15	1.0	10/26/21 13:37	
Calcium	ug/L	<76.2	254	10/26/21 13:37	
Chromium	ug/L	<1.0	3.4	10/26/21 13:37	
Cobalt	ug/L	<0.12	1.0	10/26/21 13:37	
Lead	ug/L	<0.24	1.0	10/26/21 13:37	
Lithium	ug/L	<0.22	1.0	10/26/21 13:37	
Mercury	ug/L	<0.093	0.31	10/26/21 13:37	
Molybdenum	ug/L	<0.44	1.5	10/26/21 13:37	
Selenium	ug/L	<0.32	1.1	10/26/21 13:37	
Thallium	ug/L	<0.14	1.0	10/26/21 13:37	

LABORATORY CONTROL SAMPLE: 2304131

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	250	241	96	80-120	
Arsenic	ug/L	250	239	96	80-120	
Barium	ug/L	250	243	97	80-120	
Beryllium	ug/L	250	240	96	80-120	
Boron	ug/L	250	243	97	80-120	
Cadmium	ug/L	250	244	98	80-120	
Calcium	ug/L	10000	10000	100	80-120	
Chromium	ug/L	250	232	93	80-120	
Cobalt	ug/L	250	242	97	80-120	
Lead	ug/L	250	231	93	80-120	
Lithium	ug/L	250	242	97	80-120	
Mercury	ug/L	5	5.1	102	80-120	
Molybdenum	ug/L	250	240	96	80-120	
Selenium	ug/L	250	246	98	80-120	
Thallium	ug/L	250	237	95	80-120	

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

Parameter	Units	2304132		2304133		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40235317001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Antimony	ug/L	<0.15	250	250	240	243	96	97	75-125	1	20		
Arsenic	ug/L	0.35J	250	250	240	241	96	96	75-125	1	20		
Barium	ug/L	7.7	250	250	251	254	97	98	75-125	1	20		
Beryllium	ug/L	<0.25	250	250	238	238	95	95	75-125	0	20		
Boron	ug/L	31.4	250	250	273	277	97	98	75-125	1	20		
Cadmium	ug/L	<0.15	250	250	243	244	97	98	75-125	1	20		
Calcium	ug/L	67800	10000	10000	77700	80700	100	129	75-125	4	20	P6	
Chromium	ug/L	<1.0	250	250	232	236	93	94	75-125	2	20		
Cobalt	ug/L	0.34J	250	250	241	245	96	98	75-125	2	20		
Lead	ug/L	<0.24	250	250	234	236	93	94	75-125	1	20		
Lithium	ug/L	0.46J	250	250	242	244	97	98	75-125	1	20		
Mercury	ug/L	<0.093	5	5	5.2	5.4	104	107	75-125	3	20		
Molybdenum	ug/L	<0.44	250	250	244	245	97	98	75-125	1	20		
Selenium	ug/L	<0.32	250	250	244	245	98	98	75-125	0	20		
Thallium	ug/L	0.17J	250	250	243	244	97	97	75-125	0	20		

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40235317

QC Batch: 398939 Analysis Method: SM 2540C  
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids  
Laboratory: Pace Analytical Services - Green Bay  
Associated Lab Samples: 40235317001, 40235317002

METHOD BLANK: 2303507 Matrix: Water  
Associated Lab Samples: 40235317001, 40235317002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	10/19/21 13:29	

LABORATORY CONTROL SAMPLE: 2303508

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	575	566	98	80-120	

SAMPLE DUPLICATE: 2303509

Parameter	Units	40235220001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	248	272	9	10	

SAMPLE DUPLICATE: 2303510

Parameter	Units	40235316003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	374	390	4	10	

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

QC Batch: 399227

Analysis Method: EPA 9040

QC Batch Method: EPA 9040

Analysis Description: 9040 pH

Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40235317001, 40235317002

SAMPLE DUPLICATE: 2304971

Parameter	Units	40235095010 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.8	7.8	0	20	H6

SAMPLE DUPLICATE: 2304972

Parameter	Units	40235316004 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.8	7.8	1	20	H6

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### QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40235317

QC Batch: 400930 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Laboratory: Pace Analytical Services - Green Bay  
Associated Lab Samples: 40235317001, 40235317002

METHOD BLANK: 2315482 Matrix: Water  
Associated Lab Samples: 40235317001, 40235317002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	11/08/21 19:10	
Fluoride	mg/L	<0.095	0.32	11/08/21 19:10	
Sulfate	mg/L	<0.44	2.0	11/08/21 19:10	

LABORATORY CONTROL SAMPLE: 2315483

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	18.7	94	90-110	
Fluoride	mg/L	2	1.9	93	90-110	
Sulfate	mg/L	20	18.2	91	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2315484 2315485

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40235824001 Result	Spike Conc.	Spike Conc.	Conc.								
Chloride	mg/L	7.3	20	20	29.8	30.1	113	114	90-110	1	15	M0	
Fluoride	mg/L	<0.095	2	2	2.2	2.2	110	111	90-110	1	15	M0	
Sulfate	mg/L	18.5	20	20	41.0	41.1	112	113	90-110	0	15	M0	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2315486 2315487

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40235317002 Result	Spike Conc.	Spike Conc.	Conc.								
Chloride	mg/L	3.5	20	20	25.8	27.1	111	118	90-110	5	15	M0	
Fluoride	mg/L	<0.095	2	2	2.2	2.3	109	114	90-110	5	15	M0	
Sulfate	mg/L	1.3J	20	20	23.2	24.5	109	116	90-110	6	15	M0	

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### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

**Sample: MW-301**      **Lab ID: 40235317001**      Collected: 10/14/21 17:05      Received: 10/16/21 08:35      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	<b>0.172 ± 0.337 (0.617)</b> <b>C:NA T:96%</b>	pCi/L	11/17/21 12:14	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	<b>-0.0327 ± 0.419 (0.973)</b> <b>C:61% T:89%</b>	pCi/L	11/15/21 11:02	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	<b>0.172 ± 0.756 (1.59)</b>	pCi/L	11/24/21 15:38	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

**Sample: MW-84A**      **Lab ID: 40235317002**      Collected: 10/14/21 15:20      Received: 10/16/21 08:35      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Pace Analytical Services - Greensburg						
Radium-226	EPA 903.1	<b>0.000 ± 0.242 (0.493)</b> <b>C:NA T:100%</b>	pCi/L	11/17/21 12:14	13982-63-3	
Pace Analytical Services - Greensburg						
Radium-228	EPA 904.0	<b>0.243 ± 0.576 (1.27)</b> <b>C:60% T:88%</b>	pCi/L	11/15/21 11:01	15262-20-1	
Pace Analytical Services - Greensburg						
Total Radium	Total Radium Calculation	<b>0.243 ± 0.818 (1.76)</b>	pCi/L	11/24/21 15:38	7440-14-4	

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

QC Batch: 471019

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40235317001, 40235317002

METHOD BLANK: 2273682

Matrix: Water

Associated Lab Samples: 40235317001, 40235317002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.0899 ± 0.216 (0.540) C:NA T:95%	pCi/L	11/17/21 12:14	

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

QC Batch: 471020

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40235317001, 40235317002

METHOD BLANK: 2273691

Matrix: Water

Associated Lab Samples: 40235317001, 40235317002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.552 ± 0.431 (0.853) C:67% T:79%	pCi/L	11/19/21 11:42	

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## QUALIFIERS

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40235317

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### DEFINITIONS

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor, percent moisture, initial weight and final volume.

LOQ - Limit of Quantitation adjusted for dilution factor, percent moisture, initial weight and final volume.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### WORKORDER QUALIFIERS

WO: 40235317

[1] Mercury by Method 7470 was analyzed past hold due to laboratory oversight. Mercury by Method 6020 has been provided as supplemental data.

### ANALYTE QUALIFIERS

H1 Analysis conducted outside the recognized method holding time.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

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**QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: 25219067 COLUMBIA CCR BACKGRND  
Pace Project No.: 40235317

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40235317001	MW-301	EPA 3010A	399050	EPA 6020B	399167
40235317002	MW-84A	EPA 3010A	399050	EPA 6020B	399167
40235317001	MW-301	EPA 7470	401437	EPA 7470	401479
40235317002	MW-84A	EPA 7470	401437	EPA 7470	401479
40235317001	MW-301				
40235317002	MW-84A				
40235317001	MW-301	EPA 903.1	471019		
40235317002	MW-84A	EPA 903.1	471019		
40235317001	MW-301	EPA 904.0	471020		
40235317002	MW-84A	EPA 904.0	471020		
40235317001	MW-301	Total Radium Calculation	474011		
40235317002	MW-84A	Total Radium Calculation	474011		
40235317001	MW-301	SM 2540C	398939		
40235317002	MW-84A	SM 2540C	398939		
40235317001	MW-301	EPA 9040	399227		
40235317002	MW-84A	EPA 9040	399227		
40235317001	MW-301	EPA 300.0	400930		
40235317002	MW-84A	EPA 300.0	400930		

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Addresses	Ship To :	Return To:
<b>Order By :</b>	<b>Company</b> SCS ENGINEERS	<b>Company</b> Pace Analytical Green Bay
<b>Contact</b> Blodgett, Meghan	<b>Contact</b> Adam Watson	<b>Contact</b> Milewsky, Dan
<b>Email</b> mblodgett@scsengineers.com	<b>Email</b> awatson@scsengineers.com	<b>Email</b> dan.milewsky@pacelabs.com
<b>Address</b> 2830 Dairy Drive	<b>Address</b> 2830 Dairy Drive	<b>Address</b> 1241 Bellevue Street
<b>Address 2</b>	<b>Address 2</b>	<b>Address 2</b> Suite 9
<b>City</b> Madison	<b>City</b> Madison	<b>City</b> Green Bay
<b>State</b> WI <b>Zip</b> 53718	<b>State</b> WI <b>Zip</b> 53718	<b>State</b> WI <b>Zip</b> 54302
<b>Phone</b> 608-216-7362	<b>Phone</b> 608-216-7362	<b>Phone</b> (920)469-2436

<b>Project Name</b> 25219067 Columbia CCR Secondary Pond	<b>Due Date</b> 10/08/2021	<b>Profile</b> 3946-12	<b>Quote</b>
<b>Project Manager</b> Milewsky, Dan	<b>Return Date</b>	<b>Carrier</b> Most Economical	<b>Location</b>

**Trip Blanks**

Include Trip Blanks

**Bottle Labels**

Blank

Pre-Printed No Sample IDs

Pre-Printed With Sample IDs

**Bottles**

Boxed Cases

Individually Wrapped

Grouped By Sample ID/Matrix

**Return Shipping Labels**

No Shipper

With Shipper

**Misc**

Sampling Instructions

Custody Seal

Temp. Blanks

Coolers

Syringes

Extra Bubble Wrap

Short Hold/Rush Stickers

DI Water

USDA Regulated Soils

**COC Options**

Number of Blanks

Pre-Printed

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
4	WT	Metals	250mL plastic w/HNO3	4	0	M-1-106-03BB	
4	WT	pH	250mL plastic unpres	4	0	M-1-203-03BB	
4	WT	TDS, Cl, F, SO4	250mL plastic unpres	4	0	M-1-203-03BB	
4	WT	Radium 226	1L plastic HNO3 preserved	4	0		
4	WT	Radium 228	1L Plastic HNO3 Presered	4	0		

**Hazard Shipping Placard In Place : NA**

\*Sample receiving hours are typically 8am-5pm, but may differ by location. Please check with your Pace Project Manager.

\*Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you.

\*Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage/disposal.

\*Payment term are net 30 days.

\*Please include the proposal number on the chain of custody to insure proper billing.

**LAB USE:**

**Ship Date :**

**Prepared By:**

**Verified By:**

**Sample**

Metals=As,Ba,Cr,Co,Li,Mo,Se,Ca,B  
ALL SAMPLES UNFILTERED


**CLIENT USE (Optional):**

**Date Rec'd:**

**Received By:**


**Verified By:**



 1241 Bellevue Street, Green Bay, WI 54302	Document Name: Sample Condition Upon Receipt (SCUR)	Document Revised: 26Mar2020
	Document No.: ENV-FRM-GBAY-0014-Rev.00	Author: Pace Green Bay Quality Office

### Sample Condition Upon Receipt Form (SCUR)

Client Name: SCS Engineers

Project #: 
 WO#: 40235317  
  
 40235317

Courier:  CS Logistics  Fed Ex  Speedee  UPS  Walco  
 Client  Pace Other: \_\_\_\_\_

Tracking #: \_\_\_\_\_  
 Custody Seal on Cooler/Box Present:  yes  no    Seals intact:  yes  no  
 Custody Seal on Samples Present:  yes  no    Seals intact:  yes  no  
 Packing Material:  Bubble Wrap  Bubble Bags  None  Other  
 Thermometer Used SR-107    Type of Ice:  Wet  Blue Dry None  
 Cooler Temperature    Uncorr: 5    /Corr: 5  
 Temp Blank Present:  yes  no    Biological Tissue is Frozen:  yes  no

Samples on ice, cooling process has begun

Person examining contents:	
Date: <u>10/16/21</u>	Initials: <u>ARJ</u>
Labeled By Initials: <u>MP</u>	

Temp should be above freezing to 6°C.  
 Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.


Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2. <u>P.I.H.</u>
Chain of Custody Relinquished:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3. <u>does have date time 10/16/21 ARJ</u>
Sampler Name & Signature on COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume:		8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No    MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis    Matrix: <u>W</u>		
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: \_\_\_\_\_ If checked, see attached form for additional comments

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample logir



Appendix E  
Historical Monitoring Results

**Single Location**

**Name: WPL - Columbia**

Location ID: MW-84A																					
Number of Sampling Dates: 20																					
Parameter Name	Units	12/22/2015	4/5/2016	7/8/2016	7/28/2016	10/13/2016	12/29/2016	1/25/2017	4/11/2017	6/6/2017	8/8/2017	10/24/2017	4/25/2018	8/8/2018	10/24/2018	4/3/2019	10/9/2019	2/3/2020	5/29/2020	10/8/2020	4/14/2021
Boron	ug/L	11.9	14	14.7	--	11.1	14.7	16.1	12.9	14.8	22.9	13.8	25	12.8	10.1	13.6	12	15.7	10	9.7	14.3
Calcium	ug/L	74000	72200	67600	--	74000	76000	70800	73200	76100	74900	77500	76600	76000	74000	80100	73500	72700	77600	69200	69100
Chloride	mg/L	4.9	4.7	5.1	--	4.3	4.7	4.6	4.9	5.5	5.5	5.1	4.8	4.9	4.2	3.6	3.9	3.7	3.7	4.3	4.4
Fluoride	mg/L	<0.2	<0.2	<0.2	--	<0.1	<0.1	0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.095	<0.095	<0.095
Field pH	Std. Units	7.6	7.61	7.45	7.34	7.91	7.25	6.99	7.8	7.28	7.23	7.68	7.45	7.38	7.24	7.03	7.23	7.51	7.34	7.49	7.34
Sulfate	mg/L	4.9	4.3	3.7	--	2.6	2.7	3	2.8	2.7	2	2.2	2.8	1.9	1.6	1.4	1.3	<2.2	1.5	1.3	1.4
Total Dissolved Solids	mg/L	316	322	316	--	324	316	328	342	344	342	314	328	372	330	318	310	316	340	320	328
Antimony	ug/L	<0.073	0.084	0.1	--	<0.073	<0.073	<0.073	<0.073	<0.15	<0.15	--	<0.15	<0.15	<0.15	<0.15	<0.15	--	<0.15	<0.15	0.55
Arsenic	ug/L	0.15	0.29	0.14	--	0.35	0.19	0.35	<0.099	<0.28	0.28	--	<0.28	<0.28	0.33	<0.28	0.46	0.38	0.34	0.49	0.91
Barium	ug/L	15.3	12.7	12.2	--	14.2	18.4	13.8	14.1	13.4	14	--	14.6	13.7	14.5	14.7	13.2	14	13.9	12.6	13.4
Beryllium	ug/L	<0.13	<0.13	<0.13	--	<0.13	<0.13	<0.13	<0.13	<0.18	<0.18	--	<0.18	<0.18	<0.18	<0.18	<0.25	--	<0.25	<0.25	0.47
Cadmium	ug/L	<0.089	<0.089	<0.089	--	<0.089	<0.089	<0.089	<0.089	<0.081	<0.081	--	<0.081	--	<0.15	<0.15	<0.15	--	<0.15	<0.15	0.53
Chromium	ug/L	2.5	1.9	1.8	--	2	2	1.9	2.4	2	1.6	--	2.4	1.5	1.6	1.8	1.6	1.6	1.7	1.6	2.6
Cobalt	ug/L	0.095	<0.036	0.053	--	<0.036	<0.036	<0.036	<0.036	<0.085	<0.085	--	<0.085	<0.085	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	0.52
Lead	ug/L	0.16	<0.04	0.39	--	0.049	0.11	<0.04	0.041	<0.2	<0.2	--	<0.2	--	<0.24	<0.24	<0.24	--	<0.24	<0.24	0.55
Lithium	ug/L	0.72	0.44	0.5	--	0.56	0.56	0.56	0.55	0.46	0.58	--	0.5	0.4	0.49	0.56	0.52	0.58	0.4	0.39	1
Mercury	ug/L	<0.1	<0.1	<0.13	--	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	<0.084	<0.084	<0.084	--	<0.084	<0.066	<0.066
Molybdenum	ug/L	<0.07	<0.07	0.073	--	0.12	<0.07	<0.07	<0.07	<0.44	<0.44	--	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	0.62
Selenium	ug/L	<0.21	<0.21	<0.21	--	<0.21	<0.21	<0.21	<0.21	<0.32	<0.32	--	<0.32	<0.32	<0.32	<0.32	<0.32	<0.32	<0.32	<0.32	0.48
Thallium	ug/L	<0.14	<0.14	<0.14	--	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	--	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	0.66
Total Radium	pCi/L	0.593	0.0809	--	1.37	0.825	0.404	1.39	0.0929	0.676	0.509	--	0.526	0.529	0.62	0.681	0.247	0.1	0.395	0.39	0.285
Radium-226	pCi/L	0.156	-0.088	--	-0.058	0.132	0.168	0.624	0.0768	0.27	0.242	--	0.155	-0.203	0.313	0.199	0.247	0.1	0.368	0	-0.289
Radium-228	pCi/L	0.437	0.0809	--	1.37	0.693	0.236	0.766	0.0161	0.406	0.267	--	0.371	0.529	0.307	0.482	-0.024	-0.153	0.0273	0.39	0.285
Field Specific Conductance	umhos/cm	599	427	574.8	579.3	1002	578.2	489	948	535.3	557.2	491	581.7	617.1	609	637.2	614.1	618.4	613.7	610.1	610.9
Oxygen, Dissolved	mg/L	9.7	9.37	3.78	5.11	9.61	8.94	6.48	9.28	9.46	7.5	9.3	3.94	8.84	10.01	9.49	11.36	8.43	9.81	9.39	9.8
Field Oxidation Potential	mV	154	165.1	139.9	138.3	82.7	87	192.9	102	123.6	204.7	210	53.3	142.7	71.5	103.4	181.7	121.5	135	153.2	95.6
Groundwater Elevation	feet	785.31	786.3	785.89	785.61	787.22	786.63	786.7	787.16	787.63	786.68	785.32	785.88	786.55	788.32	787.35	787.79	786.5	787.02	786.1	785.84
Temperature	deg C	10.4	10.2	11.3	11	11.5	10.8	10.9	10.6	11.3	11.2	11.1	10.2	12	11.6	10.2	11.8	10.3	10.6	11.9	10.2
Turbidity	NTU	--	0.86	2.75	0.17	0.3	0.25	0.33	0.04	0.56	0.08	2.93	0.81	0.71	3.79	1.9	2.41	1.23	2.15	0	2.45
pH at 25 Degrees C	Std. Units	7.5	7.4	7.4	--	7.3	7.4	7.3	7.7	7.6	7.4	7.6	7.6	7.4	7.5	7.4	7.5	7.4	7.6	7.6	7.6

## Single Location

Name: WPL - Columbia

Location ID: MW-301																				
Number of Sampling Dates: 19																				
Parameter Name	Units	12/22/2015	4/5/2016	7/8/2016	10/13/2016	12/29/2016	1/25/2017	4/11/2017	6/6/2017	8/8/2017	10/23/2017	4/25/2018	8/8/2018	10/24/2018	4/2/2019	10/9/2019	2/3/2020	5/29/2020	10/8/2020	4/14/2021
Boron	ug/L	26.5	25.2	23.6	30.6	32.8	32.6	28.8	21.3	30.6	34.3	24.3	22.8	27.8	26.9	35.9	27.9	21.3	28.8	22.2
Calcium	ug/L	126000	115000	108000	118000	129000	124000	120000	111000	108000	87200	112000	105000	101000	126000	114000	113000	112000	93000	117000
Chloride	mg/L	3.7	4	3.5	2.2	2	1.5	2	3.5	5.5	4	2.3	5.2	3.2	0.79	1.7	1.3	2	3.4	1.5
Fluoride	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.095	<0.095	<0.095
Field pH	Std. Units	6.85	7.01	6.87	7.28	6.63	7.1	7.11	6.7	6.75	7.37	6.76	6.91	6.79	6.62	6.67	6.89	6.73	6.95	6.66
Sulfate	mg/L	9.3	15.3	15	13.9	12.3	6.5	10.3	17.1	31.6	27.5	8.6	21.6	19.2	4.4	8.4	7.2	11.5	25.1	8.5
Total Dissolved Solids	mg/L	478	486	464	490	444	514	502	458	462	362	464	502	424	462	418	462	452	412	472
Antimony	ug/L	0.15	0.094	0.13	<0.073	0.4	<0.073	<0.073	<0.15	<0.15	--	<0.15	0.36	<0.15	0.32	<0.15	--	<0.15	0.33	<0.15
Arsenic	ug/L	0.26	0.26	0.19	0.24	0.4	0.13	0.18	<0.28	<0.28	--	<0.28	0.45	<0.28	0.4	0.42	<0.28	0.33	0.62	<0.28
Barium	ug/L	20.2	11.1	11.6	15.6	15	13.5	13.2	11.3	11.8	--	9.3	10.2	11.5	11.8	10	10.9	9.8	9.4	8.9
Beryllium	ug/L	<0.13	<0.13	<0.13	<0.13	0.19	<0.13	<0.13	<0.18	<0.18	--	<0.18	0.37	<0.18	0.28	<0.25	--	<0.25	<0.25	<0.25
Cadmium	ug/L	<0.089	<0.089	<0.089	<0.089	0.32	<0.089	<0.089	<0.081	<0.081	--	<0.081	--	<0.15	0.21	<0.15	--	<0.15	0.19	<0.15
Chromium	ug/L	2.1	0.58	0.59	<0.39	0.7	0.53	0.7	2.3	<1	--	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	ug/L	1.4	0.25	0.22	0.041	0.38	0.071	0.064	0.13	0.12	--	<0.085	0.28	<0.12	0.35	<0.12	0.17	<0.12	0.29	<0.12
Lead	ug/L	0.9	0.077	0.48	<0.04	0.34	<0.04	<0.04	<0.2	<0.2	--	<0.2	--	<0.24	0.3	<0.24	--	<0.24	0.25	<0.24
Lithium	ug/L	1.3	0.58	0.69	0.6	0.87	0.67	0.68	0.62	0.6	--	0.55	0.85	0.52	0.9	0.61	0.67	0.47	0.46	0.58
Mercury	ug/L	<0.1	<0.1	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	<0.084	<0.084	<0.084	--	<0.084	<0.066	<0.066
Molybdenum	ug/L	0.35	0.15	0.14	0.12	0.38	<0.07	<0.07	<0.44	<0.44	--	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44
Selenium	ug/L	0.3	0.21	0.39	<0.21	0.26	<0.21	<0.21	<0.32	<0.32	--	<0.32	0.71	<0.32	0.49	<0.32	<0.32	<0.32	<0.32	<0.32
Thallium	ug/L	<0.14	<0.14	<0.14	<0.14	0.48	<0.14	<0.14	<0.14	<0.14	--	<0.14	0.3	<0.14	0.48	<0.14	<0.14	<0.14	0.3	<0.14
Total Radium	pCi/L	1.31	1.11	0.89	0.631	1.01	2.42	1.35	1.3	1.74	--	0.882	0.0351	0.652	0.552	0.701	0.502	0.193	0.38	1.16
Radium-226	pCi/L	0.655	0.294	0.404	-0.067	0.108	1.46	0.513	0.287	1.09	--	0.122	-0.06	0.247	0	0.252	0.136	0	0.0511	0.418
Radium-228	pCi/L	0.651	0.82	0.486	0.631	0.905	0.964	0.833	1.01	0.647	--	0.76	0.0351	0.405	0.552	0.449	0.366	0.193	0.329	0.739
Field Specific Conductance	umhos/cm	897	573	796	1464	859	1018	1354	698.4	691.7	561	774	799	767	883	801	868	797	760	857
Oxygen, Dissolved	mg/L	1.7	2.71	1.47	1.99	1.34	1.24	1.44	1.81	1.43	1.1	2.35	2.14	2.49	2.2	1.67	1.07	2	1.22	3.9
Field Oxidation Potential	mV	135	123.7	133.9	100.8	95.8	226.1	100.9	115.1	187.4	204	74.3	126.5	77.9	152.1	173	132.3	118.7	183.9	102.9
Groundwater Elevation	feet	785.56	768.12	786.31	787.64	787.37	787.27	787.89	788.25	787.34	785.89	785.29	787.06	788.98	787.04	788.47	787.24	787.77	786.53	786.5
Temperature	deg C	9.7	7.7	10	11.2	10.1	8.8	7.7	8.9	10.2	11.1	7.4	10.6	11.1	7.5	11.3	8.5	8.1	11	7.4
Turbidity	NTU	--	1.52	3.89	0.59	0.74	0.42	0.1	0.22	0.18	1.52	1.12	0.46	3.3	2.02	2.12	1.41	0	0	2.41
pH at 25 Degrees C	Std. Units	7	7	6.8	6.8	6.9	6.9	7.1	7	7	7.3	7	7	7.1	6.8	7	6.8	7	7.2	6.9



## Single Location

Name: WPL - Columbia

Location ID: MW-306		Number of Sampling Dates: 15														
Parameter Name	Units	1/26/2017	4/10/2017	6/5/2017	8/8/2017	10/23/2017	5/24/2018	10/24/2018	4/1/2019	10/8/2019	12/13/2019	2/3/2020	5/28/2020	10/7/2020	4/12/2021	10/12/2021
Boron	ug/L	138	128	129	136	145	92	166	119	134	121	120	108	108	101	114
Calcium	ug/L	81200	83500	85200	84800	90700	78400	86700	87300	92800	83800	81900	84600	77900	80400	77000
Chloride	mg/L	1.7	1.1	2.3	1.7	1	1.8	1.3	1.7	0.64	0.76	0.88	0.76	0.63	0.71	0.98
Fluoride	mg/L	0.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.095	--	<0.095	<0.095	<0.095	<0.095
Field pH	Std. Units	8.98	7.56	7.22	6.96	7.7	7.25	7.09	7.31	7.28	7.29	7.08	6.97	7.25	7.22	7.4
Sulfate	mg/L	8.2	6.8	10.1	7.3	8.7	6.3	14.4	9.2	7.8	7.6	7.2	6.9	8.4	7.2	8.5
Total Dissolved Solids	mg/L	310	326	324	338	310	314	322	310	328	326	310	306	322	310	282
Antimony	ug/L	0.074	0.21	<0.15	<0.15	0.17	<0.15	<0.15	--	--	<0.15	--	<0.15	--	<0.15	<0.15
Arsenic	ug/L	0.14	0.25	<0.28	<0.28	0.29	<0.28	<0.28	--	--	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28
Barium	ug/L	19.2	14.9	8.2	11.8	16.1	11.3	8.5	--	--	9	10.2	9.7	10.5	11	11.5
Beryllium	ug/L	<0.13	0.14	<0.18	<0.18	<0.18	<0.18	<0.18	--	--	<0.25	--	<0.25	--	<0.25	<0.25
Cadmium	ug/L	<0.089	0.11	<0.081	<0.081	<0.081	<0.081	<0.15	--	--	<0.15	--	<0.15	--	<0.15	<0.15
Chromium	ug/L	1.6	2.2	1.8	2	2.9	2.2	1.7	--	--	4.1	2.1	2.1	2	2.7	2.8
Cobalt	ug/L	0.054	0.15	<0.085	<0.085	0.2	<0.085	<0.12	--	--	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Lead	ug/L	<0.04	0.15	<0.2	<0.2	<0.2	<0.2	0.26	--	--	<0.24	--	<0.24	--	<0.24	<0.24
Lithium	ug/L	13.9	6.8	1.6	5.7	8.6	3.8	0.51	--	--	2.2	3.1	2.7	4.4	7.2	9.2
Mercury	ug/L	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.084	--	--	<0.084	--	<0.084	--	<0.066	<0.066
Molybdenum	ug/L	11.4	8.4	5	6.7	9.6	7.2	4	--	--	5.8	6.1	6.5	7.1	8.3	9.7
Selenium	ug/L	0.52	0.77	0.48	0.58	0.84	0.58	0.59	--	--	0.54	0.81	0.85	0.69	0.87	1
Thallium	ug/L	<0.14	0.28	<0.14	<0.14	<0.14	<0.14	<0.14	--	--	0.17	<0.14	<0.14	--	<0.14	<0.14
Total Radium	pCi/L	0.653	0.886	1.4	0.435	0.502	0.5	0.291	--	--	0.323	0.759	0.49	0.721	0.18	0.784
Radium-226	pCi/L	-0.148	0.567	0.329	0.0606	0.271	0.31	0.291	--	--	0	-0.0492	0.182	0.304	0.13	0.399
Radium-228	pCi/L	0.653	0.319	1.07	0.374	0.231	0.19	-0.378	--	--	0.323	0.759	0.308	0.417	0.0499	0.385
Field Specific Conductance	umhos/cm	531.8	899	495.7	524.4	477	583	598	592.3	583	662	588	572.1	565.4	552.4	543.1
Oxygen, Dissolved	mg/L	5.91	7.81	9.6	6.27	5	8.91	8.02	8.46	9.8	8.34	8.26	9.08	7.71	8.91	7.97
Field Oxidation Potential	mV	-16.1	97.6	84.3	196.2	234	92.8	40.3	150	109.1	56	226.5	227.7	103.8	116.7	90.9
Groundwater Elevation	feet	785.5	786.22	786.85	785.69	783.97	785.79	787.66	786.72	787.47	787.03	785.77	785.77	785.39	784.32	782.93
Temperature	deg C	10.1	9.8	10	12.1	13.4	9.6	13.5	9.1	13.1	11.6	9.9	10.2	13.1	9.7	12.7
Turbidity	NTU	0.41	0.34	0.55	0.34	32.64	3.96	4.89	1.61	1.27	0	0.65	0.32	1.29	5.52	0.51
pH at 25 Degrees C	Std. Units	7.5	7.4	7.4	7.3	7.4	7.4	7.5	7.4	7.3	7.3	7.4	7.6	7.6	7.5	7.7

## Single Location

Name: WPL - Columbia

Location ID: MW-307																
Number of Sampling Dates: 15																
Parameter Name	Units	1/26/2017	4/10/2017	6/5/2017	8/8/2017	10/23/2017	5/24/2018	10/24/2018	4/1/2019	10/7/2019	12/13/2019	2/3/2020	5/27/2020	10/8/2020	4/12/2021	10/12/2021
Boron	ug/L	319	175	178	373	434	313	338	154	242	281	246	231	307	201	327
Calcium	ug/L	70300	68300	70600	72500	83700	107000	17400	76500	75800	78700	72600	77800	67800	61900	74600
Chloride	mg/L	8.7	4.1	5.4	8.3	12.9	52.8	19.3	13.8	9.3	16	13.8	12.9	12.1	7	9.8
Fluoride	mg/L	<0.5	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.48	--	<0.095	<0.48	<0.48	<0.48
Field pH	Std. Units	6.89	7.52	7.26	6.9	7.75	6.83	6.94	7.14	7.24	7.18	7.19	7.07	7.28	7.32	7.11
Sulfate	mg/L	14.2	33.1	32.6	6.7	10.7	115	47.7	38.2	27.8	15.5	15.3	13.2	10.3	16.9	92.9
Total Dissolved Solids	mg/L	318	324	324	350	362	576	398	350	336	354	340	356	334	312	388
Antimony	ug/L	<0.073	0.29	<0.15	<0.15	<0.15	0.39	<0.15	--	--	<0.15	--	<0.15	--	<0.15	<0.15
Arsenic	ug/L	2	0.73	0.42	1.5	3	0.7	<0.28	--	--	1.1	1.7	0.76	2.7	2	1.8
Barium	ug/L	10.7	9.3	7.8	13.7	15.1	13.6	4.8	--	--	15.9	13.5	13.7	13.8	7.8	13.1
Beryllium	ug/L	<0.13	<0.13	<0.18	<0.18	<0.18	<0.18	<0.18	--	--	<0.25	--	<0.25	--	<0.25	<0.25
Cadmium	ug/L	<0.089	0.27	<0.081	<0.081	<0.081	<0.081	0.21	--	--	<0.15	--	<0.15	--	<0.15	<0.15
Chromium	ug/L	<0.39	1.6	<1	<1	<1	<1	<1	--	--	<1	<1	<1	<1	<1	<1
Cobalt	ug/L	0.33	0.58	0.19	0.6	0.43	2.7	0.45	--	--	0.46	1	0.55	0.61	0.26	0.68
Lead	ug/L	<0.04	0.41	<0.2	0.21	<0.2	<0.2	0.33	--	--	<0.24	--	<0.24	--	<0.24	<0.24
Lithium	ug/L	<0.11	0.3	<0.14	0.21	<0.14	0.2	0.5	--	--	0.24	0.53	<0.22	<0.22	<0.22	<0.22
Mercury	ug/L	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.084	--	--	<0.084	--	<0.084	--	<0.066	<0.066
Molybdenum	ug/L	1	0.8	0.44	0.74	1.5	0.94	<0.44	--	--	0.72	1.2	0.7	0.64	0.83	0.91
Selenium	ug/L	<0.21	0.4	<0.32	<0.32	<0.32	<0.32	<0.32	--	--	<0.32	0.78	<0.32	<0.32	<0.32	<0.32
Thallium	ug/L	<0.14	0.37	<0.14	<0.14	<0.14	<0.14	<0.14	--	--	0.21	0.65	<0.14	--	<0.14	<0.14
Total Radium	pCi/L	0.864	1.39	2.26	0.676	0.742	0.505	0.416	--	--	0.188	0.706	0.309	0.636	0.241	0.842
Radium-226	pCi/L	-0.523	0.233	0.914	0.309	0.511	0.309	0.251	--	--	-0.0613	-0.228	0.203	0.108	-0.179	0.154
Radium-228	pCi/L	0.864	1.16	1.35	0.367	0.231	0.196	0.165	--	--	0.188	0.706	0.106	0.528	0.241	0.688
Field Specific Conductance	umhos/cm	570.2	898	503.9	589.9	591	915	731	662.5	618.2	752	638.3	615.2	644	575.7	709
Oxygen, Dissolved	mg/L	0.23	0.28	0.19	0.14	0.3	0.2	0.07	0.12	0.11	0.33	0.07	0.13	0.03	0.17	0.46
Field Oxidation Potential	mV	-119.6	-19.6	-12.9	-51.1	101	-34	-68.2	-0.8	-98.7	-102.7	-80.5	-26.3	-141.8	-120.4	-85
Groundwater Elevation	feet	785.36	785.64	786.07	785.19	784.79	785.09	786.57	786.71	786.99	785.68	785.57	785.35	784.71	784.21	782.44
Temperature	deg C	10.1	9.2	10.5	15	14.5	9.5	14.6	8.2	14.3	12	10	10.8	14	9.4	14.2
Turbidity	NTU	1.9	1.28	1.85	1.78	3.87	6.64	6.07	2.27	1.83	0	1.32	0.74	0	2.83	2.18
pH at 25 Degrees C	Std. Units	7.5	7.6	7.4	7.3	7.4	7	7.4	7.3	7.5	7.2	7.2	7.5	7.3	7.2	7.4

## Single Location

Name: WPL - Columbia

Location ID: MW-308																
Number of Sampling Dates: 15																
Parameter Name	Units	1/26/2017	4/10/2017	6/5/2017	8/9/2017	10/23/2017	4/24/2018	10/24/2018	4/1/2019	10/7/2019	12/13/2019	2/3/2020	5/27/2020	10/7/2020	4/12/2021	10/12/2021
Boron	ug/L	740	614	565	644	707	584	430	587	694	647	606	476	563	463	704
Calcium	ug/L	132000	129000	140000	131000	134000	126000	144000	132000	131000	130000	124000	132000	123000	120000	115000
Chloride	mg/L	7.5	5.8	5.8	3.7	5.6	3.7	<2.5	1.8	1.6	2.3	1.5	1.2	1.1	0.96	3.6
Fluoride	mg/L	<0.5	<0.5	<0.5	0.11	<0.5	<0.5	<0.5	<0.1	<0.1	<0.48	--	<0.095	0.12	<0.095	<0.48
Field pH	Std. Units	7.38	7.56	7.09	7.25	7.51	7.1	6.78	7.39	7.48	7.25	7.29	7.1	7.09	7.25	7.11
Sulfate	mg/L	6.1	5.5	14.8	1.7	<5	<5	70.7	1.1	<1	<2.2	<2.2	2.8	0.52	<0.44	<2.2
Total Dissolved Solids	mg/L	544	526	508	546	486	512	566	484	470	504	468	510	490	470	460
Antimony	ug/L	<0.073	0.12	<0.15	<0.15	<0.15	<0.15	<0.15	--	--	<0.15	--	<0.15	--	<0.15	<0.15
Arsenic	ug/L	3.4	3.5	2.3	2.6	5.1	4.9	6.8	--	--	3.5	3.6	3.1	3.7	2.8	6.3
Barium	ug/L	70.8	95.1	66.7	75	86.6	85.4	84.8	--	--	62.4	55.6	59.1	61.5	52.6	59.2
Beryllium	ug/L	<0.13	0.17	<0.18	<0.18	<0.18	<0.18	<0.18	--	--	<0.25	--	<0.25	--	<0.25	<0.25
Cadmium	ug/L	<0.089	<0.089	<0.081	<0.081	<0.081	<0.081	<0.15	--	--	<0.15	--	<0.15	--	<0.15	<0.15
Chromium	ug/L	0.97	9.3	<1	1.1	4	7.9	<1	--	--	<1	<1	<1	<1	<1	<1
Cobalt	ug/L	0.28	1.6	0.21	0.26	0.85	1.7	1	--	--	<0.12	<0.12	<0.12	<0.12	<0.12	0.22
Lead	ug/L	0.28	2.5	<0.2	0.37	1.2	2.5	<0.24	--	--	<0.24	--	<0.24	--	<0.24	0.24
Lithium	ug/L	0.28	2.2	0.18	0.26	0.96	2.1	<0.19	--	--	<0.22	0.35	<0.22	<0.22	<0.22	0.23
Mercury	ug/L	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.084	--	--	<0.084	--	<0.084	--	<0.066	<0.066
Molybdenum	ug/L	1.2	1.4	2.2	0.91	1.2	0.54	3.2	--	--	3	1.2	0.9	1.1	0.86	7.1
Selenium	ug/L	<0.21	0.72	<0.32	<0.32	0.35	0.45	<0.32	--	--	<0.32	<0.32	<0.32	<0.32	<0.32	<0.32
Thallium	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	--	--	<0.14	<0.14	<0.14	--	<0.14	<0.14
Total Radium	pCi/L	1.67	0.78	1.44	1.18	0.318	0.581	0.274	--	--	0.733	0.257	0.569	1.03	0.151	0.517
Radium-226	pCi/L	0	0.295	0	0.454	-0.077	0.411	0.274	--	--	0.0522	-0.053	0.249	0.21	0.0739	-0.114
Radium-228	pCi/L	1.67	0.485	1.44	0.722	0.318	0.17	-0.042	--	--	0.681	0.257	0.32	0.815	0.0768	0.517
Field Specific Conductance	umhos/cm	920	1457	819	864	810	902	987	924	896	1051	909	897	916	864	894
Oxygen, Dissolved	mg/L	1.15	0.19	0.16	0.08	0.2	0.11	0.08	0.15	0.07	0.4	0.08	0.21	0.45	0.13	0.09
Field Oxidation Potential	mV	-105.4	-106.4	-76.1	-71.4	100	-184	-147.8	-137.7	-170	-154.9	-151.7	-91.5	-123.5	-136.9	-110.8
Groundwater Elevation	feet	785.73	786.51	786.46	785.37	784.17	782.65	787.81	787.53	787.18	786.43	786.48	786.28	785.68	785.55	783.76
Temperature	deg C	11.5	9	10.6	14.9	14.6	10.5	15.1	8.9	15	12	10.4	12.1	15.5	9.8	15.8
Turbidity	NTU	14.9	113.1	9.85	16.81	38.62	133.7	9.3	3.44	6.75	0	1.52	4.44	0	1.87	11.07
pH at 25 Degrees C	Std. Units	7.4	7.4	7.2	7.3	7.3	7.2	7.3	7.4	7.4	7.2	7.3	7.3	7.4	7.4	7.4

## Appendix F

### Statistical Evaluation of Groundwater Monitoring Results

January 4, 2021  
File No. 25220067.00

## TECHNICAL MEMORANDUM

**SUBJECT:** Statistical Evaluation of Groundwater Monitoring Results – Prediction Limit Update  
Columbia Energy Center - Secondary Ash Pond

**PREPARED BY:** Nicole Kron

**CHECKED BY:** Sherren Clark

## STATISTICAL METHOD FOR PREDICTION LIMITS

Groundwater monitoring data for the Columbia Energy Center (COL) Secondary Ash Pond, is evaluated in accordance with 40 CFR 257.93(f)(3), using a prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper prediction limit (UPL).

Statistical evaluation is performed using commercially available software (*Sanitas for Groundwater*® or similar) in general accordance with the USEPA's *Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* dated March 2009 (Unified Guidance) (USEPA, 2009) and generally accepted procedures.

The COL Secondary Ash Pond, monitoring data includes two background monitoring wells, MW-301 and MW-84A, as well three compliance monitoring wells, MW-306, MW-307, and MW-308. The background wells are shared with other CCR units at COL.

The initial UPLs were calculated based on nine rounds of background monitoring were performed prior to the initiation of compliance monitoring for the existing CCR units at COL, from December 2015 through August 2017. Since then, additional rounds of monitoring for Appendix III parameters and Appendix IV parameters have been performed at the background wells. As part of the evaluation of the October 2020 monitoring results, the background data set for the UPL calculations is being updated to include data from the background wells collected through October 2020. This memo addresses updated UPLs for both Appendix III and Appendix IV parameters.

## TIME SERIES PLOTS

Time series plots are prepared for the required monitoring parameters to show the concentration variations over time. Time series graphs are included in **Attachment 1**.

## OUTLIER ANALYSIS - INTERWELL

For interwell analysis, an outlier evaluation is performed for background monitoring results at the upgradient wells. A statistical outlier is a value that is extremely different from the other values in the data set. The Sanitas outlier tests identify data points that do not appear to fit the distribution of the



## TECHNICAL MEMORANDUM

January 4, 2020

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rest of the data set and determine if they differ significantly from the rest of the data. The outlier analysis performed in Sanitas includes the following steps:

- 1) Run normality test (Shapiro Wilk/Francia).
- 2) If normally distributed, run USEPA's 1989 Outlier Test to identify suspected outliers.
  - a) If number of background samples is less than or equal to 25, run Dixon's test for suspected outliers.
  - b) If number of background samples is more than 25, run Rosner's test for suspected outliers.
- 3) If not normally distributed, run Tukey's test for outliers.
- 4) Review data flagged as possible outliers to evaluate whether they should be removed from the background data set. Also review time series plots for possible outliers that were not picked up in the statistical evaluation (e.g., outlier test may not identify outliers when two values are similar to each other, but very different from all other data).

Results identified as statistical outliers are checked for possible lab instrument failure, field collection problems, or data entry errors; however, outliers may exist naturally in the data if there is an extremely wide inherent or temporal variability in the data. The Unified Guidance states that unless a likely error can be identified, the outlier should not be removed.

For the interwell evaluation of the October 2020 sampling event, the following background values were identified as potential outliers and handled as described:

- **Barium (MW-301).** One high result from the December 2015 event was flagged as a statistical outlier. This result was removed from the dataset because this was the first sample collected following the well installation, which may have impacted groundwater conditions.
- **Barium (MW-84A).** One high result from the December 2016 event was flagged as a statistical outlier. This result was not removed from the dataset because there was no known explanation for the higher result and it appeared to be within the range of potential natural variation relative to the other observed barium concentrations.
- **Cobalt (MW-301).** One high result from the December 2015 event was flagged as a statistical outlier. This result was removed from the dataset because this was the first sample collected following the well installation, which may have impacted groundwater conditions.
- **Lithium (MW-301).** One high result from the December 2015 event was flagged as a statistical outlier. This result was removed from the dataset because this was the first sample collected following the well installation, which may have impacted groundwater conditions.
- Outlier analysis of results are included in **Attachment 2**.

## INTERWELL PREDICTION LIMITS

Interwell prediction limits are calculated using background data from the upgradient monitoring wells (MW-301 and MW-84A) for each monitored constituent, with outliers removed as noted above. During this evaluation of compliance monitoring groundwater results from October 2017 through October 2020 were included to calculate the interwell prediction limits. The prediction limit analysis performed in Sanitas includes the following steps:

- 1) If 100% of the background values are non-detect, the Double Quantification rule applies and no prediction limit is calculated.
- 2) If 50% or more of results are non-detect, then a non-parametric prediction limit is calculated.
- 3) If fewer than 50% of the results are non-detect, run normality test (Shapiro Wilk/Francia) to assess whether the data fit a normal distribution or can be transformed to fit a normal distribution (e.g., lognormal).
- 4) If normal or transformed normal, calculate parametric prediction limit.
- 5) If not normal or transformed normal, calculate non-parametric prediction limit.

Consistent with the Unified Guidance, parametric prediction limits are calculated based on a 1-of-2 retesting protocol and a 10 percent site-wide false positive rate. Sanitas establishes the per-test significance level based on user inputs of the number of events per year, number of constituents being evaluated, and number of compliance wells. For the October 2020 event, the following values were used:

Parameter	Value	Comments
Evaluations per year	2	Spring and Fall events
Appendix III Constituents analyzed	6	Total of 7 constituents analyzed, fluoride not counted because all background results were non-detect
Appendix IV Constituents analyzed	13	Total of 15 constituents analyzed, fluoride and mercury not counted because double quantification rule will be used
Compliance wells	3	MW-306, MW-307, MW-308

Non-parametric prediction limits are also based on a 1-of-2 retesting protocol. The non-parametric limit is the highest value in the background dataset. Due to the small sample size, the false positive rate for the non-parametric tests is higher than for the parametric tests, but will go down as more background data are obtained.

For results with 100 percent non-detects in the background data, evaluation under the Double Quantification Rule means that a statistically significant increase (SSI) has not occurred for a compliance well unless two sample results from the well exceed the laboratory's reporting limit or quantification limit. Mercury had 100 percent non-detects in the background data. Fluoride had only one J-flagged detection in the pooled background data, at an estimated concentration below the

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detection limits for some other results; therefore, the double quantification rule will also be used for fluoride.

For evaluation of parameters with less than 100 percent non-detects in the background sampling, the non-detects were adjusted using the Kaplan-Meier technique, unless the non-detects represent less than 15 percent of the total samples, in which case one-half of the detection limit was used.

Interwell prediction limit analysis results for Appendix III constituents are included in **Attachment 3** and **Attachment 4** for Appendix IV constituents. UPLs were updated for all parameters. For Appendix IV parameters that were not analyzed in October 2020 because they were not detected in the compliance wells in May 2020, Sanitas shows the May 2020 results in the summary table.

NDK/SCC

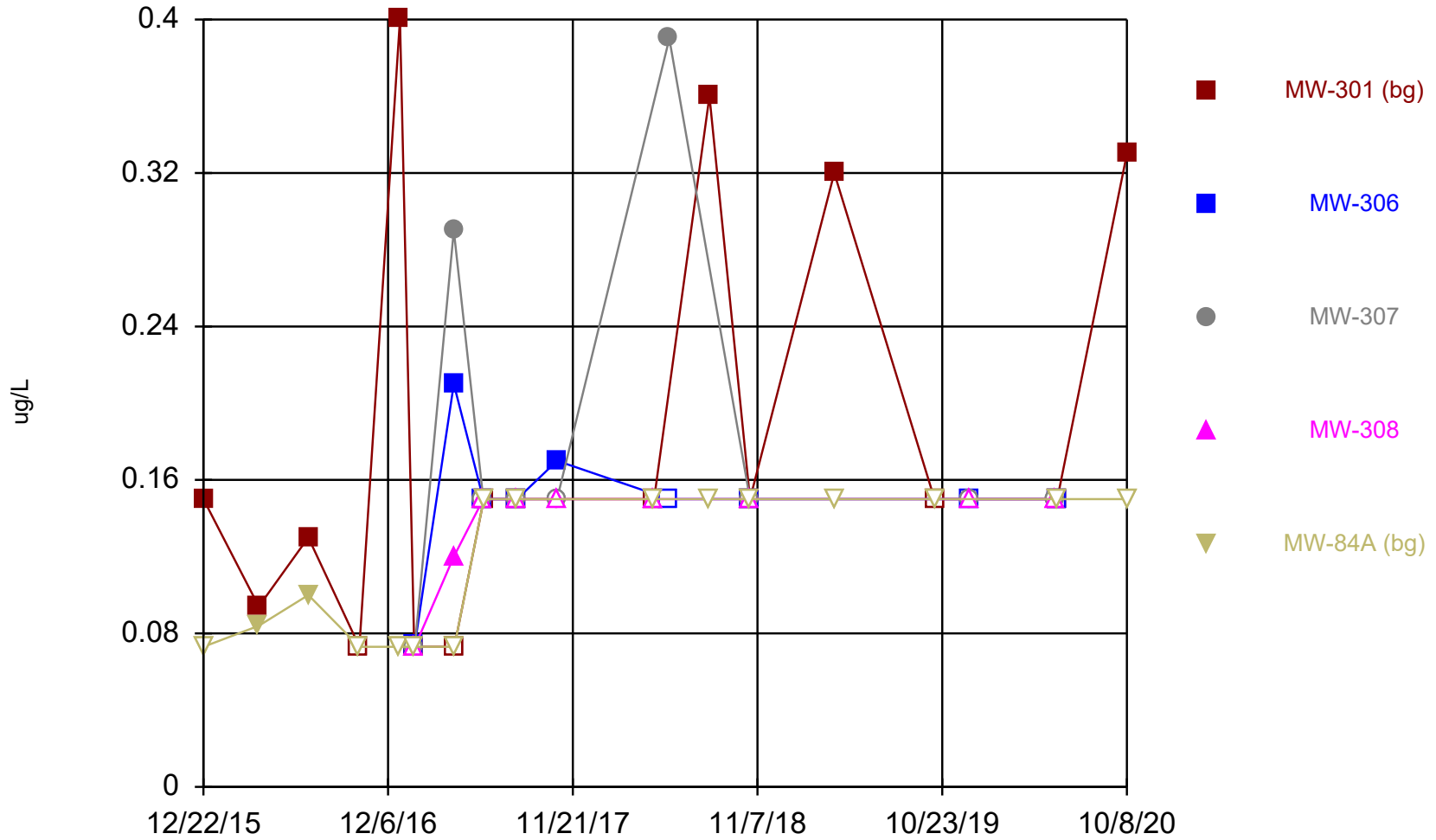
I:\25220067.00\Data and Calculations\Sanitas\COL Secondary Pond\COL Secondary Pond CCR Stats Memo.docx



## Attachment 1

### Times Series Graphs

# Antimony



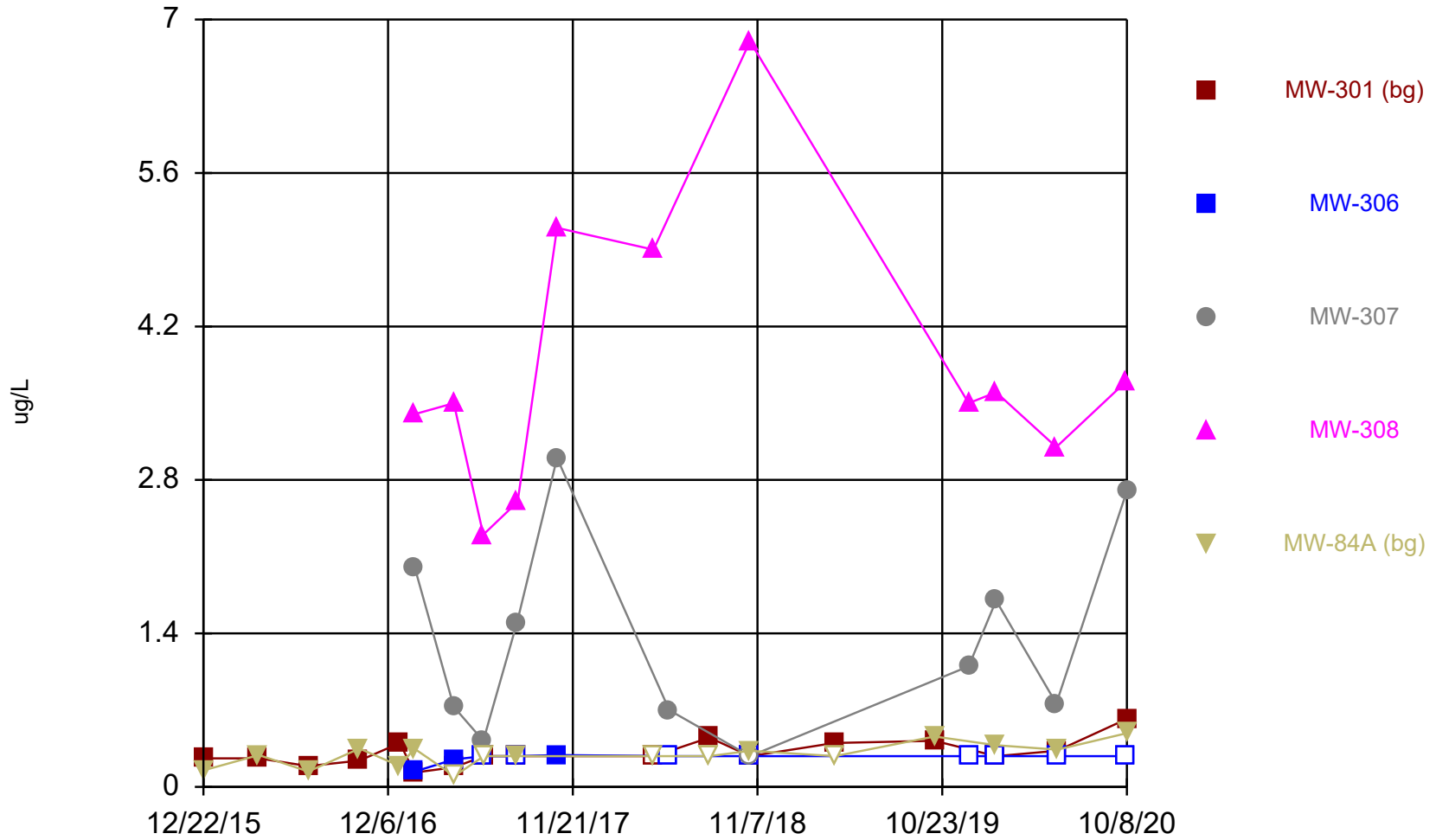
Time Series Analysis Run 12/23/2020 3:36 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

# Time Series

Constituent: Antimony (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	0.15 (J)				<0.073 (U)
4/5/2016	0.094 (J)				0.084 (J)
7/8/2016	0.13 (J)				0.1 (J)
10/13/2016	<0.073 (U)				<0.073 (U)
12/29/2016	0.4 (J)				<0.073 (U)
1/25/2017	<0.073 (U)				<0.073 (U)
1/26/2017		0.074 (J)	<0.073 (U)	<0.073 (U)	
4/10/2017		0.21 (J)	0.29 (J)	0.12 (J)	
4/11/2017	<0.073 (U)				<0.073 (U)
6/5/2017		<0.15 (U)	<0.15 (U)	<0.15 (U)	
6/6/2017	<0.15 (U)				<0.15 (U)
8/8/2017	<0.15 (U)	<0.15 (U)	<0.15 (U)		<0.15 (U)
8/9/2017				<0.15 (U)	
10/23/2017		0.17 (J)	<0.15 (U)	<0.15 (U)	
4/24/2018				<0.15 (U)	
4/25/2018	<0.15 (U)				<0.15 (U)
5/24/2018		<0.15 (U)	0.39 (J)		
8/8/2018	0.36 (J)				<0.15 (U)
10/24/2018	<0.15 (U)	<0.15 (U)	<0.15 (U)	<0.15 (U)	<0.15 (U)
4/2/2019	0.32 (J)				
4/3/2019					<0.15 (U)
10/9/2019	<0.15 (U)				<0.15 (U)
12/13/2019		<0.15 (U)	<0.15 (U)	<0.15 (U)	
5/27/2020			<0.15 (U)	<0.15 (U)	
5/28/2020		<0.15 (U)			
5/29/2020	<0.15 (U)				<0.15 (U)
10/8/2020	0.33 (J)				<0.15 (U)

### Arsenic



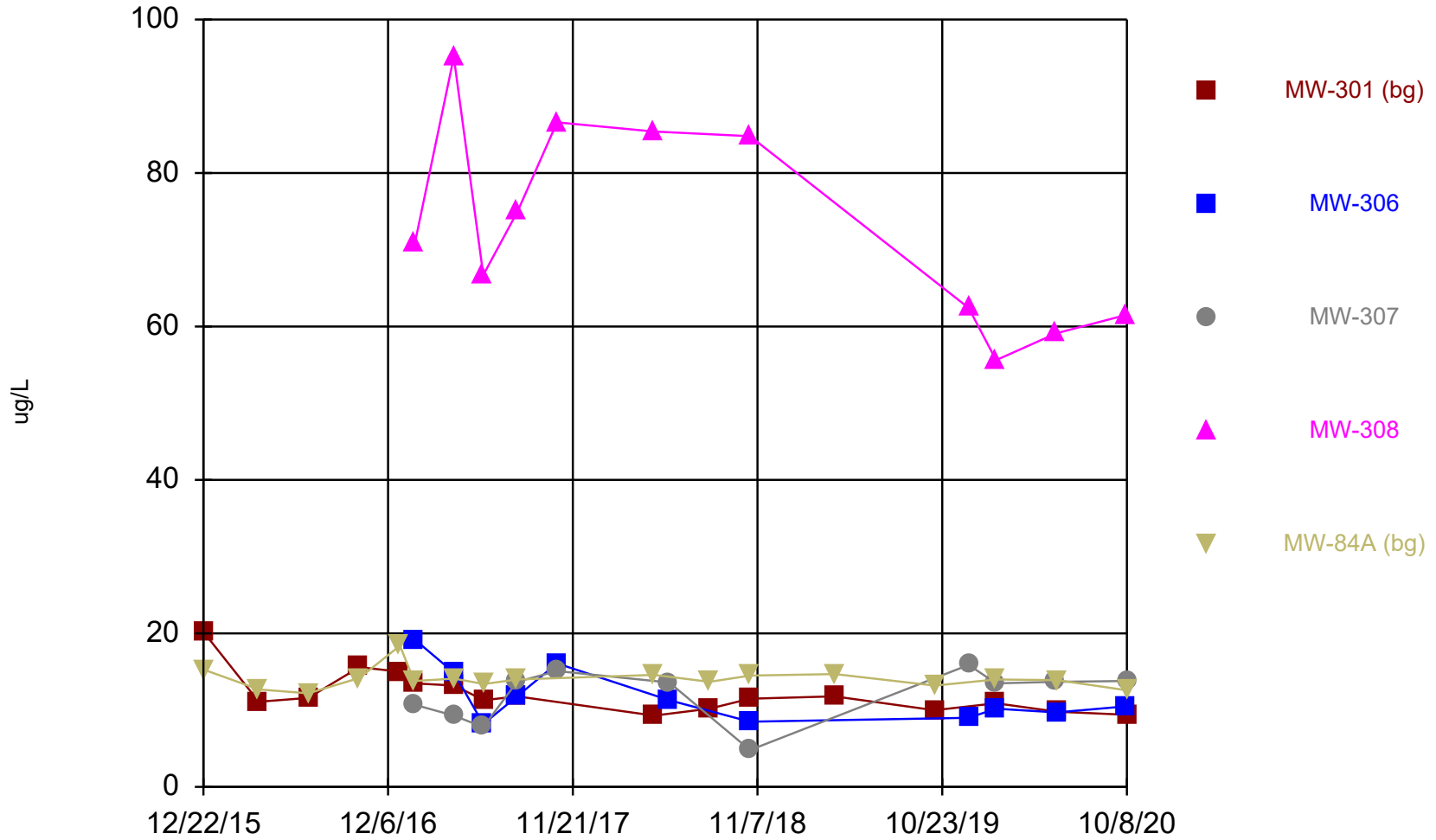
Time Series Analysis Run 12/23/2020 3:36 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

# Time Series

Constituent: Arsenic (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	0.26 (J)				0.15 (J)
4/5/2016	0.26 (J)				0.29 (J)
7/8/2016	0.19 (J)				0.14 (J)
10/13/2016	0.24 (J)				0.35 (J)
12/29/2016	0.4 (J)				0.19 (J)
1/25/2017	0.13 (J)				0.35 (J)
1/26/2017		0.14 (J)	2	3.4	
4/10/2017		0.25 (J)	0.73 (J)	3.5	
4/11/2017	0.18 (J)				<0.099 (U)
6/5/2017		<0.28 (U)	0.42 (J)	2.3	
6/6/2017	<0.28 (U)				<0.28 (U)
8/8/2017	<0.28 (U)	<0.28 (U)	1.5		0.28 (J)
8/9/2017				2.6	
10/23/2017		0.29 (J)	3	5.1	
4/24/2018				4.9	
4/25/2018	<0.28 (U)				<0.28 (U)
5/24/2018		<0.28 (U)	0.7 (J)		
8/8/2018	0.45 (J)				<0.28 (U)
10/24/2018	<0.28 (U)	<0.28 (U)	<0.28 (U)	6.8	0.33 (J)
4/2/2019	0.4 (J)				
4/3/2019					<0.28 (U)
10/9/2019	0.42 (J)				0.46 (J)
12/13/2019		<0.28 (U)	1.1	3.5	
2/3/2020	<0.28 (U)	<0.28 (U)	1.7	3.6	0.38 (J)
5/27/2020			0.76 (J)	3.1	
5/28/2020		<0.28 (U)			
5/29/2020	0.33 (J)				0.34 (J)
10/7/2020		<0.28 (U)		3.7	
10/8/2020	0.62 (J)		2.7		0.49 (J)

# Barium



# Time Series

Constituent: Barium (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	20.2				15.3
4/5/2016	11.1				12.7
7/8/2016	11.6				12.2
10/13/2016	15.6				14.2
12/29/2016	15				18.4
1/25/2017	13.5				13.8
1/26/2017		19.2	10.7	70.8	
4/10/2017		14.9	9.3	95.1	
4/11/2017	13.2				14.1
6/5/2017		8.2	7.8	66.7	
6/6/2017	11.3				13.4
8/8/2017	11.8	11.8	13.7		14
8/9/2017				75	
10/23/2017		16.1	15.1	86.6	
4/24/2018				85.4	
4/25/2018	9.3				14.6
5/24/2018		11.3	13.6		
8/8/2018	10.2				13.7
10/24/2018	11.5	8.5	4.8 (J)	84.8	14.5
4/2/2019	11.8				
4/3/2019					14.7
10/9/2019	10				13.2
12/13/2019		9	15.9	62.4	
2/3/2020	10.9	10.2	13.5	55.6	14
5/27/2020			13.7	59.1	
5/28/2020		9.7			
5/29/2020	9.8				13.9
10/7/2020		10.5		61.5	
10/8/2020	9.4		13.8		12.6



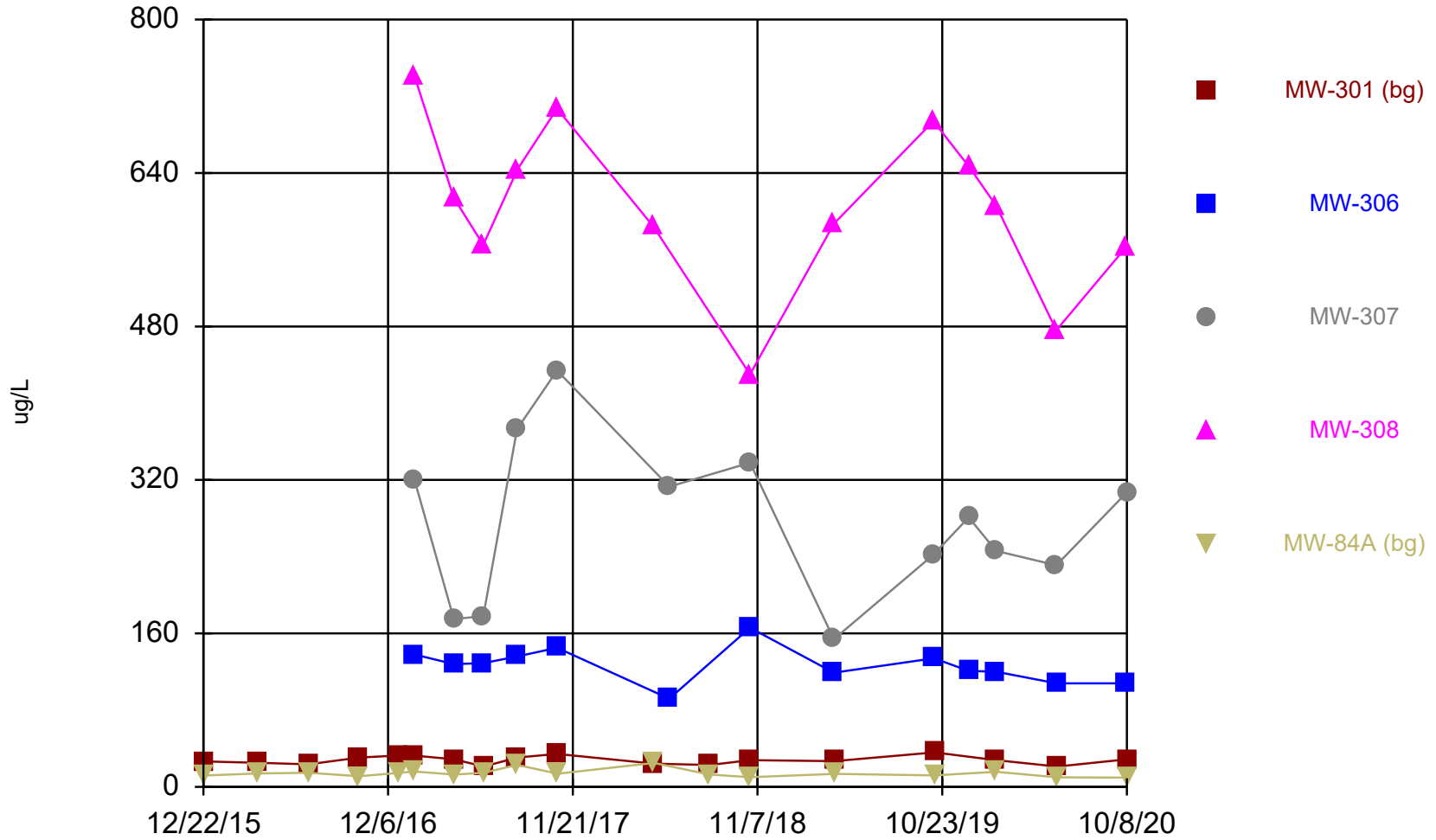


# Time Series

Constituent: Beryllium (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	<0.13 (U)				<0.13 (U)
4/5/2016	<0.13 (U)				<0.13 (U)
7/8/2016	<0.13 (U)				<0.13 (U)
10/13/2016	<0.13 (U)				<0.13 (U)
12/29/2016	0.19 (J)				<0.13 (U)
1/25/2017	<0.13 (U)				<0.13 (U)
1/26/2017		<0.13 (U)	<0.13 (U)	<0.13 (U)	
4/10/2017		0.14 (J)	<0.13 (U)	0.17 (J)	
4/11/2017	<0.13 (U)				<0.13 (U)
6/5/2017		<0.18 (U)	<0.18 (U)	<0.18 (U)	
6/6/2017	<0.18 (U)				<0.18 (U)
8/8/2017	<0.18 (U)	<0.18 (U)	<0.18 (U)		<0.18 (U)
8/9/2017				<0.18 (U)	
10/23/2017		<0.18 (U)	<0.18 (U)	<0.18 (U)	
4/24/2018				<0.18 (U)	
4/25/2018	<0.18 (U)				<0.18 (U)
5/24/2018		<0.18 (U)	<0.18 (U)		
8/8/2018	0.37 (J)				<0.18 (U)
10/24/2018	<0.18 (U)	<0.18 (U)	<0.18 (U)	<0.18 (U)	<0.18 (U)
4/2/2019	0.28 (J)				
4/3/2019					<0.18 (U)
10/9/2019	<0.25 (U)				<0.25 (U)
12/13/2019		<0.25 (U)	<0.25 (U)	<0.25 (U)	
5/27/2020			<0.25 (U)	<0.25 (U)	
5/28/2020		<0.25 (U)			
5/29/2020	<0.25 (U)				<0.25 (U)
10/8/2020	<0.25 (U)				<0.25 (U)

# Boron



# Time Series

Constituent: Boron (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	26.5				11.9
4/5/2016	25.2				14
7/8/2016	23.6				14.7
10/13/2016	30.6				11.1
12/29/2016	32.8				14.7
1/25/2017	32.6				16.1
1/26/2017		138	319	740	
4/10/2017		128	175	614	
4/11/2017	28.8				12.9
6/5/2017		129	178	565	
6/6/2017	21.3				14.8
8/8/2017	30.6	136	373		22.9
8/9/2017				644	
10/23/2017	34.3	145	434	707	
10/24/2017					13.8
4/24/2018				584	
4/25/2018	24.3				25
5/24/2018		92	313		
8/8/2018	22.8				12.8
10/24/2018	27.8	166	338	430	10.1 (J)
4/1/2019		119	154	587	
4/2/2019	26.9				
4/3/2019					13.6
10/7/2019			242	694	
10/8/2019		134			
10/9/2019	35.9				12
12/13/2019		121	281	647	
2/3/2020	27.9	120	246	606	15.7
5/27/2020			231	476	
5/28/2020		108			
5/29/2020	21.3				10
10/7/2020		108		563	
10/8/2020	28.8		307		9.7 (J)

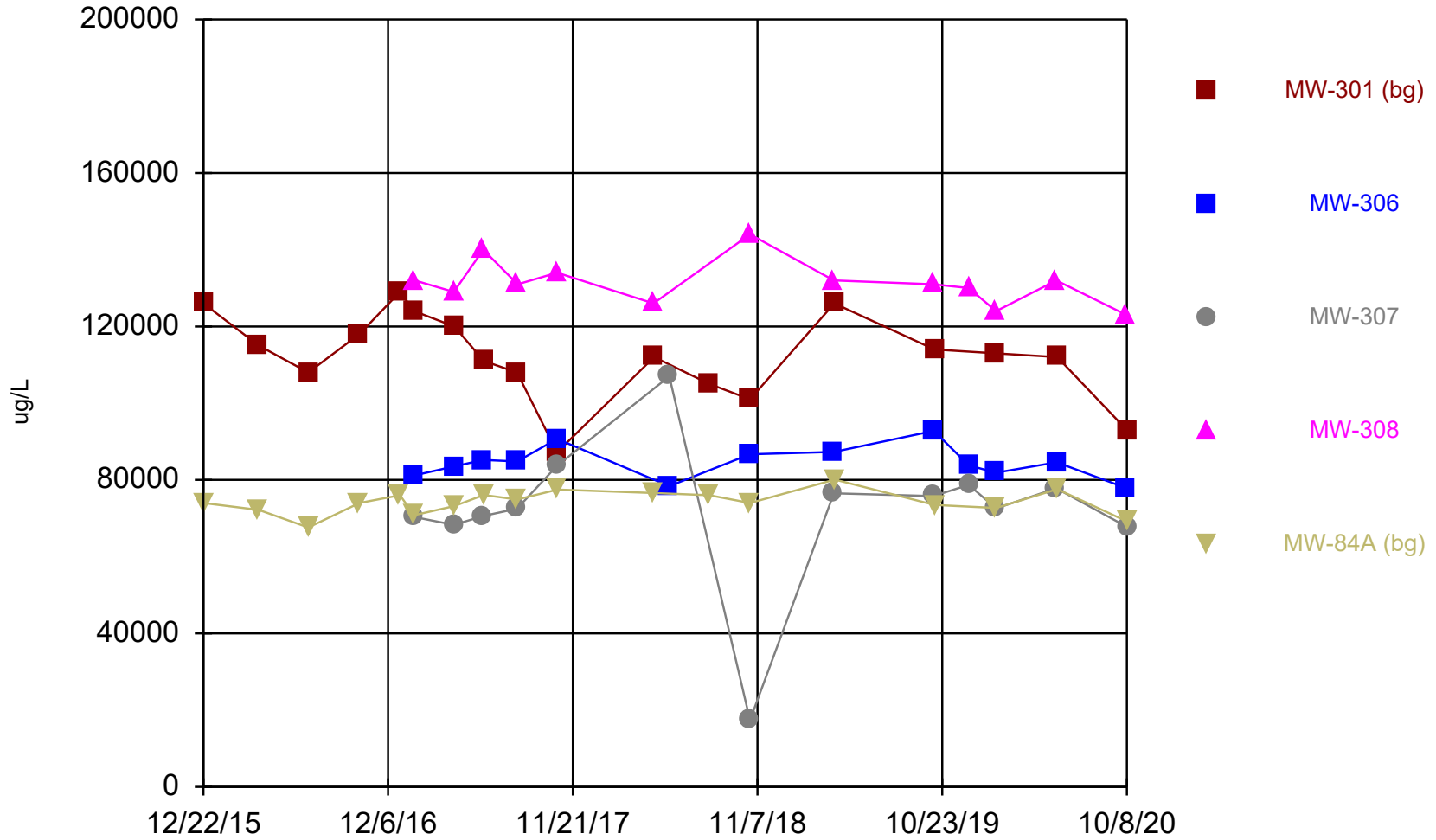


# Time Series

Constituent: Cadmium (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	<0.089 (U)				<0.089 (U)
4/5/2016	<0.089 (U)				<0.089 (U)
7/8/2016	<0.089 (U)				<0.089 (U)
10/13/2016	<0.089 (U)				<0.089 (U)
12/29/2016	0.32 (J)				<0.089 (U)
1/25/2017	<0.089 (U)				<0.089 (U)
1/26/2017		<0.089 (U)	<0.089 (U)	<0.089 (U)	
4/10/2017		0.11 (J)	0.27 (J)	<0.089 (U)	
4/11/2017	<0.089 (U)				<0.089 (U)
6/5/2017		<0.081 (U)	<0.081 (U)	<0.081 (U)	
6/6/2017	<0.081 (U)				<0.081 (U)
8/8/2017	<0.081 (U)	<0.081 (U)	<0.081 (U)		<0.081 (U)
8/9/2017				<0.081 (U)	
10/23/2017		<0.081 (U)	<0.081 (U)	<0.081 (U)	
4/24/2018				<0.081 (U)	
4/25/2018	<0.081 (U)				<0.081 (U)
5/24/2018		<0.081 (U)	<0.081 (U)		
10/24/2018	<0.15 (U)	<0.15 (U)	0.21 (J)	<0.15 (U)	<0.15 (U)
4/2/2019	0.21 (J)				
4/3/2019					<0.15 (U)
10/9/2019	<0.15 (U)				<0.15 (U)
12/13/2019		<0.15 (U)	<0.15 (U)	<0.15 (U)	
5/27/2020			<0.15 (U)	<0.15 (U)	
5/28/2020		<0.15 (U)			
5/29/2020	<0.15 (U)				<0.15 (U)
10/8/2020	0.19 (J)				<0.15 (U)

# Calcium



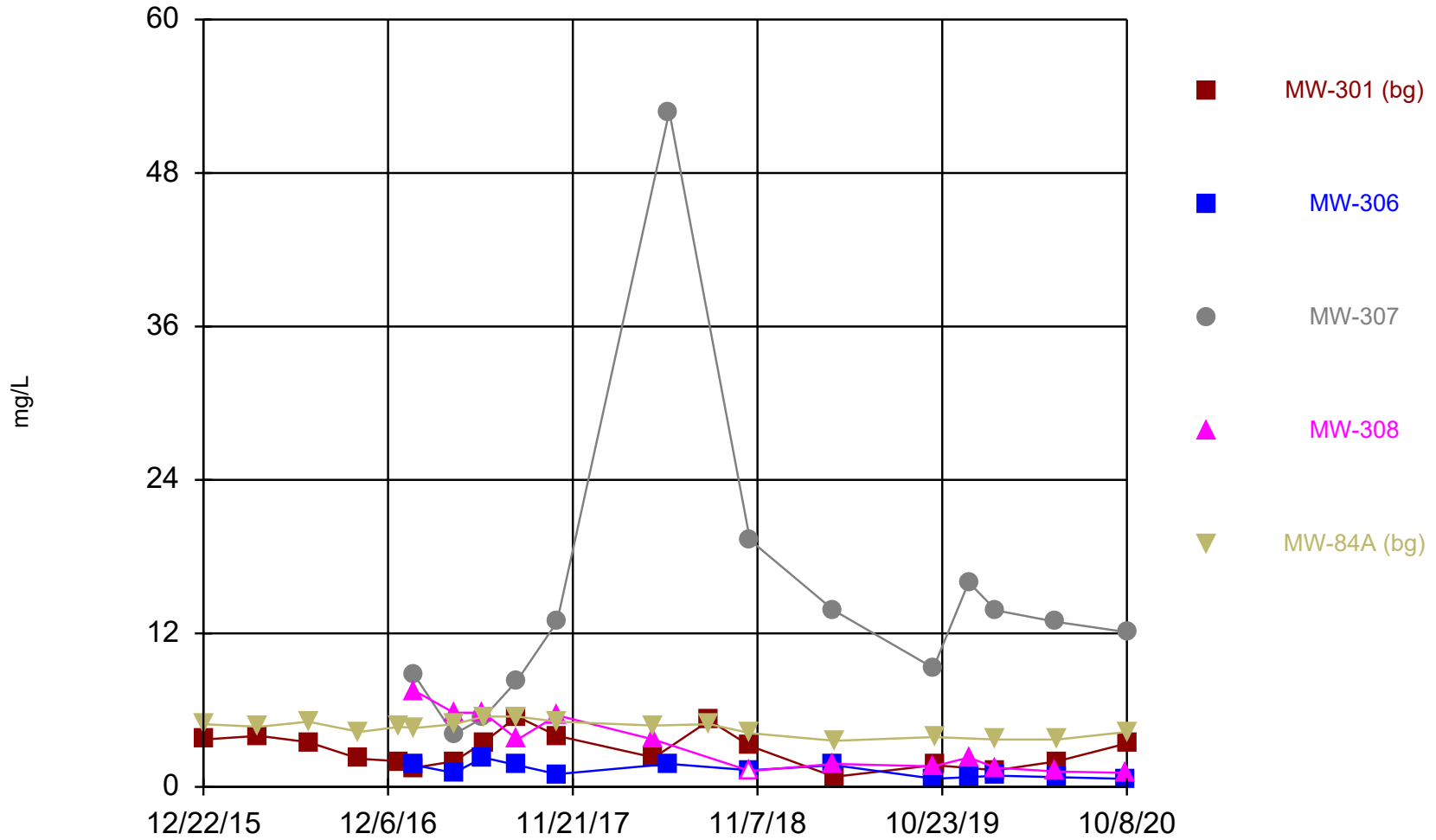
Time Series Analysis Run 12/23/2020 3:37 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

# Time Series

Constituent: Calcium (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	126000				74000
4/5/2016	115000				72200
7/8/2016	108000				67600
10/13/2016	118000				74000
12/29/2016	129000				76000
1/25/2017	124000				70800
1/26/2017		81200	70300	132000	
4/10/2017		83500	68300	129000	
4/11/2017	120000				73200
6/5/2017		85200	70600	140000	
6/6/2017	111000				76100
8/8/2017	108000	84800	72500		74900
8/9/2017				131000	
10/23/2017	87200	90700	83700	134000	
10/24/2017					77500
4/24/2018				126000	
4/25/2018	112000				76600
5/24/2018		78400	107000		
8/8/2018	105000				76000
10/24/2018	101000	86700	17400	144000	74000
4/1/2019		87300	76500	132000	
4/2/2019	126000				
4/3/2019					80100
10/7/2019			75800	131000	
10/8/2019		92800			
10/9/2019	114000				73500
12/13/2019		83800	78700	130000	
2/3/2020	113000	81900	72600	124000	72700
5/27/2020			77800	132000	
5/28/2020		84600			
5/29/2020	112000				77600
10/7/2020		77900		123000	
10/8/2020	93000		67800		69200

# Chloride



Time Series Analysis Run 12/23/2020 3:37 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

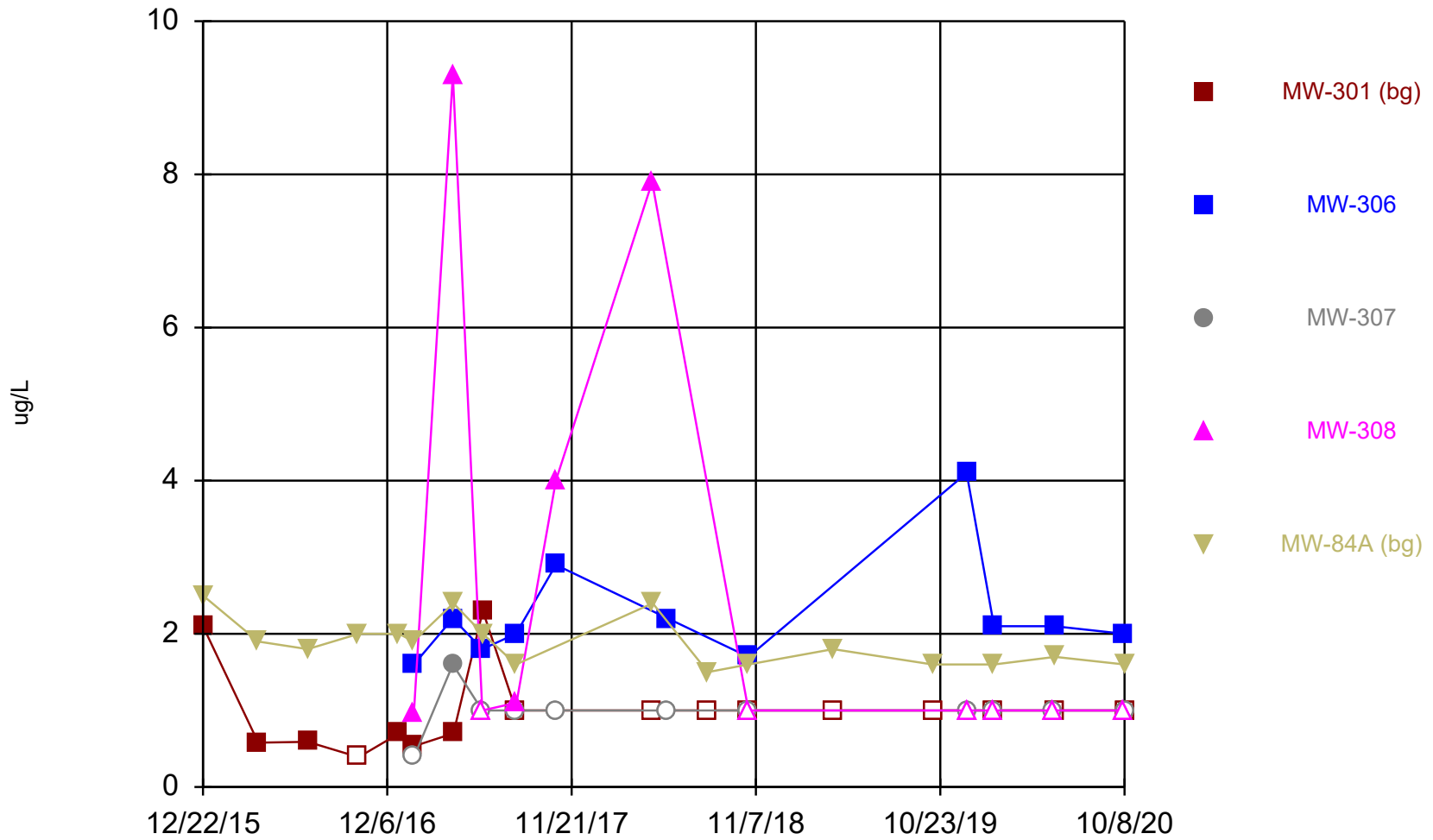


# Time Series

Constituent: Chloride (mg/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	3.7 (J)				4.9
4/5/2016	4				4.7
7/8/2016	3.5 (J)				5.1
10/13/2016	2.2				4.3
12/29/2016	2 (J)				4.7
1/25/2017	1.5 (J)				4.6
1/26/2017		1.7 (J)	8.7 (J)	7.5 (J)	
4/10/2017		1.1 (J)	4.1	5.8 (J)	
4/11/2017	2				4.9
6/5/2017		2.3	5.4	5.8 (J)	
6/6/2017	3.5				5.5
8/8/2017	5.5	1.7 (J)	8.3		5.5
8/9/2017				3.7	
10/23/2017	4	1 (J)	12.9	5.6 (J)	
10/24/2017					5.1
4/24/2018				3.7 (J)	
4/25/2018	2.3				4.8
5/24/2018		1.8 (J)	52.8		
8/8/2018	5.2				4.9
10/24/2018	3.2	1.3 (J)	19.3	<2.5 (U)	4.2
4/1/2019		1.7 (J)	13.8	1.8 (J)	
4/2/2019	0.79 (J)				
4/3/2019					3.6
10/7/2019			9.3	1.6 (J)	
10/8/2019		0.64 (J)			
10/9/2019	1.7 (J)				3.9
12/13/2019		0.76 (J)	16	2.3 (J)	
2/3/2020	1.3 (J)	0.88 (J)	13.8	1.5 (J)	3.7
5/27/2020			12.9	1.2 (J)	
5/28/2020		0.76 (J)			
5/29/2020	2 (J)				3.7
10/7/2020		0.63 (J)		1.1 (J)	
10/8/2020	3.4		12.1		4.3

# Chromium

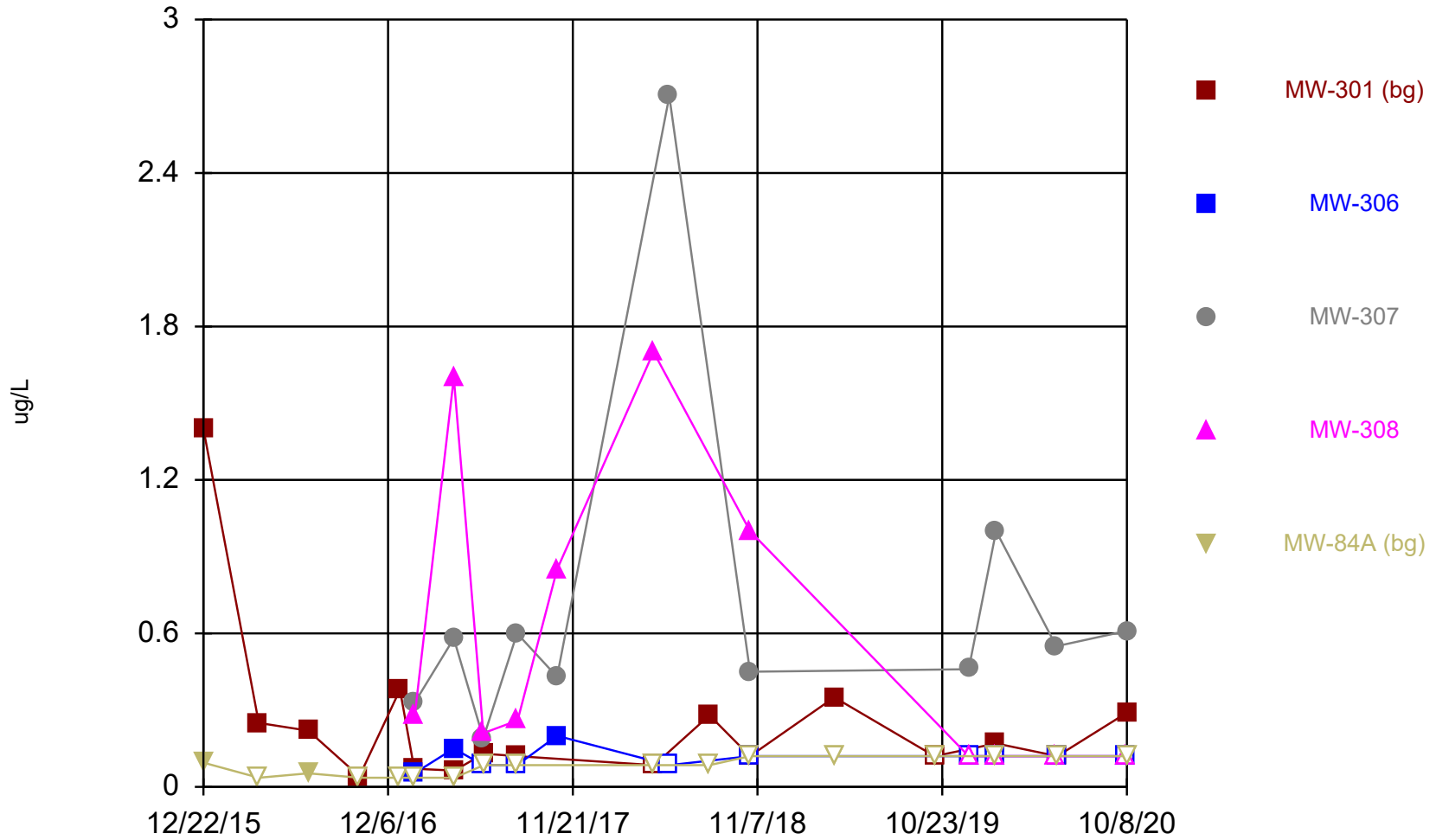


# Time Series

Constituent: Chromium (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	2.1				2.5
4/5/2016	0.58 (J)				1.9
7/8/2016	0.59 (J)				1.8
10/13/2016	<0.39 (U)				2
12/29/2016	0.7 (J)				2
1/25/2017	0.53 (J)				1.9
1/26/2017		1.6	<0.39 (U)	0.97 (J)	
4/10/2017		2.2	1.6	9.3	
4/11/2017	0.7 (J)				2.4
6/5/2017		1.8 (J)	<1 (U)	<1 (U)	
6/6/2017	2.3 (J)				2 (J)
8/8/2017	<1 (U)	2 (J)	<1 (U)		1.6 (J)
8/9/2017				1.1 (J)	
10/23/2017		2.9 (J)	<1 (U)	4	
4/24/2018				7.9	
4/25/2018	<1 (U)				2.4 (J)
5/24/2018		2.2 (J)	<1 (U)		
8/8/2018	<1 (U)				1.5 (J)
10/24/2018	<1 (U)	1.7 (J)	<1 (U)	<1 (U)	1.6 (J)
4/2/2019	<1 (U)				
4/3/2019					1.8 (J)
10/9/2019	<1 (U)				1.6 (J)
12/13/2019		4.1	<1 (U)	<1 (U)	
2/3/2020	<1 (U)	2.1 (J)	<1 (U)	<1 (U)	1.6 (J)
5/27/2020			<1 (U)	<1 (U)	
5/28/2020		2.1 (J)			
5/29/2020	<1 (U)				1.7 (J)
10/7/2020		2 (J)		<1 (U)	
10/8/2020	<1 (U)		<1 (U)		1.6 (J)

### Cobalt

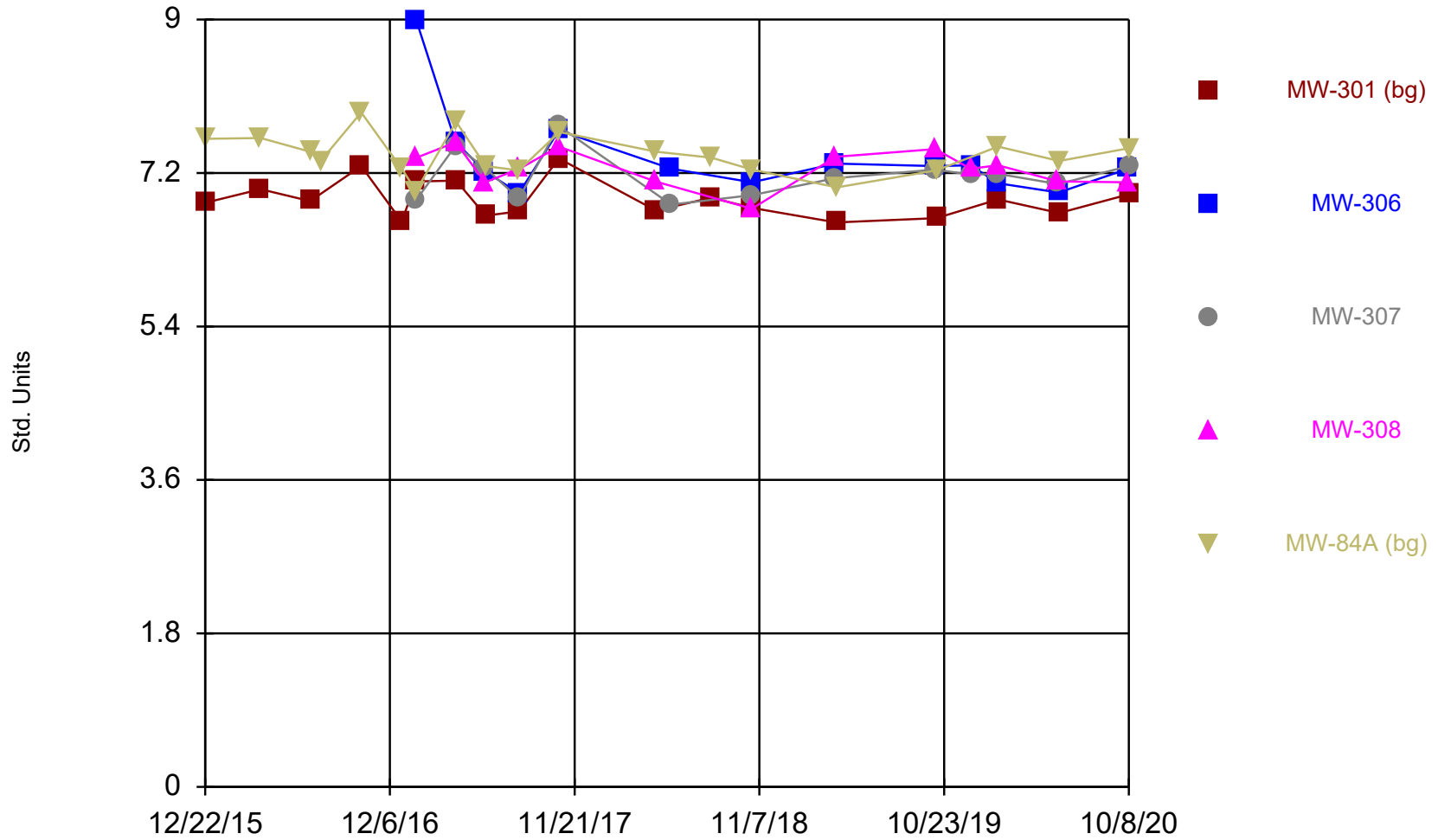


# Time Series

Constituent: Cobalt (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	1.4				0.095 (J)
4/5/2016	0.25 (J)				<0.036 (U)
7/8/2016	0.22 (J)				0.053 (J)
10/13/2016	0.041 (J)				<0.036 (U)
12/29/2016	0.38 (J)				<0.036 (U)
1/25/2017	0.071 (J)				<0.036 (U)
1/26/2017		0.054 (J)	0.33 (J)	0.28 (J)	
4/10/2017		0.15 (J)	0.58 (J)	1.6	
4/11/2017	0.064 (J)				<0.036 (U)
6/5/2017		<0.085 (U)	0.19 (J)	0.21 (J)	
6/6/2017	0.13 (J)				<0.085 (U)
8/8/2017	0.12 (J)	<0.085 (U)	0.6 (J)		<0.085 (U)
8/9/2017				0.26 (J)	
10/23/2017		0.2 (J)	0.43 (J)	0.85 (J)	
4/24/2018				1.7	
4/25/2018	<0.085 (U)				<0.085 (U)
5/24/2018		<0.085 (U)	2.7		
8/8/2018	0.28 (J)				<0.085 (U)
10/24/2018	<0.12 (U)	<0.12 (U)	0.45 (J)	1	<0.12 (U)
4/2/2019	0.35 (J)				
4/3/2019					<0.12 (U)
10/9/2019	<0.12 (U)				<0.12 (U)
12/13/2019		<0.12 (U)	0.46 (J)	<0.12 (U)	
2/3/2020	0.17 (J)	<0.12 (U)	1	<0.12 (U)	<0.12 (U)
5/27/2020			0.55 (J)	<0.12 (U)	
5/28/2020		<0.12 (U)			
5/29/2020	<0.12 (U)				<0.12 (U)
10/7/2020		<0.12 (U)		<0.12 (U)	
10/8/2020	0.29 (J)		0.61 (J)		<0.12 (U)

### Field pH



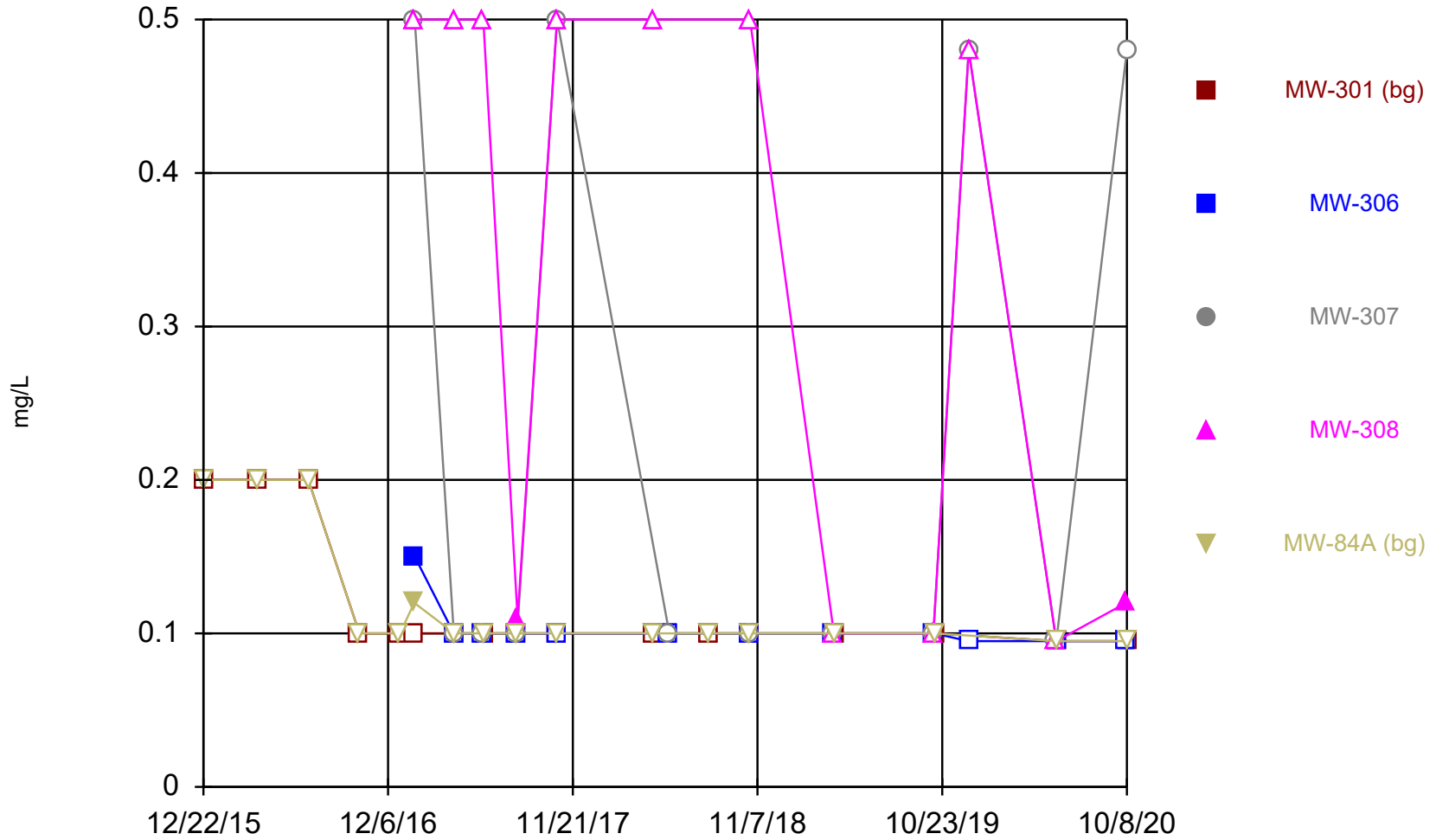
Time Series Analysis Run 12/23/2020 3:37 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

# Time Series

Constituent: Field pH (Std. Units) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	6.85				7.6
4/5/2016	7.01				7.61
7/8/2016	6.87				7.45
7/28/2016					7.34
10/13/2016	7.28				7.91
12/29/2016	6.63				7.25
1/25/2017	7.1				6.99
1/26/2017		8.98	6.89	7.38	
4/10/2017		7.56	7.52	7.56	
4/11/2017	7.11				7.8
6/5/2017		7.22	7.26	7.09	
6/6/2017	6.7				7.28
8/8/2017	6.75	6.96	6.9		7.23
8/9/2017				7.25	
10/23/2017	7.37	7.7	7.75	7.51	
10/24/2017					7.68
4/24/2018				7.1	
4/25/2018	6.76				7.45
5/24/2018		7.25	6.83		
8/8/2018	6.91				7.38
10/24/2018	6.79	7.09	6.94	6.78	7.24
4/1/2019		7.31	7.14	7.39	
4/2/2019	6.62				
4/3/2019					7.03
10/7/2019			7.24	7.48	
10/8/2019		7.28			
10/9/2019	6.67				7.23
12/13/2019		7.29	7.18	7.25	
2/3/2020	6.89	7.08	7.19	7.29	7.51
5/27/2020			7.07	7.1	
5/28/2020		6.97			
5/29/2020	6.73				7.34
10/7/2020		7.25		7.09	
10/8/2020	6.95		7.28		7.49

# Fluoride



Time Series Analysis Run 12/23/2020 3:37 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

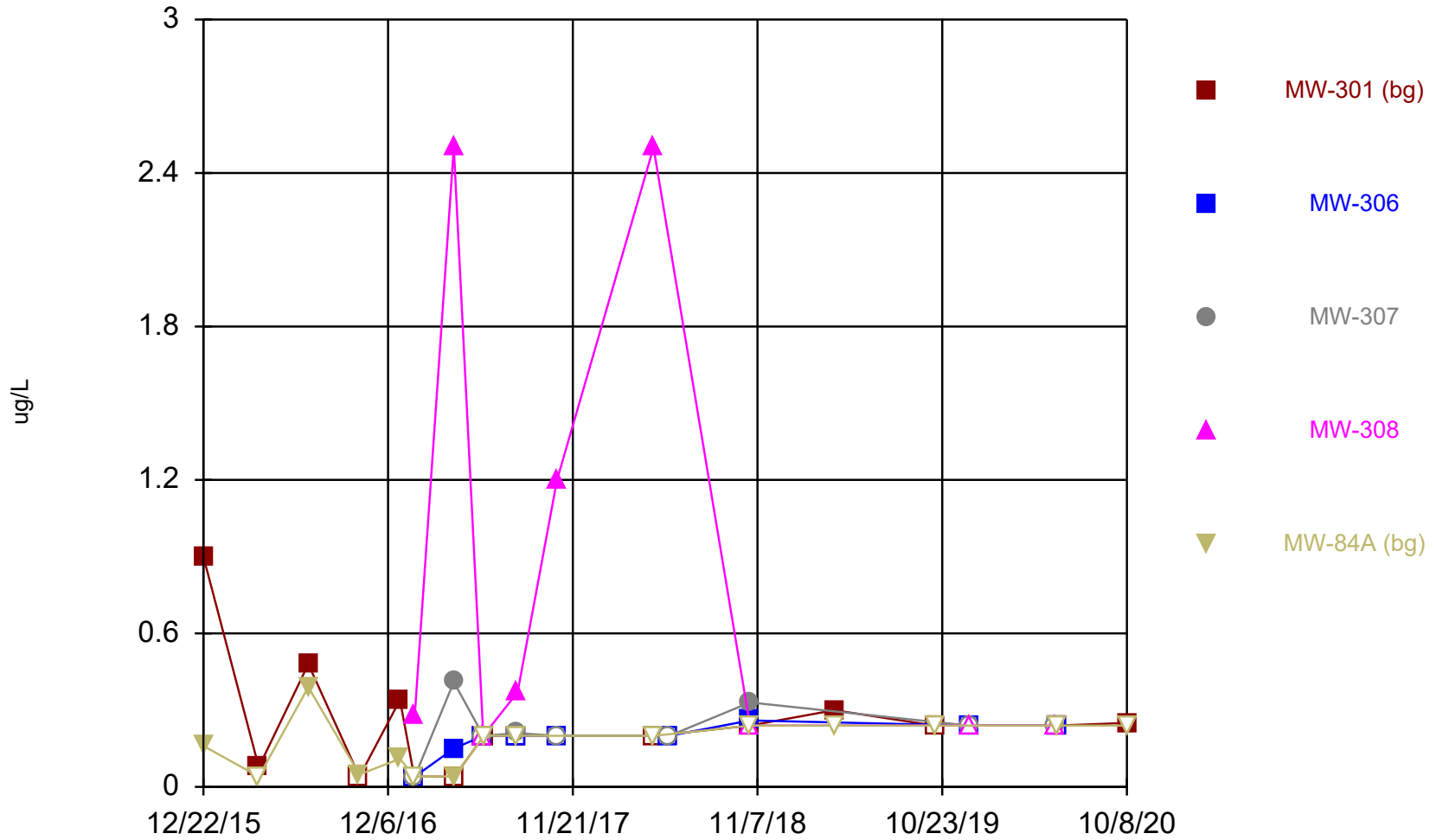


# Time Series

Constituent: Fluoride (mg/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	<0.2 (U)				<0.2 (U)
4/5/2016	<0.2 (U)				<0.2 (U)
7/8/2016	<0.2 (U)				<0.2 (U)
10/13/2016	<0.1 (U)				<0.1 (U)
12/29/2016	<0.1 (U)				<0.1 (U)
1/25/2017	<0.1 (U)				0.12 (J)
1/26/2017		0.15 (J)	<0.5 (U)	<0.5 (U)	
4/10/2017		<0.1 (U)	<0.1 (U)	<0.5 (U)	
4/11/2017	<0.1 (U)				<0.1 (U)
6/5/2017		<0.1 (U)	<0.1 (U)	<0.5 (U)	
6/6/2017	<0.1 (U)				<0.1 (U)
8/8/2017	<0.1 (U)	<0.1 (U)	<0.1 (U)		<0.1 (U)
8/9/2017				0.11 (J)	
10/23/2017	<0.1 (U)	<0.1 (U)	<0.5 (U)	<0.5 (U)	
10/24/2017					<0.1 (U)
4/24/2018				<0.5 (U)	
4/25/2018	<0.1 (U)				<0.1 (U)
5/24/2018		<0.1 (U)	<0.1 (U)		
8/8/2018	<0.1 (U)				<0.1 (U)
10/24/2018	<0.1 (U)	<0.1 (U)	<0.1 (U)	<0.5 (U)	<0.1 (U)
4/1/2019		<0.1 (U)	<0.1 (U)	<0.1 (U)	
4/2/2019	<0.1 (U)				
4/3/2019					<0.1 (U)
10/7/2019			<0.1 (U)	<0.1 (U)	
10/8/2019		<0.1 (U)			
10/9/2019	<0.1 (U)				<0.1 (U)
12/13/2019		<0.095 (U)	<0.48 (U)	<0.48 (U)	
5/27/2020			<0.095 (U)	<0.095 (U)	
5/28/2020		<0.095 (U)			
5/29/2020	<0.095 (U)				<0.095 (U)
10/7/2020		<0.095 (U)		0.12 (J)	
10/8/2020	<0.095 (U)		<0.48 (U)		<0.095 (U)

# Lead



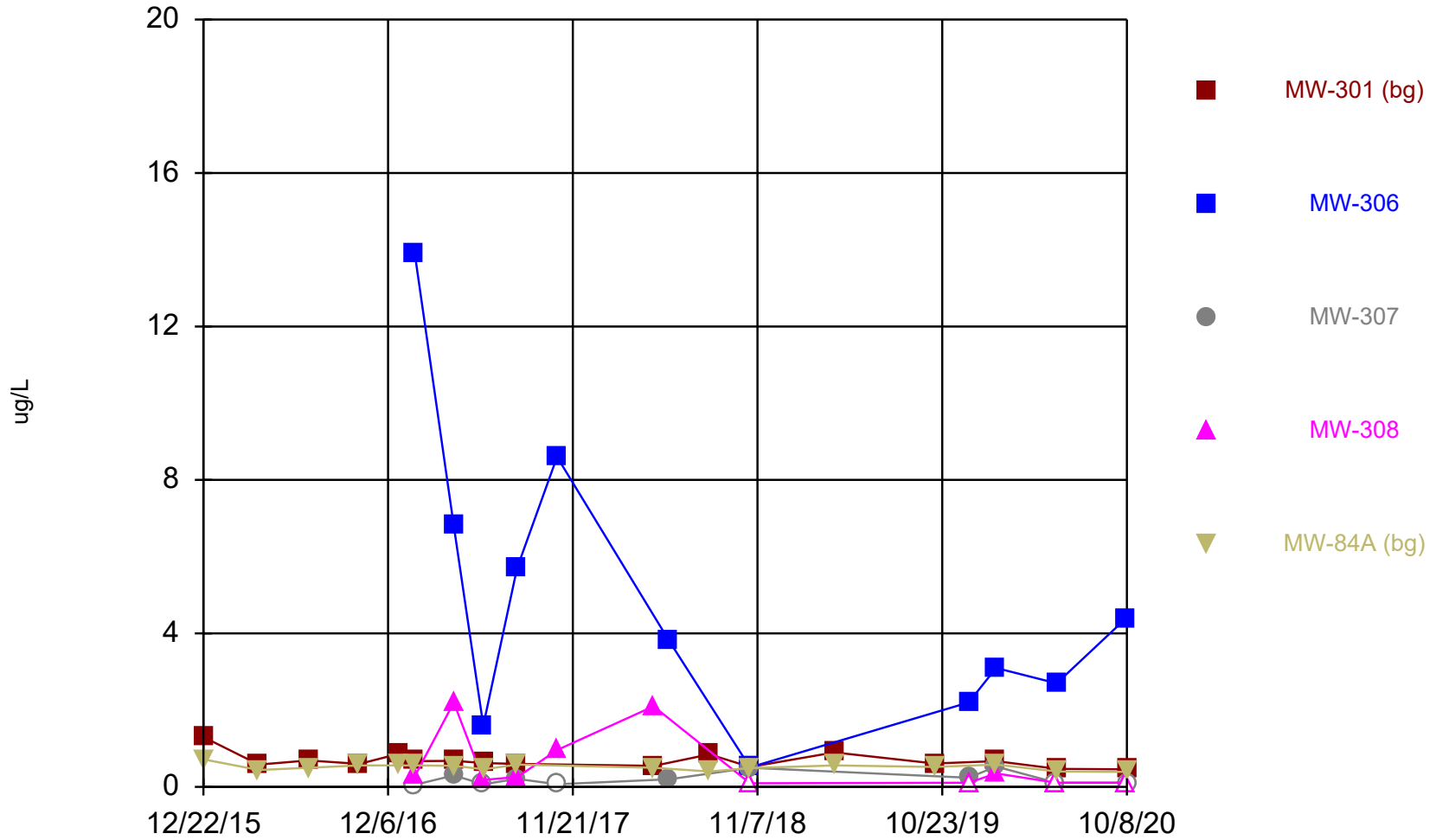
Time Series Analysis Run 12/23/2020 3:37 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

# Time Series

Constituent: Lead (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	0.9 (J)				0.16 (J)
4/5/2016	0.077 (J)				<0.04 (U)
7/8/2016	0.48 (J)				0.39 (J)
10/13/2016	<0.04 (U)				0.049 (J)
12/29/2016	0.34 (J)				0.11 (J)
1/25/2017	<0.04 (U)				<0.04 (U)
1/26/2017		<0.04 (U)	<0.04 (U)	0.28 (J)	
4/10/2017		0.15 (J)	0.41 (J)	2.5	
4/11/2017	<0.04 (U)				0.041 (J)
6/5/2017		<0.2 (U)	<0.2 (U)	<0.2 (U)	
6/6/2017	<0.2 (U)				<0.2 (U)
8/8/2017	<0.2 (U)	<0.2 (U)	0.21 (J)		<0.2 (U)
8/9/2017				0.37 (J)	
10/23/2017		<0.2 (U)	<0.2 (U)	1.2	
4/24/2018				2.5	
4/25/2018	<0.2 (U)				<0.2 (U)
5/24/2018		<0.2 (U)	<0.2 (U)		
10/24/2018	<0.24 (U)	0.26 (J)	0.33 (J)	<0.24 (U)	<0.24 (U)
4/2/2019	0.3 (J)				
4/3/2019					<0.24 (U)
10/9/2019	<0.24 (U)				<0.24 (U)
12/13/2019		<0.24 (U)	<0.24 (U)	<0.24 (U)	
5/27/2020			<0.24 (U)	<0.24 (U)	
5/28/2020		<0.24 (U)			
5/29/2020	<0.24 (U)				<0.24 (U)
10/8/2020	0.25 (J)				<0.24 (U)

# Lithium

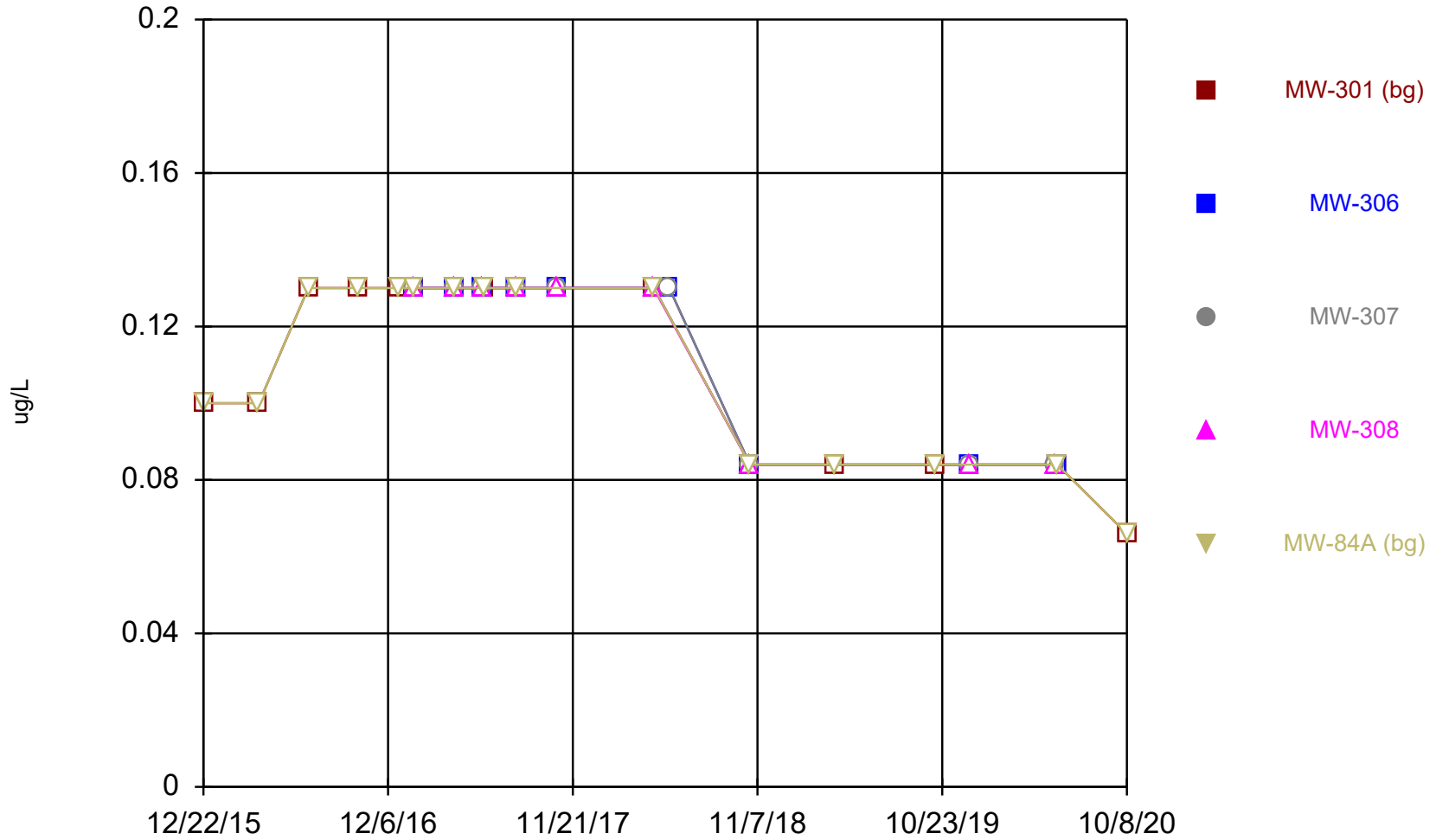


# Time Series

Constituent: Lithium (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	1.3				0.72 (J)
4/5/2016	0.58 (J)				0.44 (J)
7/8/2016	0.69 (J)				0.5 (J)
10/13/2016	0.6 (J)				0.56 (J)
12/29/2016	0.87 (J)				0.56 (J)
1/25/2017	0.67 (J)				0.56 (J)
1/26/2017		13.9	<0.11 (U)	0.28 (J)	
4/10/2017		6.8	0.3 (J)	2.2	
4/11/2017	0.68 (J)				0.55 (J)
6/5/2017		1.6	<0.14 (U)	0.18 (J)	
6/6/2017	0.62 (J)				0.46 (J)
8/8/2017	0.6 (J)	5.7	0.21 (J)		0.58 (J)
8/9/2017				0.26 (J)	
10/23/2017		8.6	<0.14 (U)	0.96 (J)	
4/24/2018				2.1	
4/25/2018	0.55 (J)				0.5 (J)
5/24/2018		3.8	0.2 (J)		
8/8/2018	0.85 (J)				0.4 (J)
10/24/2018	0.52 (J)	0.51 (J)	0.5 (J)	<0.19 (U)	0.49 (J)
4/2/2019	0.9 (J)				
4/3/2019					0.56 (J)
10/9/2019	0.61 (J)				0.52 (J)
12/13/2019		2.2	0.24 (J)	<0.22 (U)	
2/3/2020	0.67 (J)	3.1	0.53 (J)	0.35 (J)	0.58 (J)
5/27/2020			<0.22 (U)	<0.22 (U)	
5/28/2020		2.7			
5/29/2020	0.47 (J)				0.4 (J)
10/7/2020		4.4		<0.22 (U)	
10/8/2020	0.46 (J)		<0.22 (U)		0.39 (J)

# Mercury

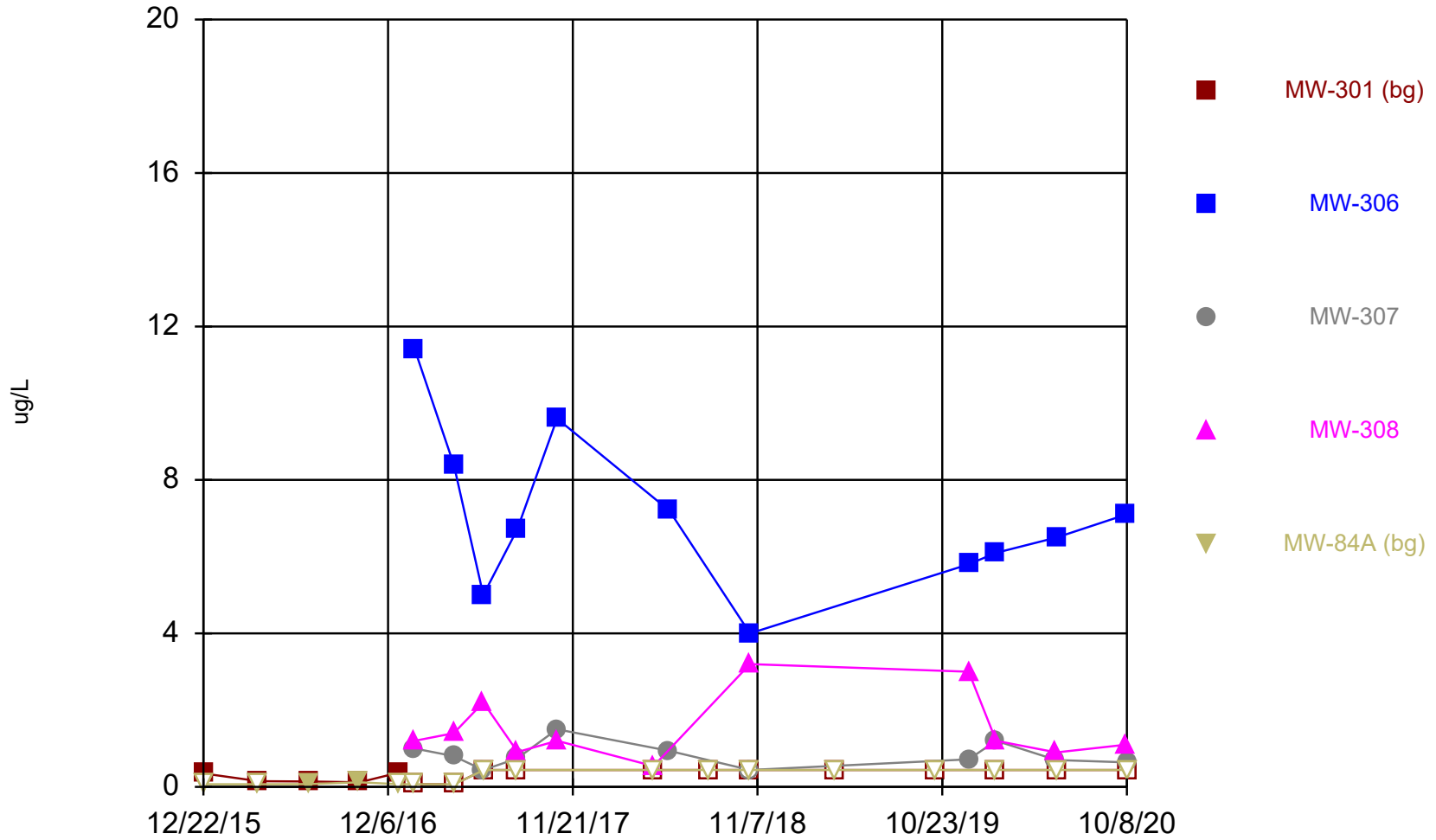


# Time Series

Constituent: Mercury (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	<0.1 (U)				<0.1 (U)
4/5/2016	<0.1 (U)				<0.1 (U)
7/8/2016	<0.13 (U)				<0.13 (U)
10/13/2016	<0.13 (U)				<0.13 (U)
12/29/2016	<0.13 (U)				<0.13 (U)
1/25/2017	<0.13 (U)				<0.13 (U)
1/26/2017		<0.13 (U)	<0.13 (U)	<0.13 (U)	
4/10/2017		<0.13 (U)	<0.13 (U)	<0.13 (U)	
4/11/2017	<0.13 (U)				<0.13 (U)
6/5/2017		<0.13 (U)	<0.13 (U)	<0.13 (U)	
6/6/2017	<0.13 (U)				<0.13 (U)
8/8/2017	<0.13 (U)	<0.13 (U)	<0.13 (U)		<0.13 (U)
8/9/2017				<0.13 (U)	
10/23/2017		<0.13 (U)	<0.13 (U)	<0.13 (U)	
4/24/2018				<0.13 (U)	
4/25/2018	<0.13 (U)				<0.13 (U)
5/24/2018		<0.13 (U)	<0.13 (U)		
10/24/2018	<0.084 (U)	<0.084 (U)	<0.084 (U)	<0.084 (U)	<0.084 (U)
4/2/2019	<0.084 (U)				
4/3/2019					<0.084 (U)
10/9/2019	<0.084 (U)				<0.084 (U)
12/13/2019		<0.084 (U)	<0.084 (U)	<0.084 (U)	
5/27/2020			<0.084 (U)	<0.084 (U)	
5/28/2020		<0.084 (U)			
5/29/2020	<0.084 (U)				<0.084 (U)
10/8/2020	<0.066 (U)				<0.066 (U)

# Molybdenum



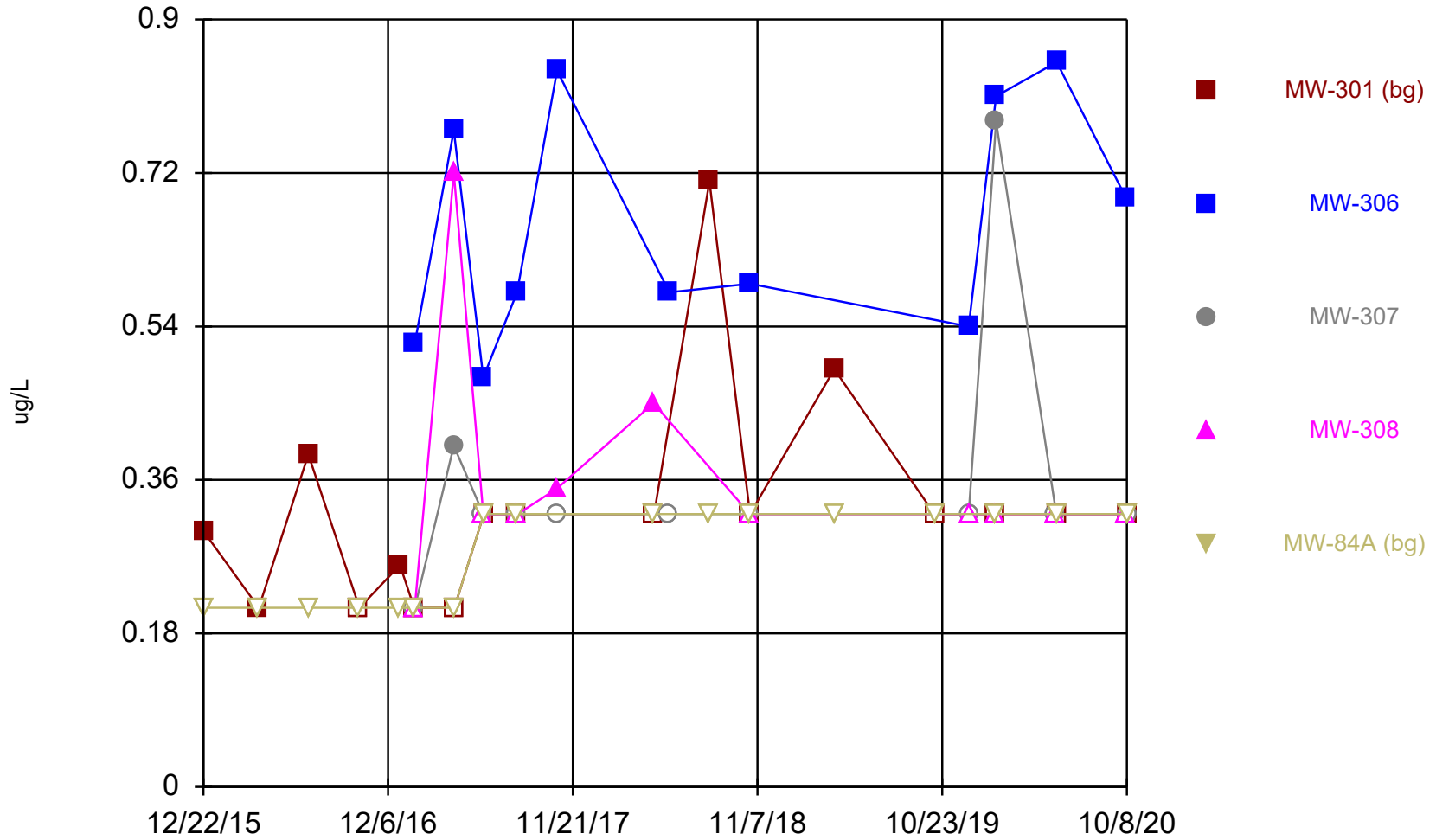


# Time Series

Constituent: Molybdenum (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	0.35 (J)				<0.07 (U)
4/5/2016	0.15 (J)				<0.07 (U)
7/8/2016	0.14 (J)				0.073 (J)
10/13/2016	0.12 (J)				0.12 (J)
12/29/2016	0.38 (J)				<0.07 (U)
1/25/2017	<0.07 (U)				<0.07 (U)
1/26/2017		11.4	1	1.2	
4/10/2017		8.4	0.8 (J)	1.4	
4/11/2017	<0.07 (U)				<0.07 (U)
6/5/2017		5	0.44 (J)	2.2	
6/6/2017	<0.44 (U)				<0.44 (U)
8/8/2017	<0.44 (U)	6.7	0.74 (J)		<0.44 (U)
8/9/2017				0.91 (J)	
10/23/2017		9.6	1.5 (J)	1.2 (J)	
4/24/2018				0.54 (J)	
4/25/2018	<0.44 (U)				<0.44 (U)
5/24/2018		7.2	0.94 (J)		
8/8/2018	<0.44 (U)				<0.44 (U)
10/24/2018	<0.44 (U)	4	<0.44 (U)	3.2	<0.44 (U)
4/2/2019	<0.44 (U)				
4/3/2019					<0.44 (U)
10/9/2019	<0.44 (U)				<0.44 (U)
12/13/2019		5.8	0.72 (J)	3	
2/3/2020	<0.44 (U)	6.1	1.2 (J)	1.2 (J)	<0.44 (U)
5/27/2020			0.7 (J)	0.9 (J)	
5/28/2020		6.5			
5/29/2020	<0.44 (U)				<0.44 (U)
10/7/2020		7.1		1.1 (J)	
10/8/2020	<0.44 (U)		0.64 (J)		<0.44 (U)

### Selenium

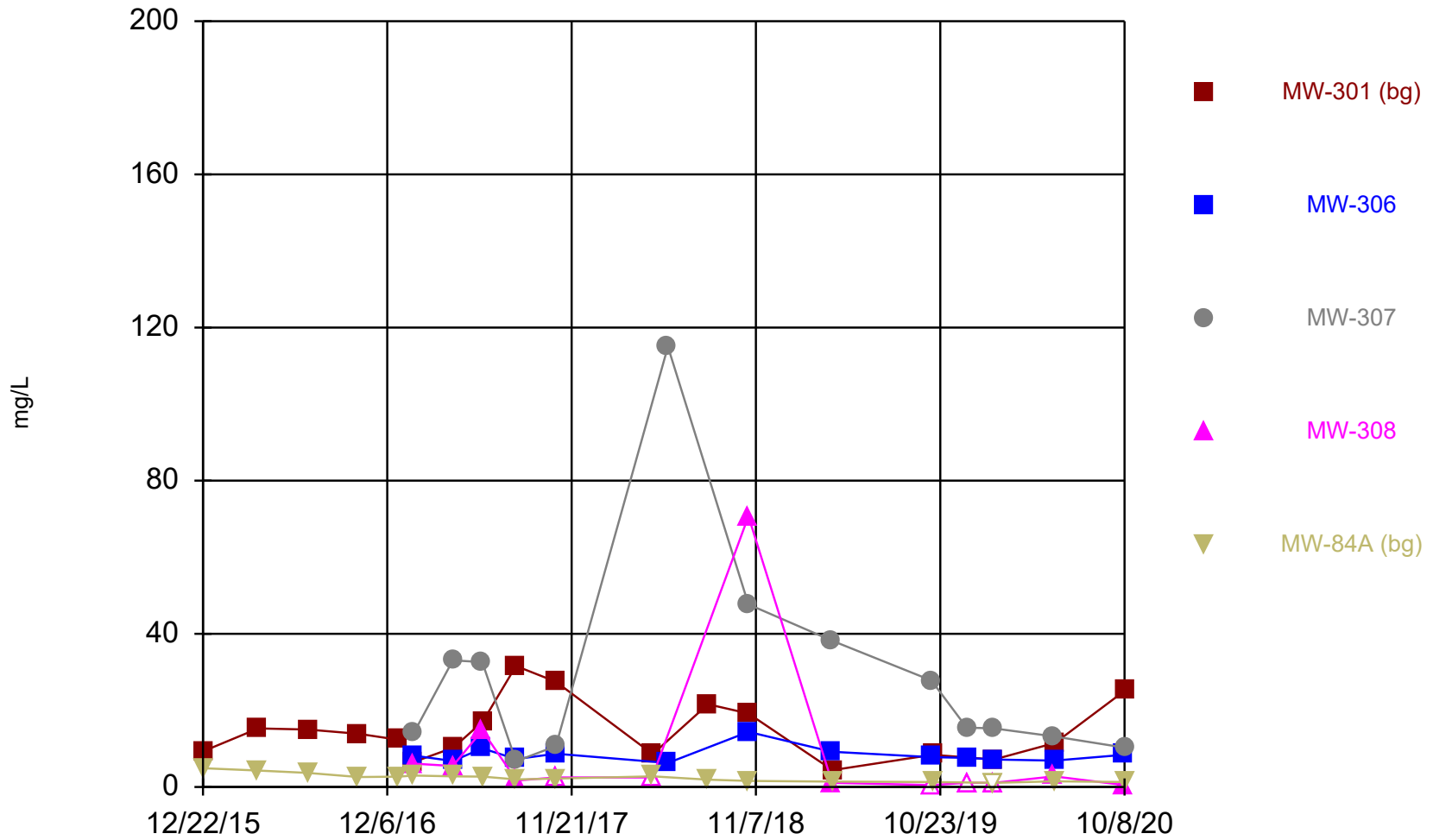


# Time Series

Constituent: Selenium (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	0.3 (J)				<0.21 (U)
4/5/2016	0.21 (J)				<0.21 (U)
7/8/2016	0.39 (J)				<0.21 (U)
10/13/2016	<0.21 (U)				<0.21 (U)
12/29/2016	0.26 (J)				<0.21 (U)
1/25/2017	<0.21 (U)				<0.21 (U)
1/26/2017		0.52 (J)	<0.21 (U)	<0.21 (U)	
4/10/2017		0.77 (J)	0.4 (J)	0.72 (J)	
4/11/2017	<0.21 (U)				<0.21 (U)
6/5/2017		0.48 (J)	<0.32 (U)	<0.32 (U)	
6/6/2017	<0.32 (U)				<0.32 (U)
8/8/2017	<0.32 (U)	0.58 (J)	<0.32 (U)		<0.32 (U)
8/9/2017				<0.32 (U)	
10/23/2017		0.84 (J)	<0.32 (U)	0.35 (J)	
4/24/2018				0.45 (J)	
4/25/2018	<0.32 (U)				<0.32 (U)
5/24/2018		0.58 (J)	<0.32 (U)		
8/8/2018	0.71 (J)				<0.32 (U)
10/24/2018	<0.32 (U)	0.59 (J)	<0.32 (U)	<0.32 (U)	<0.32 (U)
4/2/2019	0.49 (J)				
4/3/2019					<0.32 (U)
10/9/2019	<0.32 (U)				<0.32 (U)
12/13/2019		0.54 (J)	<0.32 (U)	<0.32 (U)	
2/3/2020	<0.32 (U)	0.81 (J)	0.78 (J)	<0.32 (U)	<0.32 (U)
5/27/2020			<0.32 (U)	<0.32 (U)	
5/28/2020		0.85 (J)			
5/29/2020	<0.32 (U)				<0.32 (U)
10/7/2020		0.69 (J)		<0.32 (U)	
10/8/2020	<0.32 (U)		<0.32 (U)		<0.32 (U)

### Sulfate



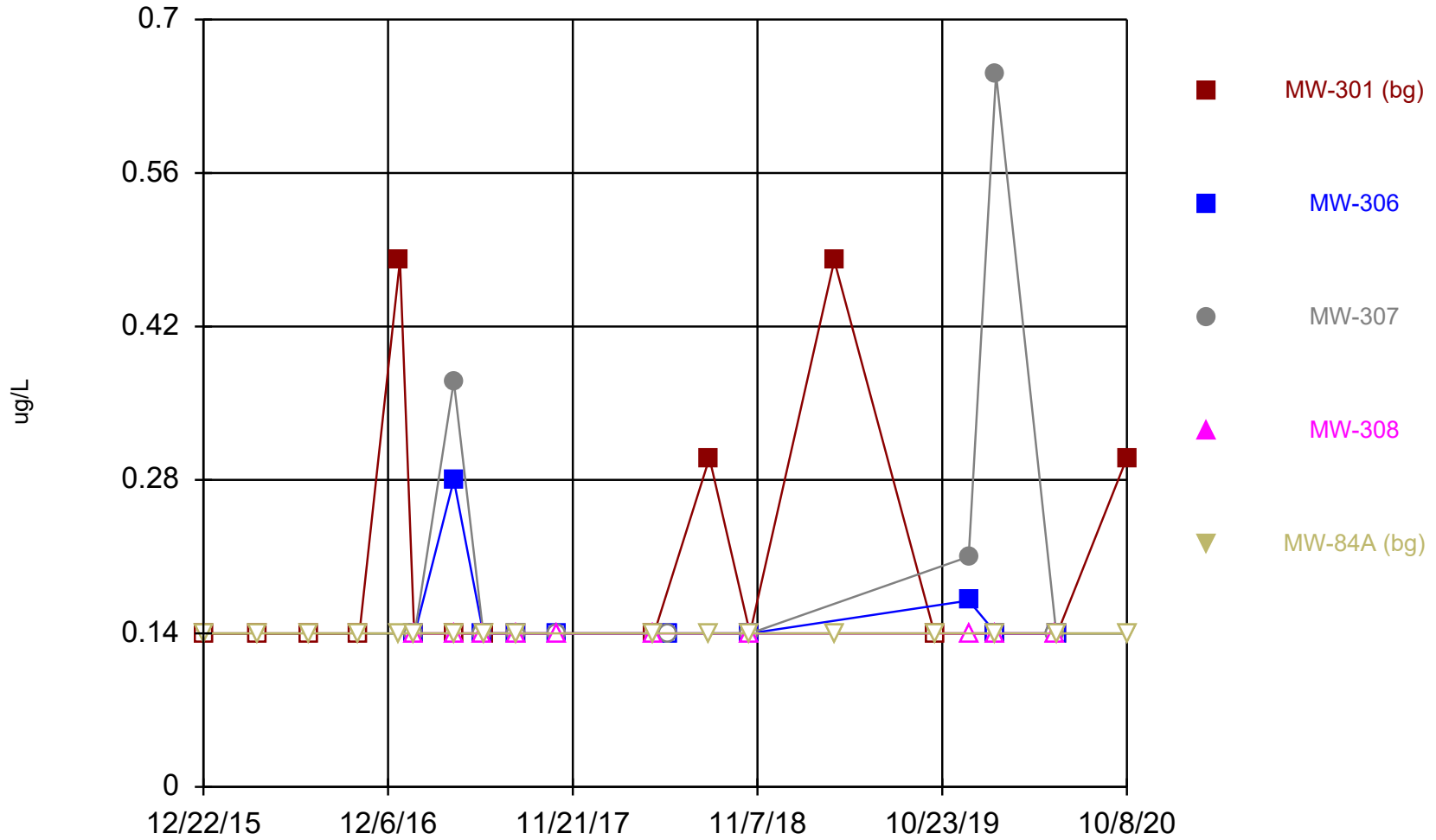
Time Series Analysis Run 12/23/2020 3:37 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

# Time Series

Constituent: Sulfate (mg/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	9.3				4.9
4/5/2016	15.3				4.3
7/8/2016	15				3.7 (J)
10/13/2016	13.9				2.6 (J)
12/29/2016	12.3 (J)				2.7 (J)
1/25/2017	6.5				3
1/26/2017		8.2	14.2 (J)	6.1 (J)	
4/10/2017		6.8	33.1	5.5 (J)	
4/11/2017	10.3				2.8 (J)
6/5/2017		10.1	32.6	14.8 (J)	
6/6/2017	17.1				2.7 (J)
8/8/2017	31.6	7.3	6.7		2 (J)
8/9/2017				1.7 (J)	
10/23/2017	27.5	8.7	10.7 (J)	<5 (U)	
10/24/2017					2.2 (J)
4/24/2018				<5 (U)	
4/25/2018	8.6				2.8 (J)
5/24/2018		6.3	115		
8/8/2018	21.6				1.9 (J)
10/24/2018	19.2	14.4	47.7	70.7	1.6 (J)
4/1/2019		9.2	38.2	1.1 (J)	
4/2/2019	4.4				
4/3/2019					1.4 (J)
10/7/2019			27.8	<1 (U)	
10/8/2019		7.8			
10/9/2019	8.4				1.3 (J)
12/13/2019		7.6	15.5	<2.2 (U)	
2/3/2020	7.2	7.2	15.3	<2.2 (U)	<2.2 (U)
5/27/2020			13.2	2.8	
5/28/2020		6.9			
5/29/2020	11.5				1.5 (J)
10/7/2020		8.4		0.52 (J)	
10/8/2020	25.1		10.3		1.3 (J)

# Thallium



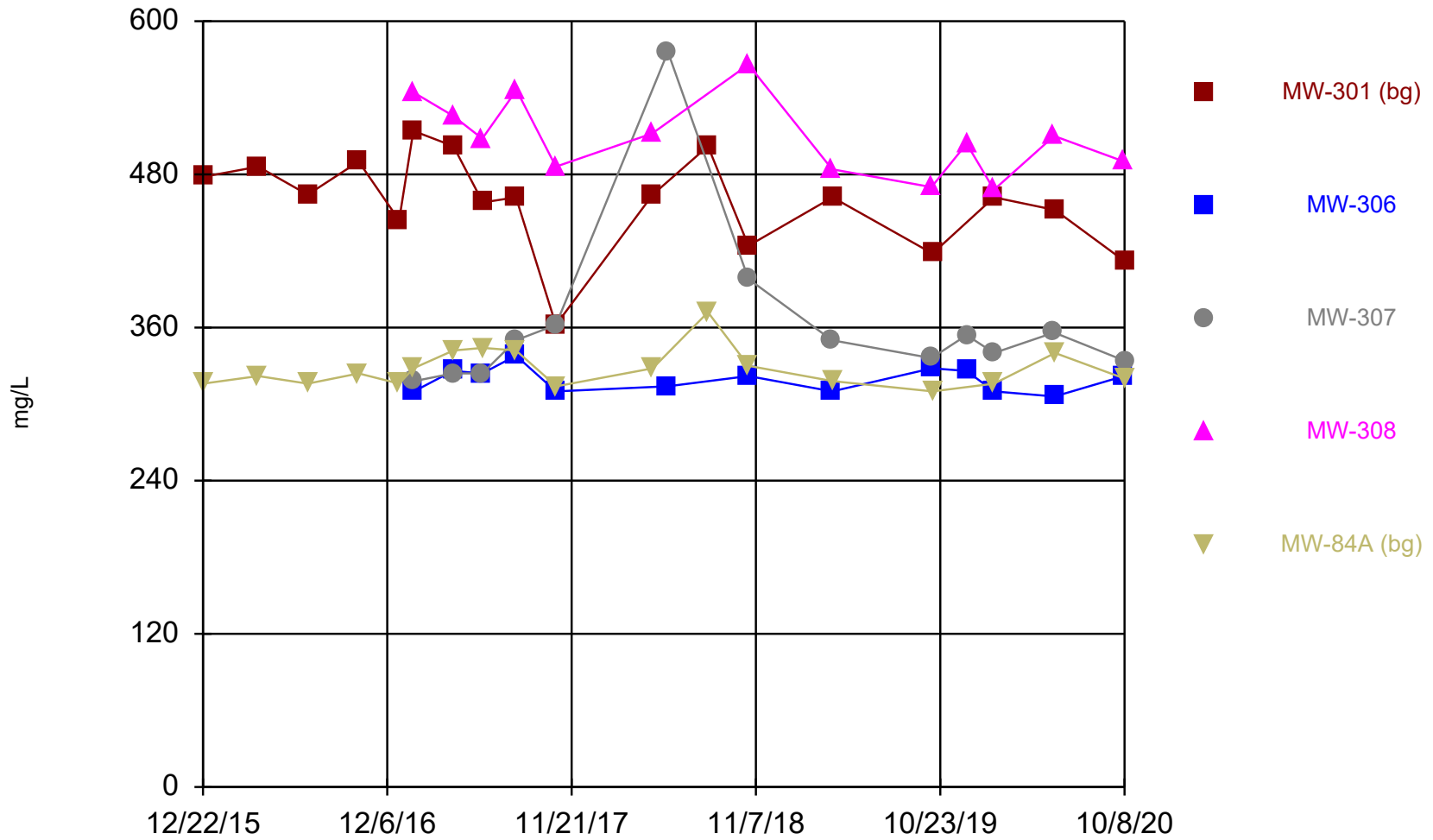
Time Series Analysis Run 12/23/2020 3:37 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

# Time Series

Constituent: Thallium (ug/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	<0.14 (U)				<0.14 (U)
4/5/2016	<0.14 (U)				<0.14 (U)
7/8/2016	<0.14 (U)				<0.14 (U)
10/13/2016	<0.14 (U)				<0.14 (U)
12/29/2016	0.48 (J)				<0.14 (U)
1/25/2017	<0.14 (U)				<0.14 (U)
1/26/2017		<0.14 (U)	<0.14 (U)	<0.14 (U)	
4/10/2017		0.28 (J)	0.37 (J)	<0.14 (U)	
4/11/2017	<0.14 (U)				<0.14 (U)
6/5/2017		<0.14 (U)	<0.14 (U)	<0.14 (U)	
6/6/2017	<0.14 (U)				<0.14 (U)
8/8/2017	<0.14 (U)	<0.14 (U)	<0.14 (U)		<0.14 (U)
8/9/2017				<0.14 (U)	
10/23/2017		<0.14 (U)	<0.14 (U)	<0.14 (U)	
4/24/2018				<0.14 (U)	
4/25/2018	<0.14 (U)				<0.14 (U)
5/24/2018		<0.14 (U)	<0.14 (U)		
8/8/2018	0.3 (J)				<0.14 (U)
10/24/2018	<0.14 (U)	<0.14 (U)	<0.14 (U)	<0.14 (U)	<0.14 (U)
4/2/2019	0.48 (J)				
4/3/2019					<0.14 (U)
10/9/2019	<0.14 (U)				<0.14 (U)
12/13/2019		0.17 (J)	0.21 (J)	<0.14 (U)	
2/3/2020	<0.14 (U)	<0.14 (U)	0.65 (J)	<0.14 (U)	<0.14 (U)
5/27/2020			<0.14 (U)	<0.14 (U)	
5/28/2020		<0.14 (U)			
5/29/2020	<0.14 (U)				<0.14 (U)
10/8/2020	0.3 (J)				<0.14 (U)

### Total Dissolved Solids



Time Series Analysis Run 12/23/2020 3:37 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

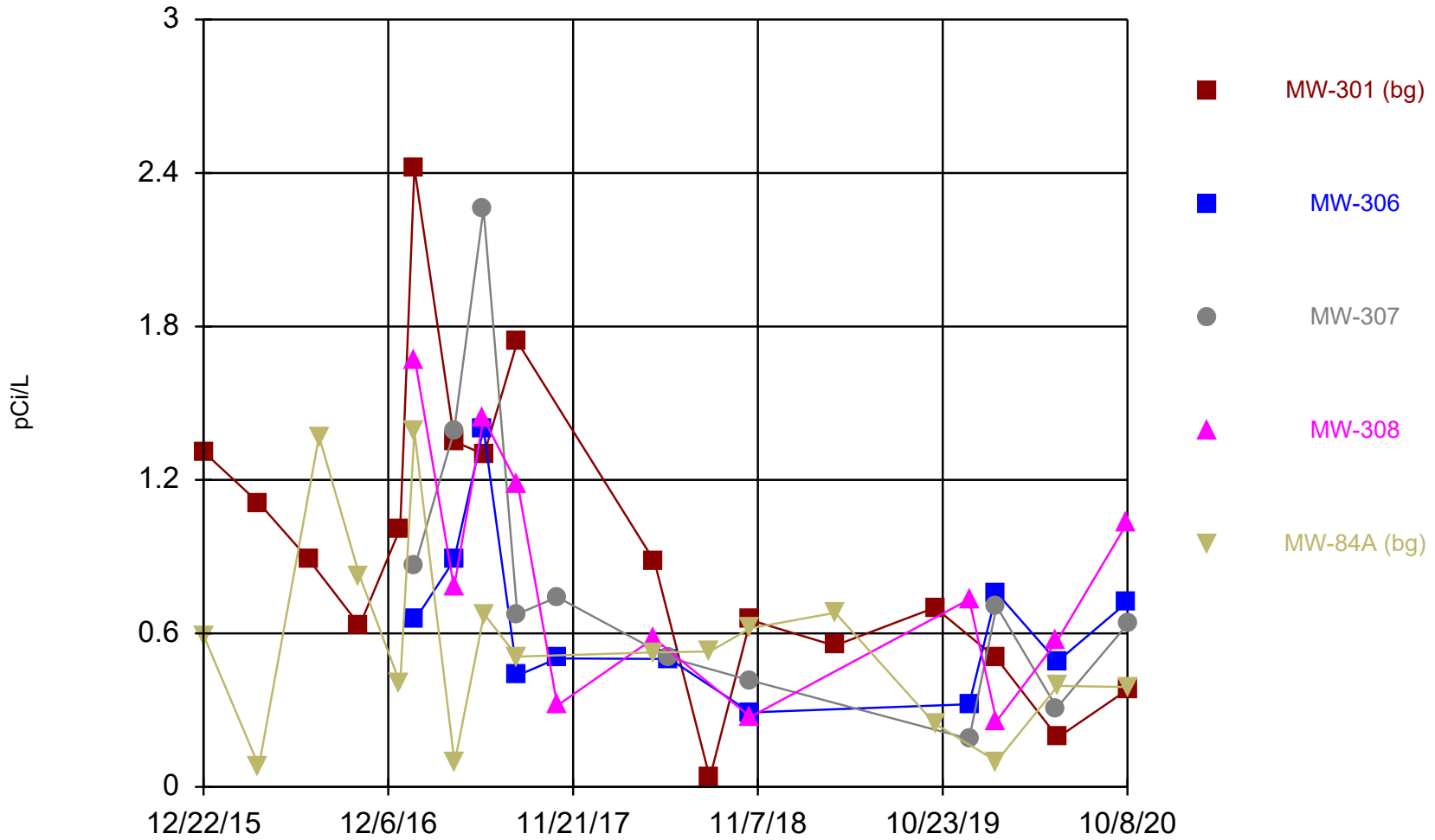


# Time Series

Constituent: Total Dissolved Solids (mg/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	478				316
4/5/2016	486				322
7/8/2016	464				316
10/13/2016	490				324
12/29/2016	444				316
1/25/2017	514				328
1/26/2017		310	318	544	
4/10/2017		326	324	526	
4/11/2017	502				342
6/5/2017		324	324	508	
6/6/2017	458				344
8/8/2017	462	338	350		342
8/9/2017				546	
10/23/2017	362	310	362	486	
10/24/2017					314
4/24/2018				512	
4/25/2018	464				328
5/24/2018		314	576		
8/8/2018	502				372
10/24/2018	424	322	398	566	330
4/1/2019		310	350	484	
4/2/2019	462				
4/3/2019					318
10/7/2019			336	470	
10/8/2019		328			
10/9/2019	418				310
12/13/2019		326	354	504	
2/3/2020	462	310	340	468	316
5/27/2020			356	510	
5/28/2020		306			
5/29/2020	452				340
10/7/2020		322		490	
10/8/2020	412		334		320

### Total Radium



Time Series Analysis Run 12/23/2020 3:37 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

# Time Series

Constituent: Total Radium (pCi/L) Analysis Run 12/23/2020 3:38 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	1.31				0.593
4/5/2016	1.11				0.0809
7/8/2016	0.89				
7/28/2016					1.37
10/13/2016	0.631				0.825
12/29/2016	1.01				0.404
1/25/2017	2.42				1.39
1/26/2017		0.653	0.864	1.67	
4/10/2017		0.886	1.39	0.78	
4/11/2017	1.35				0.0929
6/5/2017		1.4	2.26	1.44	
6/6/2017	1.3				0.676
8/8/2017	1.74	0.435	0.676		0.509
8/9/2017				1.18	
10/23/2017		0.502	0.742	0.318	
4/24/2018				0.581	
4/25/2018	0.882				0.526
5/24/2018		0.5	0.505		
8/8/2018	0.0351				0.529
10/24/2018	0.652	0.291	0.416	0.274	0.62
4/2/2019	0.552				
4/3/2019					0.681
10/9/2019	0.701				0.247
12/13/2019		0.323	0.188	0.733	
2/3/2020	0.502	0.759	0.706	0.257	0.1
5/27/2020			0.309	0.569	
5/28/2020		0.49			
5/29/2020	0.193				0.395
10/7/2020		0.721		1.03	
10/8/2020	0.38		0.636		0.39

## Attachment 2

### Outliers Analysis Results – Background Wells

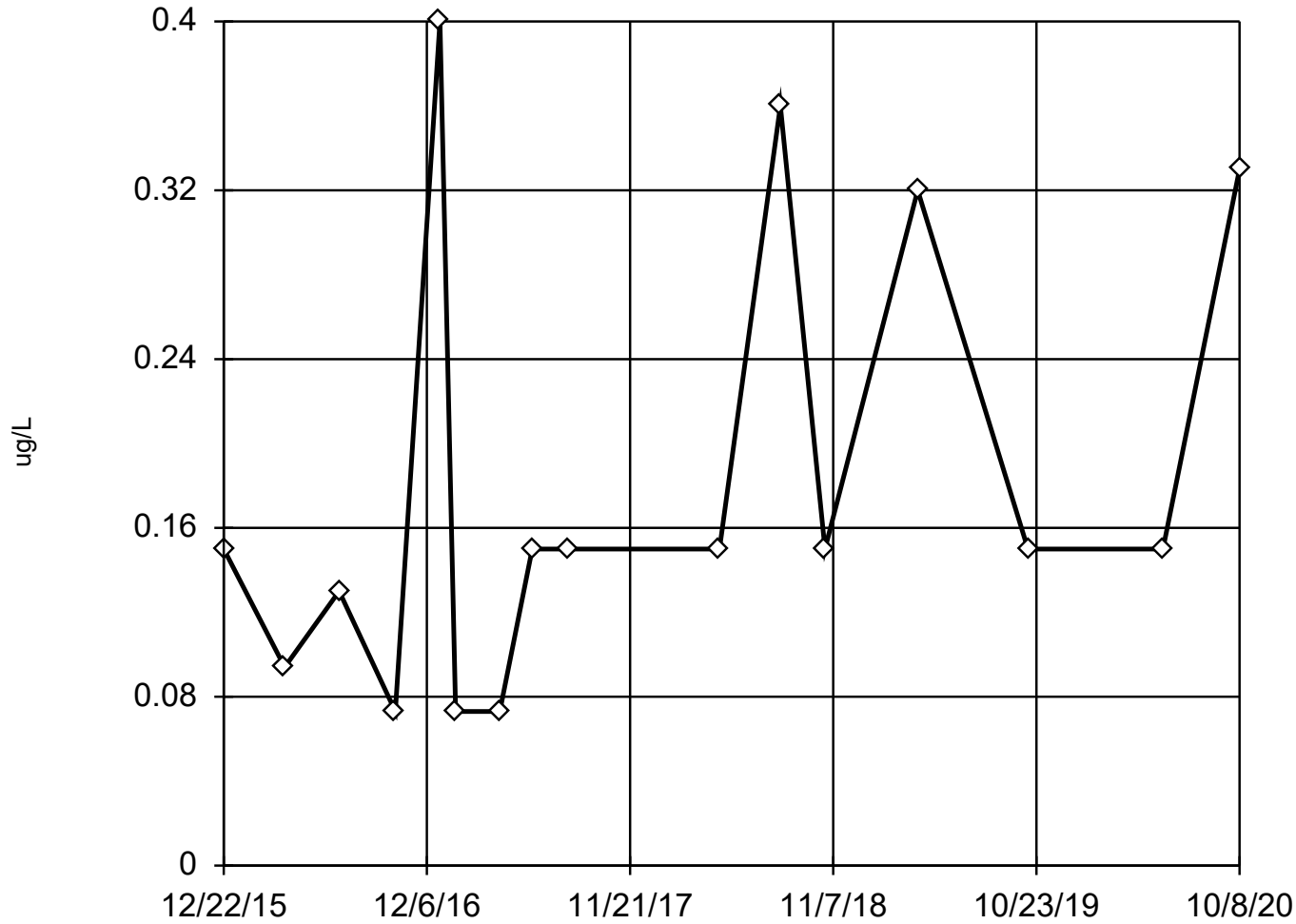
# Outlier Analysis

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020 Printed 12/28/2020, 5:12 PM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Date(s)</u>	<u>Method</u>	<u>Alpha</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Antimony (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	16	0.1814	0.1075	unknown	ShapiroWilk
Antimony (ug/L)	MW-84A (bg)	n/a	n/a	n/a	NP (nrm)	NaN	16	0.1187	0.03725	unknown	ShapiroWilk
Arsenic (ug/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	17	0.3106	0.1179	normal	ShapiroWilk
Arsenic (ug/L)	MW-84A (bg)	No	n/a	n/a	EPA 1989	0.05	17	0.2923	0.1053	normal	ShapiroWilk
<b>Barium (ug/L)</b>	<b>MW-301 (bg)</b>	<b>Yes</b>	<b>20.2</b>	<b>12/22/2015</b>	<b>Dixon`s</b>	<b>0.05</b>	<b>17</b>	<b>12.13</b>	<b>2.758</b>	<b>normal</b>	<b>ShapiroWilk</b>
<b>Barium (ug/L)</b>	<b>MW-84A (bg)</b>	<b>Yes</b>	<b>18.4</b>	<b>12/29/2016</b>	<b>Dixon`s</b>	<b>0.05</b>	<b>17</b>	<b>14.08</b>	<b>1.372</b>	<b>normal</b>	<b>ShapiroWilk</b>
Beryllium (ug/L)	MW-301 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	16	0.1931	0.06983	unknown	ShapiroWilk
Beryllium (ug/L)	MW-84A (bg)	n/a	n/a	n/a	NP (nrm)	NaN	16	0.1713	0.04544	unknown	ShapiroWilk
Boron (ug/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	18	27.89	4.353	normal	ShapiroWilk
Boron (ug/L)	MW-84A (bg)	No	n/a	n/a	NP (nrm)	NaN	18	14.21	4.042	unknown	ShapiroWilk
Cadmium (ug/L)	MW-301 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	15	0.1298	0.06792	unknown	ShapiroWilk
Cadmium (ug/L)	MW-84A (bg)	n/a	n/a	n/a	NP (nrm)	NaN	15	0.1077	0.03109	unknown	ShapiroWilk
Calcium (ug/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	18	112344	11156	normal	ShapiroWilk
Calcium (ug/L)	MW-84A (bg)	No	n/a	n/a	EPA 1989	0.05	18	74222	3083	normal	ShapiroWilk
Chloride (mg/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	18	2.877	1.325	normal	ShapiroWilk
Chloride (mg/L)	MW-84A (bg)	No	n/a	n/a	EPA 1989	0.05	18	4.578	0.5887	normal	ShapiroWilk
Chromium (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.9935	0.501	unknown	ShapiroWilk
Chromium (ug/L)	MW-84A (bg)	No	n/a	n/a	NP (nrm)	NaN	17	1.876	0.3113	unknown	ShapiroWilk
<b>Cobalt (ug/L)</b>	<b>MW-301 (bg)</b>	<b>Yes</b>	<b>1.4</b>	<b>12/22/2015</b>	<b>Dixon`s</b>	<b>0.05</b>	<b>17</b>	<b>0.2477</b>	<b>0.3141</b>	<b>normal</b>	<b>ShapiroWilk</b>
Cobalt (ug/L)	MW-84A (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.08165	0.03561	unknown	ShapiroWilk
Field pH (Std. Units)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	18	6.888	0.2159	normal	ShapiroWilk
Field pH (Std. Units)	MW-84A (bg)	No	n/a	n/a	EPA 1989	0.05	19	7.411	0.2402	normal	ShapiroWilk
Lead (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	15	0.2525	0.2165	unknown	ShapiroWilk
Lead (ug/L)	MW-84A (bg)	No	n/a	n/a	NP (nrm)	NaN	15	0.1753	0.1014	unknown	ShapiroWilk
<b>Lithium (ug/L)</b>	<b>MW-301 (bg)</b>	<b>Yes</b>	<b>1.3</b>	<b>12/22/2015</b>	<b>Dixon`s</b>	<b>0.05</b>	<b>17</b>	<b>0.6847</b>	<b>0.2037</b>	<b>normal</b>	<b>ShapiroWilk</b>
Lithium (ug/L)	MW-84A (bg)	No	n/a	n/a	EPA 1989	0.05	17	0.5159	0.08352	normal	ShapiroWilk
Molybdenum (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.3341	0.1524	unknown	ShapiroWilk
Molybdenum (ug/L)	MW-84A (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.2908	0.1842	unknown	ShapiroWilk
Selenium (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.3265	0.1219	unknown	ShapiroWilk
Selenium (ug/L)	MW-84A (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.2747	0.0558	unknown	ShapiroWilk
Sulfate (mg/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	18	14.71	7.682	normal	ShapiroWilk
Sulfate (mg/L)	MW-84A (bg)	No	n/a	n/a	EPA 1989	0.05	18	2.433	1.069	normal	ShapiroWilk
Thallium (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.1988	0.1182	unknown	ShapiroWilk
Thallium (ug/L)	MW-84A (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.14	0	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-301 (bg)	No	n/a	n/a	Dixon`s	0.05	18	458.7	37.3	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-84A (bg)	No	n/a	n/a	NP (nrm)	NaN	18	327.7	15.42	unknown	ShapiroWilk
Total Radium (pCi/L)	MW-301 (bg)	No	n/a	n/a	Dixon`s	0.05	17	0.9211	0.5899	normal	ShapiroWilk
Total Radium (pCi/L)	MW-84A (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.5546	0.3783	unknown	ShapiroWilk

### Tukey's Outlier Screening

MW-301 (bg)



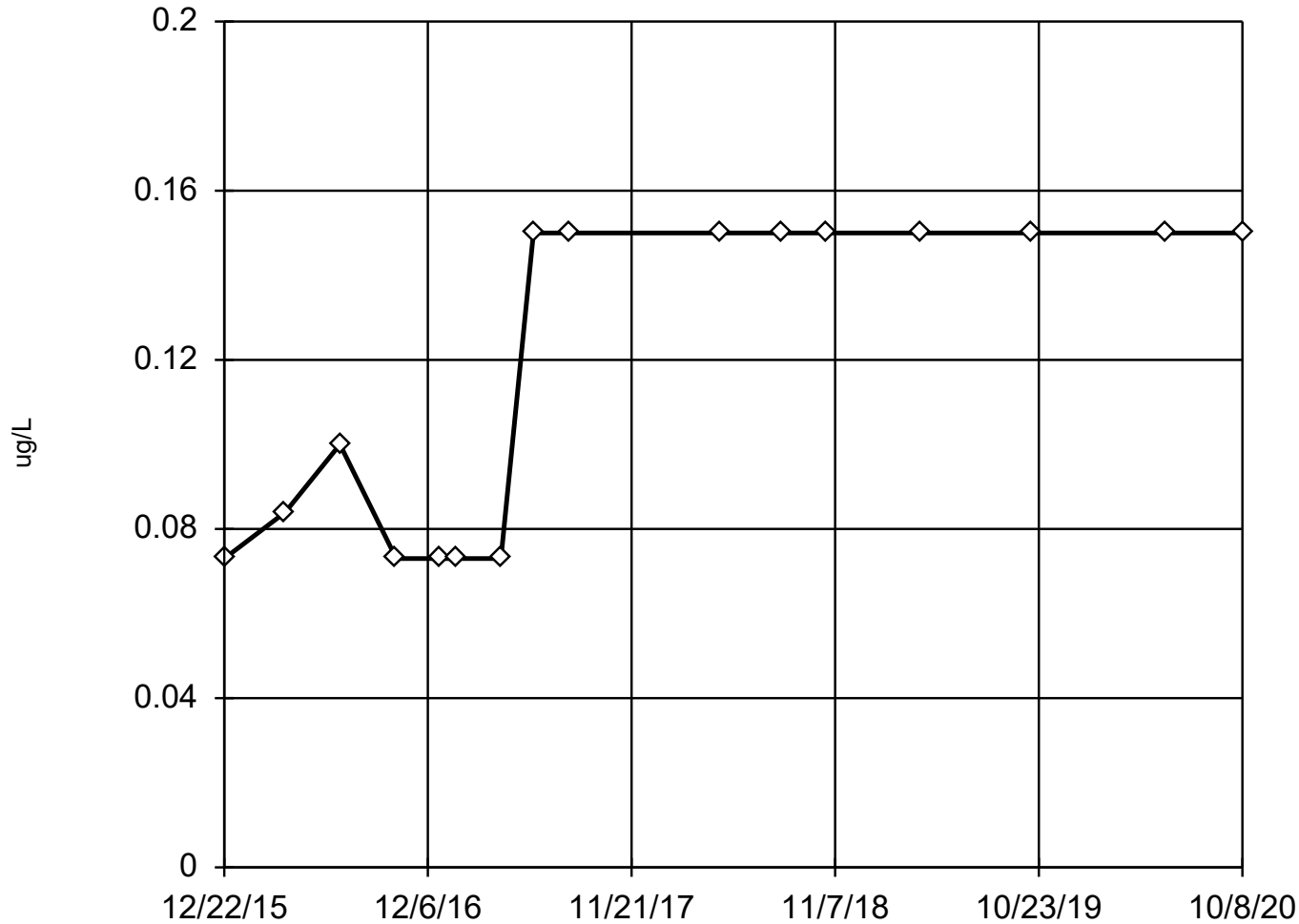
# Tukey's Outlier Screening

Constituent: Antimony (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	0.15 (J)
4/5/2016	0.094 (J)
7/8/2016	0.13 (J)
10/13/2016	<0.073 (U)
12/29/2016	0.4 (J)
1/25/2017	<0.073 (U)
4/11/2017	<0.073 (U)
6/6/2017	<0.15 (U)
8/8/2017	<0.15 (U)
4/25/2018	<0.15 (U)
8/8/2018	0.36 (J)
10/24/2018	<0.15 (U)
4/2/2019	0.32 (J)
10/9/2019	<0.15 (U)
5/29/2020	<0.15 (U)
10/8/2020	0.33 (J)

### Tukey's Outlier Screening

MW-84A (bg)



n = 16

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Antimony    Analysis Run 12/28/2020 5:09 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020



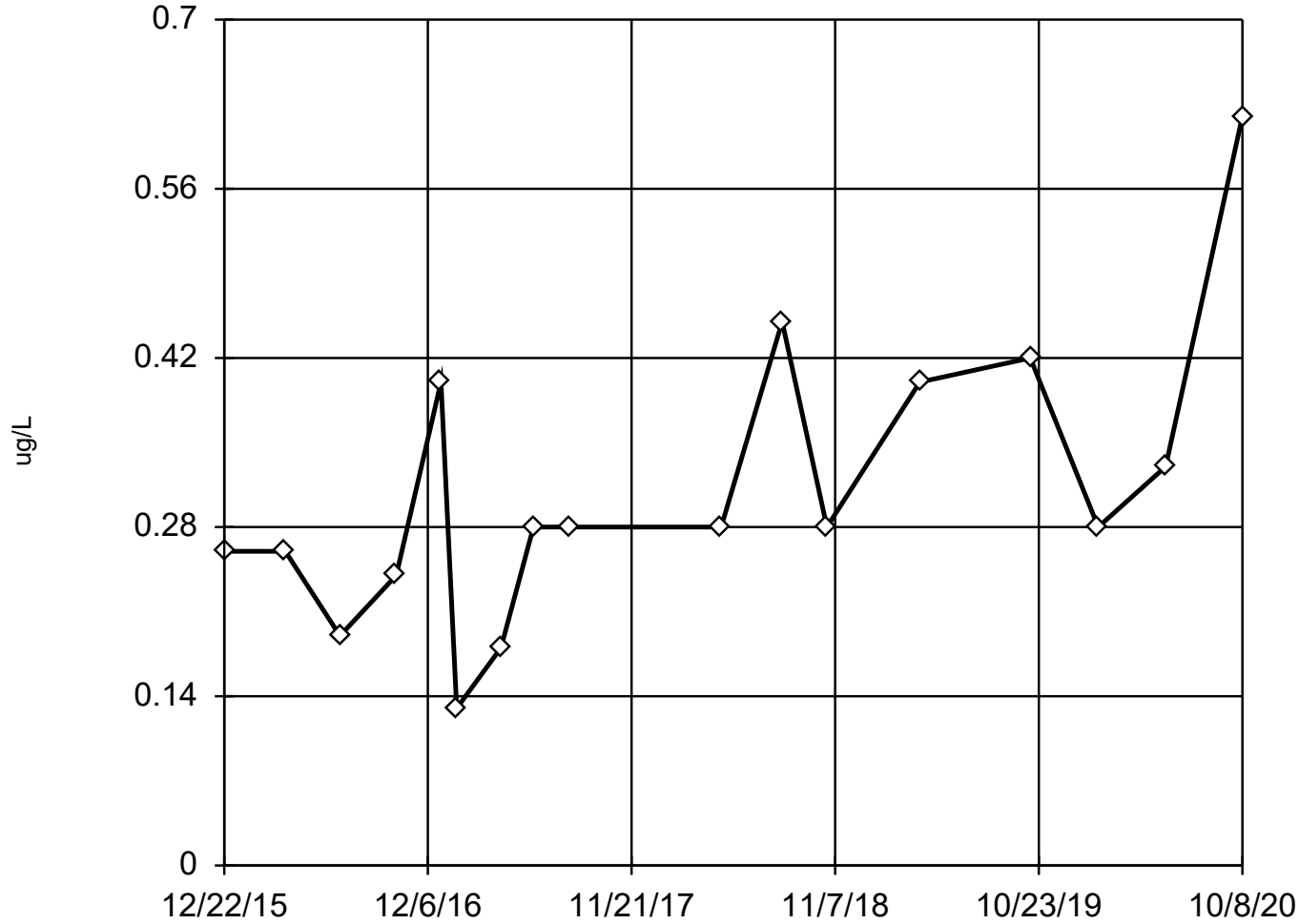
# Tukey's Outlier Screening

Constituent: Antimony (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	<0.073 (U)
4/5/2016	0.084 (J)
7/8/2016	0.1 (J)
10/13/2016	<0.073 (U)
12/29/2016	<0.073 (U)
1/25/2017	<0.073 (U)
4/11/2017	<0.073 (U)
6/6/2017	<0.15 (U)
8/8/2017	<0.15 (U)
4/25/2018	<0.15 (U)
8/8/2018	<0.15 (U)
10/24/2018	<0.15 (U)
4/3/2019	<0.15 (U)
10/9/2019	<0.15 (U)
5/29/2020	<0.15 (U)
10/8/2020	<0.15 (U)

### EPA Screening (suspected outliers for Dixon's Test)

MW-301 (bg)



n = 17  
Dixon's will not be run.  
No suspect values identified or unable to establish suspect values.  
Mean 0.3106, std. dev. 0.1179, critical Tn 2.475  
  
Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9147  
Critical = 0.91  
The distribution was found to be normally distributed.

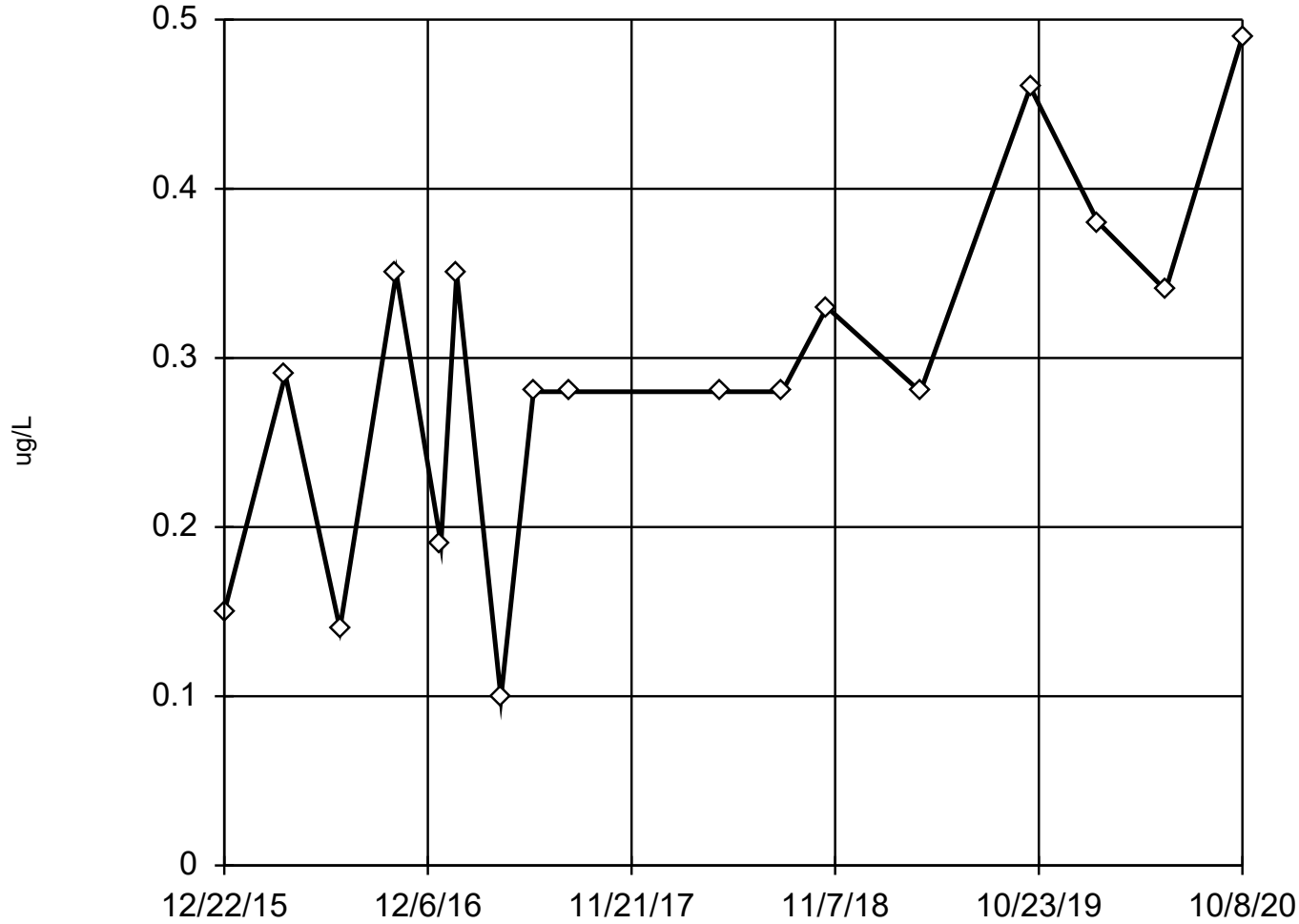
# EPA 1989 Outlier Screening

Constituent: Arsenic (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	0.26 (J)
4/5/2016	0.26 (J)
7/8/2016	0.19 (J)
10/13/2016	0.24 (J)
12/29/2016	0.4 (J)
1/25/2017	0.13 (J)
4/11/2017	0.18 (J)
6/6/2017	<0.28 (U)
8/8/2017	<0.28 (U)
4/25/2018	<0.28 (U)
8/8/2018	0.45 (J)
10/24/2018	<0.28 (U)
4/2/2019	0.4 (J)
10/9/2019	0.42 (J)
2/3/2020	<0.28 (U)
5/29/2020	0.33 (J)
10/8/2020	0.62 (J)

### EPA Screening (suspected outliers for Dixon's Test)

MW-84A (bg)



n = 17

Dixon's will not be run.  
No suspect values identified  
or unable to establish  
suspect values.  
Mean 0.2923, std. dev.  
0.1053, critical Tn 2.475

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9506  
Critical = 0.91  
The distribution was found  
to be normally distrib-  
uted.

Constituent: Arsenic    Analysis Run 12/28/2020 5:09 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

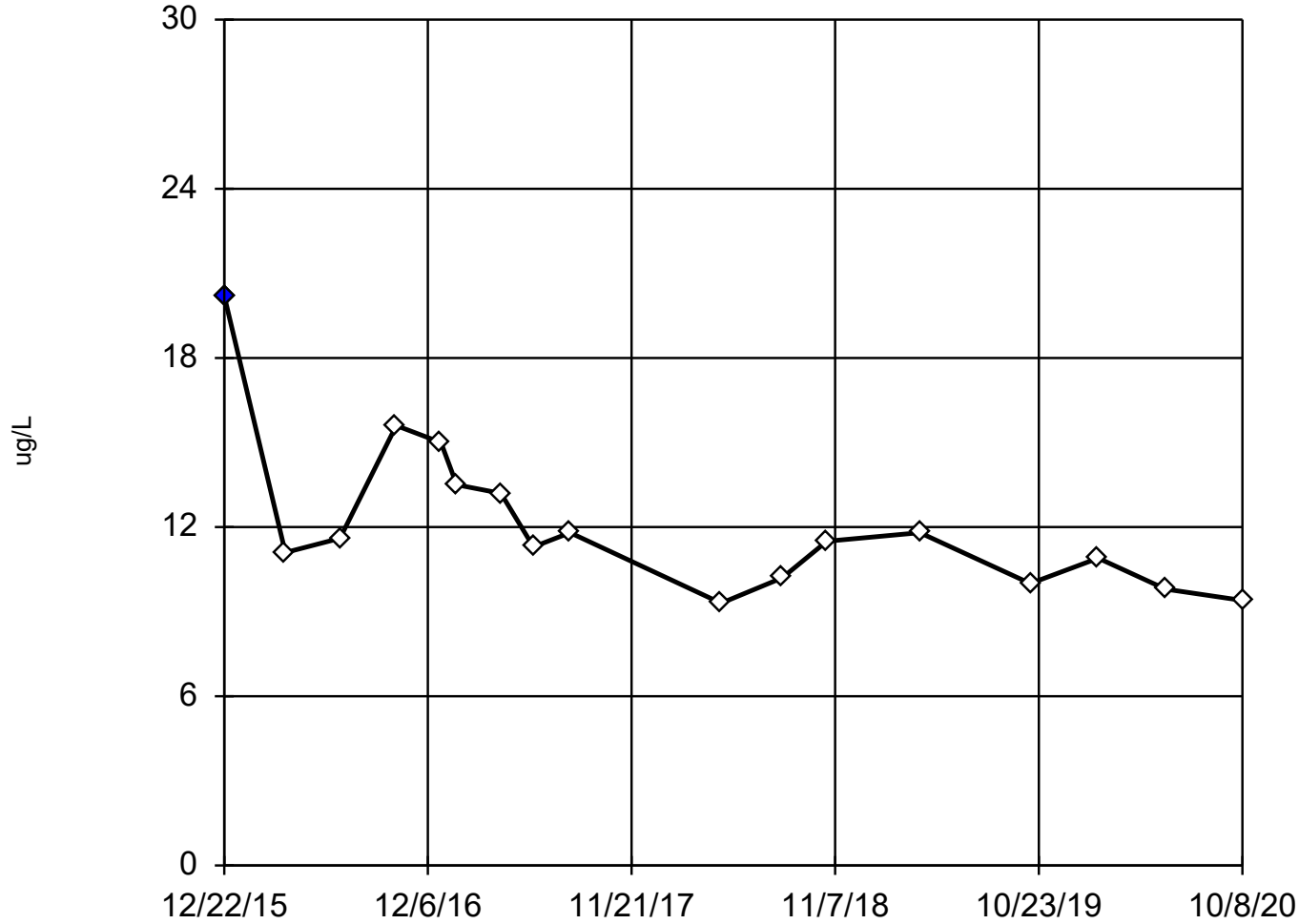
# EPA 1989 Outlier Screening

Constituent: Arsenic (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	0.15 (J)
4/5/2016	0.29 (J)
7/8/2016	0.14 (J)
10/13/2016	0.35 (J)
12/29/2016	0.19 (J)
1/25/2017	0.35 (J)
4/11/2017	<0.099 (U)
6/6/2017	<0.28 (U)
8/8/2017	0.28 (J)
4/25/2018	<0.28 (U)
8/8/2018	<0.28 (U)
10/24/2018	0.33 (J)
4/3/2019	<0.28 (U)
10/9/2019	0.46 (J)
2/3/2020	0.38 (J)
5/29/2020	0.34 (J)
10/8/2020	0.49 (J)

### Dixon's Outlier Test

MW-301 (bg)



n = 17

Statistical outlier is drawn as solid.  
Testing for 1 high outlier.  
Mean = 12.13.  
Std. Dev. = 2.758.  
20.2: c = 0.5  
tab1 = 0.49.  
Alpha = 0.05.

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9159  
Critical = 0.906  
The distribution, after removal of suspect value, was found to be normally distributed.

Constituent: Barium    Analysis Run 12/28/2020 5:09 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

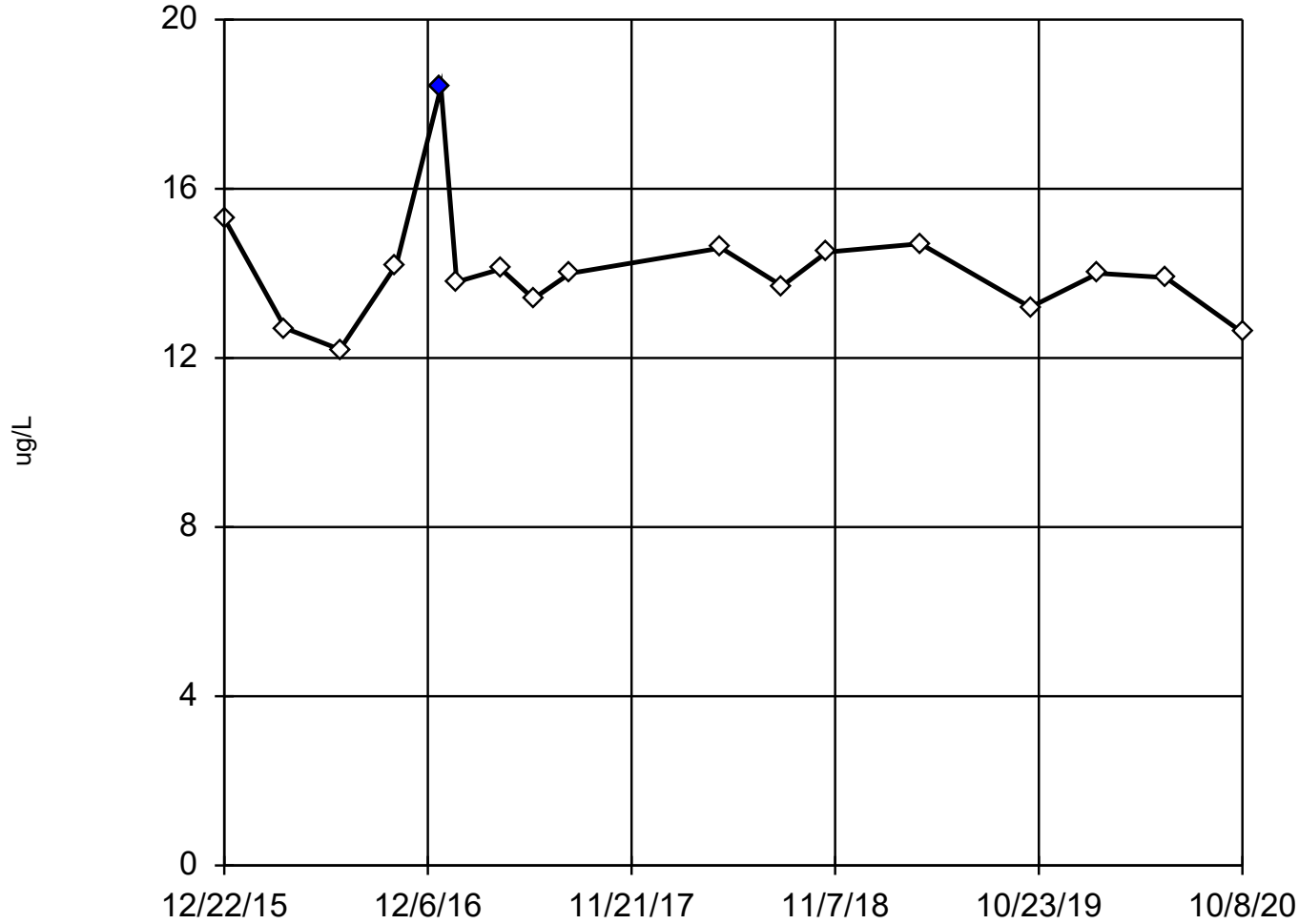
# Dixon's Outlier Test

Constituent: Barium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	20.2 (O)
4/5/2016	11.1
7/8/2016	11.6
10/13/2016	15.6
12/29/2016	15
1/25/2017	13.5
4/11/2017	13.2
6/6/2017	11.3
8/8/2017	11.8
4/25/2018	9.3
8/8/2018	10.2
10/24/2018	11.5
4/2/2019	11.8
10/9/2019	10
2/3/2020	10.9
5/29/2020	9.8
10/8/2020	9.4

### Dixon's Outlier Test

MW-84A (bg)



n = 17

Statistical outlier is drawn as solid.  
Testing for 1 high outlier.  
Mean = 14.08.  
Std. Dev. = 1.372.  
18.4: c = 0.6491  
tab1 = 0.49.  
Alpha = 0.05.

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9718  
Critical = 0.906  
The distribution, after removal of suspect value, was found to be normally distributed.

Constituent: Barium    Analysis Run 12/28/2020 5:09 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020



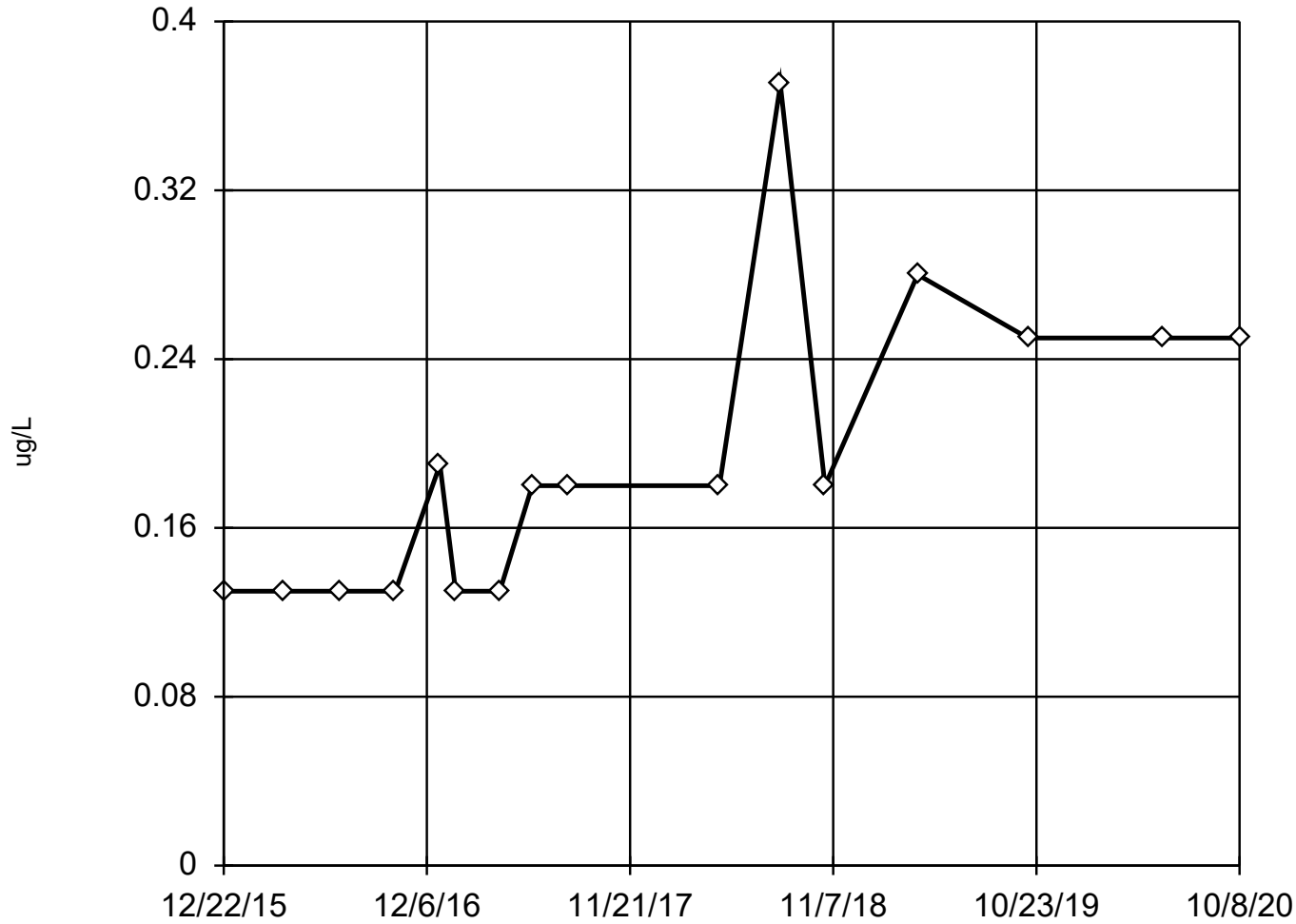
# Dixon's Outlier Test

Constituent: Barium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	15.3
4/5/2016	12.7
7/8/2016	12.2
10/13/2016	14.2
12/29/2016	18.4 (O)
1/25/2017	13.8
4/11/2017	14.1
6/6/2017	13.4
8/8/2017	14
4/25/2018	14.6
8/8/2018	13.7
10/24/2018	14.5
4/3/2019	14.7
10/9/2019	13.2
2/3/2020	14
5/29/2020	13.9
10/8/2020	12.6

### Tukey's Outlier Screening

MW-301 (bg)



n = 16

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

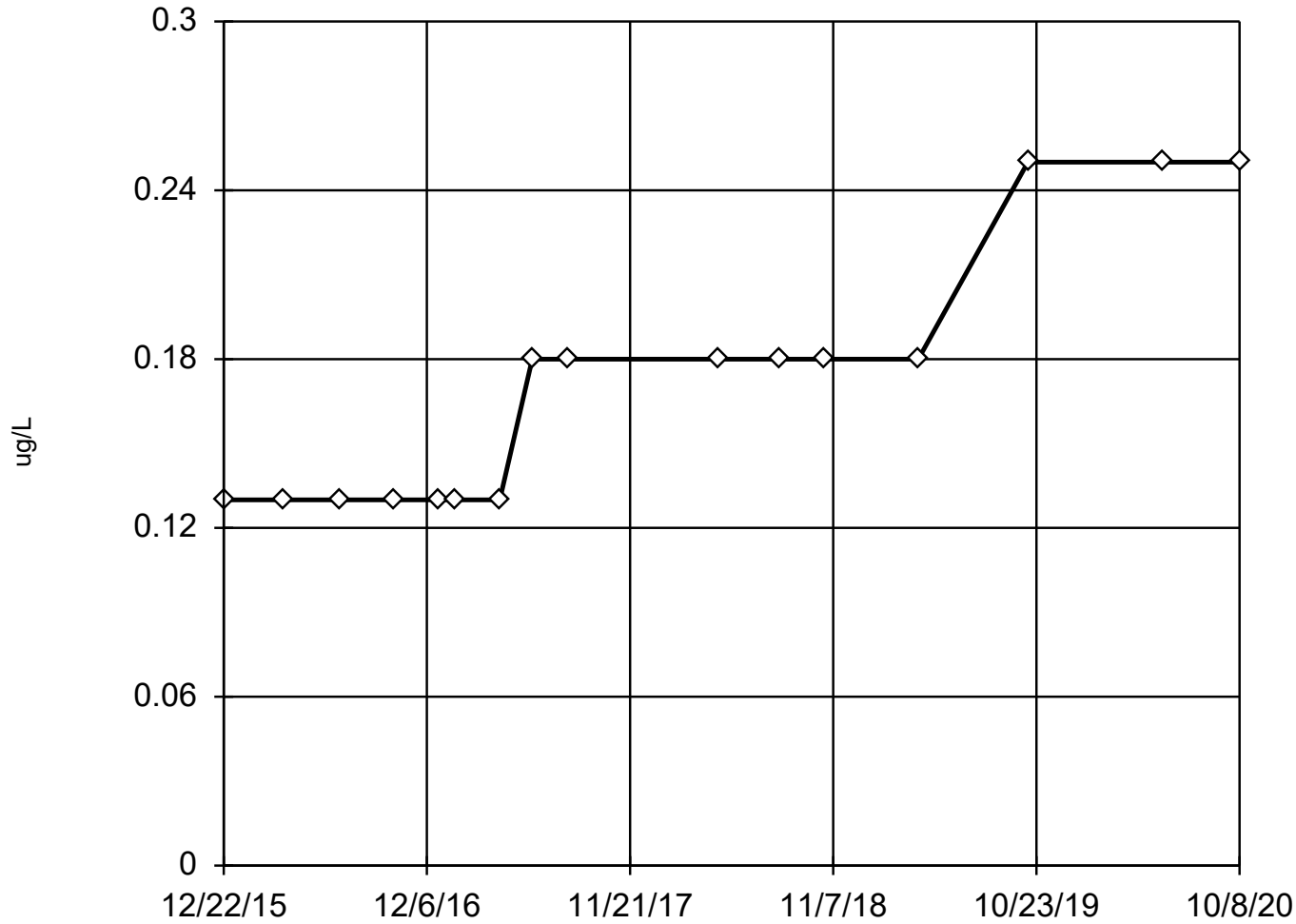
# Tukey's Outlier Screening

Constituent: Beryllium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	<0.13 (U)
4/5/2016	<0.13 (U)
7/8/2016	<0.13 (U)
10/13/2016	<0.13 (U)
12/29/2016	0.19 (J)
1/25/2017	<0.13 (U)
4/11/2017	<0.13 (U)
6/6/2017	<0.18 (U)
8/8/2017	<0.18 (U)
4/25/2018	<0.18 (U)
8/8/2018	0.37 (J)
10/24/2018	<0.18 (U)
4/2/2019	0.28 (J)
10/9/2019	<0.25 (U)
5/29/2020	<0.25 (U)
10/8/2020	<0.25 (U)

# Tukey's Outlier Screening

MW-84A (bg)



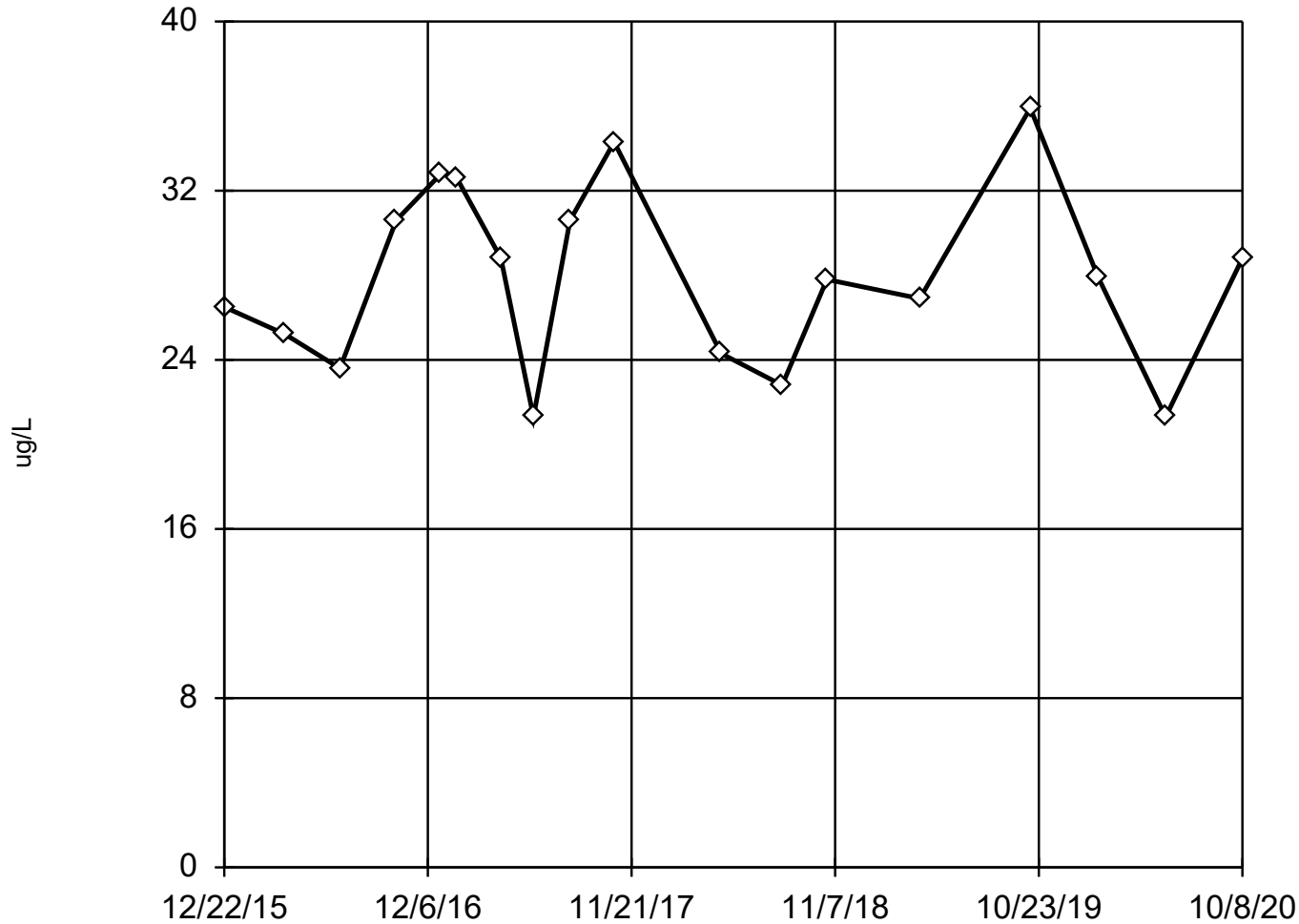
# Tukey's Outlier Screening

Constituent: Beryllium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	<0.13 (U)
4/5/2016	<0.13 (U)
7/8/2016	<0.13 (U)
10/13/2016	<0.13 (U)
12/29/2016	<0.13 (U)
1/25/2017	<0.13 (U)
4/11/2017	<0.13 (U)
6/6/2017	<0.18 (U)
8/8/2017	<0.18 (U)
4/25/2018	<0.18 (U)
8/8/2018	<0.18 (U)
10/24/2018	<0.18 (U)
4/3/2019	<0.18 (U)
10/9/2019	<0.25 (U)
5/29/2020	<0.25 (U)
10/8/2020	<0.25 (U)

### EPA Screening (suspected outliers for Dixon's Test)

MW-301 (bg)



n = 18  
Dixon's will not be run.  
No suspect values identified or unable to establish suspect values.  
Mean 27.89, std. dev. 4.353, critical Tn 2.504  
Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9698  
Critical = 0.914  
The distribution was found to be normally distributed.

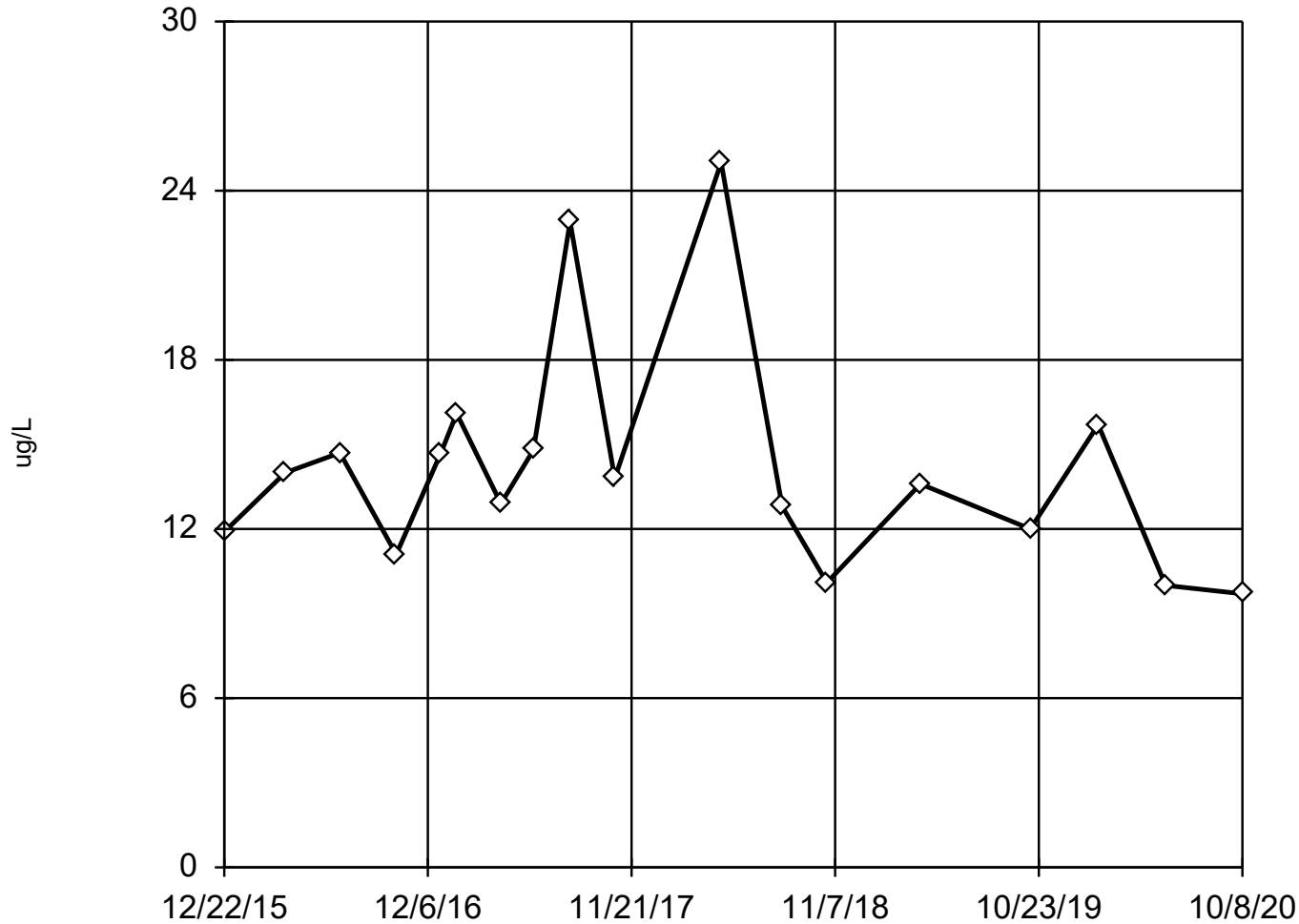
# EPA 1989 Outlier Screening

Constituent: Boron (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	26.5
4/5/2016	25.2
7/8/2016	23.6
10/13/2016	30.6
12/29/2016	32.8
1/25/2017	32.6
4/11/2017	28.8
6/6/2017	21.3
8/8/2017	30.6
10/23/2017	34.3
4/25/2018	24.3
8/8/2018	22.8
10/24/2018	27.8
4/2/2019	26.9
10/9/2019	35.9
2/3/2020	27.9
5/29/2020	21.3
10/8/2020	28.8

# Tukey's Outlier Screening

MW-84A (bg)



n = 18

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 35.56, low cutoff = 4.926, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 12/28/2020 5:09 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020



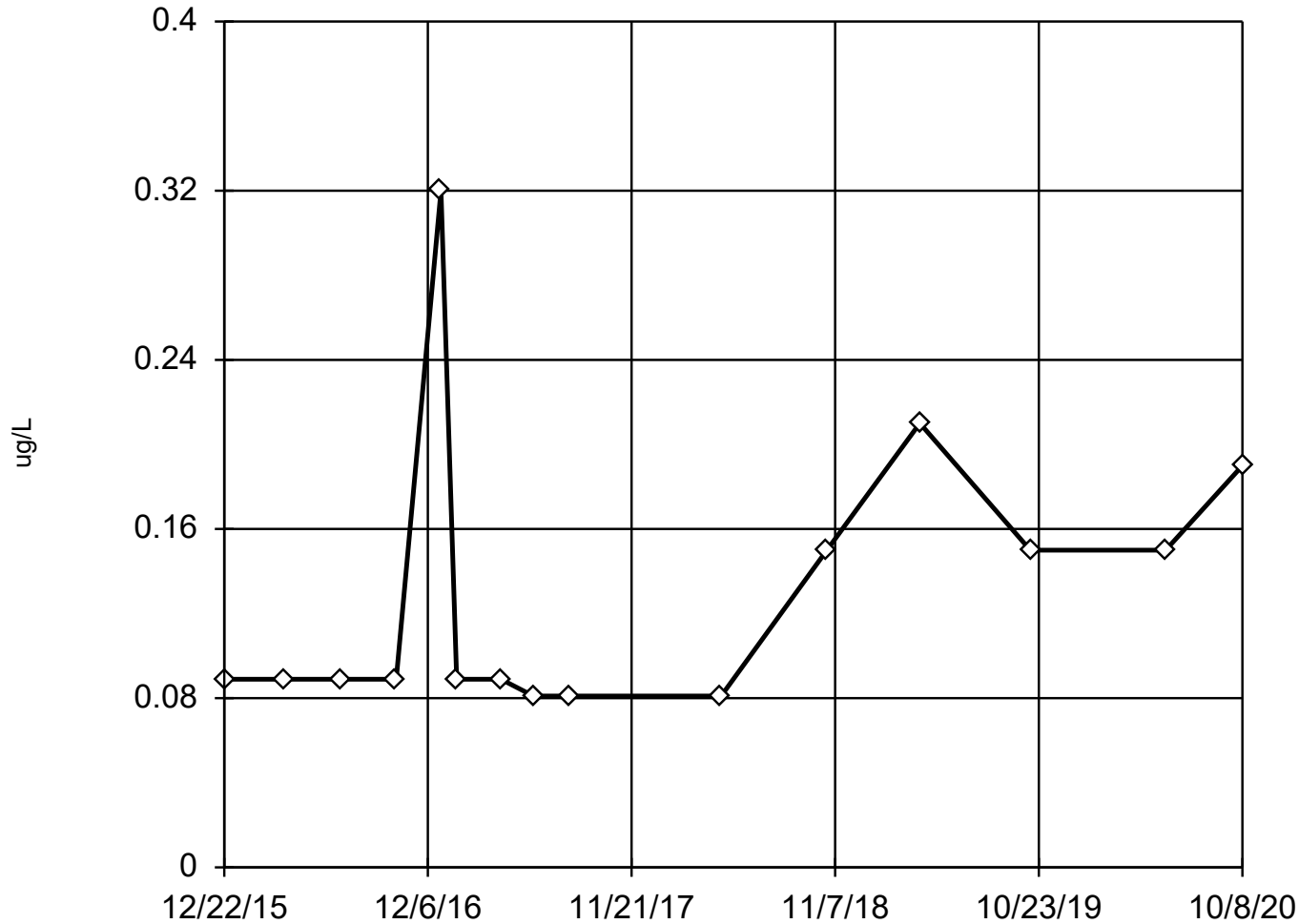
# Tukey's Outlier Screening

Constituent: Boron (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	11.9
4/5/2016	14
7/8/2016	14.7
10/13/2016	11.1
12/29/2016	14.7
1/25/2017	16.1
4/11/2017	12.9
6/6/2017	14.8
8/8/2017	22.9
10/24/2017	13.8
4/25/2018	25
8/8/2018	12.8
10/24/2018	10.1 (J)
4/3/2019	13.6
10/9/2019	12
2/3/2020	15.7
5/29/2020	10
10/8/2020	9.7 (J)

# Tukey's Outlier Screening

MW-301 (bg)



n = 15

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Cadmium    Analysis Run 12/28/2020 5:09 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

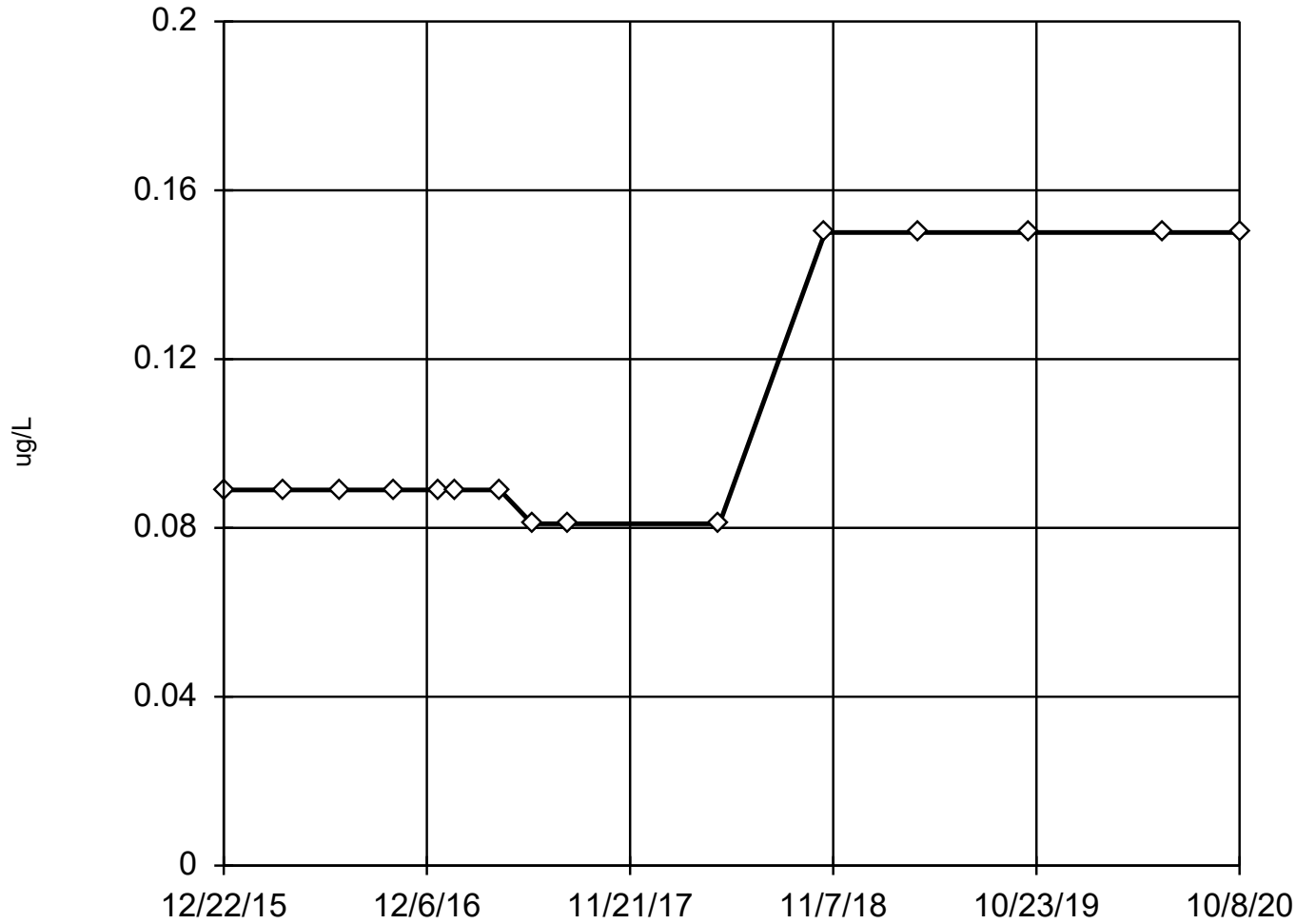
# Tukey's Outlier Screening

Constituent: Cadmium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	<0.089 (U)
4/5/2016	<0.089 (U)
7/8/2016	<0.089 (U)
10/13/2016	<0.089 (U)
12/29/2016	0.32 (J)
1/25/2017	<0.089 (U)
4/11/2017	<0.089 (U)
6/6/2017	<0.081 (U)
8/8/2017	<0.081 (U)
4/25/2018	<0.081 (U)
10/24/2018	<0.15 (U)
4/2/2019	0.21 (J)
10/9/2019	<0.15 (U)
5/29/2020	<0.15 (U)
10/8/2020	0.19 (J)

### Tukey's Outlier Screening

MW-84A (bg)



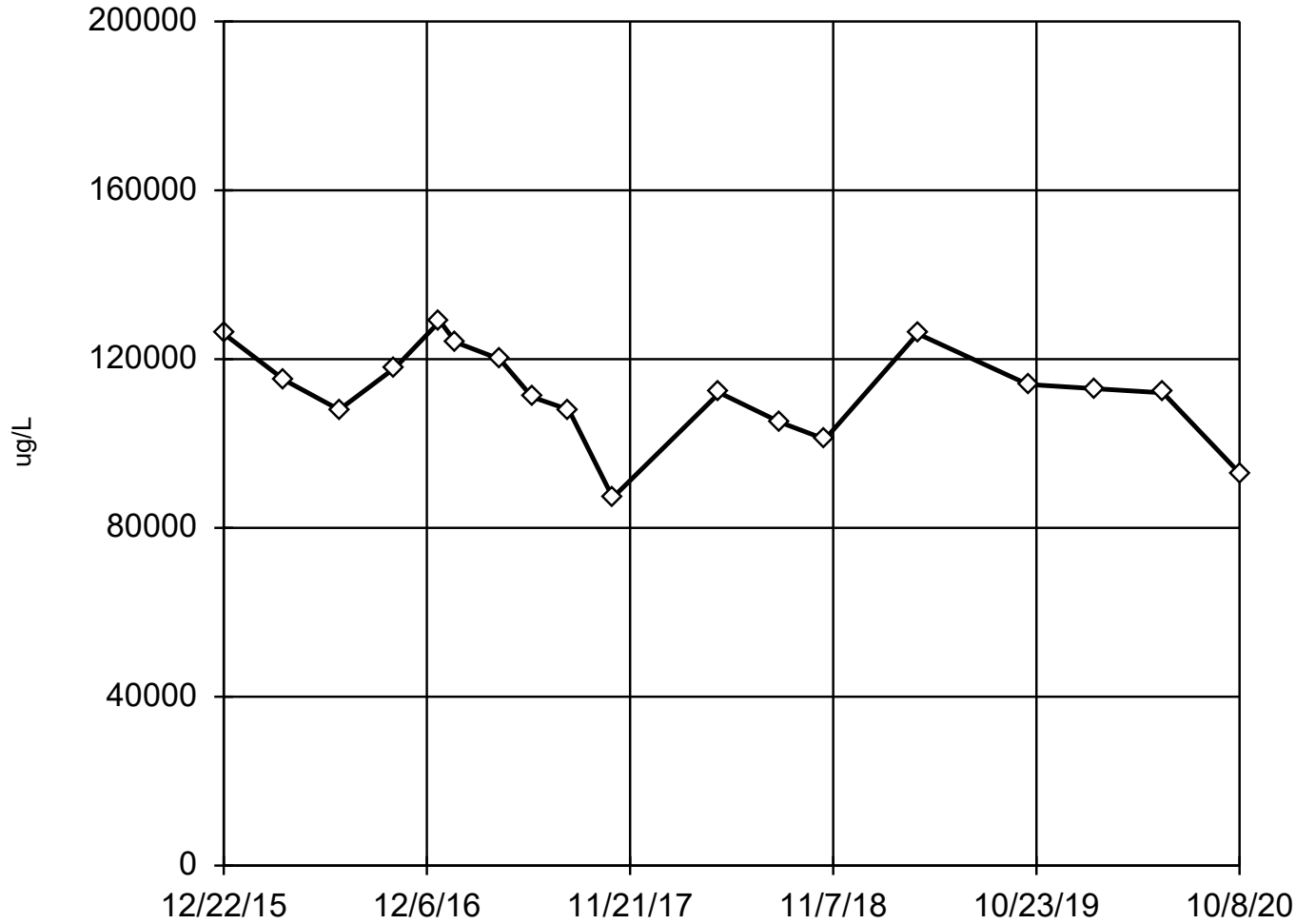
# Tukey's Outlier Screening

Constituent: Cadmium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	<0.089 (U)
4/5/2016	<0.089 (U)
7/8/2016	<0.089 (U)
10/13/2016	<0.089 (U)
12/29/2016	<0.089 (U)
1/25/2017	<0.089 (U)
4/11/2017	<0.089 (U)
6/6/2017	<0.081 (U)
8/8/2017	<0.081 (U)
4/25/2018	<0.081 (U)
10/24/2018	<0.15 (U)
4/3/2019	<0.15 (U)
10/9/2019	<0.15 (U)
5/29/2020	<0.15 (U)
10/8/2020	<0.15 (U)

### EPA Screening (suspected outliers for Dixon's Test)

MW-301 (bg)



n = 18

Dixon's will not be run.  
No suspect values identified  
or unable to establish  
suspect values.  
Mean 112344, std. dev.  
11156, critical Tn 2.504

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9547  
Critical = 0.914  
The distribution was found  
to be normally distrib-  
uted.

Constituent: Calcium    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

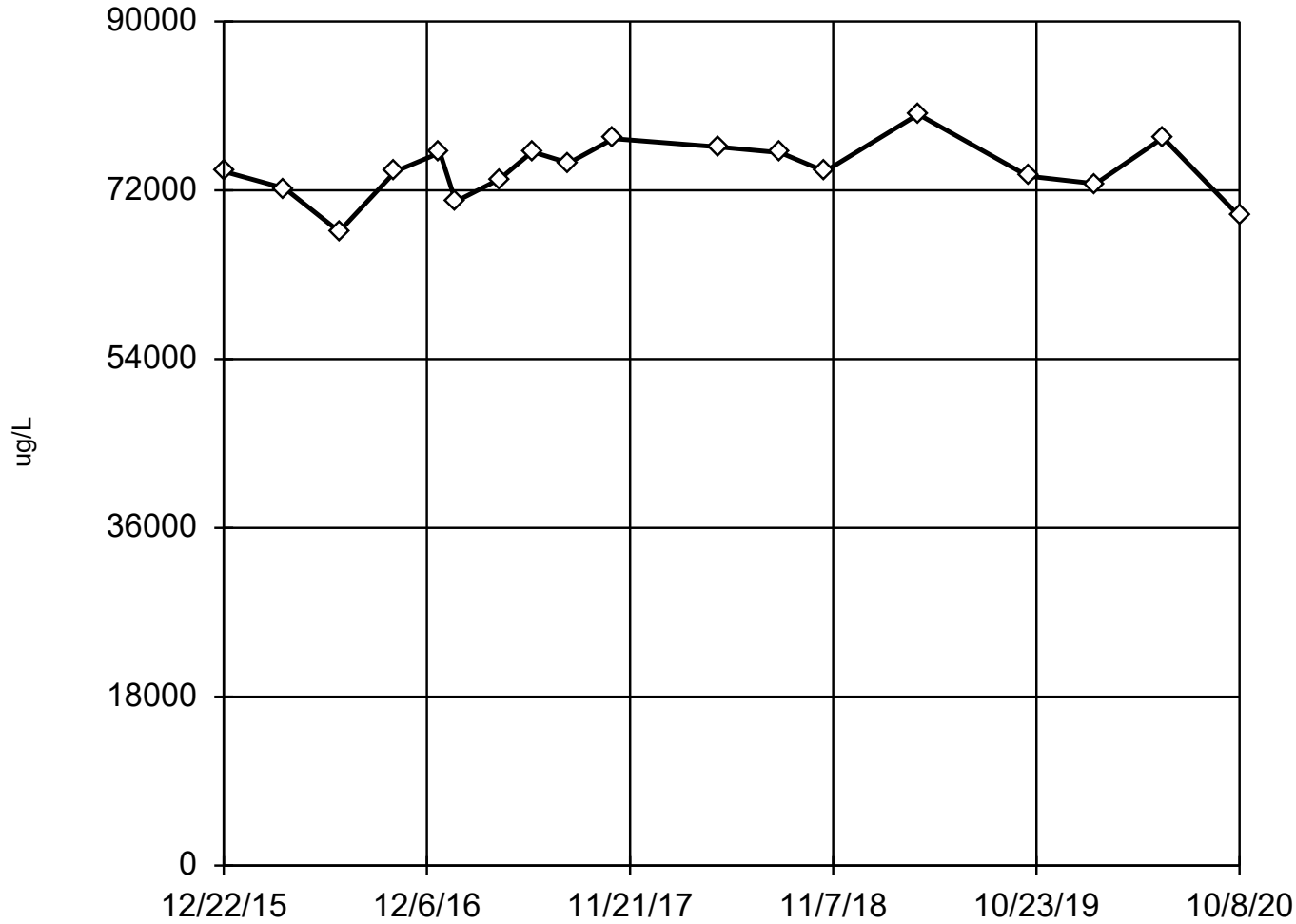
# EPA 1989 Outlier Screening

Constituent: Calcium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	126000
4/5/2016	115000
7/8/2016	108000
10/13/2016	118000
12/29/2016	129000
1/25/2017	124000
4/11/2017	120000
6/6/2017	111000
8/8/2017	108000
10/23/2017	87200
4/25/2018	112000
8/8/2018	105000
10/24/2018	101000
4/2/2019	126000
10/9/2019	114000
2/3/2020	113000
5/29/2020	112000
10/8/2020	93000

### EPA Screening (suspected outliers for Dixon's Test)

MW-84A (bg)



n = 18  
Dixon's will not be run.  
No suspect values identified or unable to establish suspect values.  
Mean 74222, std. dev. 3083, critical Tn 2.504  
Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9781  
Critical = 0.914  
The distribution was found to be normally distributed.

Constituent: Calcium    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020



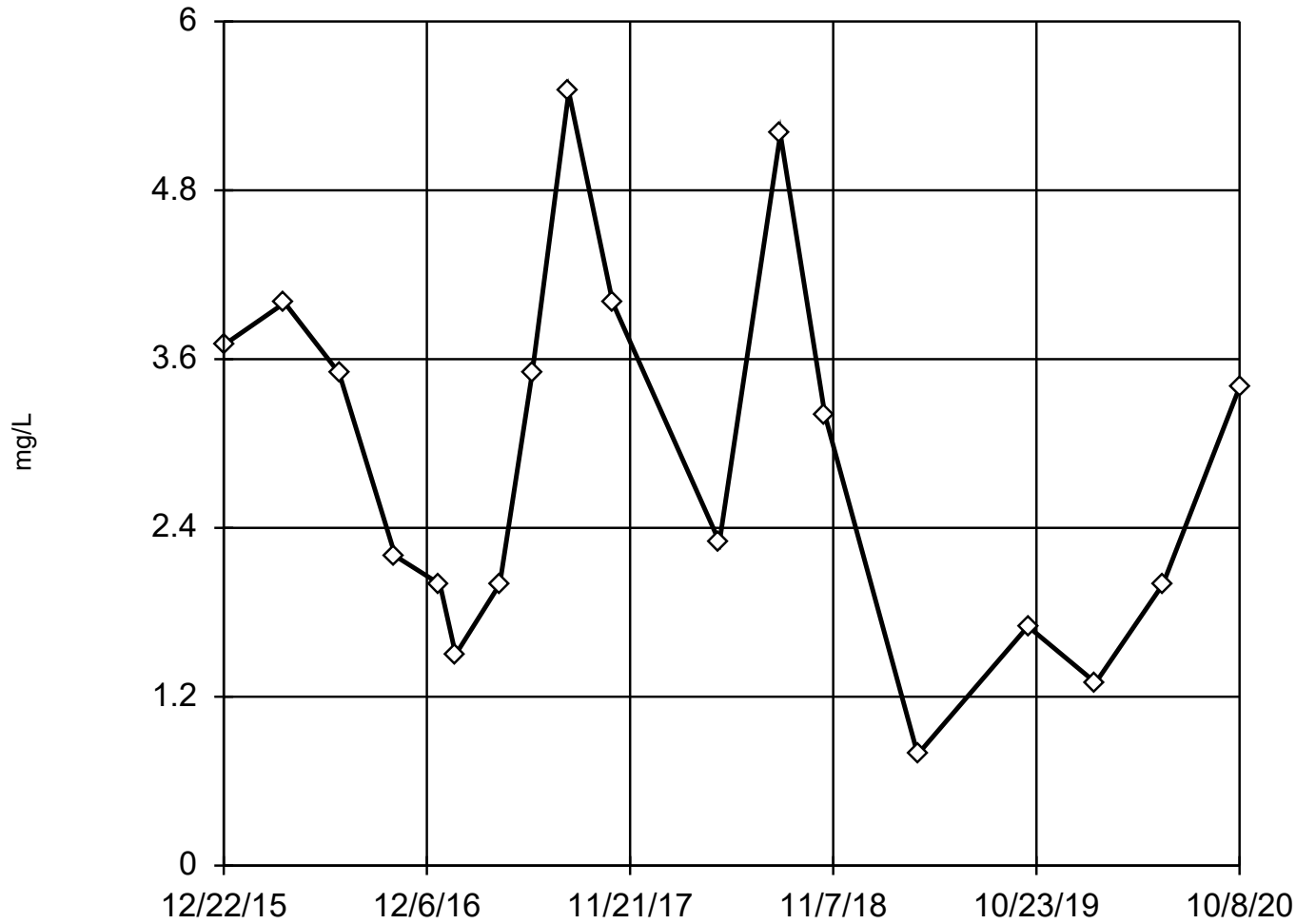
# EPA 1989 Outlier Screening

Constituent: Calcium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	74000
4/5/2016	72200
7/8/2016	67600
10/13/2016	74000
12/29/2016	76000
1/25/2017	70800
4/11/2017	73200
6/6/2017	76100
8/8/2017	74900
10/24/2017	77500
4/25/2018	76600
8/8/2018	76000
10/24/2018	74000
4/3/2019	80100
10/9/2019	73500
2/3/2020	72700
5/29/2020	77600
10/8/2020	69200

### EPA Screening (suspected outliers for Dixon's Test)

MW-301 (bg)



n = 18

Dixon's will not be run.  
No suspect values identified  
or unable to establish  
suspect values.  
Mean 2.877, std. dev.  
1.325, critical Tn 2.504

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9493  
Critical = 0.914  
The distribution was found  
to be normally distrib-  
uted.

Constituent: Chloride    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

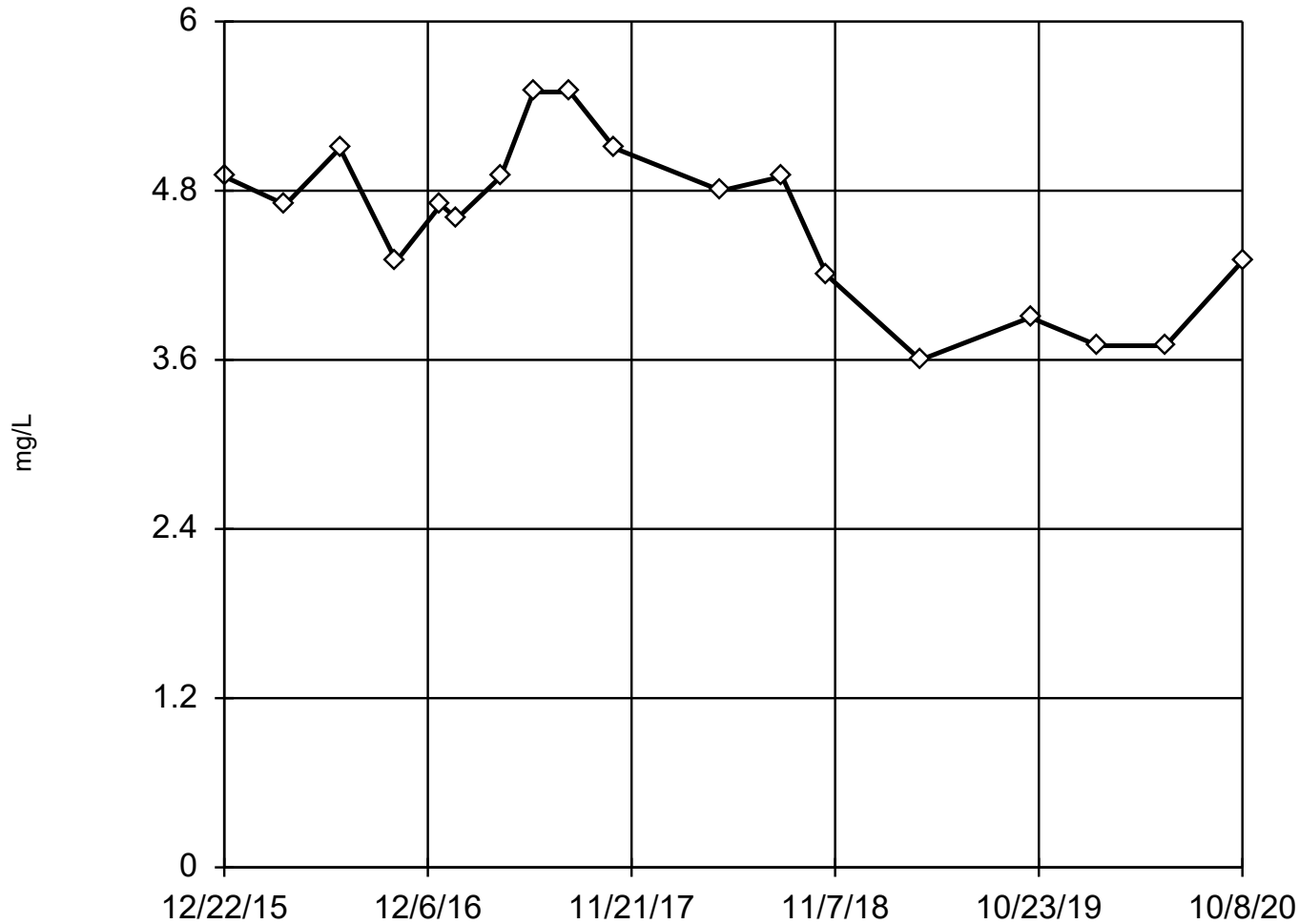
# EPA 1989 Outlier Screening

Constituent: Chloride (mg/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	3.7 (J)
4/5/2016	4
7/8/2016	3.5 (J)
10/13/2016	2.2
12/29/2016	2 (J)
1/25/2017	1.5 (J)
4/11/2017	2
6/6/2017	3.5
8/8/2017	5.5
10/23/2017	4
4/25/2018	2.3
8/8/2018	5.2
10/24/2018	3.2
4/2/2019	0.79 (J)
10/9/2019	1.7 (J)
2/3/2020	1.3 (J)
5/29/2020	2 (J)
10/8/2020	3.4

### EPA Screening (suspected outliers for Dixon's Test)

MW-84A (bg)



n = 18

Dixon's will not be run.  
No suspect values identified  
or unable to establish  
suspect values.  
Mean 4.578, std. dev.  
0.5887, critical Tn 2.504

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9435  
Critical = 0.914  
The distribution was found  
to be normally distrib-  
uted.

Constituent: Chloride    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

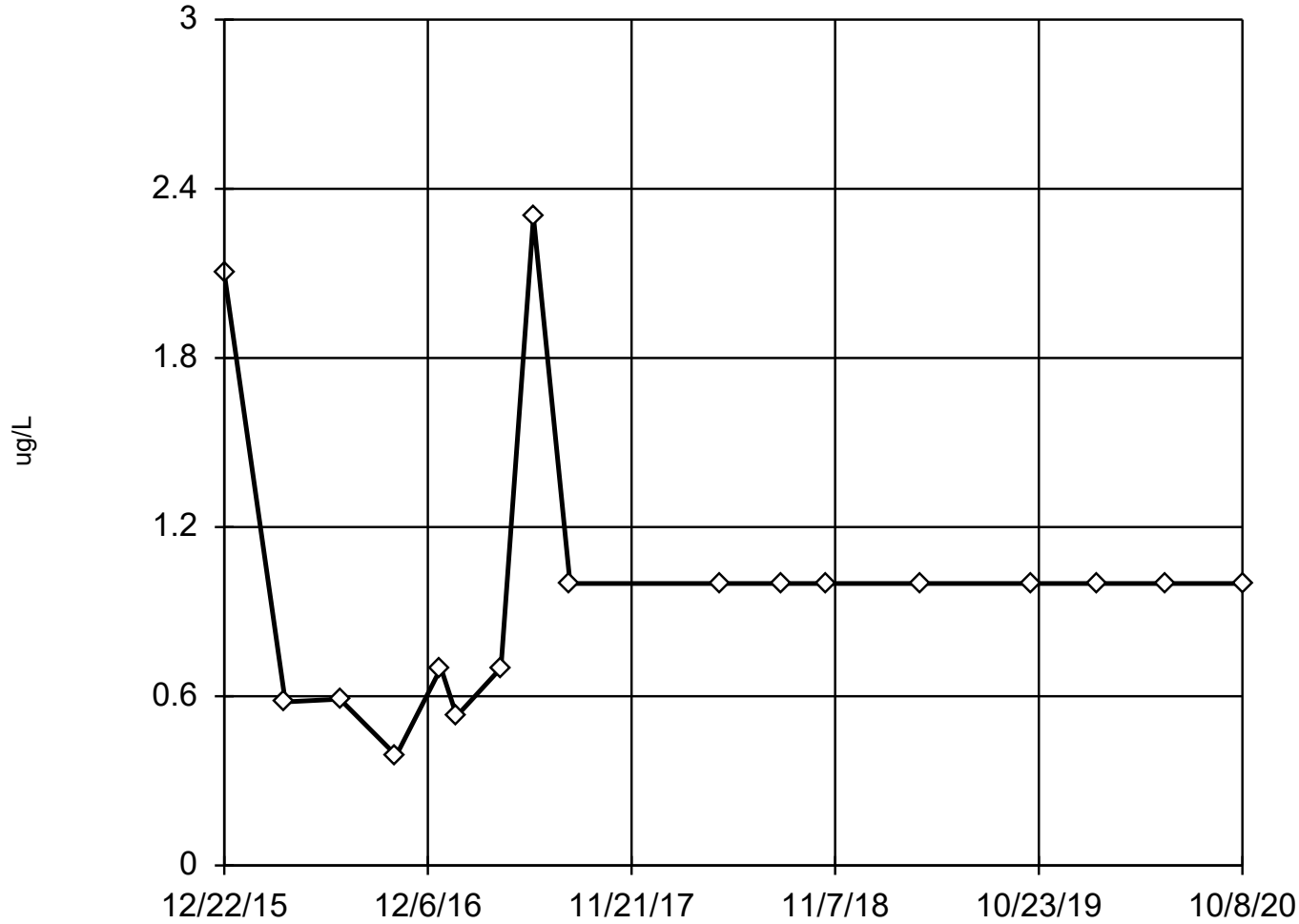
# EPA 1989 Outlier Screening

Constituent: Chloride (mg/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	4.9
4/5/2016	4.7
7/8/2016	5.1
10/13/2016	4.3
12/29/2016	4.7
1/25/2017	4.6
4/11/2017	4.9
6/6/2017	5.5
8/8/2017	5.5
10/24/2017	5.1
4/25/2018	4.8
8/8/2018	4.9
10/24/2018	4.2
4/3/2019	3.6
10/9/2019	3.9
2/3/2020	3.7
5/29/2020	3.7
10/8/2020	4.3

# Tukey's Outlier Screening

MW-301 (bg)



n = 17

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.768, low cutoff = 0.1706, based on IQR multiplier of 3.

Constituent: Chromium Analysis Run 12/28/2020 5:10 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

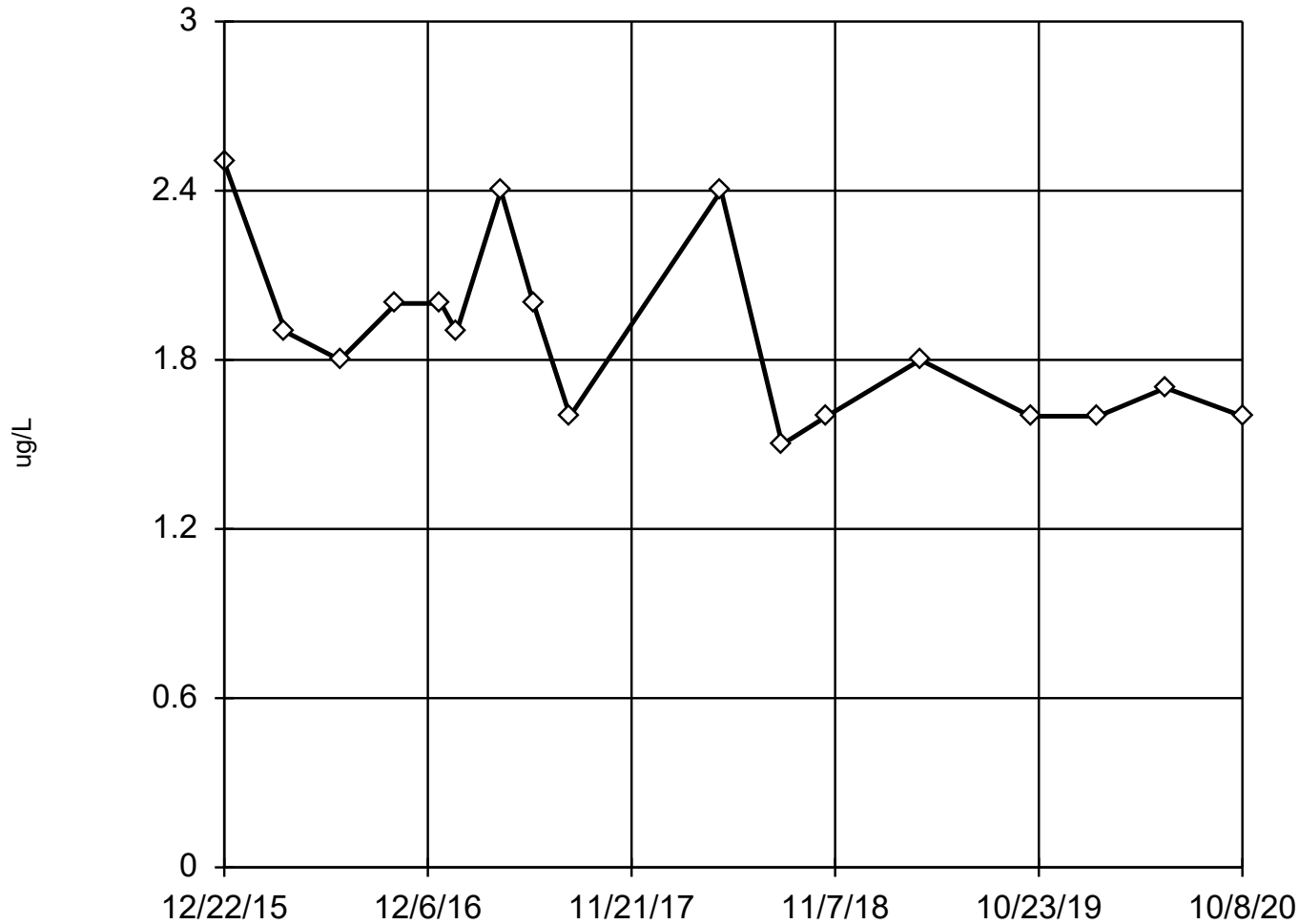
# Tukey's Outlier Screening

Constituent: Chromium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	2.1
4/5/2016	0.58 (J)
7/8/2016	0.59 (J)
10/13/2016	<0.39 (U)
12/29/2016	0.7 (J)
1/25/2017	0.53 (J)
4/11/2017	0.7 (J)
6/6/2017	2.3 (J)
8/8/2017	<1 (U)
4/25/2018	<1 (U)
8/8/2018	<1 (U)
10/24/2018	<1 (U)
4/2/2019	<1 (U)
10/9/2019	<1 (U)
2/3/2020	<1 (U)
5/29/2020	<1 (U)
10/8/2020	<1 (U)

### Tukey's Outlier Screening

MW-84A (bg)



n = 17

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.906, low cutoff = 0.8192, based on IQR multiplier of 3.

Constituent: Chromium Analysis Run 12/28/2020 5:10 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020



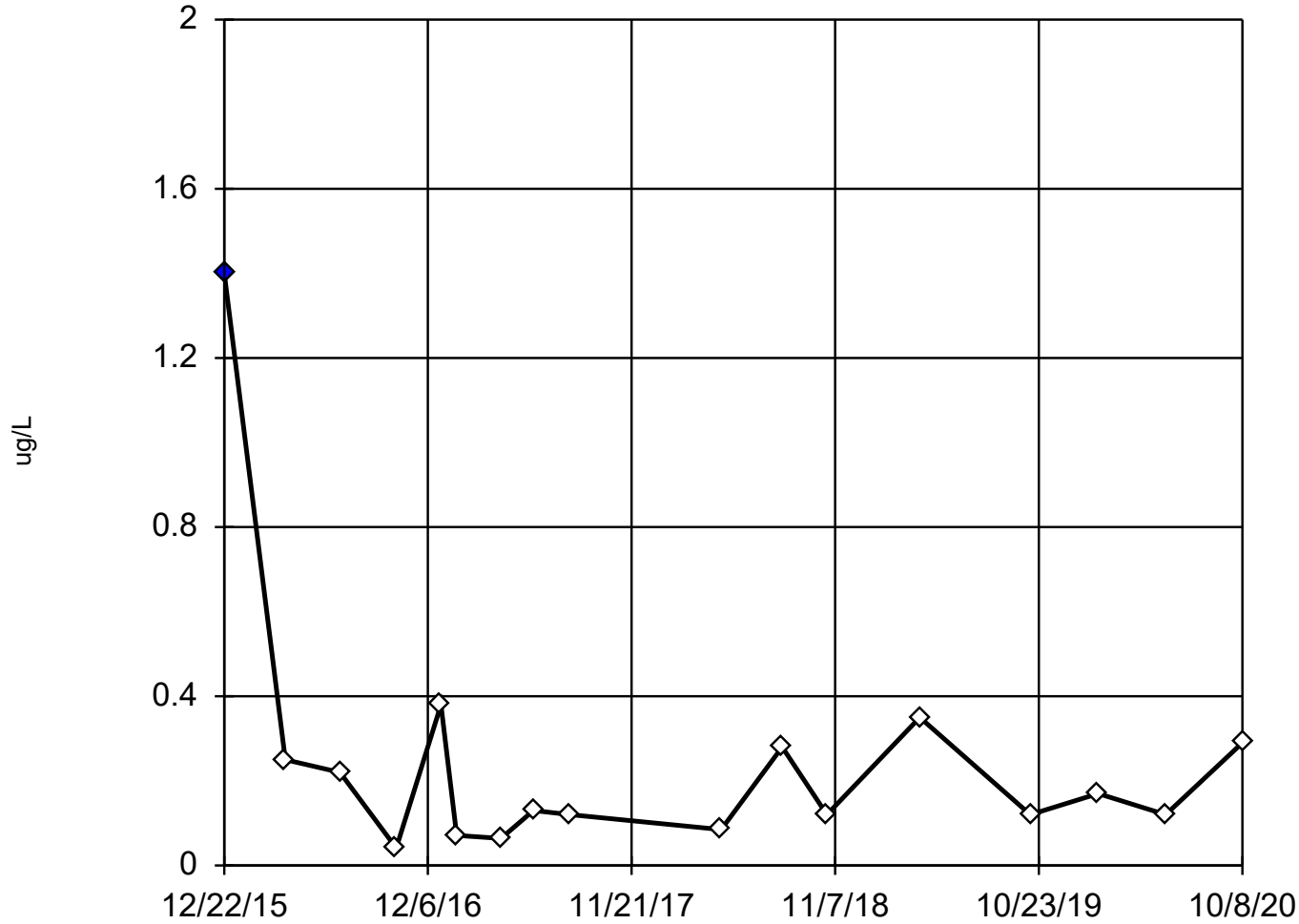
# Tukey's Outlier Screening

Constituent: Chromium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	2.5
4/5/2016	1.9
7/8/2016	1.8
10/13/2016	2
12/29/2016	2
1/25/2017	1.9
4/11/2017	2.4
6/6/2017	2 (J)
8/8/2017	1.6 (J)
4/25/2018	2.4 (J)
8/8/2018	1.5 (J)
10/24/2018	1.6 (J)
4/3/2019	1.8 (J)
10/9/2019	1.6 (J)
2/3/2020	1.6 (J)
5/29/2020	1.7 (J)
10/8/2020	1.6 (J)

### Dixon's Outlier Test

MW-301 (bg)



n = 17

Statistical outlier is drawn as solid.  
Testing for 1 high outlier.  
Mean = 0.2477.  
Std. Dev. = 0.3141.  
1.4: c = 0.7901  
tab1 = 0.49.  
Alpha = 0.05.

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9085  
Critical = 0.906  
The distribution, after removal of suspect value, was found to be normally distributed.

Constituent: Cobalt Analysis Run 12/28/2020 5:10 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

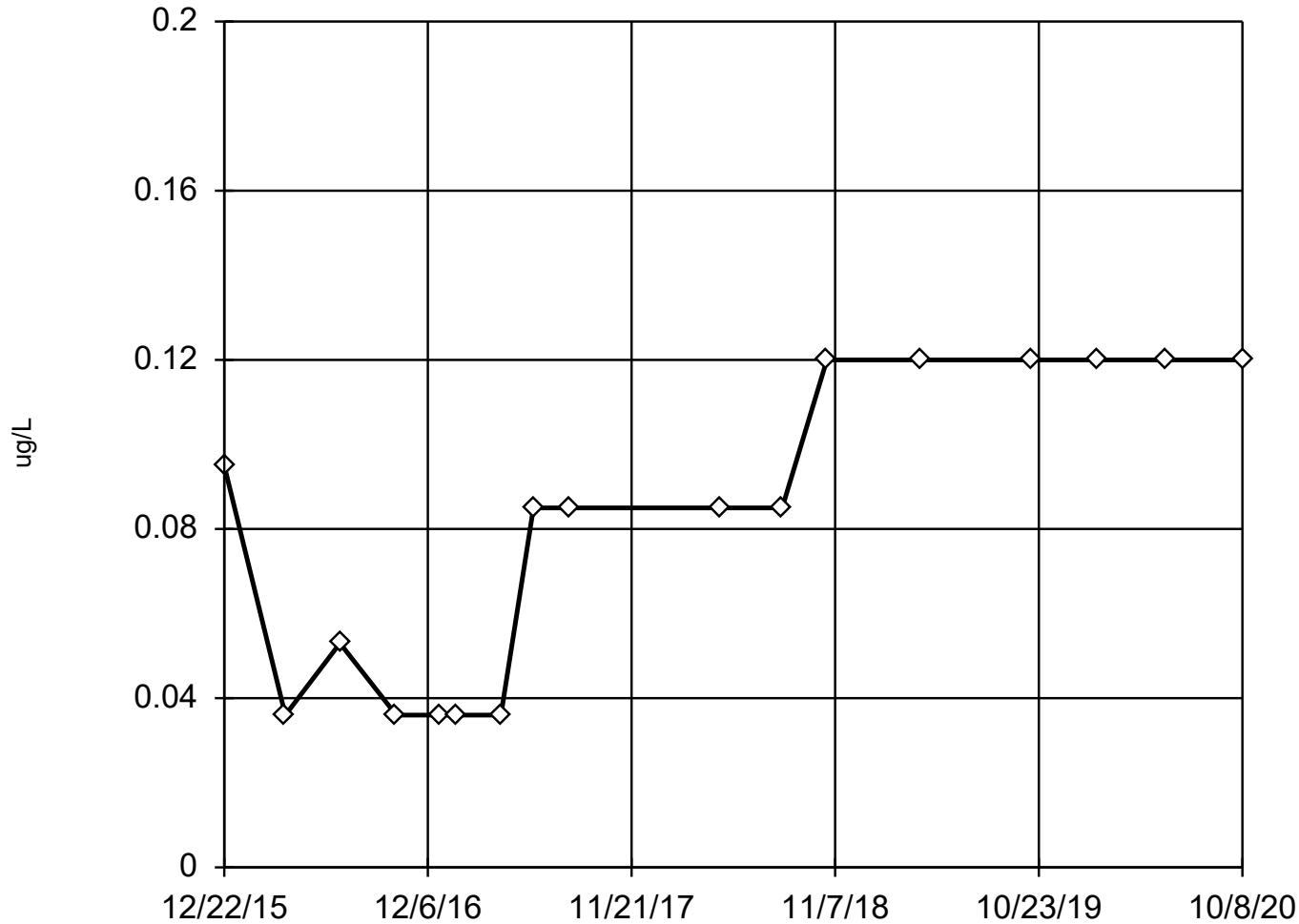
# Dixon's Outlier Test

Constituent: Cobalt (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	1.4 (O)
4/5/2016	0.25 (J)
7/8/2016	0.22 (J)
10/13/2016	0.041 (J)
12/29/2016	0.38 (J)
1/25/2017	0.071 (J)
4/11/2017	0.064 (J)
6/6/2017	0.13 (J)
8/8/2017	0.12 (J)
4/25/2018	<0.085 (U)
8/8/2018	0.28 (J)
10/24/2018	<0.12 (U)
4/2/2019	0.35 (J)
10/9/2019	<0.12 (U)
2/3/2020	0.17 (J)
5/29/2020	<0.12 (U)
10/8/2020	0.29 (J)

### Tukey's Outlier Screening

MW-84A (bg)



n = 17

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Cobalt Analysis Run 12/28/2020 5:10 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

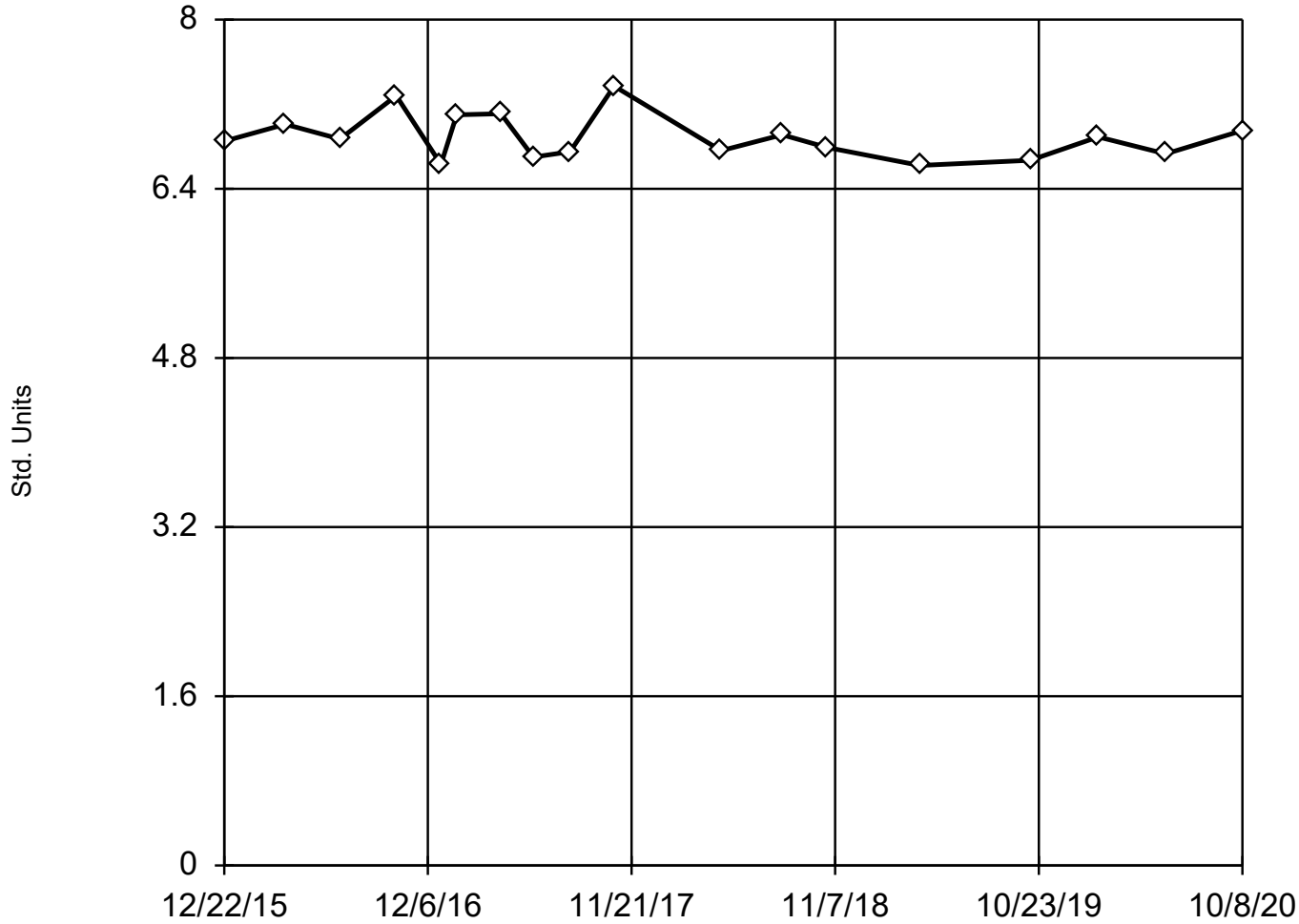
# Tukey's Outlier Screening

Constituent: Cobalt (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	0.095 (J)
4/5/2016	<0.036 (U)
7/8/2016	0.053 (J)
10/13/2016	<0.036 (U)
12/29/2016	<0.036 (U)
1/25/2017	<0.036 (U)
4/11/2017	<0.036 (U)
6/6/2017	<0.085 (U)
8/8/2017	<0.085 (U)
4/25/2018	<0.085 (U)
8/8/2018	<0.085 (U)
10/24/2018	<0.12 (U)
4/3/2019	<0.12 (U)
10/9/2019	<0.12 (U)
2/3/2020	<0.12 (U)
5/29/2020	<0.12 (U)
10/8/2020	<0.12 (U)

### EPA Screening (suspected outliers for Dixon's Test)

MW-301 (bg)



n = 18  
Dixon's will not be run.  
No suspect values identified or unable to establish suspect values.  
Mean 6.888, std. dev. 0.2159, critical Tn 2.504  
  
Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9279  
Critical = 0.914  
The distribution was found to be normally distributed.

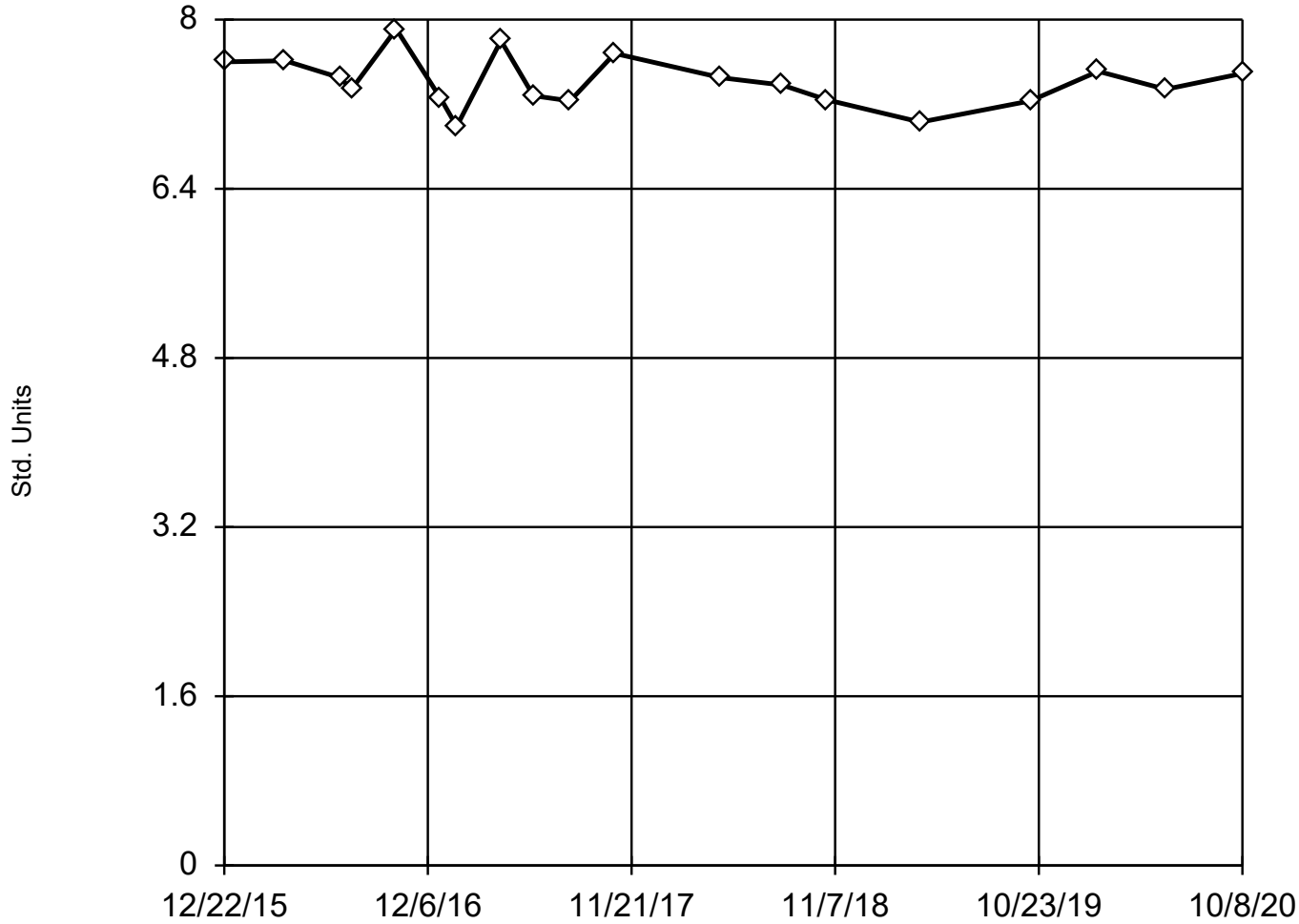
# EPA 1989 Outlier Screening

Constituent: Field pH (Std. Units) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	6.85
4/5/2016	7.01
7/8/2016	6.87
10/13/2016	7.28
12/29/2016	6.63
1/25/2017	7.1
4/11/2017	7.11
6/6/2017	6.7
8/8/2017	6.75
10/23/2017	7.37
4/25/2018	6.76
8/8/2018	6.91
10/24/2018	6.79
4/2/2019	6.62
10/9/2019	6.67
2/3/2020	6.89
5/29/2020	6.73
10/8/2020	6.95

### EPA Screening (suspected outliers for Dixon's Test)

MW-84A (bg)



n = 19  
Dixon's will not be run.  
No suspect values identified or unable to establish suspect values.  
Mean 7.411, std. dev. 0.2402, critical Tn 2.532  
  
Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9755  
Critical = 0.917  
The distribution was found to be normally distributed.



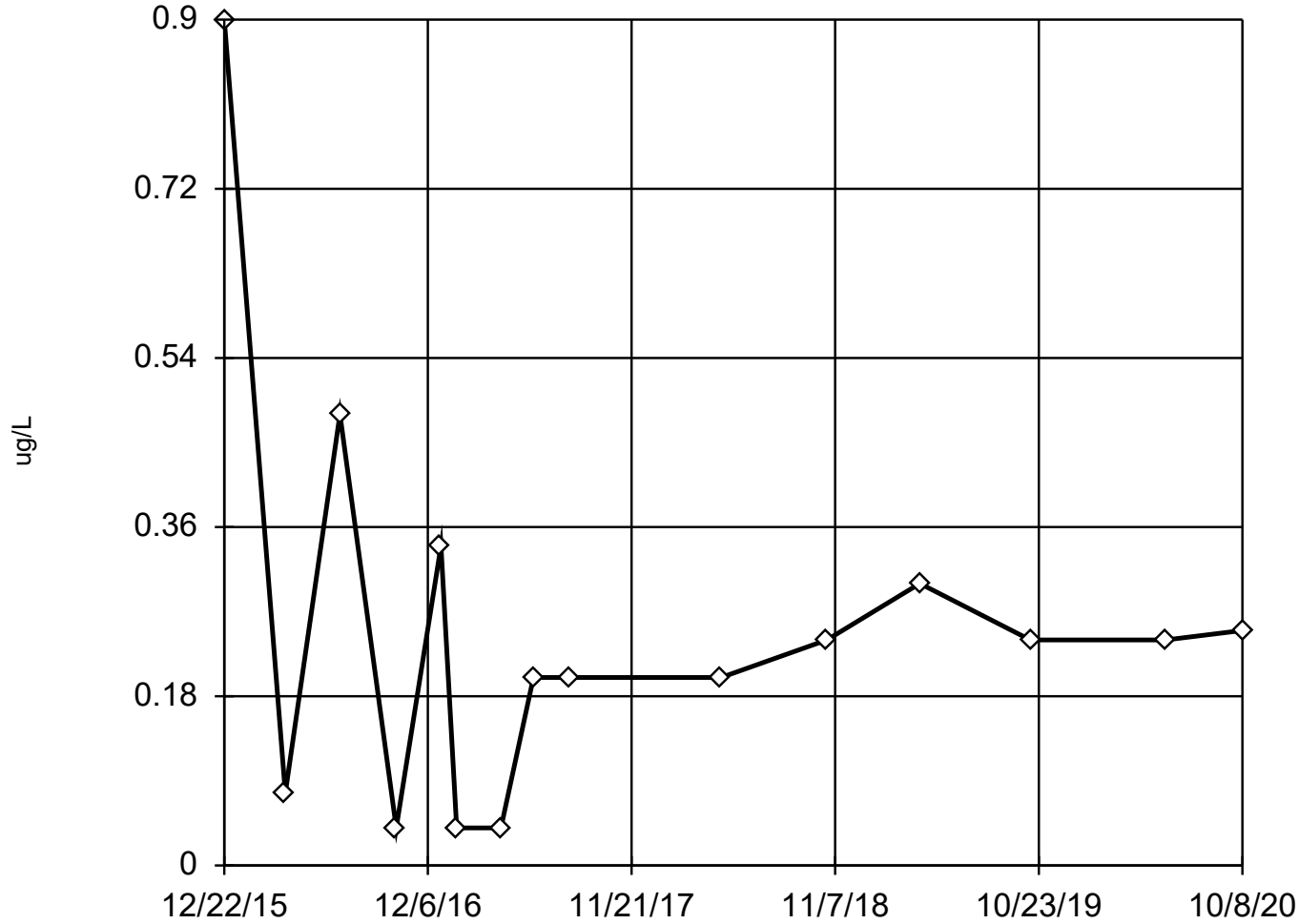
# EPA 1989 Outlier Screening

Constituent: Field pH (Std. Units) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	7.6
4/5/2016	7.61
7/8/2016	7.45
7/28/2016	7.34
10/13/2016	7.91
12/29/2016	7.25
1/25/2017	6.99
4/11/2017	7.8
6/6/2017	7.28
8/8/2017	7.23
10/24/2017	7.68
4/25/2018	7.45
8/8/2018	7.38
10/24/2018	7.24
4/3/2019	7.03
10/9/2019	7.23
2/3/2020	7.51
5/29/2020	7.34
10/8/2020	7.49

# Tukey's Outlier Screening

MW-301 (bg)



n = 15

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 2.752, low cutoff = -0.02881, based on IQR multiplier of 3.

Constituent: Lead Analysis Run 12/28/2020 5:10 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

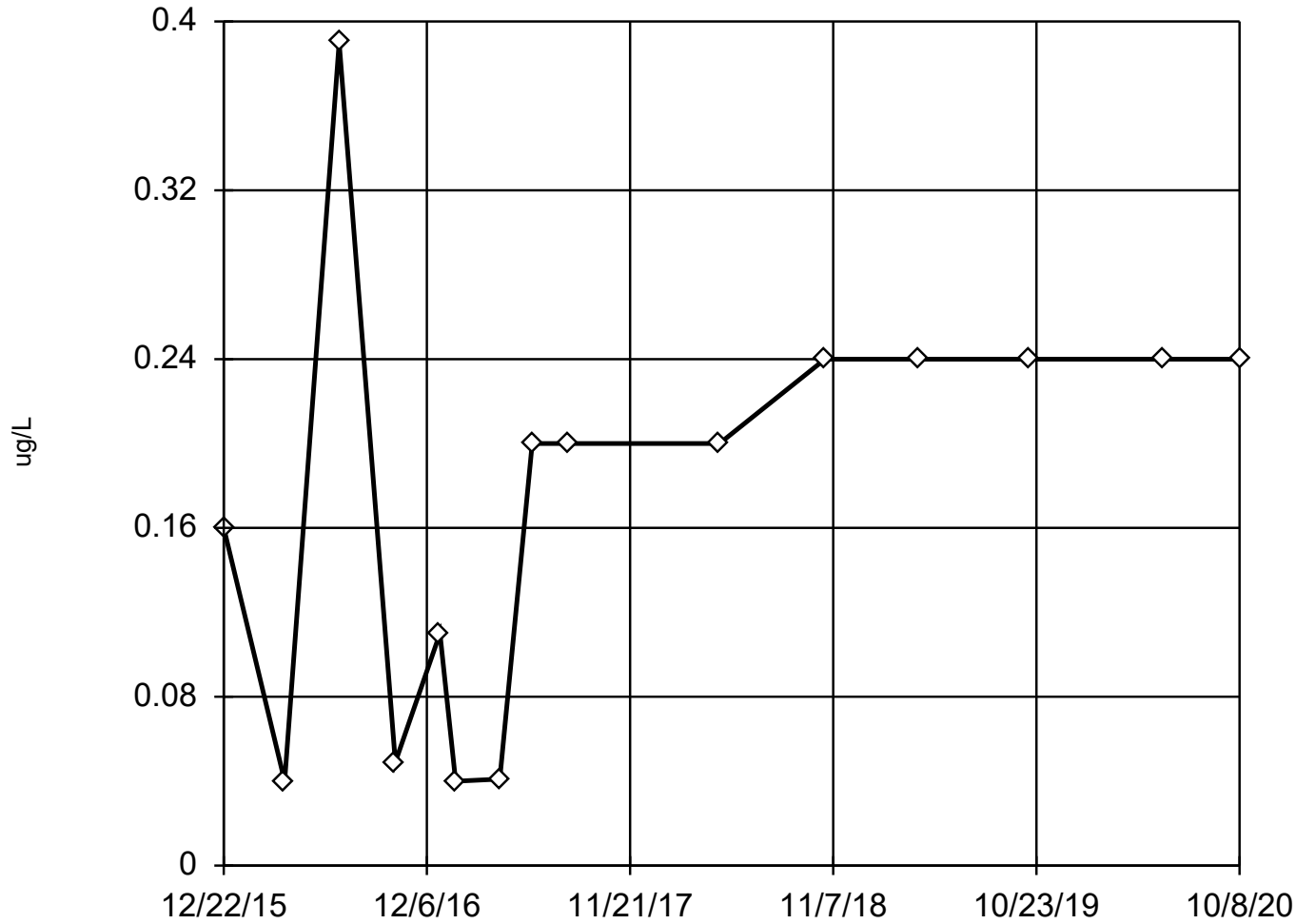
# Tukey's Outlier Screening

Constituent: Lead (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	0.9 (J)
4/5/2016	0.077 (J)
7/8/2016	0.48 (J)
10/13/2016	<0.04 (U)
12/29/2016	0.34 (J)
1/25/2017	<0.04 (U)
4/11/2017	<0.04 (U)
6/6/2017	<0.2 (U)
8/8/2017	<0.2 (U)
4/25/2018	<0.2 (U)
10/24/2018	<0.24 (U)
4/2/2019	0.3 (J)
10/9/2019	<0.24 (U)
5/29/2020	<0.24 (U)
10/8/2020	0.25 (J)

# Tukey's Outlier Screening

MW-84A (bg)



n = 15

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 0.813, low cutoff = -0.524, based on IQR multiplier of 3.

Constituent: Lead Analysis Run 12/28/2020 5:10 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

# Tukey's Outlier Screening

Constituent: Lead (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	0.16 (J)
4/5/2016	<0.04 (U)
7/8/2016	0.39 (J)
10/13/2016	0.049 (J)
12/29/2016	0.11 (J)
1/25/2017	<0.04 (U)
4/11/2017	0.041 (J)
6/6/2017	<0.2 (U)
8/8/2017	<0.2 (U)
4/25/2018	<0.2 (U)
10/24/2018	<0.24 (U)
4/3/2019	<0.24 (U)
10/9/2019	<0.24 (U)
5/29/2020	<0.24 (U)
10/8/2020	<0.24 (U)



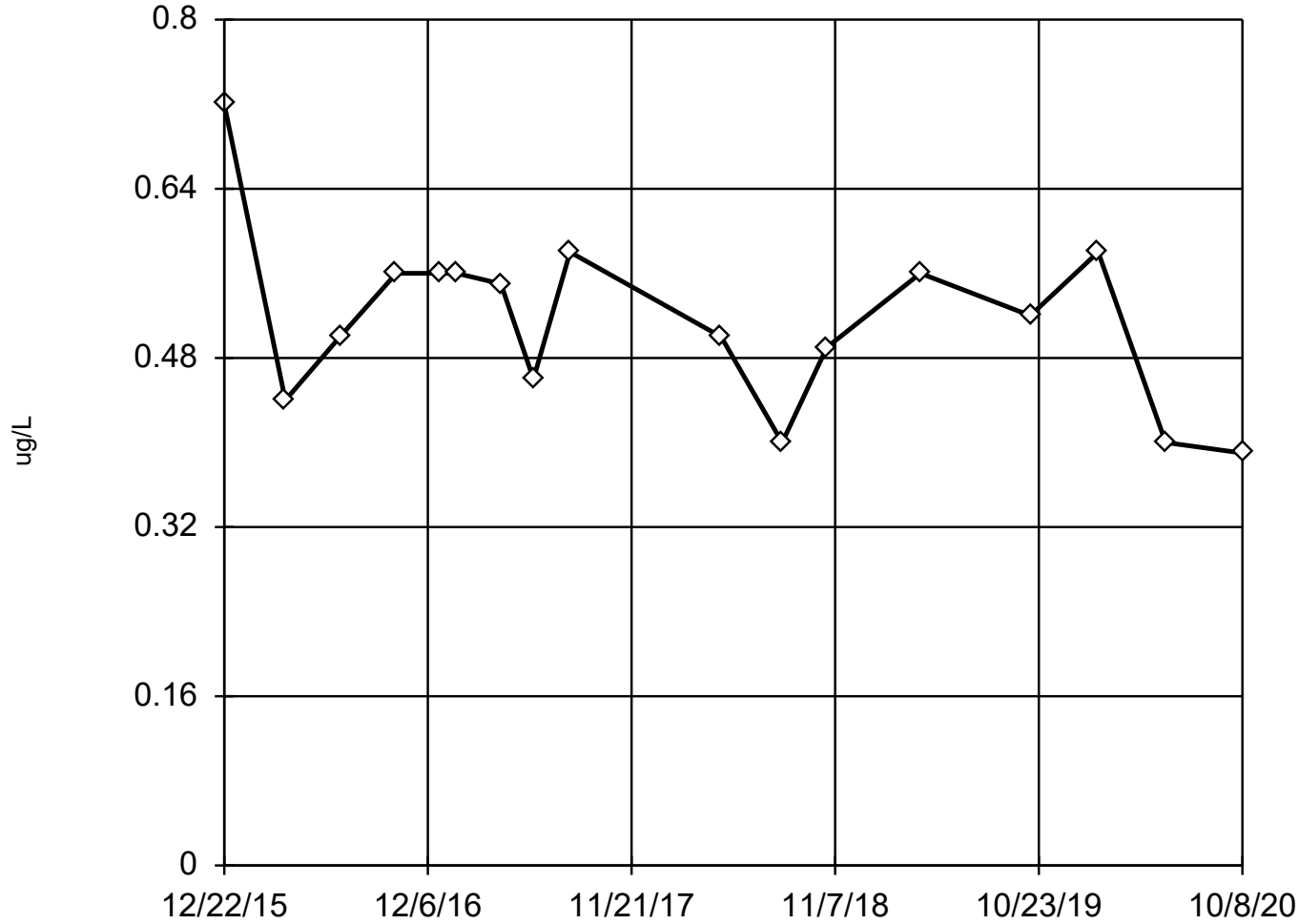
# Dixon's Outlier Test

Constituent: Lithium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	1.3 (O)
4/5/2016	0.58 (J)
7/8/2016	0.69 (J)
10/13/2016	0.6 (J)
12/29/2016	0.87 (J)
1/25/2017	0.67 (J)
4/11/2017	0.68 (J)
6/6/2017	0.62 (J)
8/8/2017	0.6 (J)
4/25/2018	0.55 (J)
8/8/2018	0.85 (J)
10/24/2018	0.52 (J)
4/2/2019	0.9 (J)
10/9/2019	0.61 (J)
2/3/2020	0.67 (J)
5/29/2020	0.47 (J)
10/8/2020	0.46 (J)

### EPA Screening (suspected outliers for Dixon's Test)

MW-84A (bg)



n = 17  
Dixon's will not be run.  
No suspect values identified or unable to establish suspect values.  
Mean 0.5159, std. dev. 0.08352, critical Tn 2.475  
  
Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9266  
Critical = 0.91  
The distribution was found to be normally distributed.

Constituent: Lithium    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

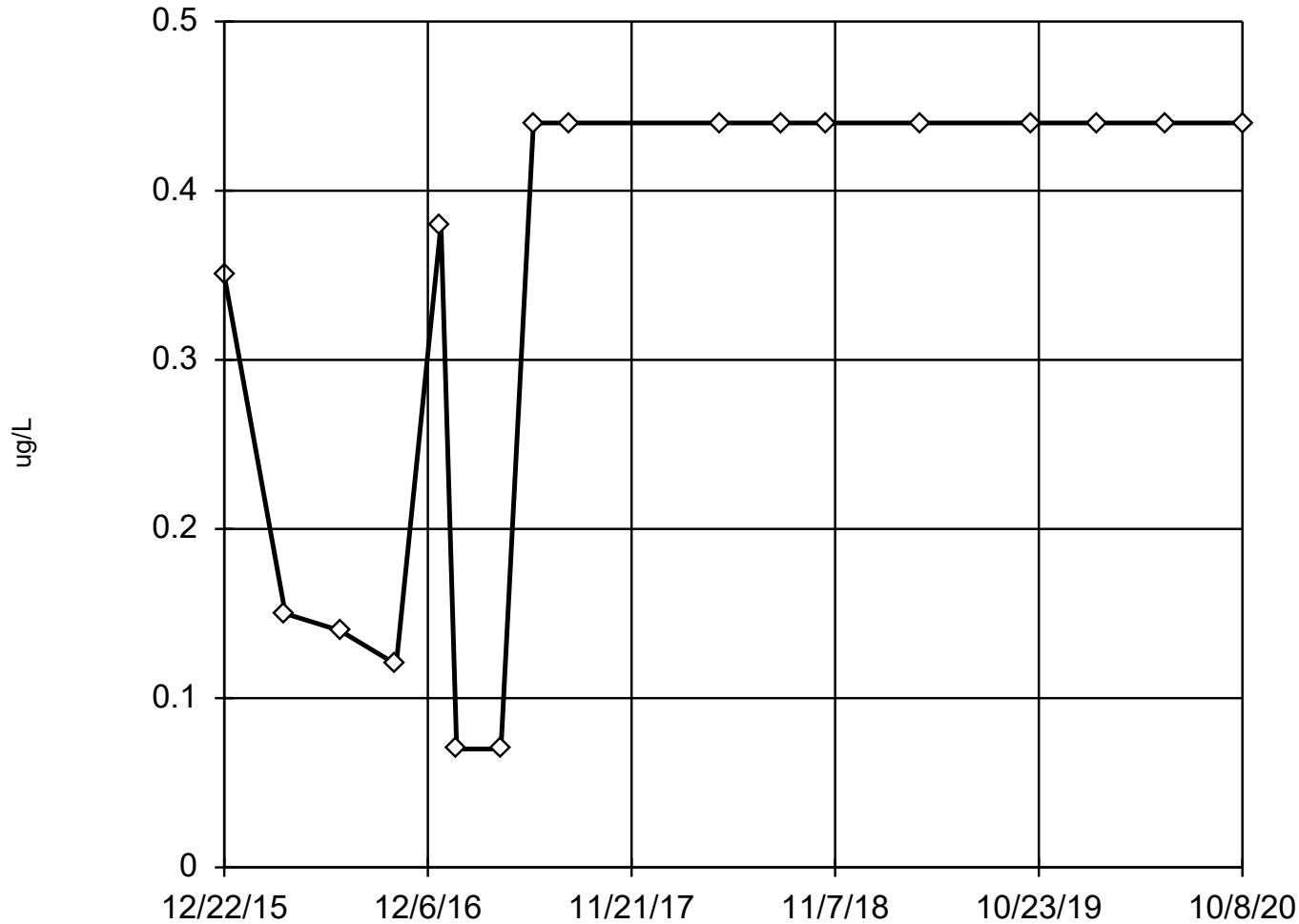


# EPA 1989 Outlier Screening

Constituent: Lithium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	0.72 (J)
4/5/2016	0.44 (J)
7/8/2016	0.5 (J)
10/13/2016	0.56 (J)
12/29/2016	0.56 (J)
1/25/2017	0.56 (J)
4/11/2017	0.55 (J)
6/6/2017	0.46 (J)
8/8/2017	0.58 (J)
4/25/2018	0.5 (J)
8/8/2018	0.4 (J)
10/24/2018	0.49 (J)
4/3/2019	0.56 (J)
10/9/2019	0.52 (J)
2/3/2020	0.58 (J)
5/29/2020	0.4 (J)
10/8/2020	0.39 (J)

### Tukey's Outlier Screening MW-301 (bg)



n = 17

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.6209,  
low cutoff = -0.5768,  
based on IQR multiplier of 3.

Constituent: Molybdenum    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

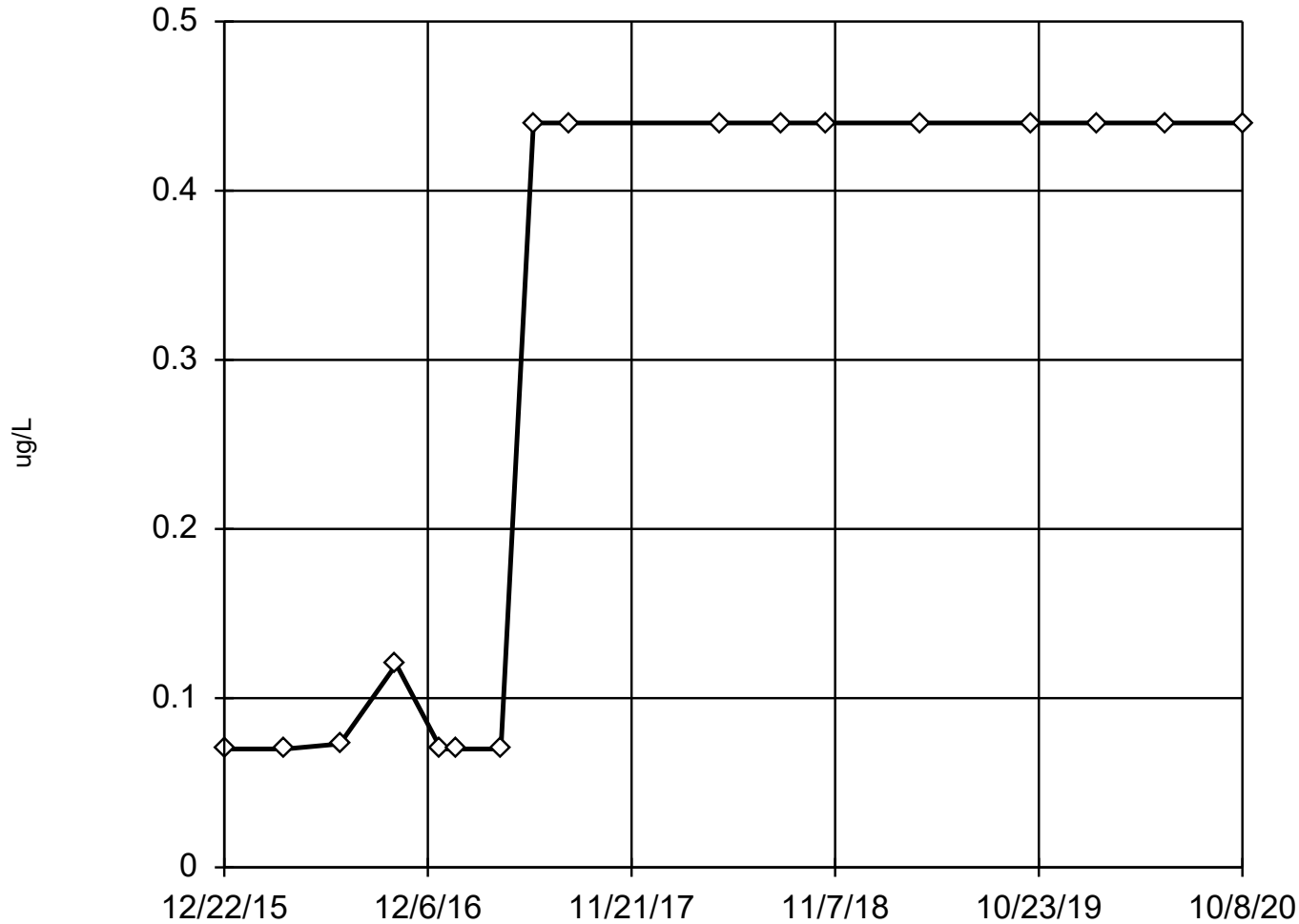
# Tukey's Outlier Screening

Constituent: Molybdenum (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	0.35 (J)
4/5/2016	0.15 (J)
7/8/2016	0.14 (J)
10/13/2016	0.12 (J)
12/29/2016	0.38 (J)
1/25/2017	<0.07 (U)
4/11/2017	<0.07 (U)
6/6/2017	<0.44 (U)
8/8/2017	<0.44 (U)
4/25/2018	<0.44 (U)
8/8/2018	<0.44 (U)
10/24/2018	<0.44 (U)
4/2/2019	<0.44 (U)
10/9/2019	<0.44 (U)
2/3/2020	<0.44 (U)
5/29/2020	<0.44 (U)
10/8/2020	<0.44 (U)

### Tukey's Outlier Screening

MW-84A (bg)



n = 17

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Molybdenum    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

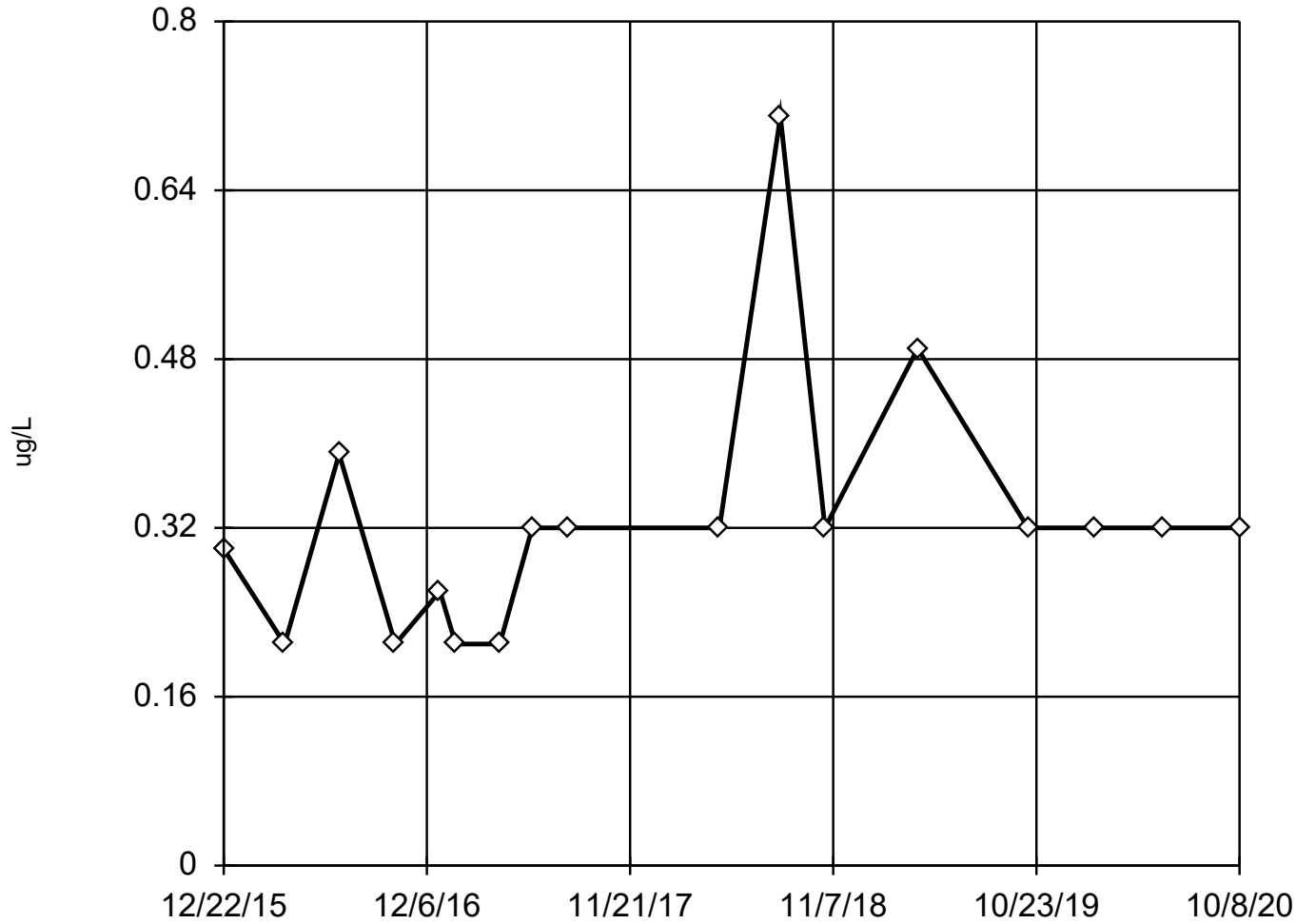
# Tukey's Outlier Screening

Constituent: Molybdenum (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	<0.07 (U)
4/5/2016	<0.07 (U)
7/8/2016	0.073 (J)
10/13/2016	0.12 (J)
12/29/2016	<0.07 (U)
1/25/2017	<0.07 (U)
4/11/2017	<0.07 (U)
6/6/2017	<0.44 (U)
8/8/2017	<0.44 (U)
4/25/2018	<0.44 (U)
8/8/2018	<0.44 (U)
10/24/2018	<0.44 (U)
4/3/2019	<0.44 (U)
10/9/2019	<0.44 (U)
2/3/2020	<0.44 (U)
5/29/2020	<0.44 (U)
10/8/2020	<0.44 (U)

# Tukey's Outlier Screening

MW-301 (bg)



n = 17

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.8219,  
low cutoff = 0.09098,  
based on IQR multiplier of 3.

Constituent: Selenium    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

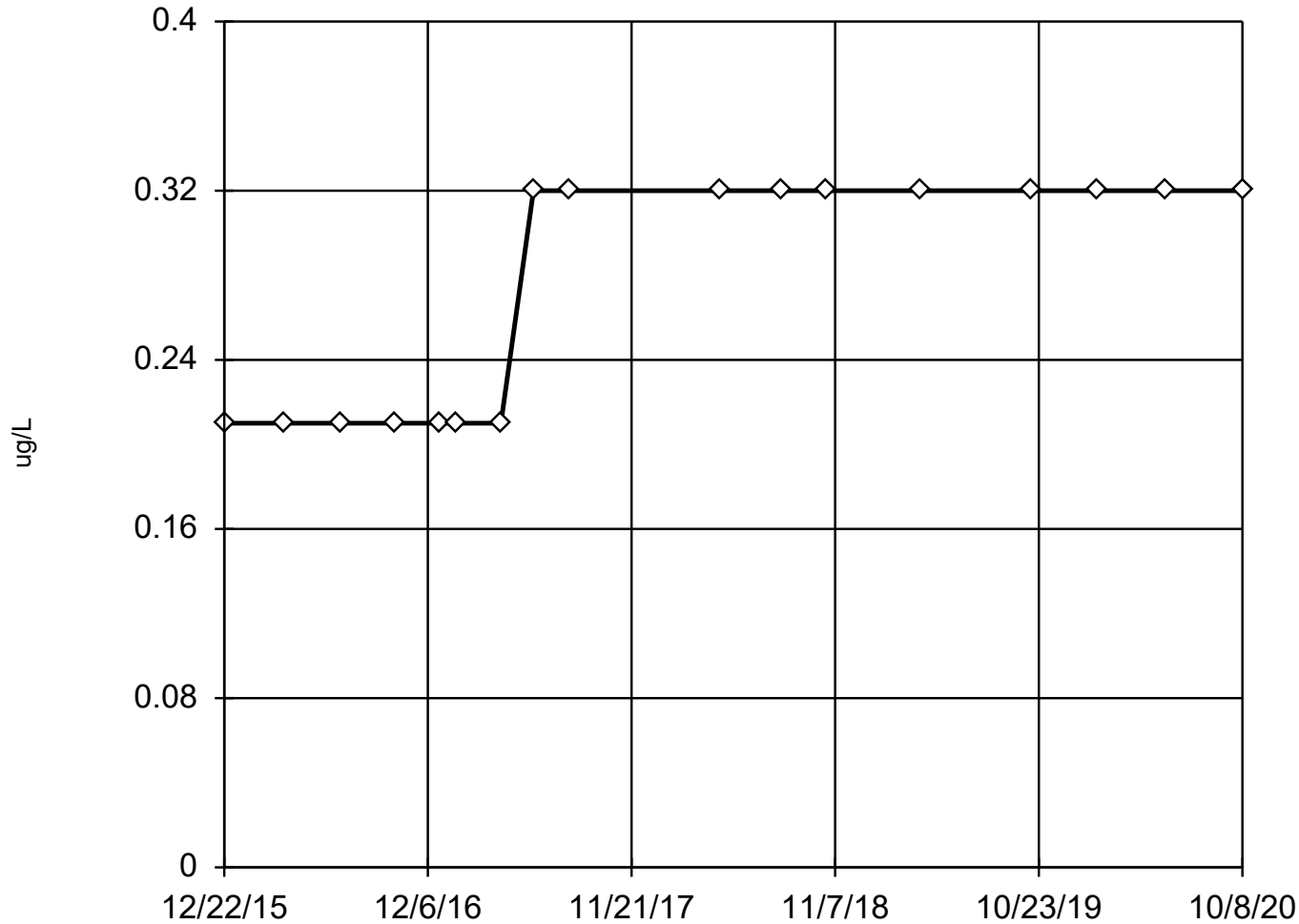
# Tukey's Outlier Screening

Constituent: Selenium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	0.3 (J)
4/5/2016	0.21 (J)
7/8/2016	0.39 (J)
10/13/2016	<0.21 (U)
12/29/2016	0.26 (J)
1/25/2017	<0.21 (U)
4/11/2017	<0.21 (U)
6/6/2017	<0.32 (U)
8/8/2017	<0.32 (U)
4/25/2018	<0.32 (U)
8/8/2018	0.71 (J)
10/24/2018	<0.32 (U)
4/2/2019	0.49 (J)
10/9/2019	<0.32 (U)
2/3/2020	<0.32 (U)
5/29/2020	<0.32 (U)
10/8/2020	<0.32 (U)

# Tukey's Outlier Screening

MW-84A (bg)



n = 17

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Selenium Analysis Run 12/28/2020 5:10 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020



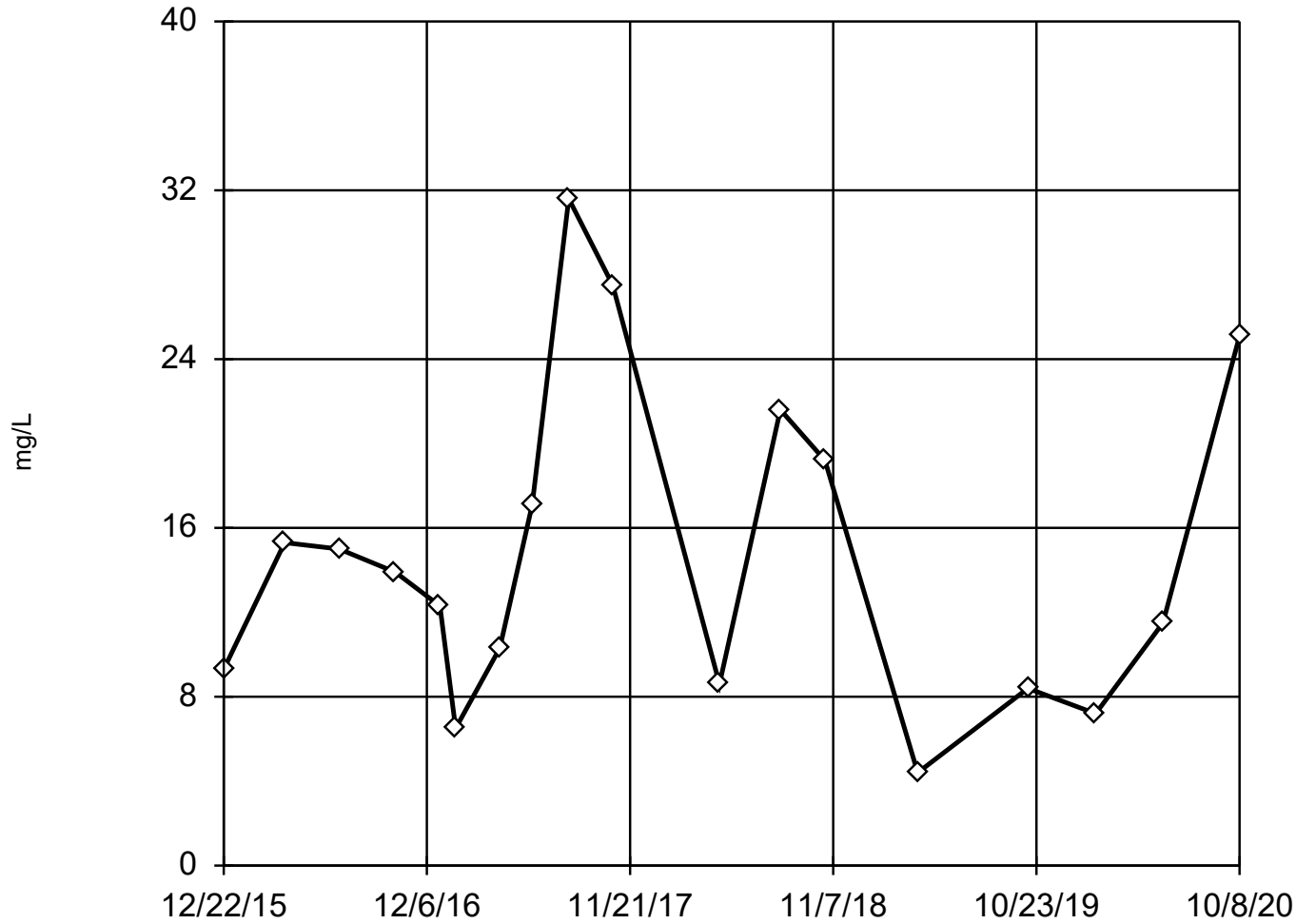
# Tukey's Outlier Screening

Constituent: Selenium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	<0.21 (U)
4/5/2016	<0.21 (U)
7/8/2016	<0.21 (U)
10/13/2016	<0.21 (U)
12/29/2016	<0.21 (U)
1/25/2017	<0.21 (U)
4/11/2017	<0.21 (U)
6/6/2017	<0.32 (U)
8/8/2017	<0.32 (U)
4/25/2018	<0.32 (U)
8/8/2018	<0.32 (U)
10/24/2018	<0.32 (U)
4/3/2019	<0.32 (U)
10/9/2019	<0.32 (U)
2/3/2020	<0.32 (U)
5/29/2020	<0.32 (U)
10/8/2020	<0.32 (U)

### EPA Screening (suspected outliers for Dixon's Test)

MW-301 (bg)



n = 18

Dixon's will not be run.  
No suspect values identified  
or unable to establish  
suspect values.  
Mean 14.71, std. dev.  
7.682, critical Tn 2.504

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9333  
Critical = 0.914  
The distribution was found  
to be normally distrib-  
uted.

Constituent: Sulfate    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

# EPA 1989 Outlier Screening

Constituent: Sulfate (mg/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	9.3
4/5/2016	15.3
7/8/2016	15
10/13/2016	13.9
12/29/2016	12.3 (J)
1/25/2017	6.5
4/11/2017	10.3
6/6/2017	17.1
8/8/2017	31.6
10/23/2017	27.5
4/25/2018	8.6
8/8/2018	21.6
10/24/2018	19.2
4/2/2019	4.4
10/9/2019	8.4
2/3/2020	7.2
5/29/2020	11.5
10/8/2020	25.1

### EPA Screening (suspected outliers for Dixon's Test)

MW-84A (bg)



n = 18

Dixon's will not be run.  
No suspect values identified or unable to establish suspect values.  
Mean 2.433, std. dev. 1.069, critical Tn 2.504

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9194  
Critical = 0.914  
The distribution was found to be normally distributed.

Constituent: Sulfate    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

# EPA 1989 Outlier Screening

Constituent: Sulfate (mg/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	4.9
4/5/2016	4.3
7/8/2016	3.7 (J)
10/13/2016	2.6 (J)
12/29/2016	2.7 (J)
1/25/2017	3
4/11/2017	2.8 (J)
6/6/2017	2.7 (J)
8/8/2017	2 (J)
10/24/2017	2.2 (J)
4/25/2018	2.8 (J)
8/8/2018	1.9 (J)
10/24/2018	1.6 (J)
4/3/2019	1.4 (J)
10/9/2019	1.3 (J)
2/3/2020	<2.2 (U)
5/29/2020	1.5 (J)
10/8/2020	1.3 (J)



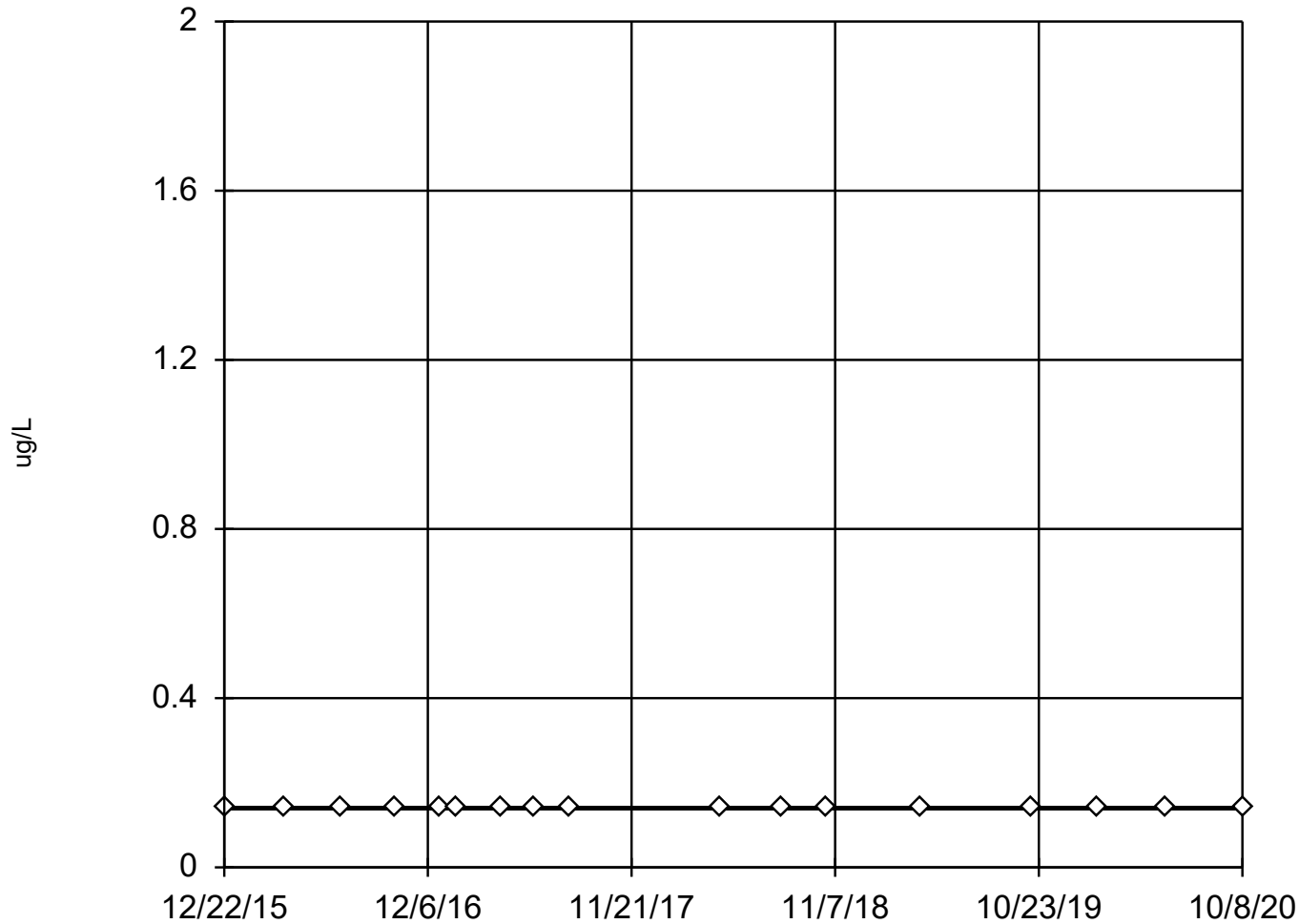
# Tukey's Outlier Screening

Constituent: Thallium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	<0.14 (U)
4/5/2016	<0.14 (U)
7/8/2016	<0.14 (U)
10/13/2016	<0.14 (U)
12/29/2016	0.48 (J)
1/25/2017	<0.14 (U)
4/11/2017	<0.14 (U)
6/6/2017	<0.14 (U)
8/8/2017	<0.14 (U)
4/25/2018	<0.14 (U)
8/8/2018	0.3 (J)
10/24/2018	<0.14 (U)
4/2/2019	0.48 (J)
10/9/2019	<0.14 (U)
2/3/2020	<0.14 (U)
5/29/2020	<0.14 (U)
10/8/2020	0.3 (J)

## Tukey's Outlier Screening

MW-84A (bg)



n = 17

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Thallium    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020



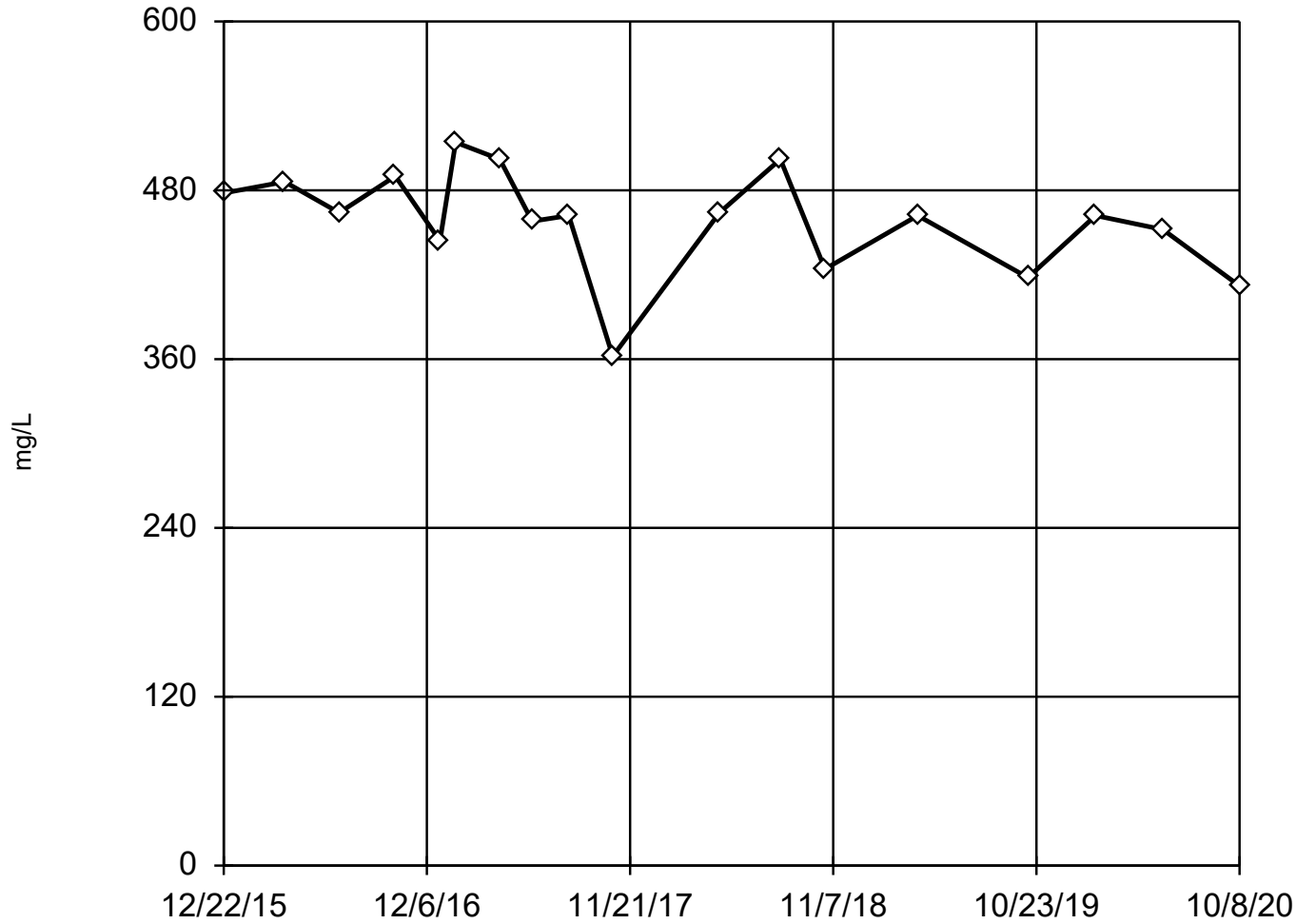
# Tukey's Outlier Screening

Constituent: Thallium (ug/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	<0.14 (U)
4/5/2016	<0.14 (U)
7/8/2016	<0.14 (U)
10/13/2016	<0.14 (U)
12/29/2016	<0.14 (U)
1/25/2017	<0.14 (U)
4/11/2017	<0.14 (U)
6/6/2017	<0.14 (U)
8/8/2017	<0.14 (U)
4/25/2018	<0.14 (U)
8/8/2018	<0.14 (U)
10/24/2018	<0.14 (U)
4/3/2019	<0.14 (U)
10/9/2019	<0.14 (U)
2/3/2020	<0.14 (U)
5/29/2020	<0.14 (U)
10/8/2020	<0.14 (U)

### Dixon's Outlier Test

MW-301 (bg)



n = 18

No statistical outliers.  
Testing for 1 low outlier.  
Mean = 458.7.  
Std. Dev. = 37.3.  
362: c = 0.4  
tab1 = 0.475.  
Alpha = 0.05.

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9572  
Critical = 0.91  
The distribution was found  
to be normally distrib-  
uted.

Constituent: Total Dissolved Solids Analysis Run 12/28/2020 5:10 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

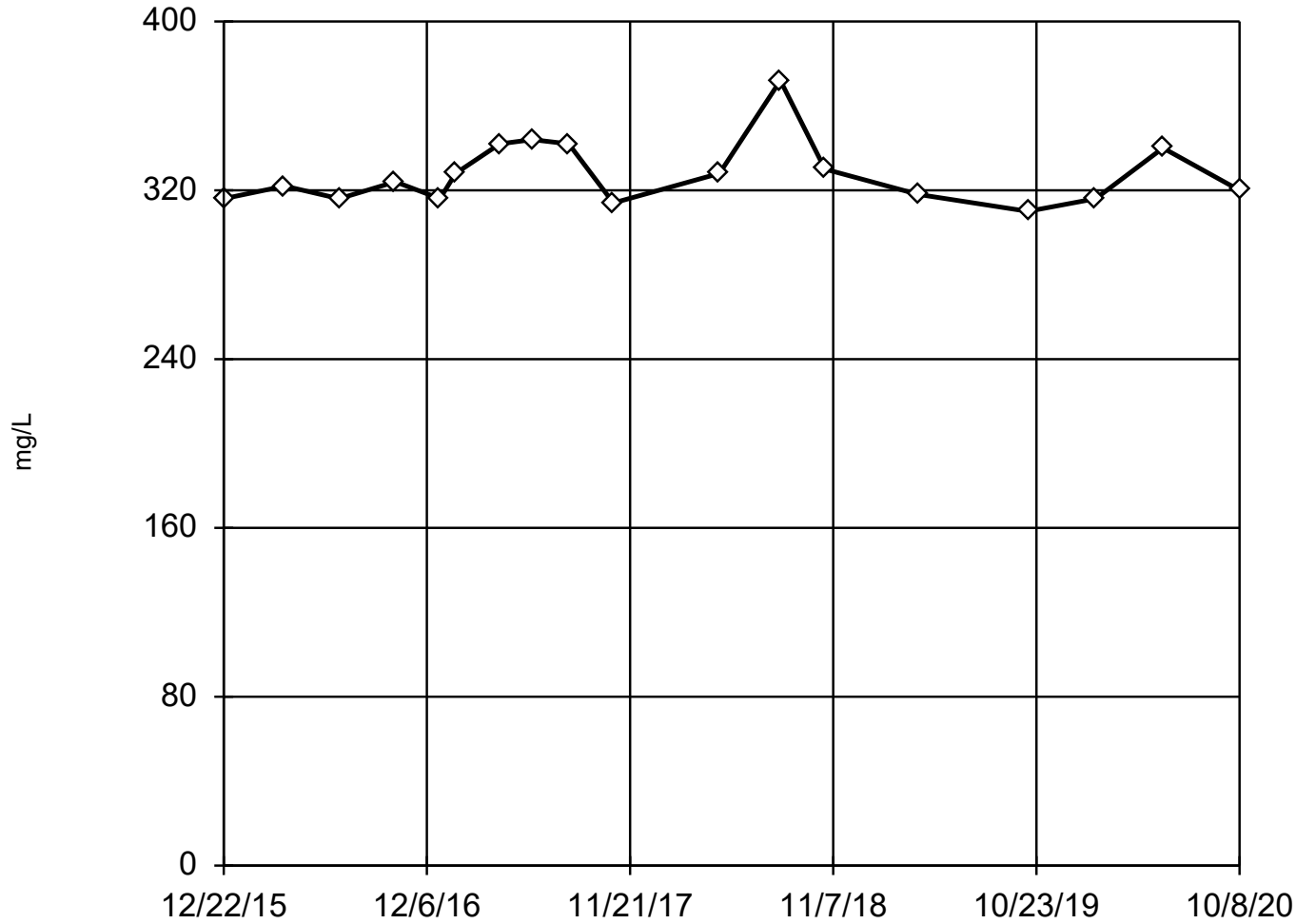
# Dixon's Outlier Test

Constituent: Total Dissolved Solids (mg/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	478
4/5/2016	486
7/8/2016	464
10/13/2016	490
12/29/2016	444
1/25/2017	514
4/11/2017	502
6/6/2017	458
8/8/2017	462
10/23/2017	362
4/25/2018	464
8/8/2018	502
10/24/2018	424
4/2/2019	462
10/9/2019	418
2/3/2020	462
5/29/2020	452
10/8/2020	412

### Tukey's Outlier Screening

MW-84A (bg)



n = 18

No outliers found.  
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 428.5, low cutoff = 251.5, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 12/28/2020 5:10 PM View: COL Secondary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

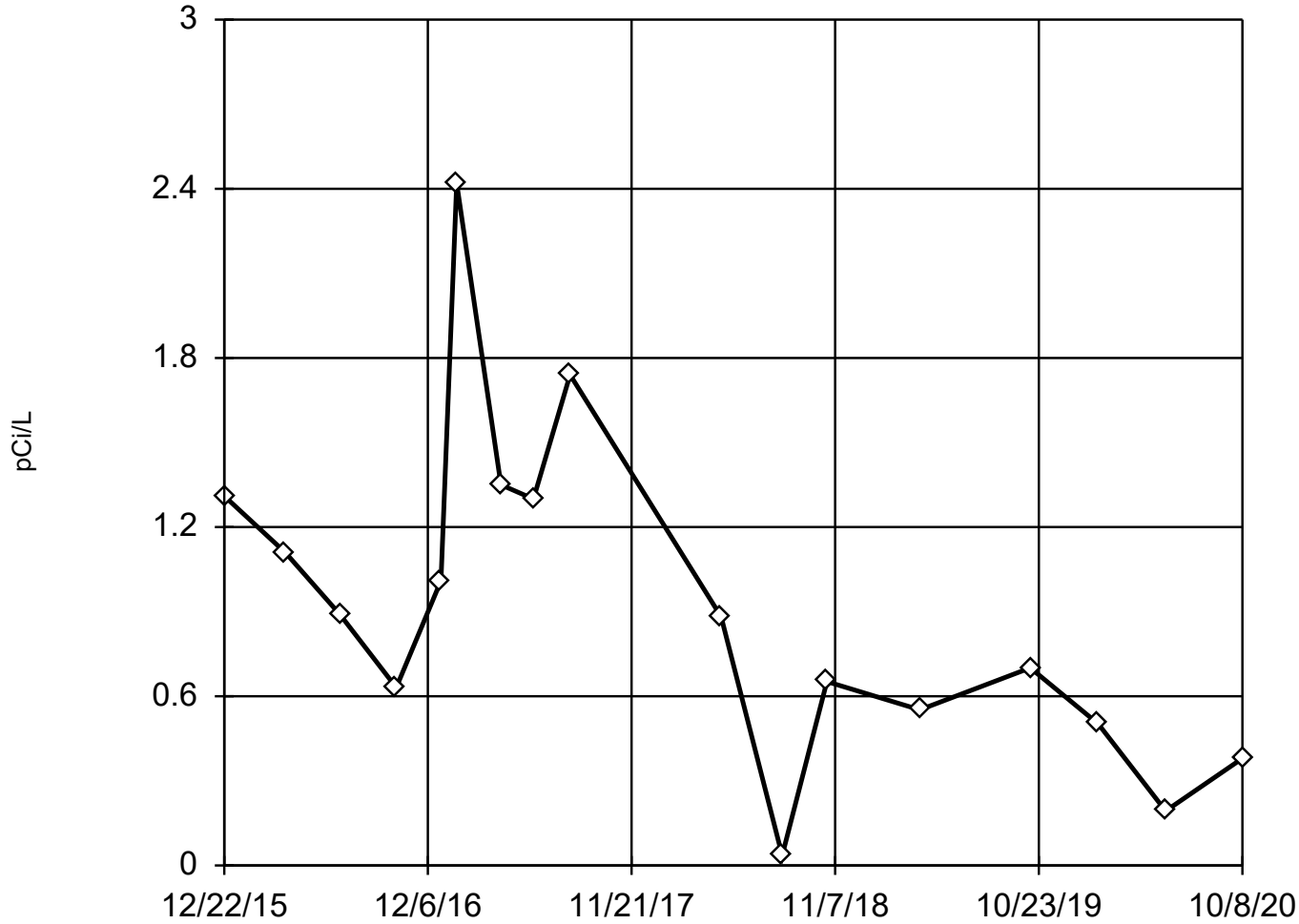
# Tukey's Outlier Screening

Constituent: Total Dissolved Solids (mg/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	316
4/5/2016	322
7/8/2016	316
10/13/2016	324
12/29/2016	316
1/25/2017	328
4/11/2017	342
6/6/2017	344
8/8/2017	342
10/24/2017	314
4/25/2018	328
8/8/2018	372
10/24/2018	330
4/3/2019	318
10/9/2019	310
2/3/2020	316
5/29/2020	340
10/8/2020	320

### Dixon's Outlier Test

MW-301 (bg)



n = 17

No statistical outliers.  
Testing for 1 low outlier.  
Mean = 0.9211.  
Std. Dev. = 0.5899.  
0.0351: c = 0.2623  
tab1 = 0.49.  
Alpha = 0.05.

Normality test used:  
Shapiro Wilk@alpha = 0.1  
Calculated = 0.9278  
Critical = 0.906  
The distribution was found to be normally distributed.

Constituent: Total Radium    Analysis Run 12/28/2020 5:10 PM    View: COL Secondary Pond  
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

# Dixon's Outlier Test

Constituent: Total Radium (pCi/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)
12/22/2015	1.31
4/5/2016	1.11
7/8/2016	0.89
10/13/2016	0.631
12/29/2016	1.01
1/25/2017	2.42
4/11/2017	1.35
6/6/2017	1.3
8/8/2017	1.74
4/25/2018	0.882
8/8/2018	0.0351
10/24/2018	0.652
4/2/2019	0.552
10/9/2019	0.701
2/3/2020	0.502
5/29/2020	0.193
10/8/2020	0.38





# Tukey's Outlier Screening

Constituent: Total Radium (pCi/L) Analysis Run 12/28/2020 5:12 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)
12/22/2015	0.593
4/5/2016	0.0809
7/28/2016	1.37
10/13/2016	0.825
12/29/2016	0.404
1/25/2017	1.39
4/11/2017	0.0929
6/6/2017	0.676
8/8/2017	0.509
4/25/2018	0.526
8/8/2018	0.529
10/24/2018	0.62
4/3/2019	0.681
10/9/2019	0.247
2/3/2020	0.1
5/29/2020	0.395
10/8/2020	0.39

## Attachment 3

### Interwell Prediction Limit Analysis Results – Appendix III Constituents

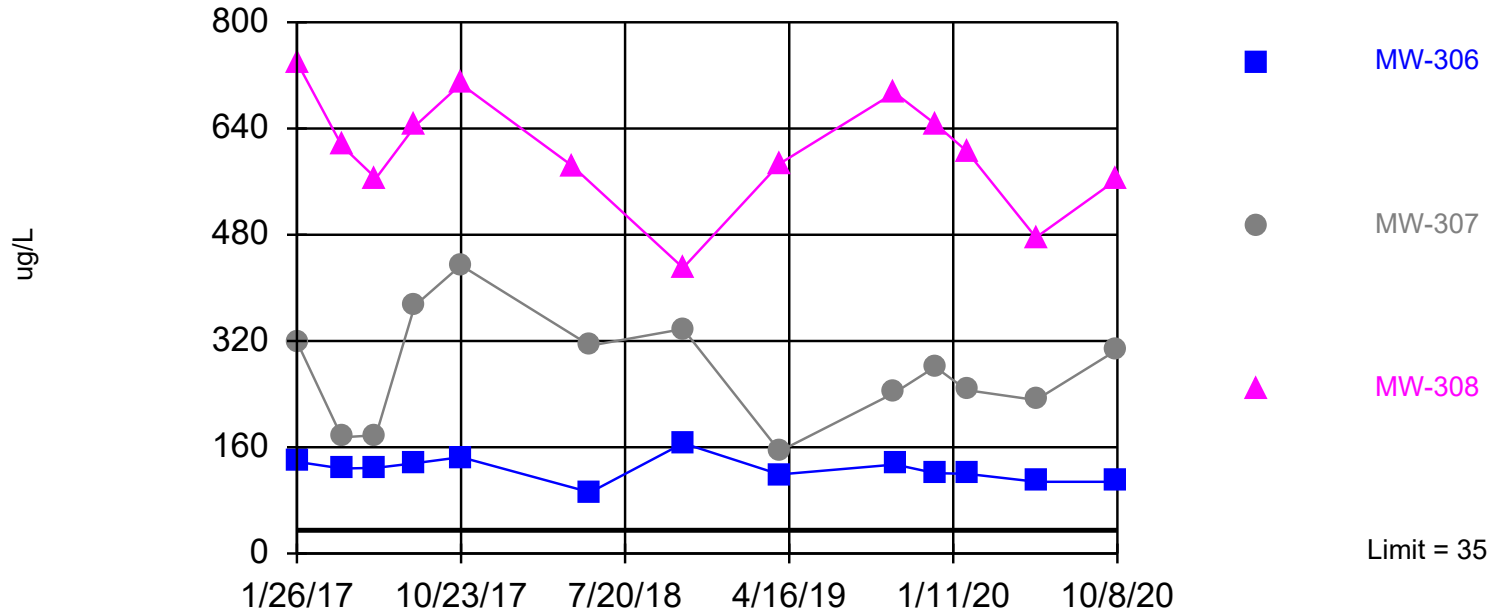
# Interwell Prediction Limit

Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020    Printed 12/28/2020, 3:59 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Wells</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
<b>Boron (ug/L)</b>	<b>MW-306</b>	<b>35</b>	<b>n/a</b>	<b>10/7/2020</b>	<b>108</b>	<b>Yes</b>	<b>36</b>	<b>MW-301,MW-84A</b>	<b>21.05</b>	<b>8.077</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002922</b>	Param 1 of 2
<b>Boron (ug/L)</b>	<b>MW-307</b>	<b>35</b>	<b>n/a</b>	<b>10/8/2020</b>	<b>307</b>	<b>Yes</b>	<b>36</b>	<b>MW-301,MW-84A</b>	<b>21.05</b>	<b>8.077</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002922</b>	Param 1 of 2
<b>Boron (ug/L)</b>	<b>MW-308</b>	<b>35</b>	<b>n/a</b>	<b>10/7/2020</b>	<b>563</b>	<b>Yes</b>	<b>36</b>	<b>MW-301,MW-84A</b>	<b>21.05</b>	<b>8.077</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002922</b>	Param 1 of 2
Calcium (ug/L)	MW-306	129000	n/a	10/7/2020	77900	No	36	MW-84A,MW-301	n/a	n/a	0	n/a	n/a	0.001409	NP (normality) 1 of 2
Calcium (ug/L)	MW-307	129000	n/a	10/8/2020	67800	No	36	MW-84A,MW-301	n/a	n/a	0	n/a	n/a	0.001409	NP (normality) 1 of 2
Calcium (ug/L)	MW-308	129000	n/a	10/7/2020	123000	No	36	MW-84A,MW-301	n/a	n/a	0	n/a	n/a	0.001409	NP (normality) 1 of 2
Chloride (mg/L)	MW-306	6.02	n/a	10/7/2020	0.63J	No	36	MW-301,MW-84A	3.728	1.328	0	None	No	0.002922	Param 1 of 2
<b>Chloride (mg/L)</b>	<b>MW-307</b>	<b>6.02</b>	<b>n/a</b>	<b>10/8/2020</b>	<b>12.1</b>	<b>Yes</b>	<b>36</b>	<b>MW-301,MW-84A</b>	<b>3.728</b>	<b>1.328</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002922</b>	Param 1 of 2
Chloride (mg/L)	MW-308	6.02	n/a	10/7/2020	1.1J	No	36	MW-301,MW-84A	3.728	1.328	0	None	No	0.002922	Param 1 of 2
Field pH (Std. Units)	MW-306	7.76	n/a	10/7/2020	7.25	No	37	MW-301,MW-84A	7.157	0.3479	0	None	No	0.002922	Param 1 of 2
Field pH (Std. Units)	MW-307	7.76	n/a	10/8/2020	7.28	No	37	MW-301,MW-84A	7.157	0.3479	0	None	No	0.002922	Param 1 of 2
Field pH (Std. Units)	MW-308	7.76	n/a	10/7/2020	7.09	No	37	MW-301,MW-84A	7.157	0.3479	0	None	No	0.002922	Param 1 of 2
Sulfate (mg/L)	MW-306	30.8	n/a	10/7/2020	8.4	No	36	MW-301,MW-84A	1.679	1.012	2.778	None	ln(x)	0.002922	Param 1 of 2
Sulfate (mg/L)	MW-307	30.8	n/a	10/8/2020	10.3	No	36	MW-301,MW-84A	1.679	1.012	2.778	None	ln(x)	0.002922	Param 1 of 2
Sulfate (mg/L)	MW-308	30.8	n/a	10/7/2020	0.52J	No	36	MW-301,MW-84A	1.679	1.012	2.778	None	ln(x)	0.002922	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-306	514	n/a	10/7/2020	322	No	36	MW-84A,MW-301	n/a	n/a	0	n/a	n/a	0.001409	NP (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-307	514	n/a	10/8/2020	334	No	36	MW-84A,MW-301	n/a	n/a	0	n/a	n/a	0.001409	NP (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-308	514	n/a	10/7/2020	490	No	36	MW-84A,MW-301	n/a	n/a	0	n/a	n/a	0.001409	NP (normality) 1 of 2

Exceeds Limit: MW-306, MW-307, MW-308

### Boron Interwell Parametric



Background Data Summary: Mean=21.05, Std. Dev.=8.077, n=36. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9147, critical = 0.912. Kappa = 1.726 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.008742. Individual comparison alpha = 0.002922. Comparing 3 points to limit.

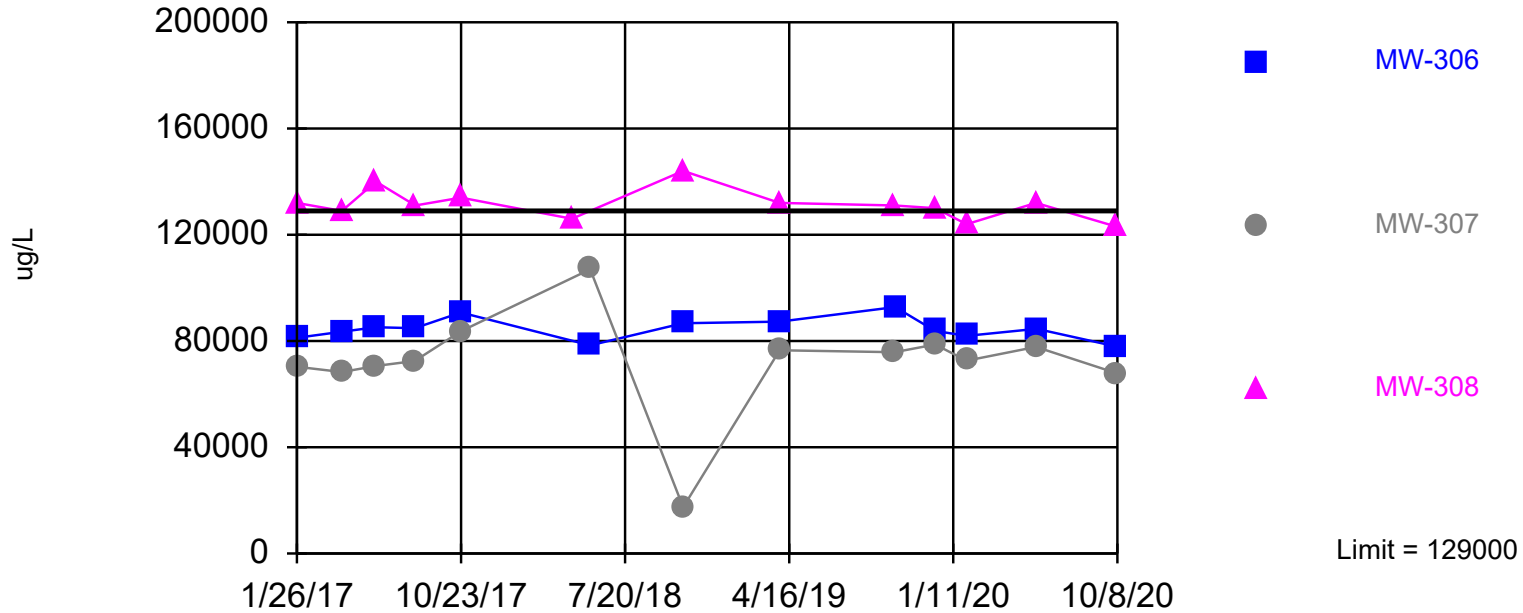
# Prediction Limit

Constituent: Boron (ug/L) Analysis Run 12/28/2020 3:59 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	26.5				11.9
4/5/2016	25.2				14
7/8/2016	23.6				14.7
10/13/2016	30.6				11.1
12/29/2016	32.8				14.7
1/25/2017	32.6				16.1
1/26/2017		138	319	740	
4/10/2017		128	175	614	
4/11/2017	28.8				12.9
6/5/2017		129	178	565	
6/6/2017	21.3				14.8
8/8/2017	30.6	136	373		22.9
8/9/2017				644	
10/23/2017	34.3	145	434	707	
10/24/2017					13.8
4/24/2018				584	
4/25/2018	24.3				25
5/24/2018		92	313		
8/8/2018	22.8				12.8
10/24/2018	27.8	166	338	430	10.1 (J)
4/1/2019		119	154	587	
4/2/2019	26.9				
4/3/2019					13.6
10/7/2019			242	694	
10/8/2019		134			
10/9/2019	35.9				12
12/13/2019		121	281	647	
2/3/2020	27.9	120	246	606	15.7
5/27/2020			231	476	
5/28/2020		108			
5/29/2020	21.3				10
10/7/2020		108		563	
10/8/2020	28.8		307		9.7 (J)

Within Limit

## Calcium Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 36 background values. Annual per-constituent alpha = 0.008426. Individual comparison alpha = 0.001409 (1 of 2). Comparing 3 points to limit. Seasonality was not detected with 95% confidence.

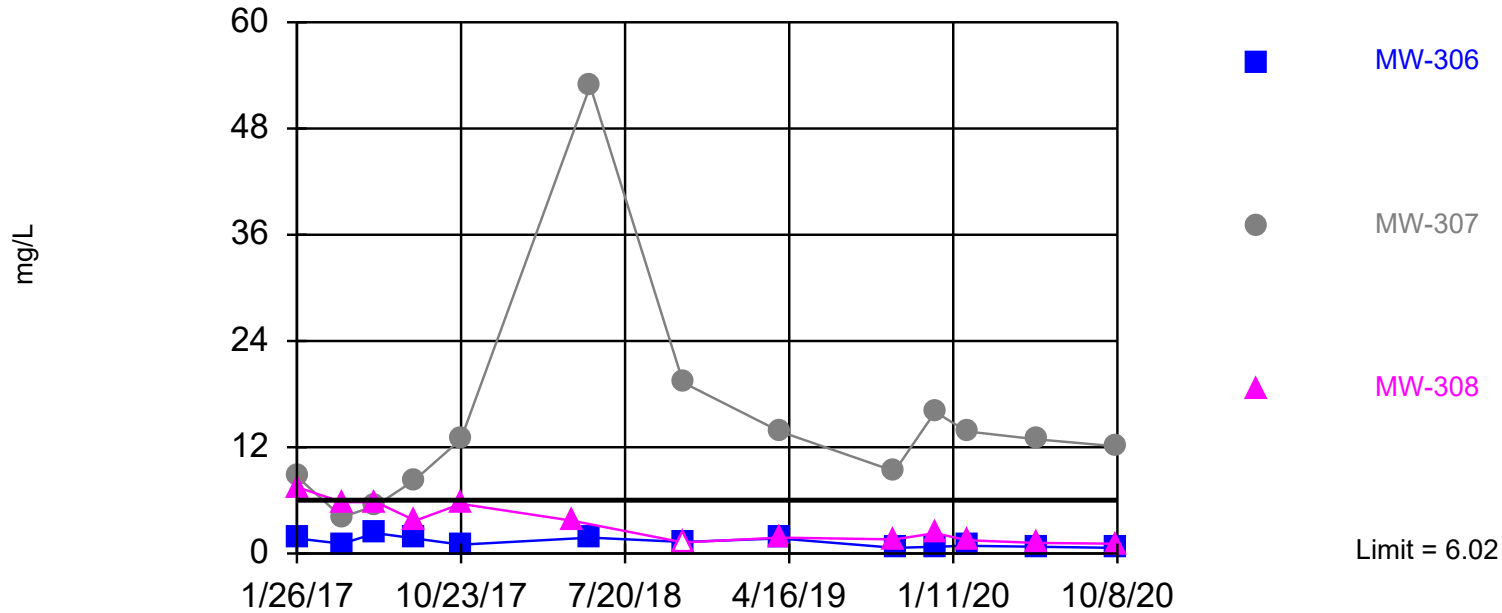
# Prediction Limit

Constituent: Calcium (ug/L) Analysis Run 12/28/2020 3:59 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-307	MW-306	MW-308
12/22/2015	126000	74000			
4/5/2016	115000	72200			
7/8/2016	108000	67600			
10/13/2016	118000	74000			
12/29/2016	129000	76000			
1/25/2017	124000	70800			
1/26/2017			70300	81200	132000
4/10/2017			68300	83500	129000
4/11/2017	120000	73200			
6/5/2017			70600	85200	140000
6/6/2017	111000	76100			
8/8/2017	108000	74900	72500	84800	
8/9/2017					131000
10/23/2017	87200		83700	90700	134000
10/24/2017		77500			
4/24/2018					126000
4/25/2018	112000	76600			
5/24/2018			107000	78400	
8/8/2018	105000	76000			
10/24/2018	101000	74000	17400	86700	144000
4/1/2019			76500	87300	132000
4/2/2019	126000				
4/3/2019		80100			
10/7/2019			75800		131000
10/8/2019				92800	
10/9/2019	114000	73500			
12/13/2019			78700	83800	130000
2/3/2020	113000	72700	72600	81900	124000
5/27/2020			77800		132000
5/28/2020				84600	
5/29/2020	112000	77600			
10/7/2020				77900	123000
10/8/2020	93000	69200	67800		

Exceeds Limit: MW-307

## Chloride Interwell Parametric



Background Data Summary: Mean=3.728, Std. Dev.=1.328, n=36. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9195, critical = 0.912. Kappa = 1.726 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.008742. Individual comparison alpha = 0.002922. Comparing 3 points to limit.



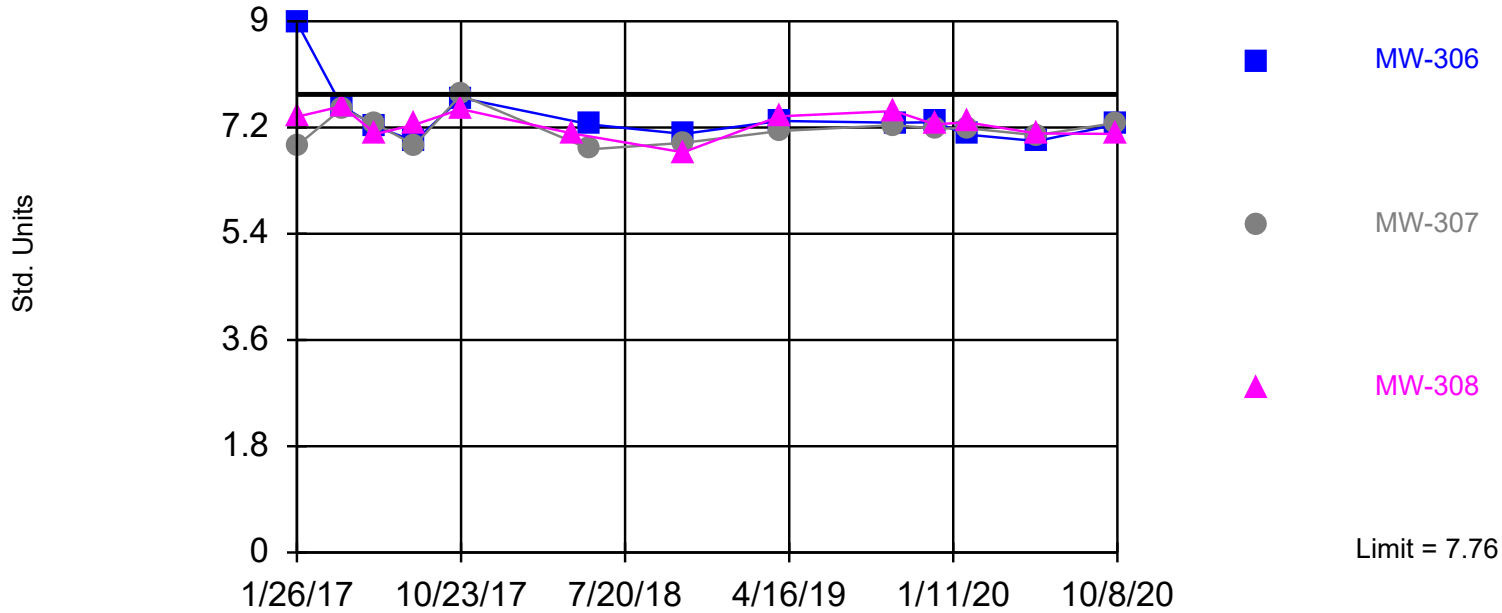
# Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 12/28/2020 3:59 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	3.7 (J)				4.9
4/5/2016	4				4.7
7/8/2016	3.5 (J)				5.1
10/13/2016	2.2				4.3
12/29/2016	2 (J)				4.7
1/25/2017	1.5 (J)				4.6
1/26/2017		1.7 (J)	8.7 (J)	7.5 (J)	
4/10/2017		1.1 (J)	4.1	5.8 (J)	
4/11/2017	2				4.9
6/5/2017		2.3	5.4	5.8 (J)	
6/6/2017	3.5				5.5
8/8/2017	5.5	1.7 (J)	8.3		5.5
8/9/2017				3.7	
10/23/2017	4	1 (J)	12.9	5.6 (J)	
10/24/2017					5.1
4/24/2018				3.7 (J)	
4/25/2018	2.3				4.8
5/24/2018		1.8 (J)	52.8		
8/8/2018	5.2				4.9
10/24/2018	3.2	1.3 (J)	19.3	<2.5 (U)	4.2
4/1/2019		1.7 (J)	13.8	1.8 (J)	
4/2/2019	0.79 (J)				
4/3/2019					3.6
10/7/2019			9.3	1.6 (J)	
10/8/2019		0.64 (J)			
10/9/2019	1.7 (J)				3.9
12/13/2019		0.76 (J)	16	2.3 (J)	
2/3/2020	1.3 (J)	0.88 (J)	13.8	1.5 (J)	3.7
5/27/2020			12.9	1.2 (J)	
5/28/2020		0.76 (J)			
5/29/2020	2 (J)				3.7
10/7/2020		0.63 (J)		1.1 (J)	
10/8/2020	3.4		12.1		4.3

Within Limit

### Field pH Interwell Parametric



Background Data Summary: Mean=7.157, Std. Dev.=0.3479, n=37. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9592, critical = 0.914. Kappa = 1.722 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.008742. Individual comparison alpha = 0.002922. Comparing 3 points to limit.

# Prediction Limit

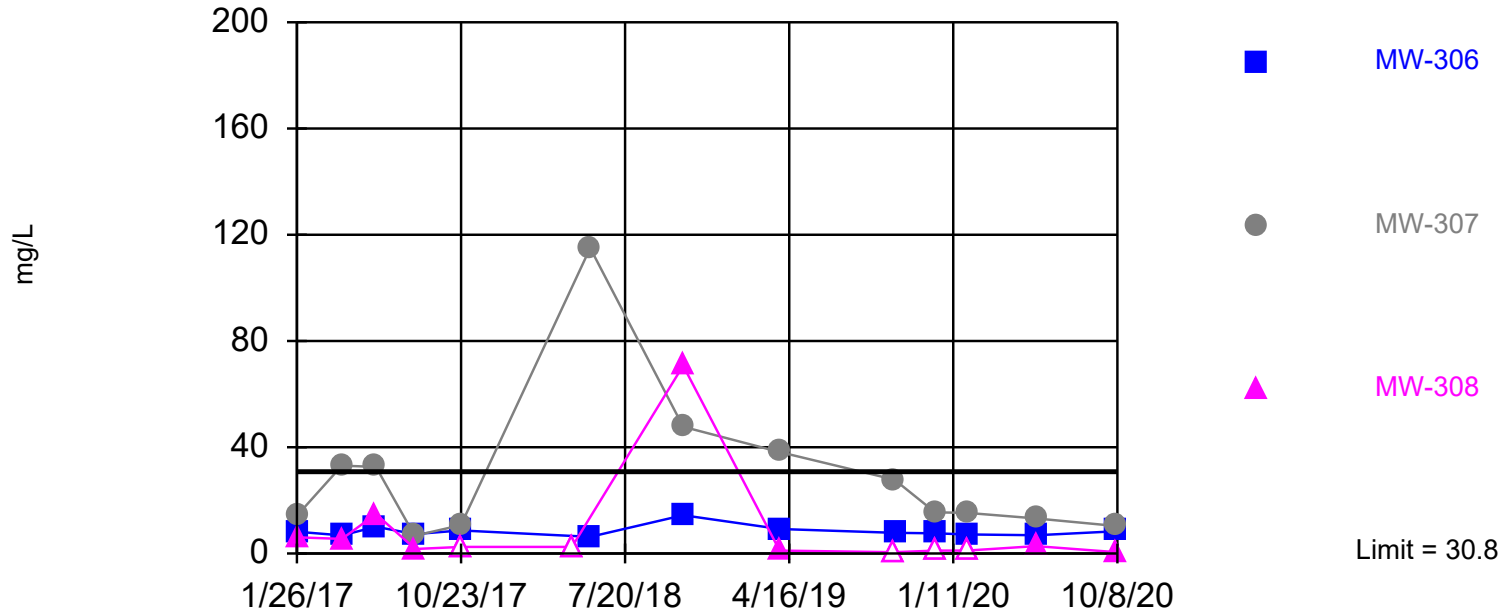
Constituent: Field pH (Std. Units) Analysis Run 12/28/2020 3:59 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	6.85				7.6
4/5/2016	7.01				7.61
7/8/2016	6.87				7.45
7/28/2016					7.34
10/13/2016	7.28				7.91
12/29/2016	6.63				7.25
1/25/2017	7.1				6.99
1/26/2017		8.98	6.89	7.38	
4/10/2017		7.56	7.52	7.56	
4/11/2017	7.11				7.8
6/5/2017		7.22	7.26	7.09	
6/6/2017	6.7				7.28
8/8/2017	6.75	6.96	6.9		7.23
8/9/2017				7.25	
10/23/2017	7.37	7.7	7.75	7.51	
10/24/2017					7.68
4/24/2018				7.1	
4/25/2018	6.76				7.45
5/24/2018		7.25	6.83		
8/8/2018	6.91				7.38
10/24/2018	6.79	7.09	6.94	6.78	7.24
4/1/2019		7.31	7.14	7.39	
4/2/2019	6.62				
4/3/2019					7.03
10/7/2019			7.24	7.48	
10/8/2019		7.28			
10/9/2019	6.67				7.23
12/13/2019		7.29	7.18	7.25	
2/3/2020	6.89	7.08	7.19	7.29	7.51
5/27/2020			7.07	7.1	
5/28/2020		6.97			
5/29/2020	6.73				7.34
10/7/2020		7.25		7.09	
10/8/2020	6.95		7.28		7.49

Within Limit

## Sulfate

### Interwell Parametric



Background Data Summary (based on natural log transformation): Mean=1.679, Std. Dev.=1.012, n=36, 2.778% NDs. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.936, critical = 0.912. Kappa = 1.726 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.008742. Individual comparison alpha = 0.002922. Comparing 3 points to limit.

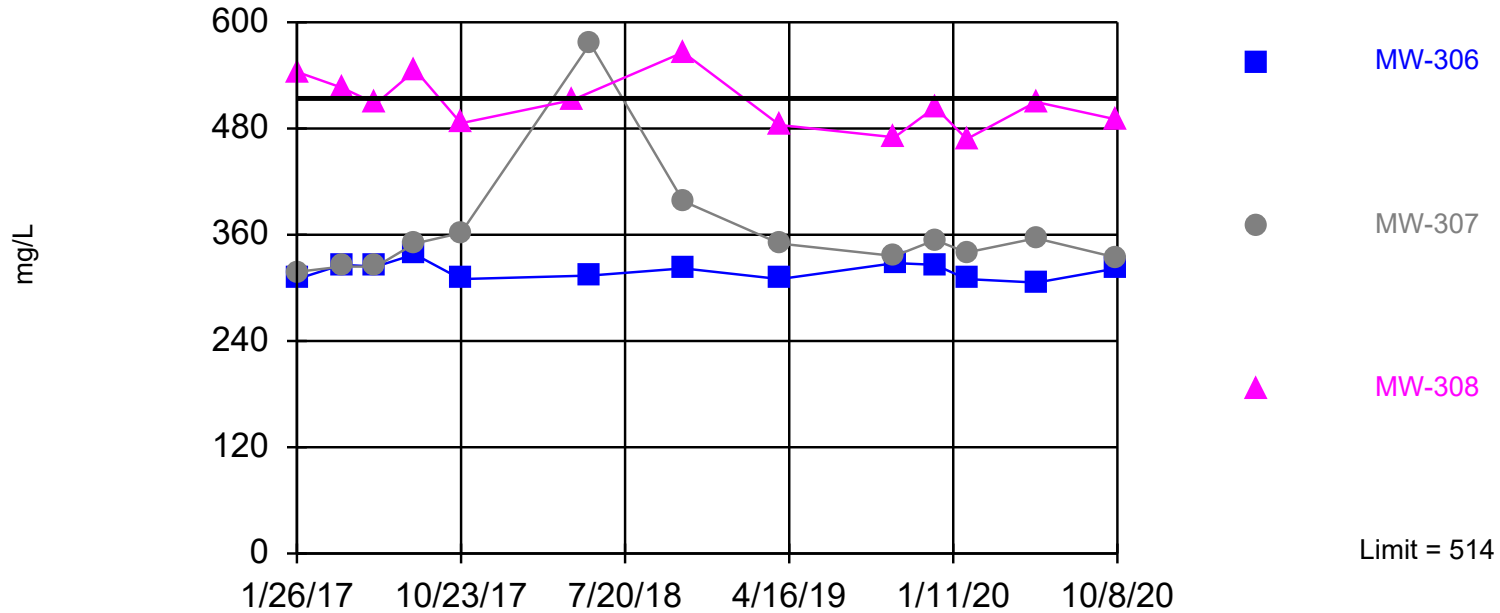
# Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 12/28/2020 3:59 PM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-306	MW-307	MW-308	MW-84A (bg)
12/22/2015	9.3				4.9
4/5/2016	15.3				4.3
7/8/2016	15				3.7 (J)
10/13/2016	13.9				2.6 (J)
12/29/2016	12.3 (J)				2.7 (J)
1/25/2017	6.5				3
1/26/2017		8.2	14.2 (J)	6.1 (J)	
4/10/2017		6.8	33.1	5.5 (J)	
4/11/2017	10.3				2.8 (J)
6/5/2017		10.1	32.6	14.8 (J)	
6/6/2017	17.1				2.7 (J)
8/8/2017	31.6	7.3	6.7		2 (J)
8/9/2017				1.7 (J)	
10/23/2017	27.5	8.7	10.7 (J)	<5 (U)	
10/24/2017					2.2 (J)
4/24/2018				<5 (U)	
4/25/2018	8.6				2.8 (J)
5/24/2018		6.3	115		
8/8/2018	21.6				1.9 (J)
10/24/2018	19.2	14.4	47.7	70.7	1.6 (J)
4/1/2019		9.2	38.2	1.1 (J)	
4/2/2019	4.4				
4/3/2019					1.4 (J)
10/7/2019			27.8	<1 (U)	
10/8/2019		7.8			
10/9/2019	8.4				1.3 (J)
12/13/2019		7.6	15.5	<2.2 (U)	
2/3/2020	7.2	7.2	15.3	<2.2 (U)	<2.2 (U)
5/27/2020			13.2	2.8	
5/28/2020		6.9			
5/29/2020	11.5				1.5 (J)
10/7/2020		8.4		0.52 (J)	
10/8/2020	25.1		10.3		1.3 (J)

Within Limit

## Total Dissolved Solids Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 36 background values. Annual per-constituent alpha = 0.008426. Individual comparison alpha = 0.001409 (1 of 2). Comparing 3 points to limit. Seasonality was not detected with 95% confidence.

# Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 12/28/2020 3:59 PM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-307	MW-306	MW-308
12/22/2015	478	316			
4/5/2016	486	322			
7/8/2016	464	316			
10/13/2016	490	324			
12/29/2016	444	316			
1/25/2017	514	328			
1/26/2017			318	310	544
4/10/2017			324	326	526
4/11/2017	502	342			
6/5/2017			324	324	508
6/6/2017	458	344			
8/8/2017	462	342	350	338	
8/9/2017					546
10/23/2017	362		362	310	486
10/24/2017		314			
4/24/2018					512
4/25/2018	464	328			
5/24/2018			576	314	
8/8/2018	502	372			
10/24/2018	424	330	398	322	566
4/1/2019			350	310	484
4/2/2019	462				
4/3/2019		318			
10/7/2019			336		470
10/8/2019				328	
10/9/2019	418	310			
12/13/2019			354	326	504
2/3/2020	462	316	340	310	468
5/27/2020			356		510
5/28/2020				306	
5/29/2020	452	340			
10/7/2020				322	490
10/8/2020	412	320	334		

## Attachment 4

### Interwell Prediction Limit Analysis Results – Appendix IV Constituents



# Interwell Prediction Limit

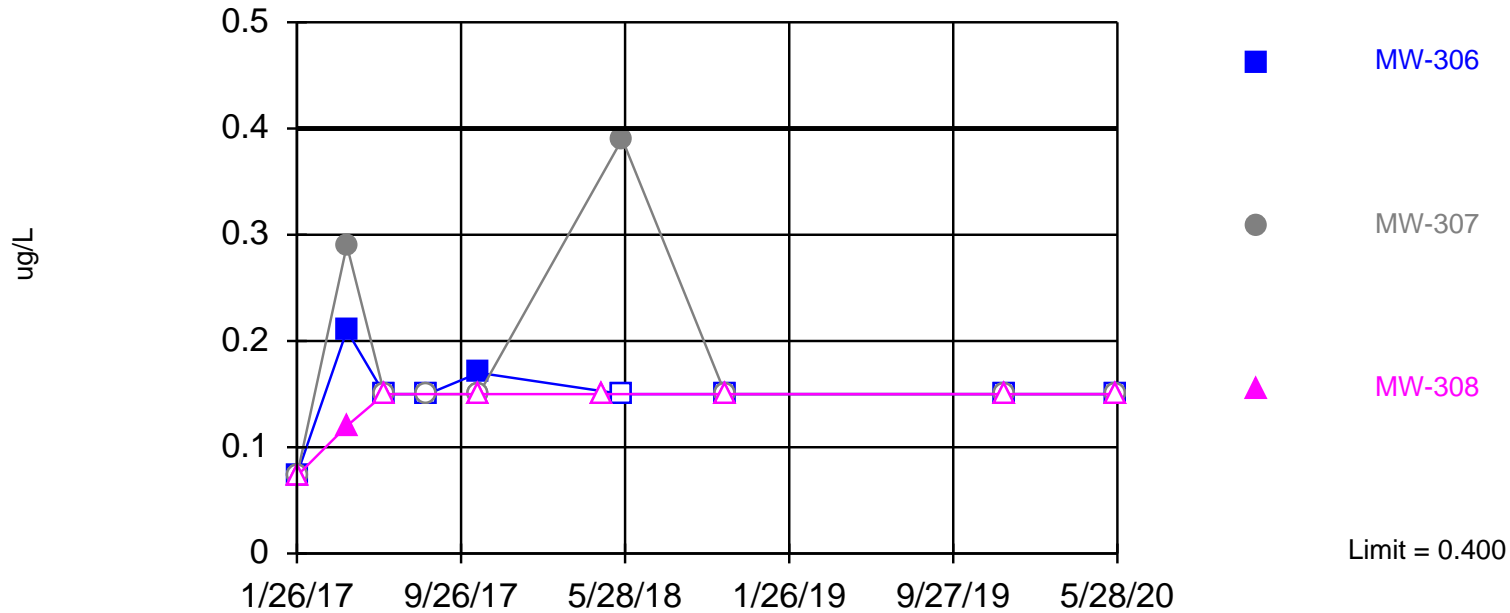
Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020    Printed 1/1/2021, 10:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Wells	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (ug/L)	MW-306	0.400	n/a	5/28/2020	0.15ND	No	32	MW-84A,MW-301	n/a	n/a	71.88	n/a	n/a	0.001772	NP (NDs) 1 of 2
Antimony (ug/L)	MW-307	0.400	n/a	5/27/2020	0.15ND	No	32	MW-84A,MW-301	n/a	n/a	71.88	n/a	n/a	0.001772	NP (NDs) 1 of 2
Antimony (ug/L)	MW-308	0.400	n/a	5/27/2020	0.15ND	No	32	MW-84A,MW-301	n/a	n/a	71.88	n/a	n/a	0.001772	NP (NDs) 1 of 2
Arsenic (ug/L)	MW-306	0.507	n/a	10/7/2020	0.28ND	No	34	MW-301,MW-84A	0.2558	0.1287	29.41	Kapla...	No	0.00135	Param 1 of 2
<b>Arsenic (ug/L)</b>	<b>MW-307</b>	<b>0.507</b>	<b>n/a</b>	<b>10/8/2020</b>	<b>2.7</b>	<b>Yes</b>	<b>34</b>	<b>MW-301,MW-84A</b>	<b>0.2558</b>	<b>0.1287</b>	<b>29.41</b>	<b>Kapla...</b>	<b>No</b>	<b>0.00135</b>	Param 1 of 2
<b>Arsenic (ug/L)</b>	<b>MW-308</b>	<b>0.507</b>	<b>n/a</b>	<b>10/7/2020</b>	<b>3.7</b>	<b>Yes</b>	<b>34</b>	<b>MW-301,MW-84A</b>	<b>0.2558</b>	<b>0.1287</b>	<b>29.41</b>	<b>Kapla...</b>	<b>No</b>	<b>0.00135</b>	Param 1 of 2
Barium (ug/L)	MW-306	16.9	n/a	10/7/2020	10.5	No	33	MW-301,MW-84A	12.89	2.033	0	None	No	0.00135	Param 1 of 2
Barium (ug/L)	MW-307	16.9	n/a	10/8/2020	13.8	No	33	MW-301,MW-84A	12.89	2.033	0	None	No	0.00135	Param 1 of 2
<b>Barium (ug/L)</b>	<b>MW-308</b>	<b>16.9</b>	<b>n/a</b>	<b>10/7/2020</b>	<b>61.5</b>	<b>Yes</b>	<b>33</b>	<b>MW-301,MW-84A</b>	<b>12.89</b>	<b>2.033</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.00135</b>	Param 1 of 2
Beryllium (ug/L)	MW-306	0.370	n/a	5/28/2020	0.25ND	No	32	MW-301,MW-84A	n/a	n/a	90.63	n/a	n/a	0.001772	NP (NDs) 1 of 2
Beryllium (ug/L)	MW-307	0.370	n/a	5/27/2020	0.25ND	No	32	MW-301,MW-84A	n/a	n/a	90.63	n/a	n/a	0.001772	NP (NDs) 1 of 2
Beryllium (ug/L)	MW-308	0.370	n/a	5/27/2020	0.25ND	No	32	MW-301,MW-84A	n/a	n/a	90.63	n/a	n/a	0.001772	NP (NDs) 1 of 2
Cadmium (ug/L)	MW-306	0.320	n/a	5/28/2020	0.15ND	No	30	MW-84A,MW-301	n/a	n/a	90	n/a	n/a	0.00197	NP (NDs) 1 of 2
Cadmium (ug/L)	MW-307	0.320	n/a	5/27/2020	0.15ND	No	30	MW-84A,MW-301	n/a	n/a	90	n/a	n/a	0.00197	NP (NDs) 1 of 2
Cadmium (ug/L)	MW-308	0.320	n/a	5/27/2020	0.15ND	No	30	MW-84A,MW-301	n/a	n/a	90	n/a	n/a	0.00197	NP (NDs) 1 of 2
Chromium (ug/L)	MW-306	2.36	n/a	10/7/2020	2J	No	34	MW-301,MW-84A	1.015	0.6871	29.41	Kapla...	No	0.00135	Param 1 of 2
Chromium (ug/L)	MW-307	2.36	n/a	10/8/2020	1ND	No	34	MW-301,MW-84A	1.015	0.6871	29.41	Kapla...	No	0.00135	Param 1 of 2
Chromium (ug/L)	MW-308	2.36	n/a	10/7/2020	1ND	No	34	MW-301,MW-84A	1.015	0.6871	29.41	Kapla...	No	0.00135	Param 1 of 2
Cobalt (ug/L)	MW-306	0.380	n/a	10/7/2020	0.12ND	No	33	MW-84A,MW-301	n/a	n/a	57.58	n/a	n/a	0.001673	NP (NDs) 1 of 2
Cobalt (ug/L)	MW-307	0.380	n/a	10/8/2020	0.61J	No	33	MW-84A,MW-301	n/a	n/a	57.58	n/a	n/a	0.001673	NP (NDs) 1 of 2
Cobalt (ug/L)	MW-308	0.380	n/a	10/7/2020	0.12ND	No	33	MW-84A,MW-301	n/a	n/a	57.58	n/a	n/a	0.001673	NP (NDs) 1 of 2
Lead (ug/L)	MW-306	0.900	n/a	5/28/2020	0.24ND	No	30	MW-301,MW-84A	n/a	n/a	63.33	n/a	n/a	0.00197	NP (NDs) 1 of 2
Lead (ug/L)	MW-307	0.900	n/a	5/27/2020	0.24ND	No	30	MW-301,MW-84A	n/a	n/a	63.33	n/a	n/a	0.00197	NP (NDs) 1 of 2
Lead (ug/L)	MW-308	0.900	n/a	5/27/2020	0.24ND	No	30	MW-301,MW-84A	n/a	n/a	63.33	n/a	n/a	0.00197	NP (NDs) 1 of 2
<b>Lithium (ug/L)</b>	<b>MW-306</b>	<b>0.827</b>	<b>n/a</b>	<b>10/7/2020</b>	<b>4.4</b>	<b>Yes</b>	<b>33</b>	<b>MW-301,MW-84A</b>	<b>0.5791</b>	<b>0.1267</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.00135</b>	Param 1 of 2
Lithium (ug/L)	MW-307	0.827	n/a	10/8/2020	0.11ND	No	33	MW-301,MW-84A	0.5791	0.1267	0	None	No	0.00135	Param 1 of 2
Lithium (ug/L)	MW-308	0.827	n/a	10/7/2020	0.11ND	No	33	MW-301,MW-84A	0.5791	0.1267	0	None	No	0.00135	Param 1 of 2
<b>Molybdenum (ug/L)</b>	<b>MW-306</b>	<b>0.440</b>	<b>n/a</b>	<b>10/7/2020</b>	<b>7.1</b>	<b>Yes</b>	<b>34</b>	<b>MW-84A,MW-301</b>	<b>n/a</b>	<b>n/a</b>	<b>79.41</b>	<b>n/a</b>	<b>n/a</b>	<b>0.001574</b>	NP (NDs) 1 of 2
Molybdenum (ug/L)	MW-307	0.440	n/a	10/8/2020	0.64J	No	34	MW-84A,MW-301	n/a	n/a	79.41	n/a	n/a	0.001574	NP (NDs) 1 of 2
Molybdenum (ug/L)	MW-308	0.440	n/a	10/7/2020	1.1J	No	34	MW-84A,MW-301	n/a	n/a	79.41	n/a	n/a	0.001574	NP (NDs) 1 of 2
Selenium (ug/L)	MW-306	0.710	n/a	10/7/2020	0.69J	No	34	MW-84A,MW-301	n/a	n/a	82.35	n/a	n/a	0.001574	NP (NDs) 1 of 2
Selenium (ug/L)	MW-307	0.710	n/a	10/8/2020	0.32ND	No	34	MW-84A,MW-301	n/a	n/a	82.35	n/a	n/a	0.001574	NP (NDs) 1 of 2
Selenium (ug/L)	MW-308	0.710	n/a	10/7/2020	0.32ND	No	34	MW-84A,MW-301	n/a	n/a	82.35	n/a	n/a	0.001574	NP (NDs) 1 of 2
Thallium (ug/L)	MW-306	0.480	n/a	5/28/2020	0.14ND	No	34	MW-301,MW-84A	n/a	n/a	88.24	n/a	n/a	0.001574	NP (NDs) 1 of 2
Thallium (ug/L)	MW-307	0.480	n/a	5/27/2020	0.14ND	No	34	MW-301,MW-84A	n/a	n/a	88.24	n/a	n/a	0.001574	NP (NDs) 1 of 2
Thallium (ug/L)	MW-308	0.480	n/a	5/27/2020	0.14ND	No	34	MW-301,MW-84A	n/a	n/a	88.24	n/a	n/a	0.001574	NP (NDs) 1 of 2
Total Radium (pCi/L)	MW-306	1.76	n/a	10/7/2020	0.721	No	34	MW-301,MW-84A	0.7379	0.5222	0	None	No	0.00135	Param 1 of 2
Total Radium (pCi/L)	MW-307	1.76	n/a	10/8/2020	0.636	No	34	MW-301,MW-84A	0.7379	0.5222	0	None	No	0.00135	Param 1 of 2
Total Radium (pCi/L)	MW-308	1.76	n/a	10/7/2020	1.03	No	34	MW-301,MW-84A	0.7379	0.5222	0	None	No	0.00135	Param 1 of 2

Within Limit

## Antimony

### Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 32 background values. 71.88% NDs. Annual per-constituent alpha = 0.01059. Individual comparison alpha = 0.001772 (1 of 2). Comparing 3 points to limit.

# Prediction Limit

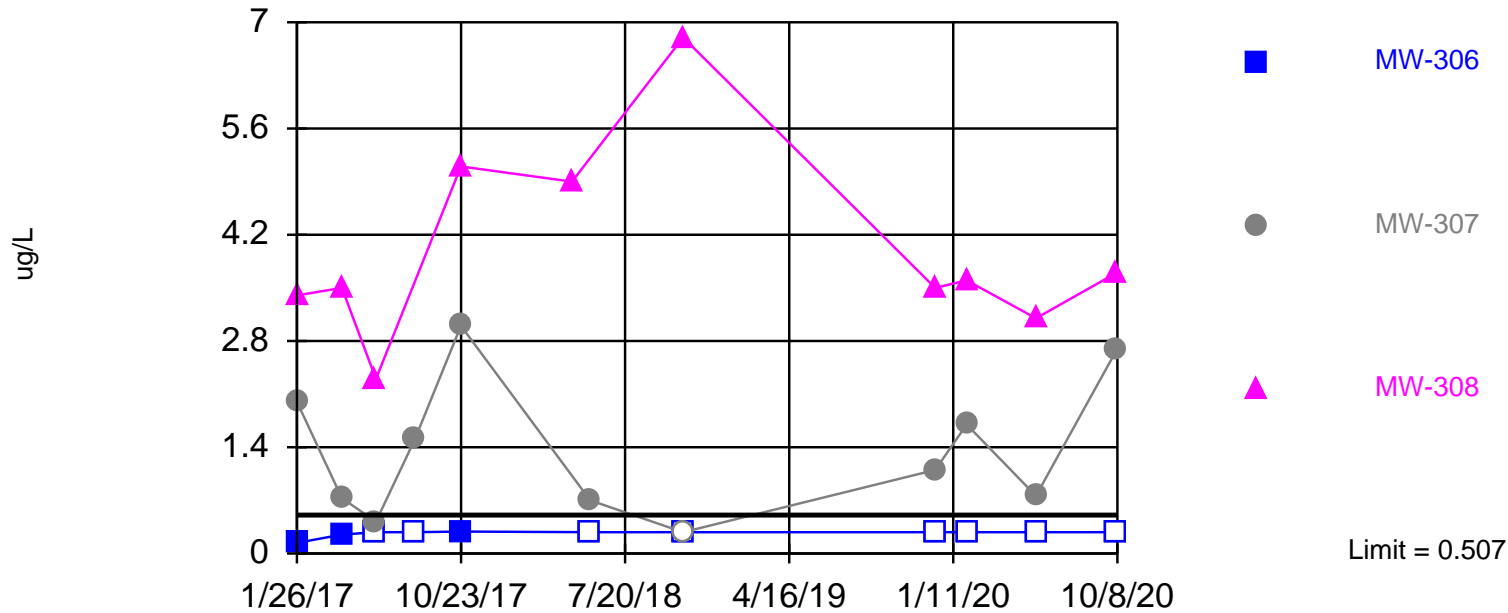
Constituent: Antimony (ug/L)    Analysis Run 1/1/2021 10:58 AM    View: COL Secondary Pond  
 Columbia Energy Center    Client: SCS Engineers    Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-307	MW-308	MW-306
12/22/2015	0.15 (J)	<0.073 (U)			
4/5/2016	0.094 (J)	0.084 (J)			
7/8/2016	0.13 (J)	0.1 (J)			
10/13/2016	<0.073 (U)	<0.073 (U)			
12/29/2016	0.4 (J)	<0.073 (U)			
1/25/2017	<0.073 (U)	<0.073 (U)			
1/26/2017			<0.073 (U)	<0.073 (U)	0.074 (J)
4/10/2017			0.29 (J)	0.12 (J)	0.21 (J)
4/11/2017	<0.073 (U)	<0.073 (U)			
6/5/2017			<0.15 (U)	<0.15 (U)	<0.15 (U)
6/6/2017	<0.15 (U)	<0.15 (U)			
8/8/2017	<0.15 (U)	<0.15 (U)	<0.15 (U)		<0.15 (U)
10/23/2017			<0.15 (U)	<0.15 (U)	0.17 (J)
4/24/2018				<0.15 (U)	
4/25/2018	<0.15 (U)	<0.15 (U)			
5/24/2018			0.39 (J)		<0.15 (U)
8/8/2018	0.36 (J)	<0.15 (U)			
10/24/2018	<0.15 (U)	<0.15 (U)	<0.15 (U)	<0.15 (U)	<0.15 (U)
4/2/2019	0.32 (J)				
4/3/2019		<0.15 (U)			
10/9/2019	<0.15 (U)	<0.15 (U)			
12/13/2019			<0.15 (U)	<0.15 (U)	<0.15 (U)
5/27/2020			<0.15 (U)	<0.15 (U)	
5/28/2020					<0.15 (U)
5/29/2020	<0.15 (U)	<0.15 (U)			
10/8/2020	0.33 (J)	<0.15 (U)			

Exceeds Limit: MW-307, MW-308

## Arsenic

### Interwell Parametric



Background Data Summary (after Kaplan-Meier Adjustment): Mean=0.2558, Std. Dev.=0.1287, n=34, 29.41% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9553, critical = 0.908. Kappa = 1.953 (c=13, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.004044. Individual comparison alpha = 0.00135. Comparing 3 points to limit.

# Prediction Limit

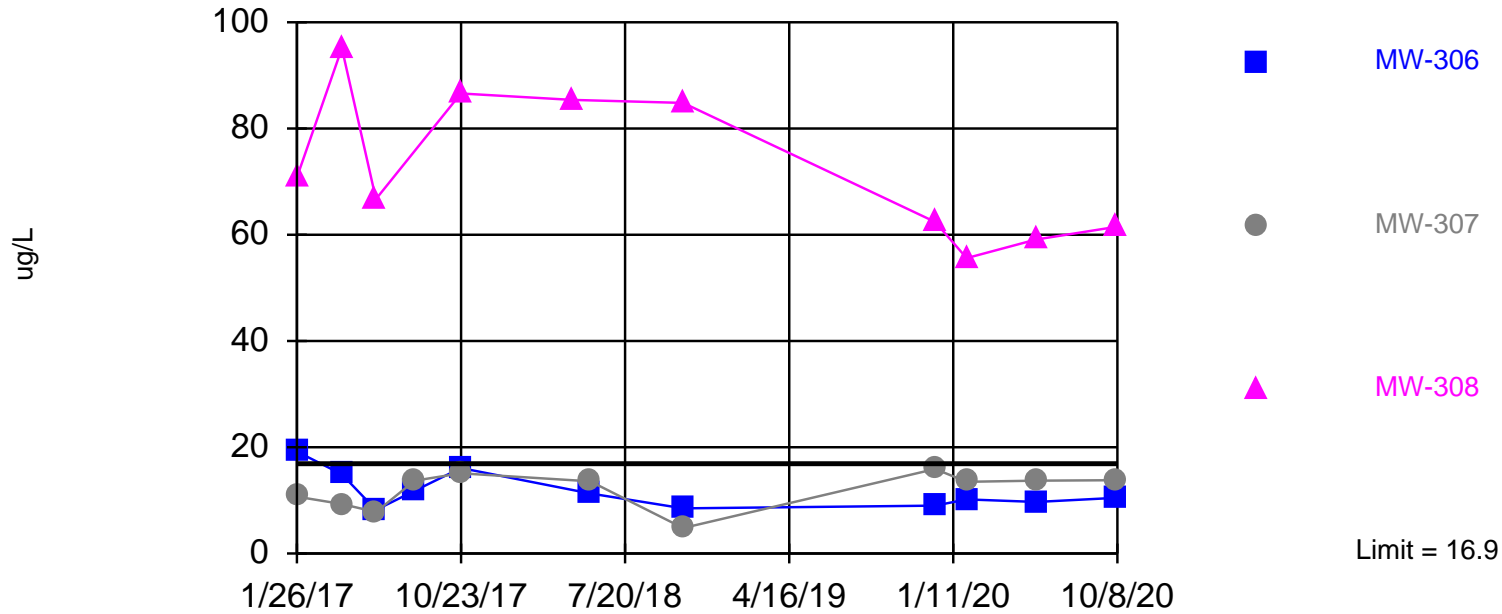
Constituent: Arsenic (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-308	MW-306	MW-307
12/22/2015	0.26 (J)	0.15 (J)			
4/5/2016	0.26 (J)	0.29 (J)			
7/8/2016	0.19 (J)	0.14 (J)			
10/13/2016	0.24 (J)	0.35 (J)			
12/29/2016	0.4 (J)	0.19 (J)			
1/25/2017	0.13 (J)	0.35 (J)			
1/26/2017			3.4	0.14 (J)	2
4/10/2017			3.5	0.25 (J)	0.73 (J)
4/11/2017	0.18 (J)	<0.099 (U)			
6/5/2017			2.3	<0.28 (U)	0.42 (J)
6/6/2017	<0.28 (U)	<0.28 (U)			
8/8/2017	<0.28 (U)	0.28 (J)		<0.28 (U)	1.5
10/23/2017			5.1	0.29 (J)	3
4/24/2018			4.9		
4/25/2018	<0.28 (U)	<0.28 (U)			
5/24/2018				<0.28 (U)	0.7 (J)
8/8/2018	0.45 (J)	<0.28 (U)			
10/24/2018	<0.28 (U)	0.33 (J)	6.8	<0.28 (U)	<0.28 (U)
4/2/2019	0.4 (J)				
4/3/2019		<0.28 (U)			
10/9/2019	0.42 (J)	0.46 (J)			
12/13/2019			3.5	<0.28 (U)	1.1
2/3/2020	<0.28 (U)	0.38 (J)	3.6	<0.28 (U)	1.7
5/27/2020			3.1		0.76 (J)
5/28/2020				<0.28 (U)	
5/29/2020	0.33 (J)	0.34 (J)			
10/7/2020			3.7	<0.28 (U)	
10/8/2020	0.62 (J)	0.49 (J)			2.7

Exceeds Limit: MW-308

# Barium

## Interwell Parametric



Background Data Summary: Mean=12.89, Std. Dev.=2.033, n=33. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9665, critical = 0.906. Kappa = 1.959 (c=13, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.004044. Individual comparison alpha = 0.00135. Comparing 3 points to limit.

# Prediction Limit

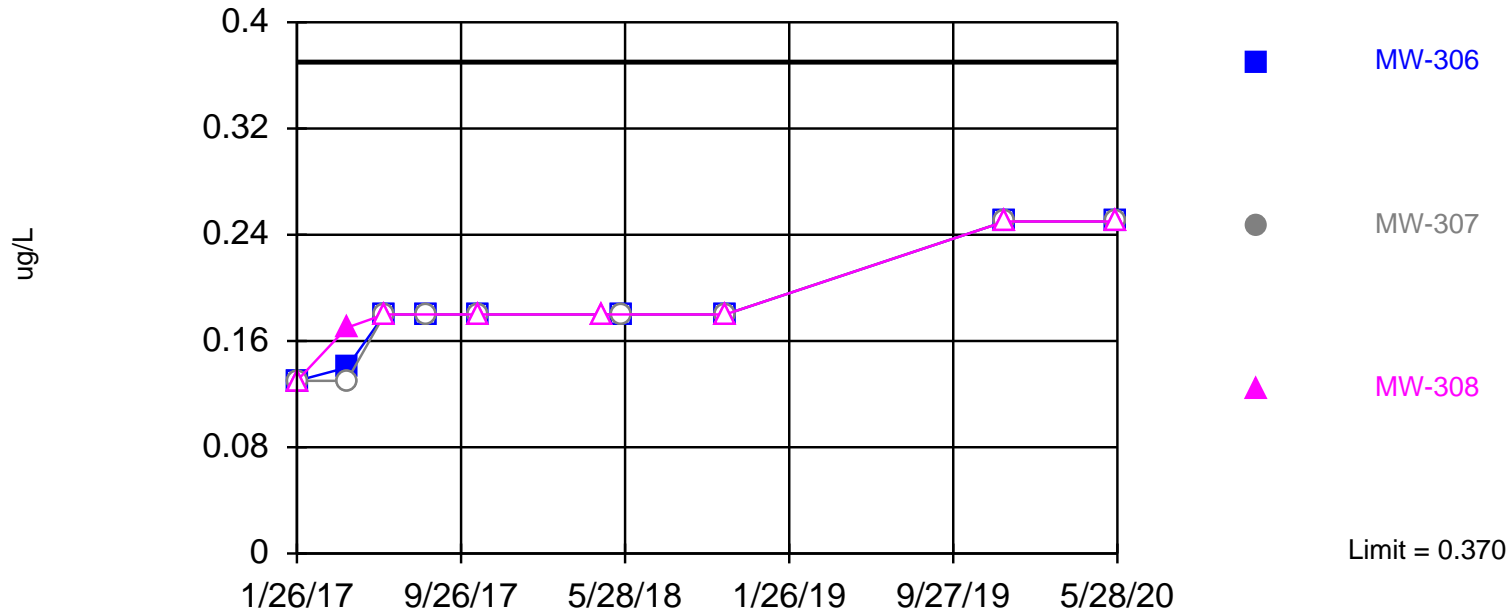
Constituent: Barium (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)	MW-301 (bg)	MW-307	MW-306	MW-308
12/22/2015	15.3	20.2 (X)			
4/5/2016	12.7	11.1			
7/8/2016	12.2	11.6			
10/13/2016	14.2	15.6			
12/29/2016	18.4	15			
1/25/2017	13.8	13.5			
1/26/2017			10.7	19.2	70.8
4/10/2017			9.3	14.9	95.1
4/11/2017	14.1	13.2			
6/5/2017			7.8	8.2	66.7
6/6/2017	13.4	11.3			
8/8/2017	14	11.8	13.7	11.8	
10/23/2017			15.1	16.1	86.6
4/24/2018					85.4
4/25/2018	14.6	9.3			
5/24/2018			13.6	11.3	
8/8/2018	13.7	10.2			
10/24/2018	14.5	11.5	4.8 (J)	8.5	84.8
4/2/2019		11.8			
4/3/2019	14.7				
10/9/2019	13.2	10			
12/13/2019			15.9	9	62.4
2/3/2020	14	10.9	13.5	10.2	55.6
5/27/2020			13.7		59.1
5/28/2020				9.7	
5/29/2020	13.9	9.8			
10/7/2020				10.5	61.5
10/8/2020	12.6	9.4	13.8		

Within Limit

# Beryllium

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 32 background values. 90.63% NDs. Annual per-constituent alpha = 0.01059. Individual comparison alpha = 0.001772 (1 of 2). Comparing 3 points to limit.



# Prediction Limit

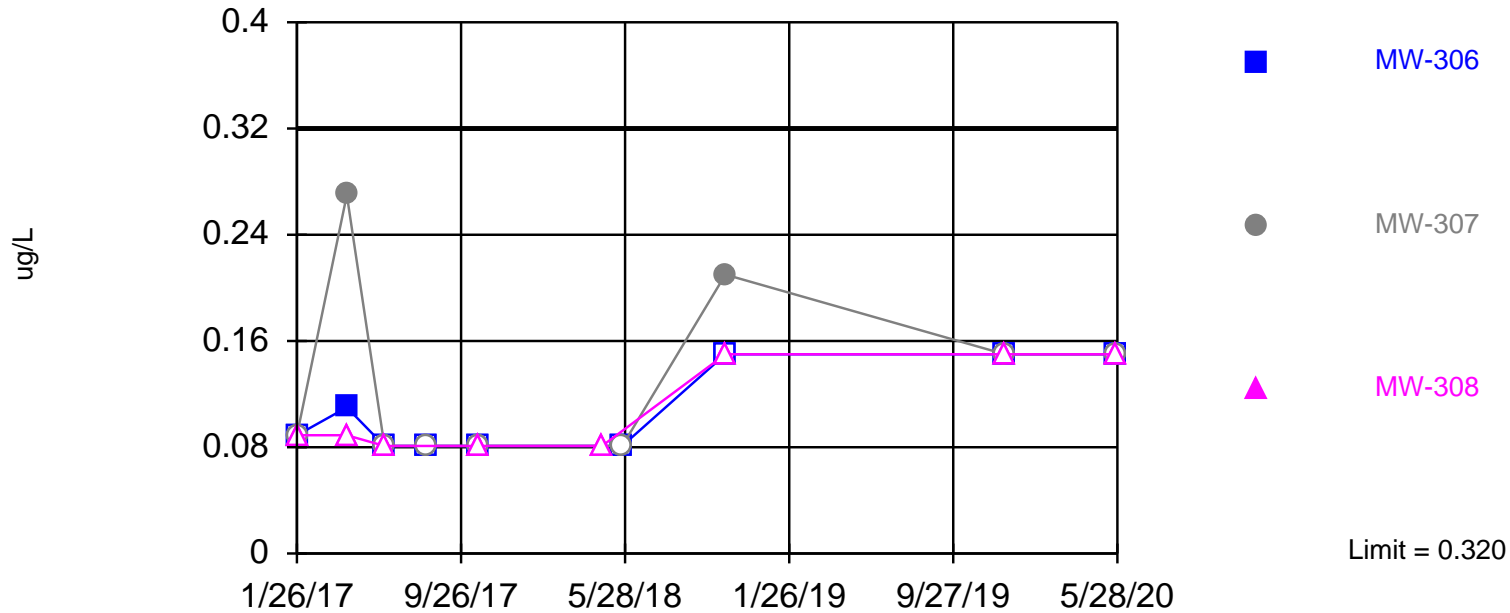
Constituent: Beryllium (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-307	MW-308	MW-306
12/22/2015	<0.13 (U)	<0.13 (U)			
4/5/2016	<0.13 (U)	<0.13 (U)			
7/8/2016	<0.13 (U)	<0.13 (U)			
10/13/2016	<0.13 (U)	<0.13 (U)			
12/29/2016	0.19 (J)	<0.13 (U)			
1/25/2017	<0.13 (U)	<0.13 (U)			
1/26/2017			<0.13 (U)	<0.13 (U)	<0.13 (U)
4/10/2017			<0.13 (U)	0.17 (J)	0.14 (J)
4/11/2017	<0.13 (U)	<0.13 (U)			
6/5/2017			<0.18 (U)	<0.18 (U)	<0.18 (U)
6/6/2017	<0.18 (U)	<0.18 (U)			
8/8/2017	<0.18 (U)	<0.18 (U)	<0.18 (U)		<0.18 (U)
10/23/2017			<0.18 (U)	<0.18 (U)	<0.18 (U)
4/24/2018				<0.18 (U)	
4/25/2018	<0.18 (U)	<0.18 (U)			
5/24/2018			<0.18 (U)		<0.18 (U)
8/8/2018	0.37 (J)	<0.18 (U)			
10/24/2018	<0.18 (U)	<0.18 (U)	<0.18 (U)	<0.18 (U)	<0.18 (U)
4/2/2019	0.28 (J)				
4/3/2019		<0.18 (U)			
10/9/2019	<0.25 (U)	<0.25 (U)			
12/13/2019			<0.25 (U)	<0.25 (U)	<0.25 (U)
5/27/2020			<0.25 (U)	<0.25 (U)	
5/28/2020					<0.25 (U)
5/29/2020	<0.25 (U)	<0.25 (U)			
10/8/2020	<0.25 (U)	<0.25 (U)			

Within Limit

# Cadmium

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 30 background values. 90% NDs. Annual per-constituent alpha = 0.01176. Individual comparison alpha = 0.00197 (1 of 2). Comparing 3 points to limit.

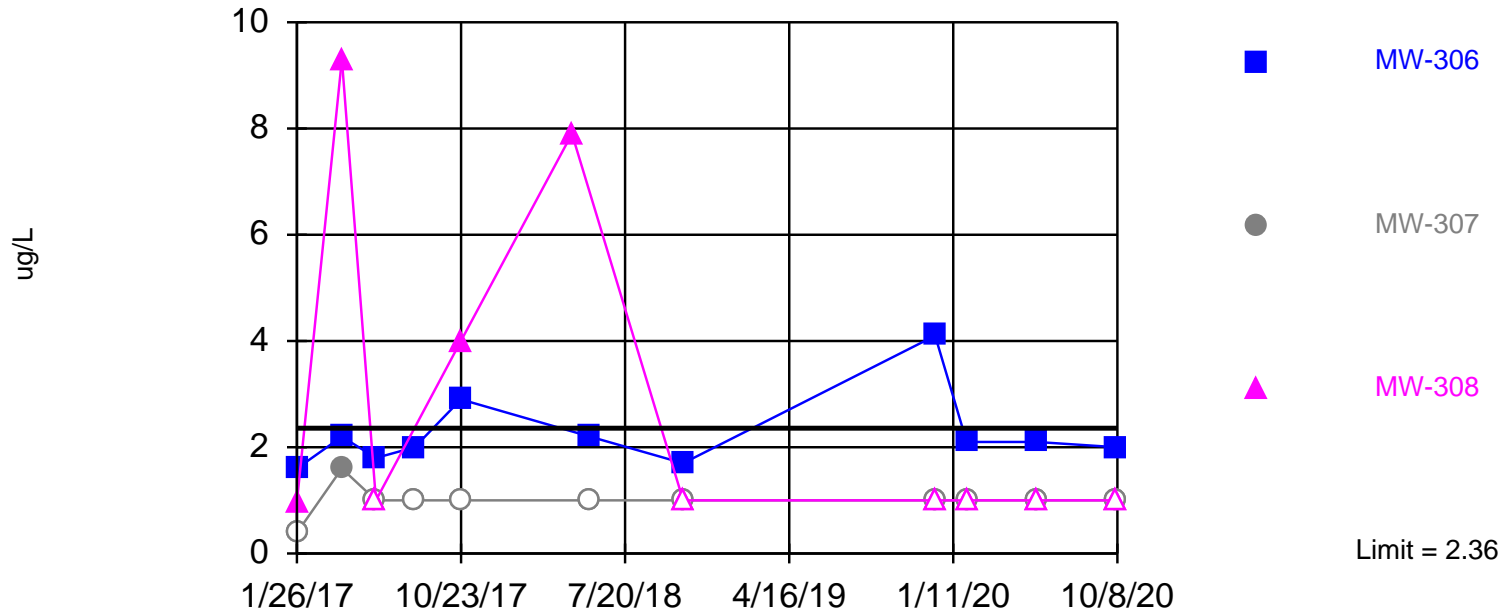
# Prediction Limit

Constituent: Cadmium (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-307	MW-306	MW-308
12/22/2015	<0.089 (U)	<0.089 (U)			
4/5/2016	<0.089 (U)	<0.089 (U)			
7/8/2016	<0.089 (U)	<0.089 (U)			
10/13/2016	<0.089 (U)	<0.089 (U)			
12/29/2016	0.32 (J)	<0.089 (U)			
1/25/2017	<0.089 (U)	<0.089 (U)			
1/26/2017			<0.089 (U)	<0.089 (U)	<0.089 (U)
4/10/2017			0.27 (J)	0.11 (J)	<0.089 (U)
4/11/2017	<0.089 (U)	<0.089 (U)			
6/5/2017			<0.081 (U)	<0.081 (U)	<0.081 (U)
6/6/2017	<0.081 (U)	<0.081 (U)			
8/8/2017	<0.081 (U)	<0.081 (U)	<0.081 (U)	<0.081 (U)	
10/23/2017			<0.081 (U)	<0.081 (U)	<0.081 (U)
4/24/2018					<0.081 (U)
4/25/2018	<0.081 (U)	<0.081 (U)			
5/24/2018			<0.081 (U)	<0.081 (U)	
10/24/2018	<0.15 (U)	<0.15 (U)	0.21 (J)	<0.15 (U)	<0.15 (U)
4/2/2019	0.21 (J)				
4/3/2019		<0.15 (U)			
10/9/2019	<0.15 (U)	<0.15 (U)			
12/13/2019			<0.15 (U)	<0.15 (U)	<0.15 (U)
5/27/2020			<0.15 (U)		<0.15 (U)
5/28/2020				<0.15 (U)	
5/29/2020	<0.15 (U)	<0.15 (U)			
10/8/2020	0.19 (J)	<0.15 (U)			

Within Limit

## Chromium Interwell Parametric



Background Data Summary (after Kaplan-Meier Adjustment): Mean=1.015, Std. Dev.=0.6871, n=34, 29.41% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9333, critical = 0.908. Kappa = 1.953 (c=13, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.004044. Individual comparison alpha = 0.00135. Comparing 3 points to limit.

# Prediction Limit

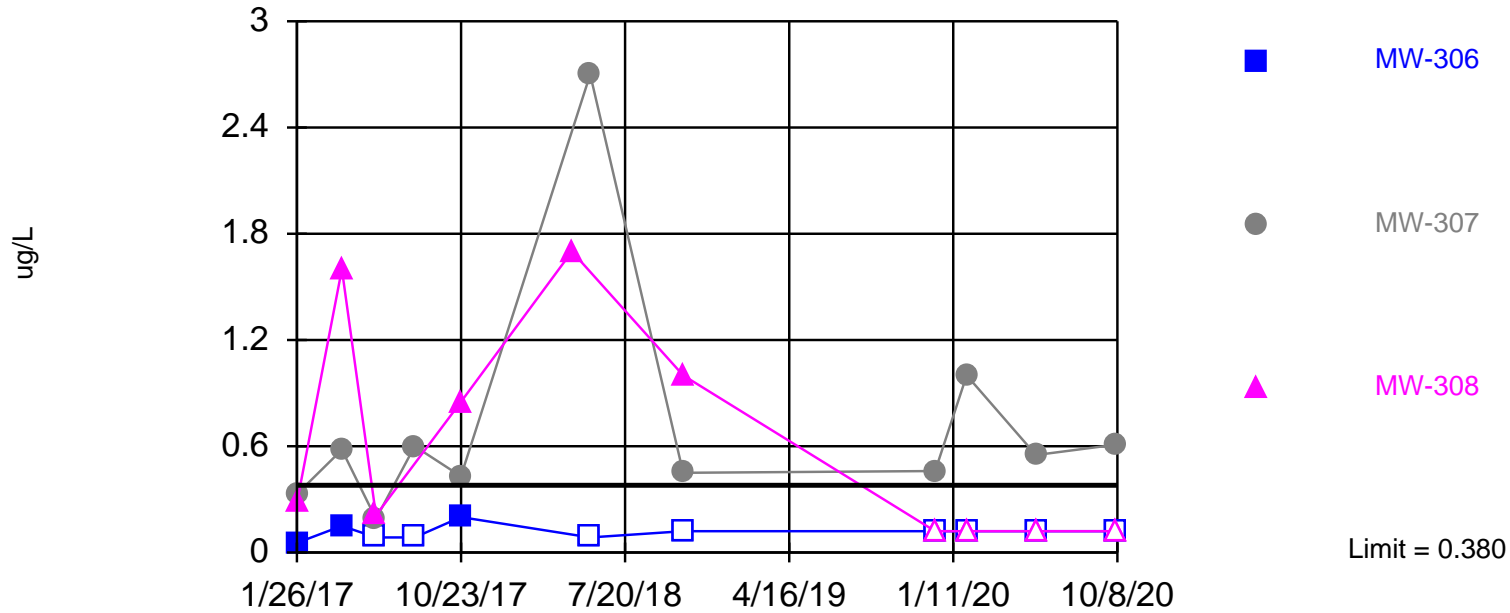
Constituent: Chromium (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-308	MW-306	MW-307
12/22/2015	2.1	2.5			
4/5/2016	0.58 (J)	1.9			
7/8/2016	0.59 (J)	1.8			
10/13/2016	<0.39 (U)	2			
12/29/2016	0.7 (J)	2			
1/25/2017	0.53 (J)	1.9			
1/26/2017			0.97 (J)	1.6	<0.39 (U)
4/10/2017			9.3	2.2	1.6
4/11/2017	0.7 (J)	2.4			
6/5/2017			<1 (U)	1.8 (J)	<1 (U)
6/6/2017	2.3 (J)	2 (J)			
8/8/2017	<1 (U)	1.6 (J)		2 (J)	<1 (U)
10/23/2017			4	2.9 (J)	<1 (U)
4/24/2018			7.9		
4/25/2018	<1 (U)	2.4 (J)			
5/24/2018				2.2 (J)	<1 (U)
8/8/2018	<1 (U)	1.5 (J)			
10/24/2018	<1 (U)	1.6 (J)	<1 (U)	1.7 (J)	<1 (U)
4/2/2019	<1 (U)				
4/3/2019		1.8 (J)			
10/9/2019	<1 (U)	1.6 (J)			
12/13/2019			<1 (U)	4.1	<1 (U)
2/3/2020	<1 (U)	1.6 (J)	<1 (U)	2.1 (J)	<1 (U)
5/27/2020			<1 (U)		<1 (U)
5/28/2020				2.1 (J)	
5/29/2020	<1 (U)	1.7 (J)			
10/7/2020			<1 (U)	2 (J)	
10/8/2020	<1 (U)	1.6 (J)			<1 (U)

Within Limit

# Cobalt

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 33 background values. 57.58% NDs. Annual per-constituent alpha = 0.009997. Individual comparison alpha = 0.001673 (1 of 2). Comparing 3 points to limit.

# Prediction Limit

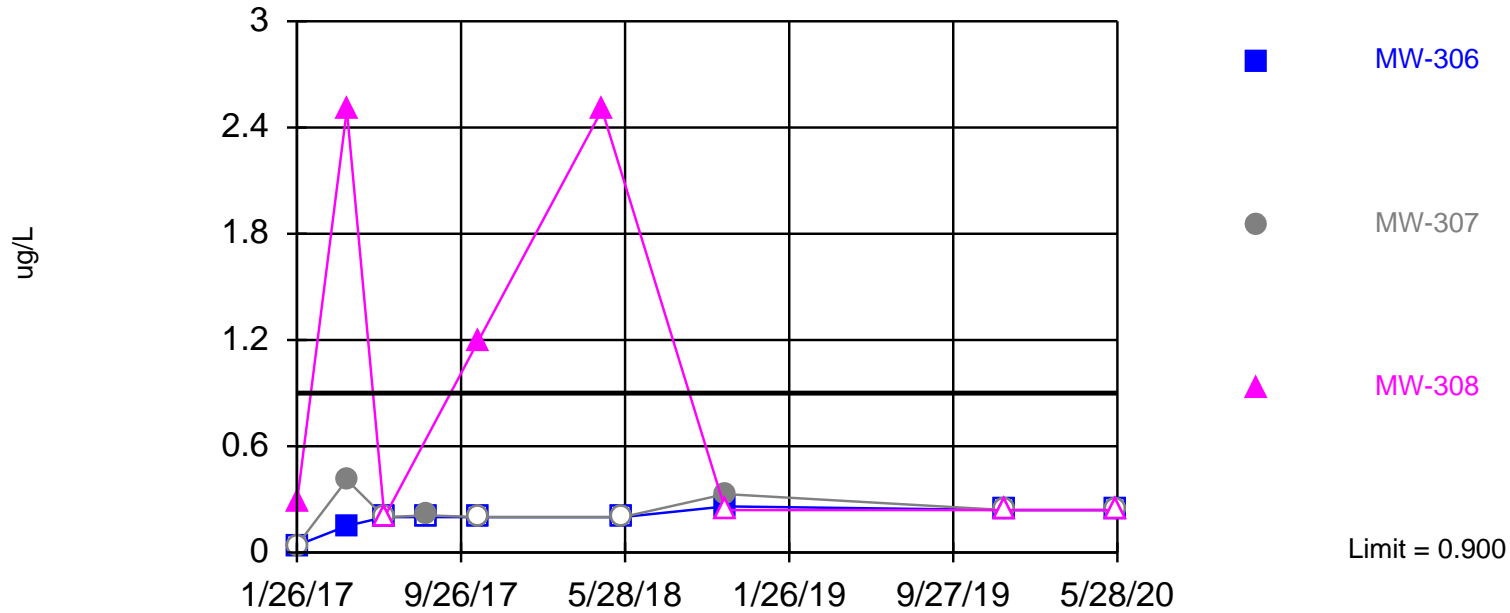
Constituent: Cobalt (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)	MW-301 (bg)	MW-307	MW-306	MW-308
12/22/2015	0.095 (J)	1.4 (X)			
4/5/2016	<0.036 (U)	0.25 (J)			
7/8/2016	0.053 (J)	0.22 (J)			
10/13/2016	<0.036 (U)	0.041 (J)			
12/29/2016	<0.036 (U)	0.38 (J)			
1/25/2017	<0.036 (U)	0.071 (J)			
1/26/2017			0.33 (J)	0.054 (J)	0.28 (J)
4/10/2017			0.58 (J)	0.15 (J)	1.6
4/11/2017	<0.036 (U)	0.064 (J)			
6/5/2017			0.19 (J)	<0.085 (U)	0.21 (J)
6/6/2017	<0.085 (U)	0.13 (J)			
8/8/2017	<0.085 (U)	0.12 (J)	0.6 (J)	<0.085 (U)	
10/23/2017			0.43 (J)	0.2 (J)	0.85 (J)
4/24/2018					1.7
4/25/2018	<0.085 (U)	<0.085 (U)			
5/24/2018			2.7	<0.085 (U)	
8/8/2018	<0.085 (U)	0.28 (J)			
10/24/2018	<0.12 (U)	<0.12 (U)	0.45 (J)	<0.12 (U)	1
4/2/2019		0.35 (J)			
4/3/2019	<0.12 (U)				
10/9/2019	<0.12 (U)	<0.12 (U)			
12/13/2019			0.46 (J)	<0.12 (U)	<0.12 (U)
2/3/2020	<0.12 (U)	0.17 (J)	1	<0.12 (U)	<0.12 (U)
5/27/2020			0.55 (J)		<0.12 (U)
5/28/2020				<0.12 (U)	
5/29/2020	<0.12 (U)	<0.12 (U)			
10/7/2020				<0.12 (U)	<0.12 (U)
10/8/2020	<0.12 (U)	0.29 (J)	0.61 (J)		

Within Limit

# Lead

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 30 background values. 63.33% NDs. Annual per-constituent alpha = 0.01176. Individual comparison alpha = 0.00197 (1 of 2). Comparing 3 points to limit.



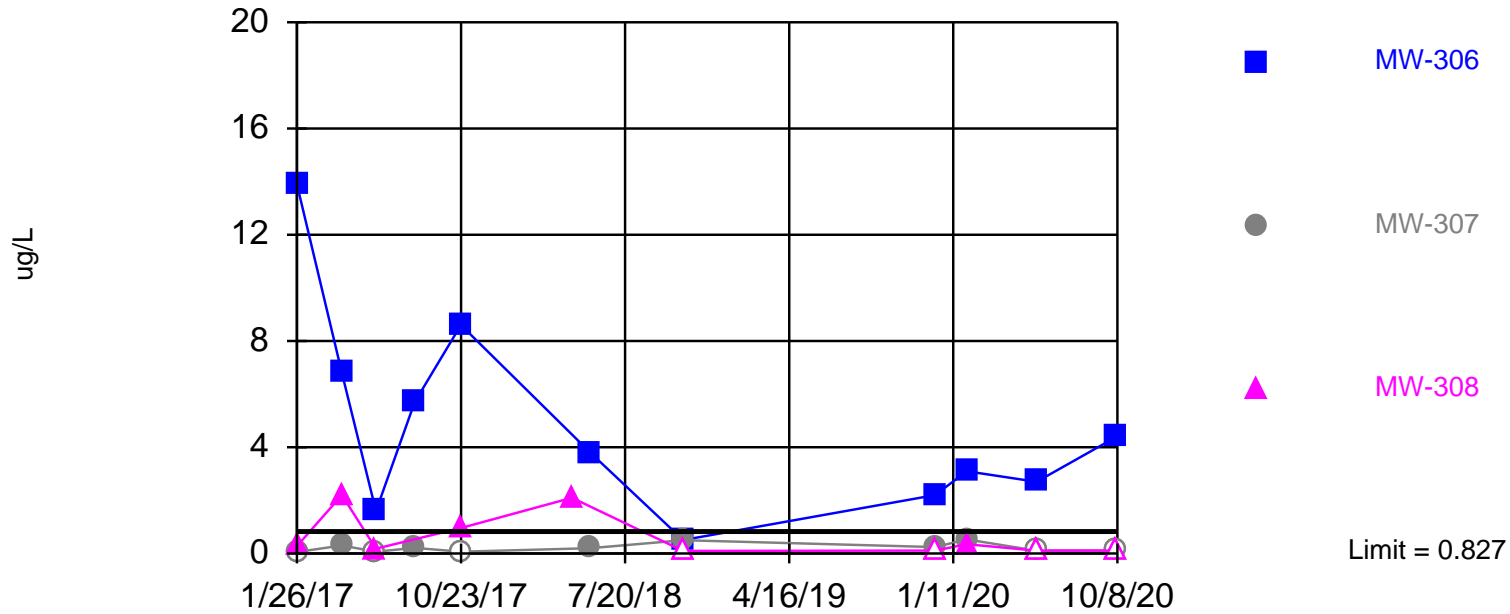
# Prediction Limit

Constituent: Lead (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-307	MW-306	MW-308
12/22/2015	0.9 (J)	0.16 (J)			
4/5/2016	0.077 (J)	<0.04 (U)			
7/8/2016	0.48 (J)	0.39 (J)			
10/13/2016	<0.04 (U)	0.049 (J)			
12/29/2016	0.34 (J)	0.11 (J)			
1/25/2017	<0.04 (U)	<0.04 (U)			
1/26/2017			<0.04 (U)	<0.04 (U)	0.28 (J)
4/10/2017			0.41 (J)	0.15 (J)	2.5
4/11/2017	<0.04 (U)	0.041 (J)			
6/5/2017			<0.2 (U)	<0.2 (U)	<0.2 (U)
6/6/2017	<0.2 (U)	<0.2 (U)			
8/8/2017	<0.2 (U)	<0.2 (U)	0.21 (J)	<0.2 (U)	
10/23/2017			<0.2 (U)	<0.2 (U)	1.2
4/24/2018					2.5
4/25/2018	<0.2 (U)	<0.2 (U)			
5/24/2018			<0.2 (U)	<0.2 (U)	
10/24/2018	<0.24 (U)	<0.24 (U)	0.33 (J)	0.26 (J)	<0.24 (U)
4/2/2019	0.3 (J)				
4/3/2019		<0.24 (U)			
10/9/2019	<0.24 (U)	<0.24 (U)			
12/13/2019			<0.24 (U)	<0.24 (U)	<0.24 (U)
5/27/2020			<0.24 (U)		<0.24 (U)
5/28/2020				<0.24 (U)	
5/29/2020	<0.24 (U)	<0.24 (U)			
10/8/2020	0.25 (J)	<0.24 (U)			

Exceeds Limit: MW-306

## Lithium Interwell Parametric



Background Data Summary: Mean=0.5791, Std. Dev.=0.1267, n=33. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9232, critical = 0.906. Kappa = 1.959 (c=13, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.004044. Individual comparison alpha = 0.00135. Comparing 3 points to limit.

# Prediction Limit

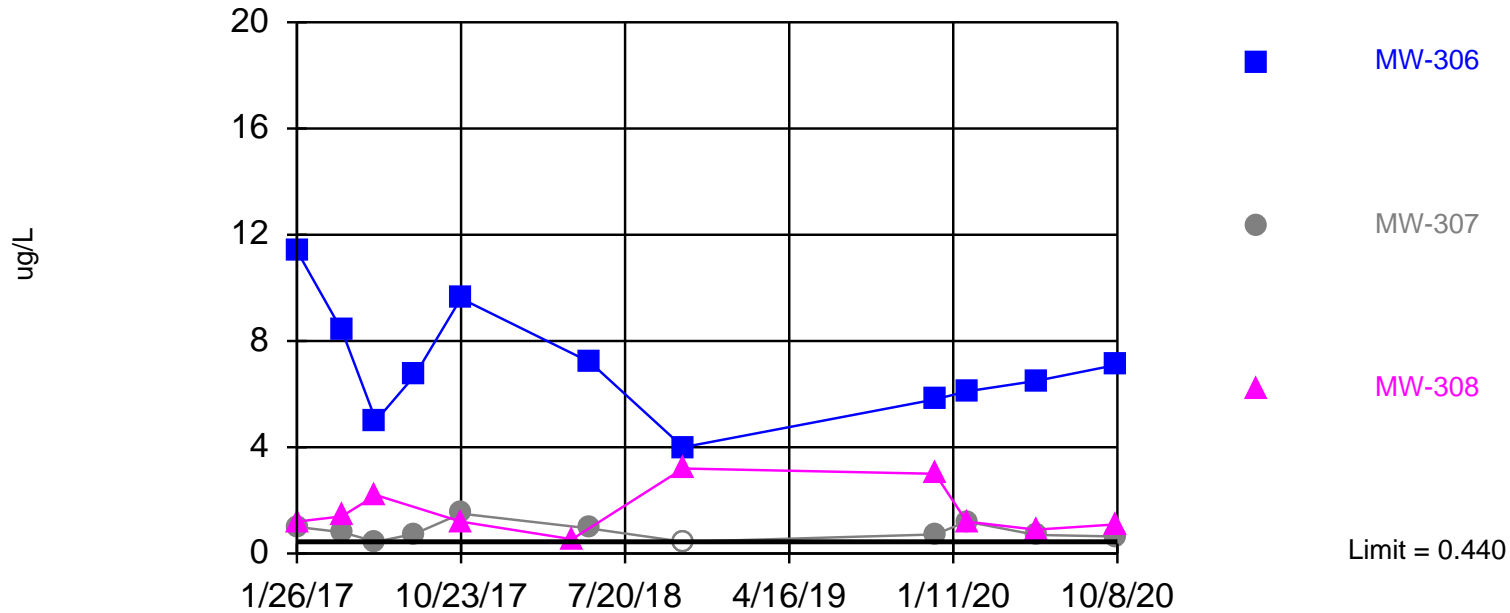
Constituent: Lithium (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-84A (bg)	MW-301 (bg)	MW-307	MW-306	MW-308
12/22/2015	0.72 (J)	1.3 (X)			
4/5/2016	0.44 (J)	0.58 (J)			
7/8/2016	0.5 (J)	0.69 (J)			
10/13/2016	0.56 (J)	0.6 (J)			
12/29/2016	0.56 (J)	0.87 (J)			
1/25/2017	0.56 (J)	0.67 (J)			
1/26/2017			<0.11 (U)	13.9	0.28 (J)
4/10/2017			0.3 (J)	6.8	2.2
4/11/2017	0.55 (J)	0.68 (J)			
6/5/2017			<0.14 (U)	1.6	0.18 (J)
6/6/2017	0.46 (J)	0.62 (J)			
8/8/2017	0.58 (J)	0.6 (J)	0.21 (J)	5.7	
10/23/2017			<0.14 (U)	8.6	0.96 (J)
4/24/2018					2.1
4/25/2018	0.5 (J)	0.55 (J)			
5/24/2018			0.2 (J)	3.8	
8/8/2018	0.4 (J)	0.85 (J)			
10/24/2018	0.49 (J)	0.52 (J)	0.5 (J)	0.51 (J)	<0.19 (U)
4/2/2019		0.9 (J)			
4/3/2019	0.56 (J)				
10/9/2019	0.52 (J)	0.61 (J)			
12/13/2019			0.24 (J)	2.2	<0.22 (U)
2/3/2020	0.58 (J)	0.67 (J)	0.53 (J)	3.1	0.35 (J)
5/27/2020			<0.22 (U)		<0.22 (U)
5/28/2020				2.7	
5/29/2020	0.4 (J)	0.47 (J)			
10/7/2020				4.4	<0.22 (U)
10/8/2020	0.39 (J)	0.46 (J)	<0.22 (U)		

Exceeds Limit: MW-306

## Molybdenum

### Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 34 background values. 79.41% NDs. Annual per-constituent alpha = 0.009408. Individual comparison alpha = 0.001574 (1 of 2). Comparing 3 points to limit.

# Prediction Limit

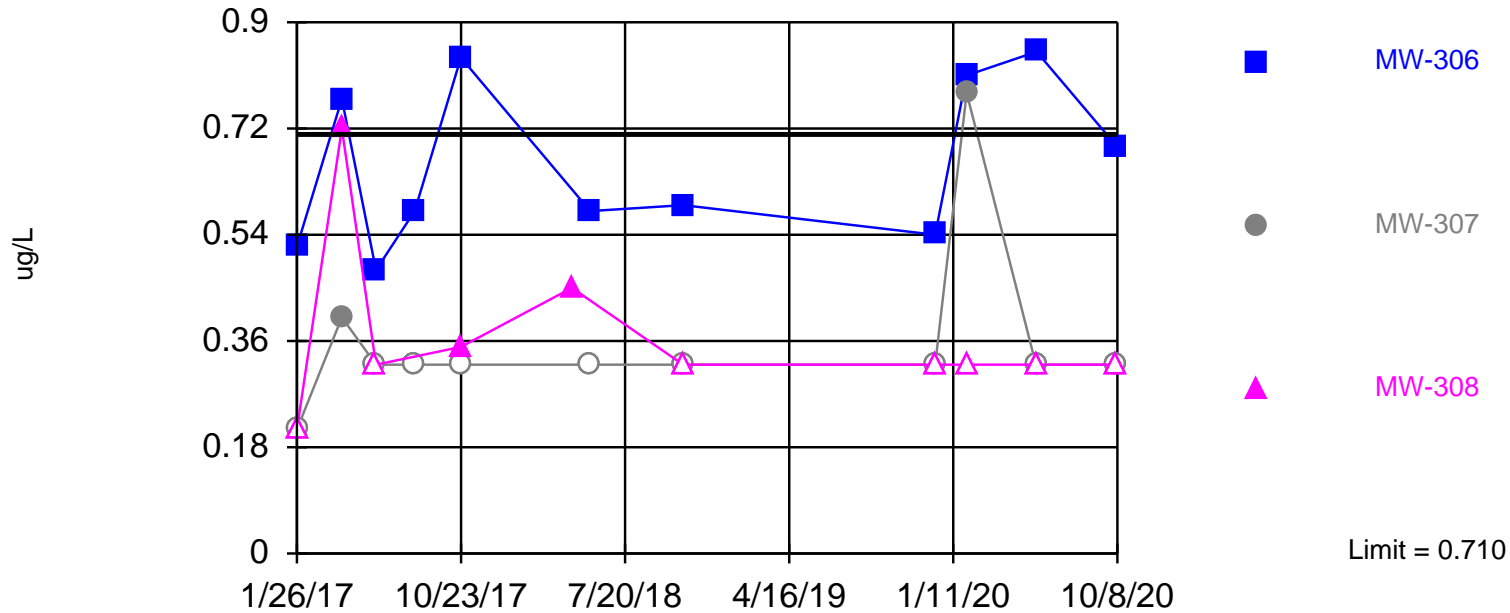
Constituent: Molybdenum (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-308	MW-306	MW-307
12/22/2015	0.35 (J)	<0.07 (U)			
4/5/2016	0.15 (J)	<0.07 (U)			
7/8/2016	0.14 (J)	0.073 (J)			
10/13/2016	0.12 (J)	0.12 (J)			
12/29/2016	0.38 (J)	<0.07 (U)			
1/25/2017	<0.07 (U)	<0.07 (U)			
1/26/2017			1.2	11.4	1
4/10/2017			1.4	8.4	0.8 (J)
4/11/2017	<0.07 (U)	<0.07 (U)			
6/5/2017			2.2	5	0.44 (J)
6/6/2017	<0.44 (U)	<0.44 (U)			
8/8/2017	<0.44 (U)	<0.44 (U)		6.7	0.74 (J)
10/23/2017			1.2 (J)	9.6	1.5 (J)
4/24/2018			0.54 (J)		
4/25/2018	<0.44 (U)	<0.44 (U)			
5/24/2018				7.2	0.94 (J)
8/8/2018	<0.44 (U)	<0.44 (U)			
10/24/2018	<0.44 (U)	<0.44 (U)	3.2	4	<0.44 (U)
4/2/2019	<0.44 (U)				
4/3/2019		<0.44 (U)			
10/9/2019	<0.44 (U)	<0.44 (U)			
12/13/2019			3	5.8	0.72 (J)
2/3/2020	<0.44 (U)	<0.44 (U)	1.2 (J)	6.1	1.2 (J)
5/27/2020			0.9 (J)		0.7 (J)
5/28/2020				6.5	
5/29/2020	<0.44 (U)	<0.44 (U)			
10/7/2020			1.1 (J)	7.1	
10/8/2020	<0.44 (U)	<0.44 (U)			0.64 (J)

Within Limit

## Selenium

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 34 background values. 82.35% NDs. Annual per-constituent alpha = 0.009408. Individual comparison alpha = 0.001574 (1 of 2). Comparing 3 points to limit.

# Prediction Limit

Constituent: Selenium (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-308	MW-306	MW-307
12/22/2015	0.3 (J)	<0.21 (U)			
4/5/2016	0.21 (J)	<0.21 (U)			
7/8/2016	0.39 (J)	<0.21 (U)			
10/13/2016	<0.21 (U)	<0.21 (U)			
12/29/2016	0.26 (J)	<0.21 (U)			
1/25/2017	<0.21 (U)	<0.21 (U)			
1/26/2017			<0.21 (U)	0.52 (J)	<0.21 (U)
4/10/2017			0.72 (J)	0.77 (J)	0.4 (J)
4/11/2017	<0.21 (U)	<0.21 (U)			
6/5/2017			<0.32 (U)	0.48 (J)	<0.32 (U)
6/6/2017	<0.32 (U)	<0.32 (U)			
8/8/2017	<0.32 (U)	<0.32 (U)		0.58 (J)	<0.32 (U)
10/23/2017			0.35 (J)	0.84 (J)	<0.32 (U)
4/24/2018			0.45 (J)		
4/25/2018	<0.32 (U)	<0.32 (U)			
5/24/2018				0.58 (J)	<0.32 (U)
8/8/2018	0.71 (J)	<0.32 (U)			
10/24/2018	<0.32 (U)	<0.32 (U)	<0.32 (U)	0.59 (J)	<0.32 (U)
4/2/2019	0.49 (J)				
4/3/2019		<0.32 (U)			
10/9/2019	<0.32 (U)	<0.32 (U)			
12/13/2019			<0.32 (U)	0.54 (J)	<0.32 (U)
2/3/2020	<0.32 (U)	<0.32 (U)	<0.32 (U)	0.81 (J)	0.78 (J)
5/27/2020			<0.32 (U)		<0.32 (U)
5/28/2020				0.85 (J)	
5/29/2020	<0.32 (U)	<0.32 (U)			
10/7/2020			<0.32 (U)	0.69 (J)	
10/8/2020	<0.32 (U)	<0.32 (U)			<0.32 (U)





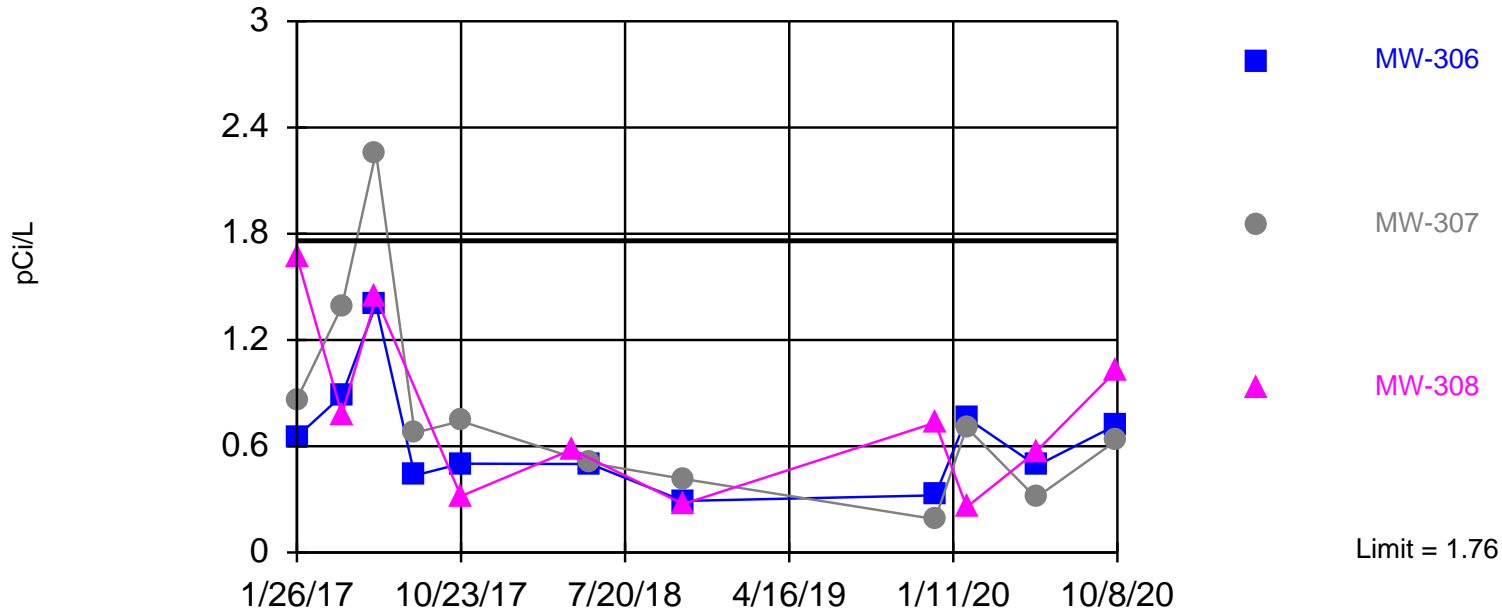
# Prediction Limit

Constituent: Thallium (ug/L) Analysis Run 1/1/2021 10:58 AM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-307	MW-308	MW-306
12/22/2015	<0.14 (U)	<0.14 (U)			
4/5/2016	<0.14 (U)	<0.14 (U)			
7/8/2016	<0.14 (U)	<0.14 (U)			
10/13/2016	<0.14 (U)	<0.14 (U)			
12/29/2016	0.48 (J)	<0.14 (U)			
1/25/2017	<0.14 (U)	<0.14 (U)			
1/26/2017			<0.14 (U)	<0.14 (U)	<0.14 (U)
4/10/2017			0.37 (J)	<0.14 (U)	0.28 (J)
4/11/2017	<0.14 (U)	<0.14 (U)			
6/5/2017			<0.14 (U)	<0.14 (U)	<0.14 (U)
6/6/2017	<0.14 (U)	<0.14 (U)			
8/8/2017	<0.14 (U)	<0.14 (U)	<0.14 (U)		<0.14 (U)
10/23/2017			<0.14 (U)	<0.14 (U)	<0.14 (U)
4/24/2018				<0.14 (U)	
4/25/2018	<0.14 (U)	<0.14 (U)			
5/24/2018			<0.14 (U)		<0.14 (U)
8/8/2018	0.3 (J)	<0.14 (U)			
10/24/2018	<0.14 (U)	<0.14 (U)	<0.14 (U)	<0.14 (U)	<0.14 (U)
4/2/2019	0.48 (J)				
4/3/2019		<0.14 (U)			
10/9/2019	<0.14 (U)	<0.14 (U)			
12/13/2019			0.21 (J)	<0.14 (U)	0.17 (J)
2/3/2020	<0.14 (U)	<0.14 (U)	0.65 (J)	<0.14 (U)	<0.14 (U)
5/27/2020			<0.14 (U)	<0.14 (U)	
5/28/2020					<0.14 (U)
5/29/2020	<0.14 (U)	<0.14 (U)			
10/8/2020	0.3 (J)	<0.14 (U)			

Within Limit

### Total Radium Interwell Parametric



Background Data Summary: Mean=0.7379, Std. Dev.=0.5222, n=34. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9112, critical = 0.908. Kappa = 1.953 (c=13, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.004044. Individual comparison alpha = 0.00135. Comparing 3 points to limit.

# Prediction Limit

Constituent: Total Radium (pCi/L) Analysis Run 1/1/2021 10:59 AM View: COL Secondary Pond  
 Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-301 (bg)	MW-84A (bg)	MW-308	MW-306	MW-307
12/22/2015	1.31	0.593			
4/5/2016	1.11	0.0809			
7/8/2016	0.89				
7/28/2016		1.37			
10/13/2016	0.631	0.825			
12/29/2016	1.01	0.404			
1/25/2017	2.42	1.39			
1/26/2017			1.67	0.653	0.864
4/10/2017			0.78	0.886	1.39
4/11/2017	1.35	0.0929			
6/5/2017			1.44	1.4	2.26
6/6/2017	1.3	0.676			
8/8/2017	1.74	0.509		0.435	0.676
10/23/2017			0.318	0.502	0.742
4/24/2018			0.581		
4/25/2018	0.882	0.526			
5/24/2018				0.5	0.505
8/8/2018	0.0351	0.529			
10/24/2018	0.652	0.62	0.274	0.291	0.416
4/2/2019	0.552				
4/3/2019		0.681			
10/9/2019	0.701	0.247			
12/13/2019			0.733	0.323	0.188
2/3/2020	0.502	0.1	0.257	0.759	0.706
5/27/2020			0.569		0.309
5/28/2020				0.49	
5/29/2020	0.193	0.395			
10/7/2020			1.03	0.721	
10/8/2020	0.38	0.39			0.636