2022 Annual Groundwater Monitoring and Corrective Action Report

Primary Ash Pond
Columbia Energy Center
Pardeeville, Wisconsin

Prepared for:

Alliant Energy

SCS ENGINEERS

25222067.00 | January 31, 2023

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OVERVIEW OF CURRENT STATUS

Columbia Energy Center, Dry Ash Disposal Facility, Primary Ash Pond
2022 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) unit. The groundwater monitoring system for the Primary Ash Pond at the Columbia Energy Center (COL) monitors a single existing CCR unit. Supporting information is provided in the text of the annual report.

Category	Rule Requirement	Site Status
Monitoring Status – Start of Year	(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
Monitoring Status – End of Year	(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
Statistically Significant Increases (SSIs)	(iii) If it was determined that there was an SSI 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>October 2021</u> Boron: MW-4R, MW-303, MW-304, MW-305 Chloride: MW-4R, MW-304, MW-305 Field pH: MW-303, MW-305 <u>February 2022</u> Field pH: MW-303, MW-305 <u>April 2022</u> Boron: M-4R, MW-303, MW-304, MW-305 Chloride: M-4R, MW-304, MW-305 Field pH: MW-303, MW-305 Sulfate: M-4R, MW-303, MW-304, MW-305 Total Dissolved Solids: MW-303 <u>July 2022</u> Field pH: MW-303, MW-305

Category	Rule Requirement	Site Status
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	July 16, 2018
Statistically Significant Levels (SSL) Above Groundwater Protection Standard (GPS)	(iv) If it was determined that there was an SSL above the 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;	Not applicable – No SSLs above GPSs
	(B) Provide the date when the assessment of corrective measures (ACM) was initiated for the CCR unit;	Not applicable – No SSLs above GPSs
	(C) Provide the date when the public meeting was held for the ACM for the CCR unit; and	Not applicable – ACM not required
	(D) Provide the date when the ACM was completed for the CCR unit.	Not applicable – ACM not required
Selection of Remedy	(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
Corrective Action	(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	Not applicable – remedial activities not required

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1.0 INTRODUCTION

This 2022 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 Code of Federal Regulations (CFR) 257.50-107]. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.90(e). The applicable sections of the Rule are provided below in italics, followed by applicable information relative to the 2022 Annual Groundwater Monitoring and Corrective Action Report for the CCR Units.

This report covers the period of groundwater monitoring from January 1, 2022, through December 31, 2022.

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

- COL Primary Ash Pond (existing CCR surface impoundment)

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

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 Primary 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-303, MW-304, and MW-305, the unconsolidated materials were identified as consisting primarily of silty sand and sand. Boring logs for previously-installed monitoring wells MW-84A and M-4R show silty sand and sand as the primary unconsolidated materials at these locations. The boring logs for Primary Ash Pond CCR monitoring wells are provided in **Appendix B**. All CCR monitoring wells are screened within the unconsolidated sand unit.

In the vicinity of the ash ponds, groundwater flow has historically been radially away from the ponds in all directions; however, the October 2022 water levels and apparent flow directions reflect the influence of a temporary dewatering system installed to lower groundwater levels in the area of the Secondary Pond as part of the closure project for that CCR Unit. The water table elevations and groundwater flow directions for the April 2022 monitoring event are shown on **Figure 3**, and the water table elevations and groundwater flow directions for the October 2022 sampling 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 for representative flow paths are provided in **Table 4.**

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 four downgradient monitoring Wells (**Table 1** and **Figure 2**). The background wells include MW-84A and MW-301. The downgradient wells include M-4R, MW-303, MW-304, and MW-305. The CCR Rule wells are installed in the surficial sand aquifer. Well depths range from approximately 26 to 40 feet, measured from the top of the well casing.

3.0 §257.90(e) ANNUAL REPORT REQUIREMENTS

Annual groundwater monitoring and corrective action report. *For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. 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. 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:*

3.1 §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 showing the site location is provided on **Figure 1**. A map showing the CCR unit 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**.

3.2 §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 2022.

3.3 §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;

Four groundwater sampling events were completed for the Primary Ash Pond CCR unit in 2022. Two semiannual sampling events were completed in April 2022 and October 2022, as required by the assessment monitoring program. Additional sampling events for select parameters at monitoring wells MW-303 and MW-305 were completed in February and July 2022. These supplemental monitoring events were added to the 2022 monitoring schedule based on the 2021 monitoring results, which included results above and below the GPS for arsenic at MW-303 and molybdenum at MW-305, but no statistically significant levels (SSLs) were above the GPS for these parameters. 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 programs is included in **Table 2**.

Groundwater samples collected in the April and October 2022 sampling events were analyzed for both Appendix III and Appendix IV constituents. Groundwater samples collected during the February and July events were analyzed for arsenic at MW-303 and molybdenum at MW-305.

The validation and evaluation of the April 2022 monitoring event data was completed and transmitted to WPL on July 15, 2022. The February and July 2022 supplemental monitoring event data was also transmitted to WPL on June 6 and November 8 2022, respectively. The validation and evaluation of the October 2022 monitoring event data was in progress at the end of 2022 and will be transmitted to WPL in 2023; therefore, the October 2022 monitoring results and analytical report will be included in the 2023 annual report. The October 2022 groundwater elevation data is included in this report.

The sampling results for Appendix III and Appendix IV parameters in February, April and July 2022 are summarized in **Table 5.** Field parameter results for the February, April and July 2022 sampling events are provided in **Table 6**. The analytical laboratory reports for February, April and July 2022 are provided in **Appendix C**. Historical results for each monitoring well through July 2022 are summarized in **Appendix D**.

3.4 §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 2022.

Assessment monitoring for the Primary Ash Pond was initiated in April 2018 and continued through 2022. Evaluation of the October 2021 results was completed in January 2022. Evaluation of the February 2022 results was completed in June 2022. Evaluation of the April 2022 results was completed in August 2022. Evaluation of the July 2022 results was completed in November 2022.

In accordance with the Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities (U.S. EPA, 2009), the comparison of assessment monitoring results to the Groundwater Protection Standards (GPS) was based on the lower confidence limit (LCL) for the arithmetic mean. The LCL evaluation was completed for each Appendix IV parameter that has been detected at a concentration exceeding the GPS in at least one sample result since assessment monitoring was initiated, which include arsenic, molybdenum, and selenium. The LCLs were calculated with Sanitas™ using historical concentrations measured since assessment monitoring began in April 2018. LCL evaluations, for data collected in February, April, and July 2022 are provided in **Appendix E**.

No Appendix IV parameters were detected at SSLs above the GPS values established under §257.95(h). As shown in **Table 5**, several Appendix III and Appendix IV parameters continue to be detected at levels that represent statistically significant increases (SSIs) above background. Based on these results, the Primary Ash Pond will continue in the assessment monitoring program.

The comparison to background was based on a prediction limit approach, comparing the results to interwell upper prediction limits (UPLs) based on background monitoring results from the upgradient wells (MW-84A and MW-301). The interwell UPLs were most recently updated in January 2020 using background data collected through October 2019. The January 2020 Statistical Analysis was included as an appendix in the 2021 Annual Groundwater Monitoring Report. The Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (U. S. EPA, 2009; Section 5.3.1) recommends periodic updating of background for both intrawell and interwell analyses. For semiannual monitoring, an update interval of 2 to 3 years is recommended; therefore, the next UPL update is planned for 2023.

3.5 §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 2022 Annual Groundwater Monitoring and Corrective Action Report for the CCR Unit.

3.5.1 §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.

Summary of Key Actions Completed.

- Statistical evaluation for the October 2021 and April 2022 assessment monitoring events.
- Two semiannual groundwater sampling and analysis events and two additional sampling events (February, April, July, and October 2022).
- Statistical evaluation for the October 2021, February 2022, April 2022, and July 2022 sampling events.

Description of Any Problems Encountered: Monitoring well MW-304 was not sampled during the October 2022 monitoring event due to insufficient water in the well. A dewatering well system is in place to assist with the ongoing pond closure at COL, which is lowering the shallow water table surface at COL. Samples were collected from the remaining wells in the monitoring system.

Discussion of Actions to Resolve the Problems: On December 2, 2022, a second attempt was made to collect a groundwater sample from MW-304, after the dewatering wells were shut off, but there was not yet sufficient water present to collect a sample. This well will be sampled after the water level recovers enough to allow sampling. If the water level remains too low for sampling, then installation of a deeper replacement well or another action to restore the monitoring system will be implemented.

Projection of Key Activities for the Upcoming Year (2023):

- Statistical evaluation and determination of any SSLs exceeding the GPS for the October 2022 and April 2023 monitoring events.
- Two semiannual groundwater sampling and analysis events (April and October 2023).
- If one or more Appendix IV constituents is detected at an SSL above the GPS, then within 30 days Wisconsin Power and Light Company (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).

3.5.2 §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 Primary Ash Pond is no longer in detection monitoring.

3.5.3 §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 Primary Ash Pond is no longer in detection monitoring.

3.5.4 §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 at the site, but no alternative assessment monitoring frequency is proposed at this time.

3.5.5 §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 2022 assessment monitoring results, background UPLs, and GPSs established for the Primary Ash Pond are provided in **Table 5**. The laboratory reports are provided in **Appendix C**. Historical monitoring results are summarized in **Appendix D**.

3.5.6 §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 evaluation for assessment monitoring was completed in 2022.

3.5.7 §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.

3.6 §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.

4.0 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.

U.S. Environmental Protection Agency (U.S. EPA), 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, EPA 530-R-09-007, March 2009.

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.

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Tables

Table 1. Groundwater Monitoring Well Network
Columbia Energy Center Primary Ash Pond / SCS Engineers Project #25222067.00

Monitoring Well	Location in Monitoring Network	Role in Monitoring Network
MW-84A	Upgradient	Background
MW-301	Upgradient	Background
M-4R	Downgradient	Compliance
MW-303	Downgradient	Compliance
MW-304	Downgradient	Compliance
MW-305	Downgradient	Compliance

Created by: NDK Date: 9/19/2022
Last revision by: NDK Date: 9/19/2022
Checked by: RM Date: 12/28/2022

Table 2. Groundwater Samples Summary
Columbia Energy Center Primary Ash Pond / SCS Engineers Project #25222067.00

Sample Dates	Compliance Wells				Background Wells	
	M-4R	MW-303	MW-304	MW-305	MW-84A	MW-301
2/24/2022	--	A-S	--	A-S	--	--
4/11-13/2022	A	A	A	A	A	A
7/27/2022	--	A-S	--	A-S	--	--
10/25-27/2022	A	A	--	A	A	A
Total Samples	2	4	1	4	2	2

Abbreviations:
A = Required by Assessment Monitoring Program
A-S = Supplemental Sample for the Assessment Monitoring Program
-- = Not Sampled

Created by:	NDK	Date:	9/19/2022
Last revision by:	RM	Date:	12/28/2022
Checked by:	BR	Date:	12/29/2022

Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25222067.00

	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	MW-93A	MW-93B	MW-312
	Top of Casing Elevation (feet amsl)	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	808.41	827.89	827.71	826.79
	Screen Length (ft)																	10	5	10
	Total Depth (ft from top of casing)	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	50.7	82.5	52.5
	Top of Well Screen Elevation (ft)	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	787.19	750.21	784.29
	Measurement Date																			
	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	NI	NI	NI
	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	NI	NI	NI
	October 8, 2013													785.66	785.42	785.97	785.52	NI	NI	NI
	October 15, 2013	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.66	785.42	785.97	785.52	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	October 9-10, 2017	NM	aband	NM	NM	NM	NM	NM	NM	NM	785.56 [6]	NM	NM	NM	NM	NM	NM	NI	NI	NI
	February 21, 2018	783.97	aband	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	784.68	784.46	NM	NM	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	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	NI	NI	NI
	February 25, 2021	NM	aband	NM	NM	NM	784.75	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI
	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	NI	NI	NI
	June 11, 2021	NM	aband	NM	784.19	NM	784.66	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI
	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	NI	NI	NI
	October 17, 2021	NM	adand	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI
	April 1, 2022	aband	aband	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	April 11-13, 2022	aband	adand	785.52	783.27	783.45	784.30	784.42	783.26	783.78	785.02	785.00	784.70	784.83	784.72	785.45	785.02	783.99	783.97	783.73
	October 24-28, 2022	aband	aband	785.43	781.94	781.61	783.61	783.61	782.28	dry	784.57	784.54	784.38	784.64	784.47	785.05	784.62	783.74	782.76	783.50
	Bottom of Well Elevation (ft)	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	777.19	745.21	774.29

Dry Ash Facility (Facility ID #03025)

	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
	Top of Casing Elevation (feet amsl)	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	805.36
	Screen Length (ft)															
	Total Depth (ft from top of casing)	16.90	25.55	34.80	76.07	51.88	75.80	14.40	38.50	37.85	37.37	18.96	--	--	--	--
	Top of Well Screen Elevation (ft)	771.33	780.55	774.82	733.43	776.98	753.04	771.89	776.98	776.36	754.18	773.94	--	--	--	--
	Measurement Date															
	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 [1]	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 [1]	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
	April 11-13, 2022	783.95	788.26	783.37	783.34	783.10	783.10	NM	782.99	783.40	783.93	783.83	788.4	794.65	dry	dry
	June 3, 2022	NM	NM	NM	NM	NM	NM	782.13	NM	NM	NM	NM	NM	NM	NM	NM
	October 25, 26, 28, 2022	780.41	783.85	780.76	780.66	779.57	779.55	779.23	778.98	778.61	780.33	781.49	NM	795.21	dry	dry
	Bottom of Well Elevation (ft)	771.33	780.55	774.82	733.43	776.98	753.04	771.89	776.98	776.36	754.18	773.94	--	--	--	--

Ash Pond Facility (Facility ID #02325)

Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25222067.00

	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
	Top of Casing Elevation (feet amsl)	806.89	813.00	815.72	805.42	806.32	806.10	808.29	805.95	814.28	807.63	806.89	806.9	813.27	813.62	809.74
	Screen Length (ft)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Total Depth (ft from top of casing)	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
	Top of Well Screen Elevation (ft)	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
	Measurement Date															
	December 21-22, 2015	785.56	784.78	784.11	786.13	788.96	787.58	783.77	783.50	785.31	NI	NI	NI	NI	NI	NI
	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
CCR Rule Wells	December 11, 2020	NM	NM	NM	NM	788.19	NM	NM	NM	NM	NM	NM	NM	785.26	785.26	NM
	February 25, 2021	NM	NM	784.27	NM	788.36	NM	NM	784.75	NM	NM	NM	NM	NM	NM	NM
	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	NM	NM	NM	NM	NM	NM	784.19	784.66	NM	NM	NM	NM	784.20	784.05	NM
	July 20, 2021	NM	NM	783.64	NM	788.39	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	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
	December 21, 2021	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	782.93	NM	NM
	February 24, 2022	NM	NM	782.34	NM	786.49	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	April 11-13, 2022	785.44	784.42	783.40	788.20	787.87	788.26	783.27	784.30	785.02	783.11	783.32	784.19	783.14	783.19	783.04
	July 27, 2022	NM	NM	783.07	NM	787.03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	October 25-27, 2022	784.91	784.62	778.94	781.79	784.97	783.85	781.94	783.61	784.57	778.32	777.89	784.16	781.50	780.96	781.23
	November 30, 2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	781.62	781.14	781.15
	December 2, 2022	785.12	784.48	NM	783.97	NM	NM	781.91	783.71	784.76	778.52	779.54	NM	NM	NM	NM
	Bottom of Well Elevation (ft)	777.49	779.40	775.72	779.72	780.72	766.52	777.21	770.52	774.07	780.63	780.39	778.90	775.60	775.21	773.55

Notes:
NM = not measured

Created by: MDB Date: 5/6/2013
Last revision by: JR Date: 12/13/2022
Checked by: RM Date: 12/23/2022

(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.
(8) MW-303 was extended in 2022 due to regrading. Prior to October 2022, the TOC elevation was 811.52'. For events in October 2022 and later, the TOC elevation is 815.72'.

I:\25222067.00\Deliverables\2022 Fed Annual Report - COL PP\Tables\[Table 3 - Groundwater Elevation Summary.xls]levels

Table 4. Horizontal Gradients and Flow Velocity
Columbia Energy Center - Primary Pond /
SCS Engineers Project #25222067.00
January - December 2022

	Flow Path A - North				
Sampling Dates	**h1 (ft)**	**h2 (ft)**	**Δl (ft)**	**Δh/Δl (ft/ft)**	**V (ft/d)**
4/11-13/2022	788.26	785.00	90	0.04	4.2

	Flow Path B - West				
Sampling Dates	**h1 (ft)**	**h2 (ft)**	**Δl (ft)**	**Δh/Δl (ft/ft)**	**V (ft/d)**
4/11-13/2022	788.00	784.00	245	0.02	1.9
10/25-27/2022	784.97	782.00	195	0.02	1.8

	Flow Path C - South				
Sampling Dates	**h1 (ft)**	**h2 (ft)**	**Δl (ft)**	**Δh/Δl (ft/ft)**	**V (ft/d)**
4/11-13/2022	788.00	785.00	111	0.03	3.1
10/25-27/2022	784.00	782.00	145	0.01	1.6

Wells	**K Values (cm/sec)**	**K Values (ft/d)**
M-4R	3.0E-03	8.4
M-303	4.0E-02	114
M-304	1.2E-02	34
M-305	5.0E-02	141
Geometric Mean	1.6E-02	46

Assumed Porosity, n
0.40

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

Note:
1. See Figures 3 and 4 for velocity calculation flow path locations.

Created by: NDK Date: 8/3/2022
Last revision by: MDB Date: 1/10/2023
Checked by: RM Date: 1/10/2023

Table 5. 2022 Groundwater Analytical Results Summary - Assessment Monitoring
Columbia Energy Center - Primary Pond / SCS Engineers Project #25222067.00

Parameter Name	UPL Method	UPL		Background Wells		Compliance Wells							
				MW-84A	MW-301	M-4R	MW-303			MW-304	MW-305		
				4/13/2022	4/13/2022	4/11/2022	2/24/2022	4/12/2022	7/27/2022	4/11/2022	2/24/2022	4/11/2022	7/27/2022
Appendix III													
Boron, ug/L	P	35.6		10.5	28.7	1,160	--	2,890	--	664	--	957	--
Calcium, ug/L	NP	129,000		75,100	97,300	75,900	--	4,950	--	84,900	--	97,000	--
Chloride, mg/L	P	6.2		5.2	1.9 J	65.5	--	10.6 J	--	52.9	--	58.5	--
Fluoride, mg/L	DQ	DQ		<0.095	<0.095	0.29 J	--	<1.9	--	<0.095	--	0.21 J	--
Field pH, Std. Units	P	7.78		7.34	6.60	7.05	9.53	9.46	9.61	7.22	9.36	8.52	9.12
Sulfate, mg/L	P	30.3		1.4 J,M0	12.7	184	--	634	--	117	--	274	--
Total Dissolved Solids, mg/L	NP	514		334	422	476	--	1090	--	492	--	484	--
Appendix IV		**UPL**	**GPS**										
Antimony, ug/L	NP*	0.4	6	<0.15	0.31 J	0.20 J	--	0.31 J	--	<0.15	--	0.33 J	--
Arsenic, ug/L	P*	0.53	10	0.31 J	0.47 J	<0.28	28.8	27.1	29.4	0.87 J	--	0.59 J	--
Barium, ug/L	P	18.3	2000	13.5	7.8	21.2	--	5.5	--	35.4	--	16.9	--
Beryllium, ug/L	NP*	0.37	4	<0.25	<0.25	<0.25	--	<0.25	--	<0.25	--	<0.25	--
Cadmium, ug/L	NP*	0.32	5	<0.15	0.30 J	<0.15	--	<0.15	--	<0.15	--	<0.15	--
Chromium, ug/L	P*	3.13	100	2.2 J	<1.0	<1.0	--	44.1	--	<1.0	--	1.3 J	--
Cobalt, ug/L	NP*	0.38	6	<0.12	0.32 J	<0.12	--	0.59 J	--	0.79 J	--	<0.12	--
Fluoride, mg/L	DQ	DQ	4	<0.095	<0.095	0.29 J	--	<1.9	--	<0.095	--	0.21 J	--
Lead, ug/L	NP*	0.48	15	<0.24	3.1	<0.24	--	<0.24	--	<0.24	--	<0.24	--
Lithium, ug/L	P*	0.86	40	0.36 J	0.56 J	2.2	--	0.31 J	--	<0.22	--	<0.22	--
Mercury, ug/L	DQ	DQ	2	<0.066	<0.066	<0.066	--	<0.066	--	<0.066	--	<0.066	--
Molybdenum, ug/L	NP*	0.44	100	<0.44	<0.044	42.5		174	--	9.8	35.8	45.9	35.1
Selenium, ug/L	NP*	0.71	50	<0.32	<0.32	3.0	--	87.2	--	<0.32	--	21.5	--
Thallium, ug/L	NP*	0.48	2	<0.14	0.32 J	<0.14	--	<0.14	--	<0.14	--	<0.14	--
Radium 226/228 Combined, pCi/L	P	1.93	5	0.611	0.179	0.427	--	0.164	--	0.256	--	0.761	--

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

Yellow highlighted cell indicates the compliance well result exceeds the GPS.

Table 5. 2022 Groundwater Analytical Results Summary - Assessment Monitoring
Columbia Energy Center - Primary Pond / SCS Engineers Project #25222067.00

Abbreviations:
mg/L = milligrams per liter
ug/L = micrograms per liter
-- = Not Analyzed

LOD = Limit of Detection
LOQ = Limit of Quantitation
DQ = Double Quantification Rule (not detected in background)

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

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

Notes:
1. An individual result above the UPL or GPS does not constitute a statistically significant increase (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.
4. Intrawell UPL for fluoride is based on the double quantification rule, because fluoride was not detected above the LOQ in the background samples.

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

Created by:	NDK	Date:	5/1/2018
Last revision by:	RM	Date:	12/30/2022
Checked by:	DK	Date:	1/3/2022
Proj Mgr QA/QC:	TK	Date:	1/10/2023

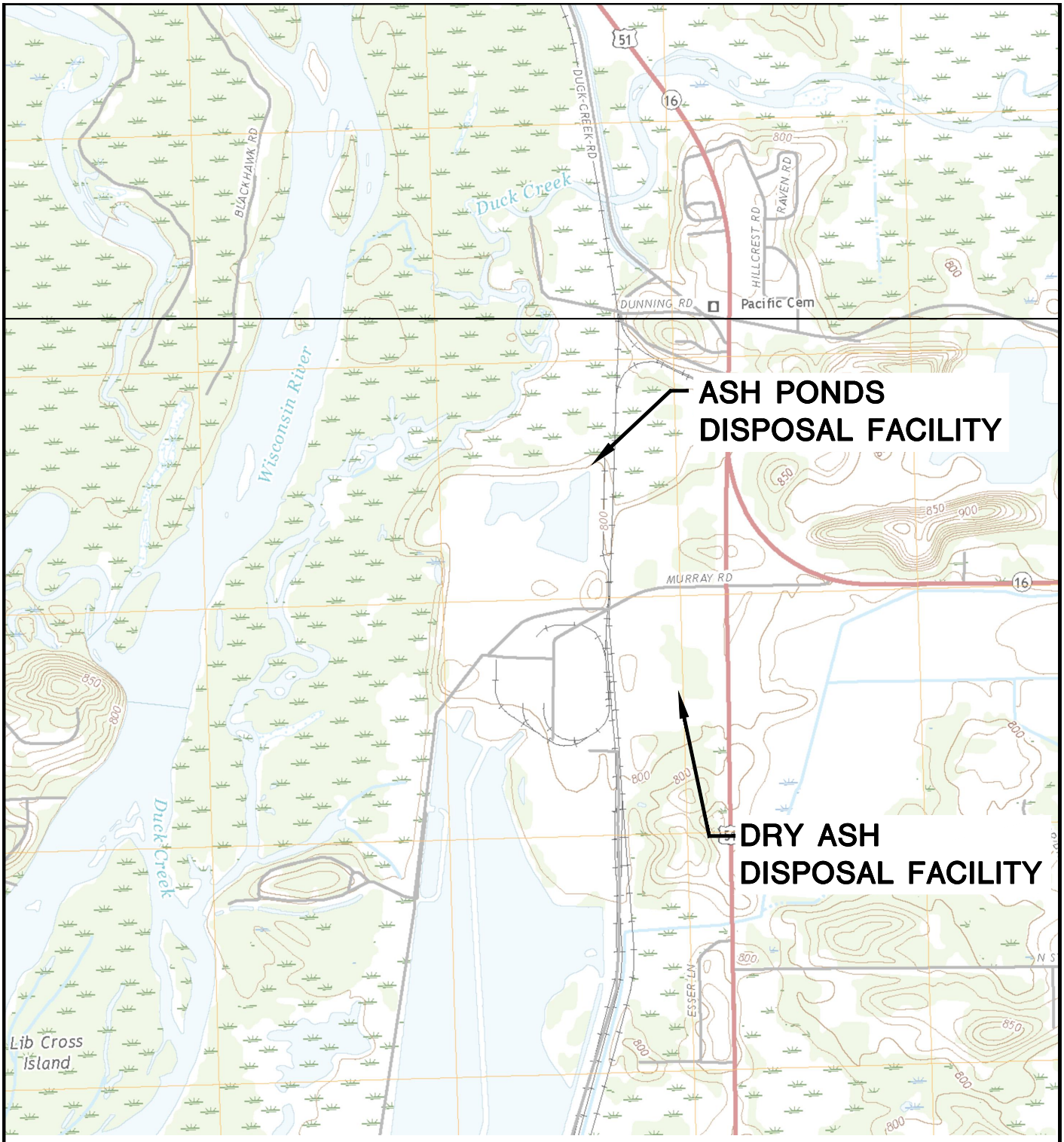
Table 6. 2022 Groundwater Field Data Summary
Columbia Energy Center - Primary Ash Pond / SCS Engineers Project #25222067.00

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	4/13/2022	785.02	9.9	7.34	9.33	600.2	200.6	0.00
MW-301	4/13/2022	785.44	7.1	6.60	2.47	747.0	207.5	0.00
M-4R	4/11/2022	788.26	10.3	7.05	0.63	754.0	208.8	0.00
MW-303	2/24/2022	782.34	9.6	9.53	3.53	1,439	205.0	2.53
	4/12/2022	783.40	10.2	9.46	1.63	1670	210.5	0.00
	7/27/2022	783.07	12.6	9.61	8.62	894	80.6	0.00
MW-304	4/11/2022	788.20	10.6	7.22	0.21	830.0	197.6	0.96
MW-305	2/24/2022	786.49	17.2	9.36	1.28	677	203.5	0.09
	4/11/2022	787.87	14.0	8.52	4.09	755	203.7	0.00
	7/27/2022	787.03	15.3	9.12	5.07	633	77.4	0.00

Abbreviations:
mg/L = milligrams per liter
amsl = Above mean sea level
µmhos/cm = micromhos/cm
NM = Not Measured

Created by:	DK	Date:	9/2/2022
Last revision by:	AJR	Date:	12/5/2022
Checked by:	BLR	Date:	12/29/2022

Figures

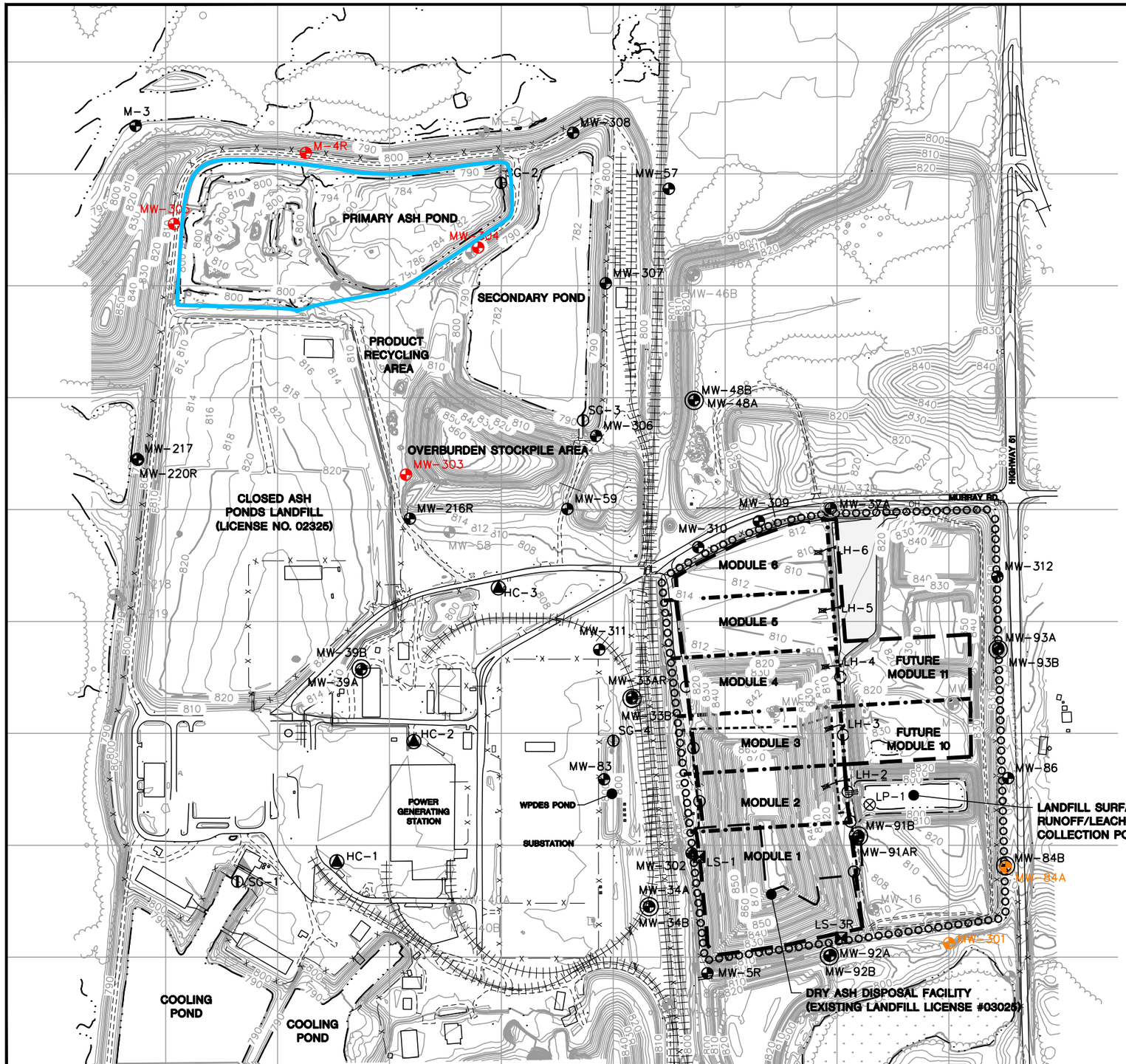


N

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	SITE LOCATION MAP	
PROJECT NO. 25219067.00	DRAWN BY: BSS	ENGINEER: SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE 1
DRAWN: 12/02/2019	CHECKED BY: MDB		
REVISED: 01/10/2020	APPROVED BY: TK 01/30/2020		

I:\25219067.00\Drawings\CCR 2019 Annual Report\Site Location Map.dwg, 1/30/2020 3:38:21 PM



LEGEND

- EXISTING MAJOR CONTOUR (10' INTERVAL)
- EXISTING MINOR CONTOUR (2' CONTOUR)
- EXISTING FENCELINE
- EXISTING TRACKS
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EDGE OF WATER
- DRY ASH DISPOSAL FACILITY LIMITS
- LIMITS OF WASTE
- LINER PHASE/MODULE LIMITS
- 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 SURVEY BY SCS ENGINEERS IN MAY 2016, JUNE 2016, OCTOBER 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, JULY 2018, AUGUST 2018, FEBRUARY 2019, MAY 2019, SEPTEMBER 2020, AUGUST 2021, AND NOVEMBER 2021.
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. MONITORING WELLS MW-93A, MW-93B, AND MW-312 WERE INSTALLED BY CASCADE ENVIRONMENTAL ON MARCH 23-28, 2022.
8. BACKGROUND MONITORING WELLS FOR THE PRIMARY ASH POND ARE: MW-301 AND MW-84A.

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25222067.00	DRAWN BY:	KP
DRAWN:	12/02/2019	CHECKED BY:	NDK/RM
REVISED:	01/16/2023	APPROVED BY:	TK, 1/16/2023

ENGINEER: SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

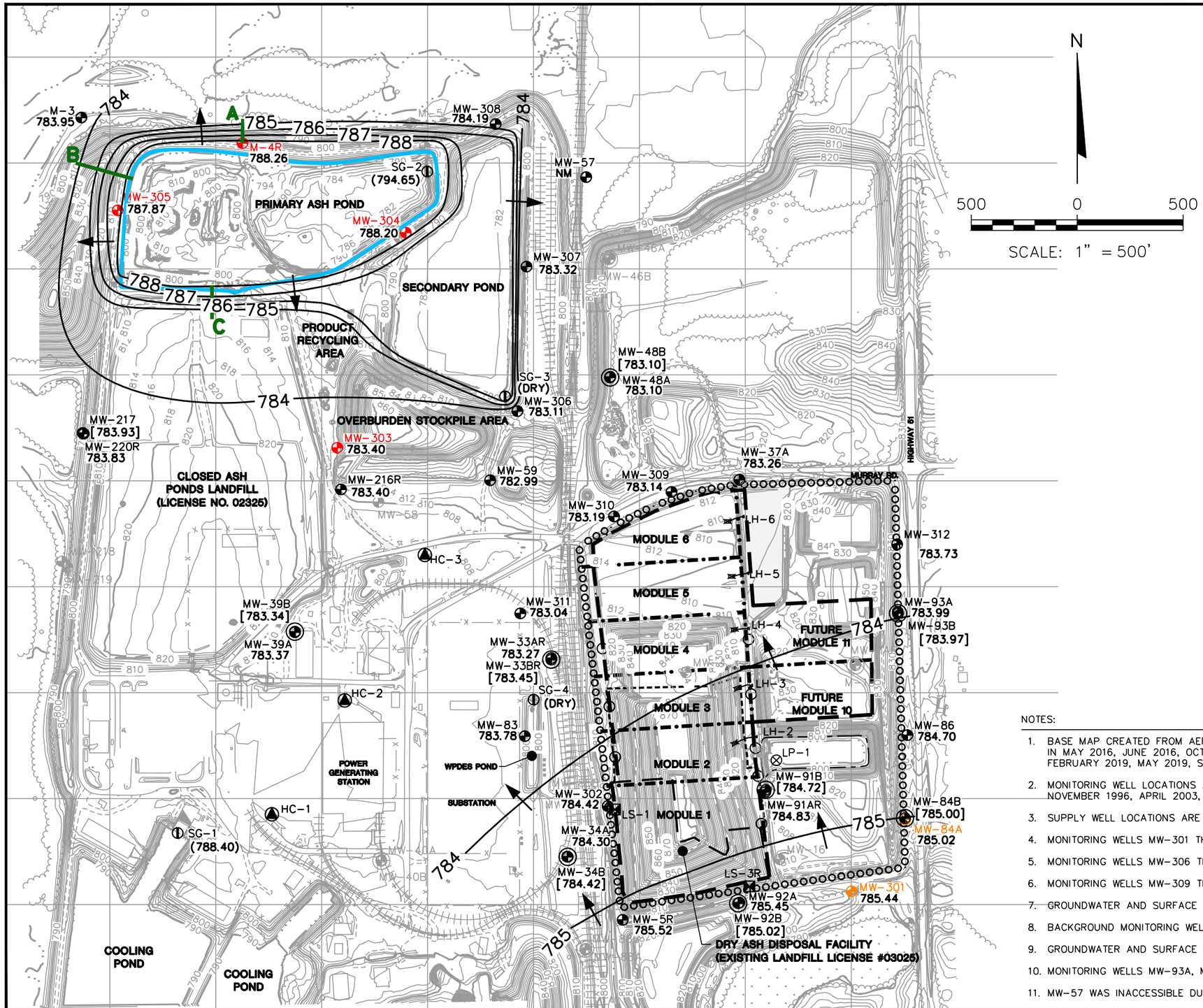
CLIENT: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WI 53954

SITE: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
PRIMARY ASH DISPOSAL FACILITY
PARDEEVILLE, WI

SITE PLAN AND MONITORING WELL LOCATIONS

FIGURE 2

I:\25222067.00\Drawings\Primary\Site Plan and Monitoring Well Locations.dwg, 1/16/2023 2:49:40 PM



LEGEND

- EXISTING MAJOR CONTOUR (10' INTERVAL)
- EXISTING MINOR CONTOUR (2' CONTOUR)
- EXISTING FENCELINE
- EXISTING TRACKS
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EDGE OF WATER
- DRY ASH DISPOSAL FACILITY LIMITS
- LIMITS OF WASTE
- LINER PHASE/MODULE LIMITS
- WATER SUPPLY WELL
- STAFF GAUGE
- WATER TABLE WELL
- PIEZOMETER
- SURFACE WATER SAMPLE LOCATION
- LYSIMETER
- ABANDONED WATER TABLE WELL
- ABANDONED PIEZOMETER
- LEACHATE HEADWELL
- CCR UNIT
- FLOW PATH FOR VELOCITY CALCULATION (SEE TABLE 4)
- 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 SURVEY BY SCS ENGINEERS IN MAY 2016, JUNE 2016, OCTOBER 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, JULY 2018, AUGUST 2018, FEBRUARY 2019, MAY 2019, SEPTEMBER 2020, AUGUST 2021, AND NOVEMBER 2021.
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 PRIMARY ASH POND ARE: MW-301 AND MW-84A.
9. GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED ON APRIL 11–13, 2022.
10. MONITORING WELLS MW-93A, MW-93B, AND MW-312 INSTALLED BY CASCADE ENVIRONMENTAL ON MARCH 25–28, 2022.
11. MW-57 WAS INACCESSIBLE DURING THE APRIL 2022 EVENT DUE TO HIGH WATER.

PROJECT NO.	25222067.00	DRAWN BY:	KP
DRAWN:	12/02/2019	CHECKED BY:	MDB
REVISED:	01/16/2023	APPROVED BY:	TK, 1/16/2023

ENGINEER: SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

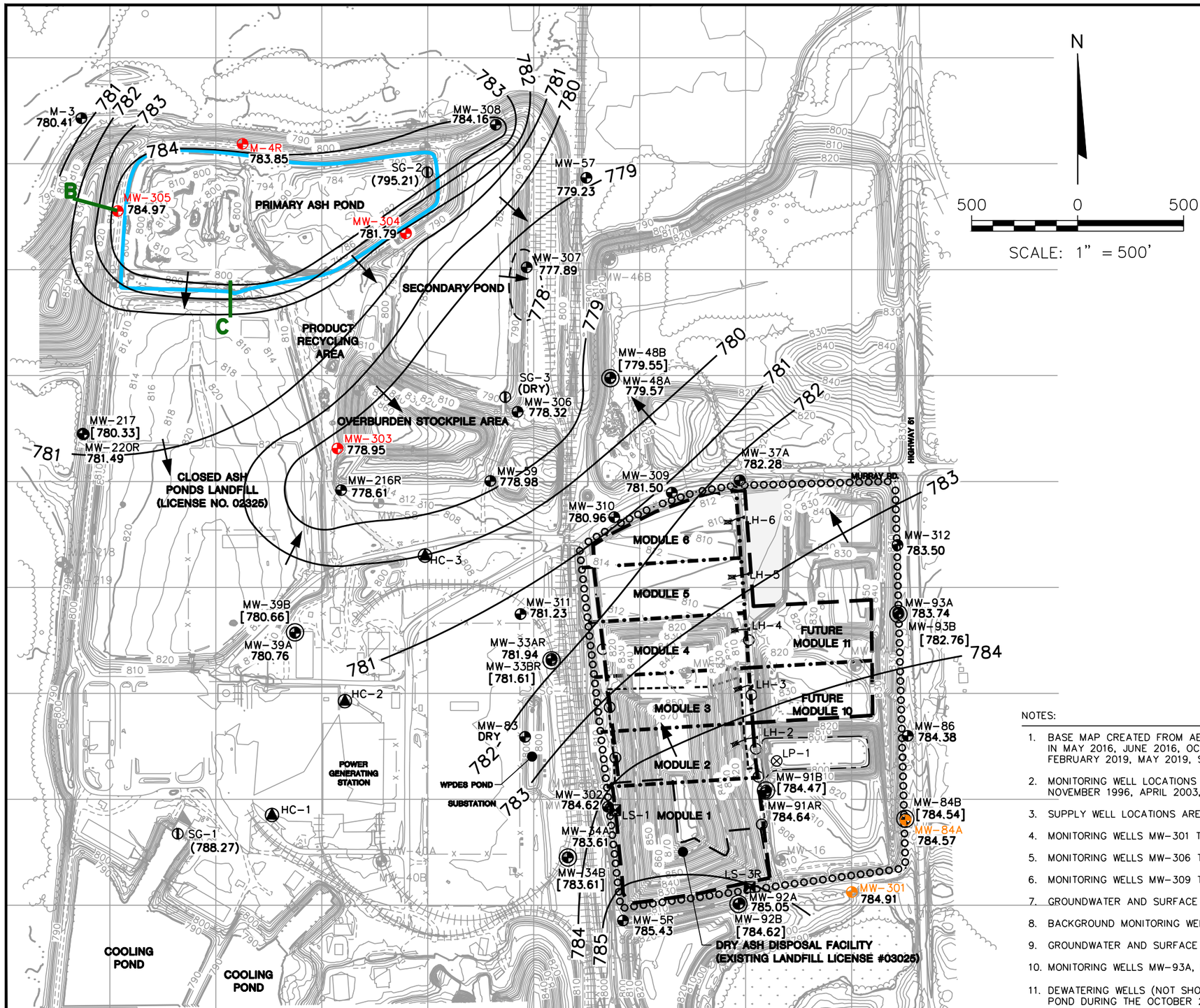
CLIENT: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WI 53954

SITE: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
PRIMARY ASH DISPOSAL FACILITY
PARDEEVILLE, WI

WATER TABLE MAP
APRIL 2022

FIGURE
3

I:\25222067.00\Drawings\Primary\Water Table Map-April 2022.dwg, 1/16/2023 3:12:57 PM



LEGEND

- EXISTING MAJOR CONTOUR (10' INTERVAL)
- EXISTING MINOR CONTOUR (2' CONTOUR)
- EXISTING FENCELINE
- EXISTING TRACKS
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EDGE OF WATER
- DRY ASH DISPOSAL FACILITY LIMITS
- LIMITS OF WASTE
- LINER PHASE/MODULE LIMITS
- WATER SUPPLY WELL
- STAFF GAUGE
- WATER TABLE WELL
- PIEZOMETER
- SURFACE WATER SAMPLE LOCATION
- LYSIMETER
- ABANDONED WATER TABLE WELL
- ABANDONED PIEZOMETER
- LEACHATE HEADWELL
- CCR UNIT
- FLOW PATH FOR VELOCITY CALCULATION (SEE TABLE 4)
- 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 SURVEY BY SCS ENGINEERS IN MAY 2016, JUNE 2016, OCTOBER 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, JULY 2018, AUGUST 2018, FEBRUARY 2019, MAY 2019, SEPTEMBER 2020, AUGUST 2021, AND NOVEMBER 2021.
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 PRIMARY ASH POND ARE: MW-301 AND MW-84A.
9. GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED ON OCTOBER 25-27, 2022.
10. MONITORING WELLS MW-93A, MW-93B, AND MW-312 INSTALLED BY CASCADE ENVIRONMENTAL ON MARCH 25-28, 2022.
11. DEWATERING WELLS (NOT SHOWN) AROUND THE SECONDARY POND WERE PUMPING AND DISCHARGING TO THE PRIMARY POND DURING THE OCTOBER 2022 SAMPLING EVENT.

PROJECT NO.	25222067.00	DRAWN BY:	KP
DRAWN:	12/15/2022	CHECKED BY:	MDB
REVISED:	01/16/2023	APPROVED BY:	TK, 1/16/2023

ENGINEER: 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
PRIMARY ASH DISPOSAL FACILITY
PARDEEVILLE, WI

WATER TABLE MAP
OCTOBER 2022

FIGURE
4

I:\25222067.00\Drawings\Primary\Water Table Map-October 2022.dwg, 1/16/2023 3:11:18 PM

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	• Unconsolidated clay, silt, sand, gravel, cobbles, boulders, and organic matter
Ordovician (460 to 490 million years old)	Sandstone Aquifer	0 to 800+	Galena Decorah Platteville St. Peter Prairie du Chien	• Dolomite and shaley dolomite • Sandstone
Cambrian (490 to 500 million years old)			Trempeleau Franconia Galesville Eau Claire Mt. Simon	• Sandstone
Precambrian (more than 1 billion years old)	Used for domestic supply in some areas	--	Precambrian	• Igneous and metamorphic rocks

*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

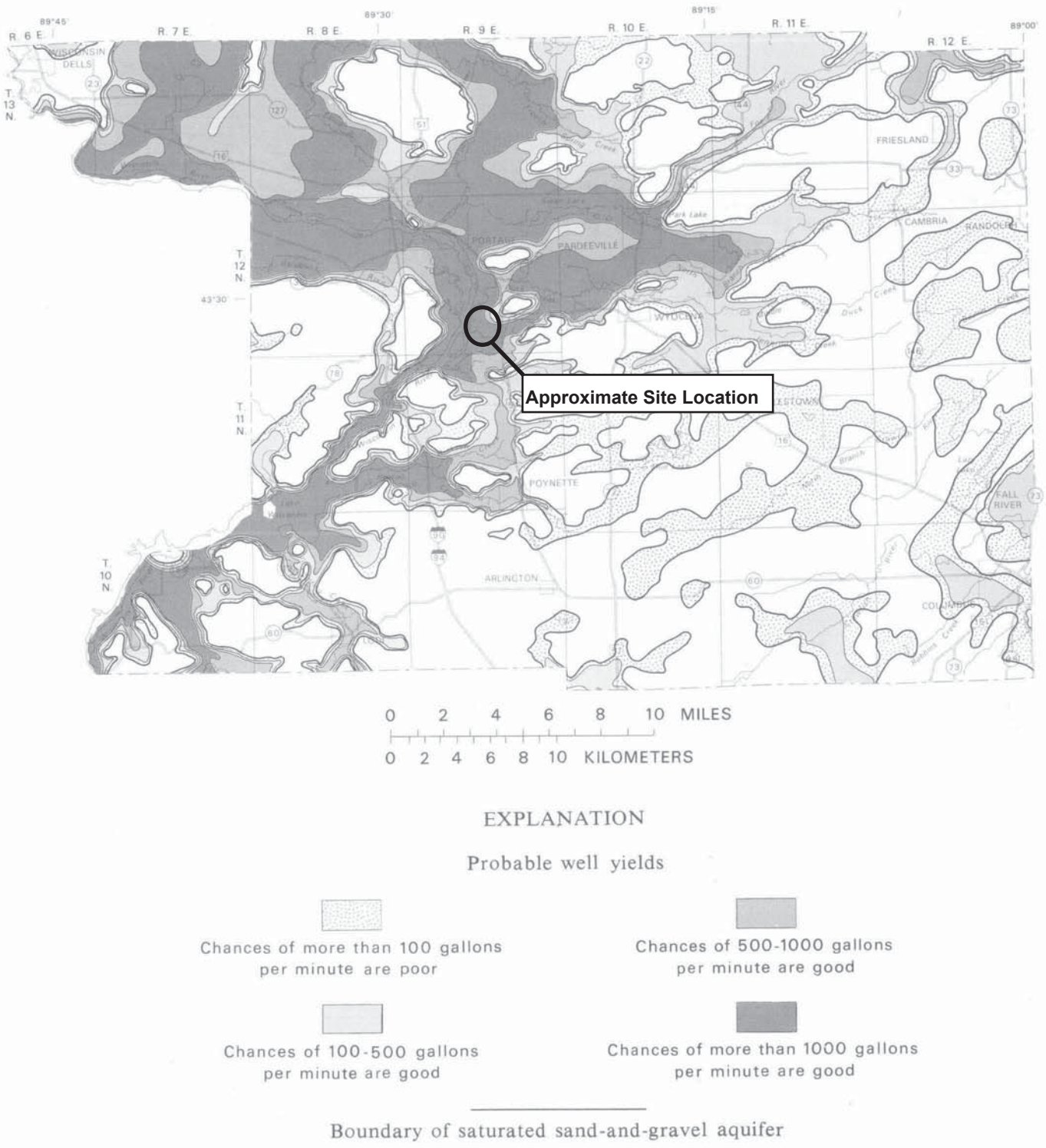
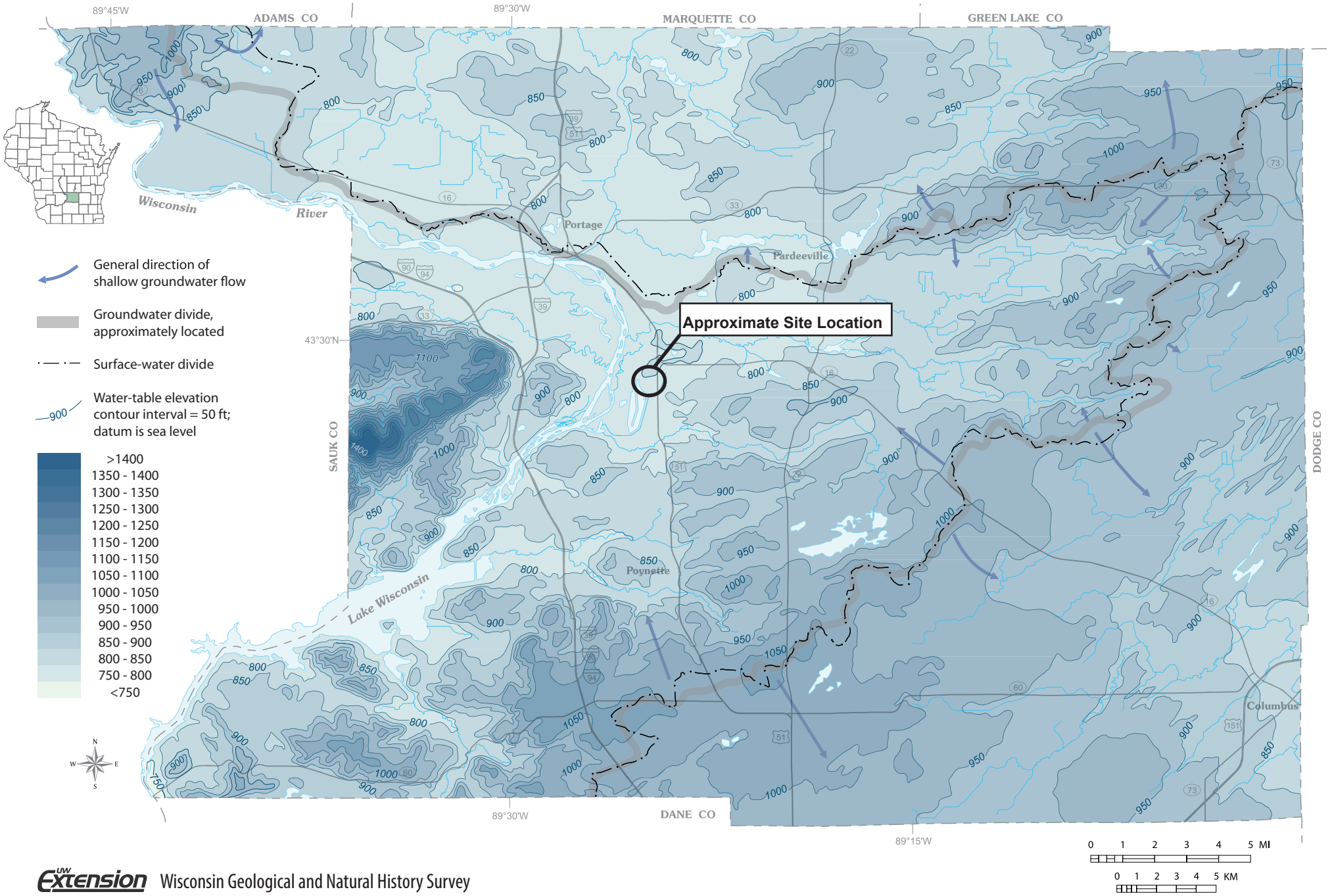


Figure 9. Probably well yields from the sand-and-gravel aquifer.

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

Generalized water-table elevation in Columbia County, Wisconsin



UW Extension Wisconsin Geological and Natural History Survey

Source: Sellwood, Stephen M., Wisconsin Geologic and Natural History Survey, Water Table Elevation, Groundwater Resources of Columbia County Wisconsin,

Appendix B

Boring Logs and Well Construction Documentation

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WPL-Columbia SCS#: 25215135.00		MW-301

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Kevin Durst Badger State Drilling	11/11/2015	11/11/2015	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VY701			Feet	803.69 Feet	8.5 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 541562.2 N, 2025001.0 E S/C/N
1/4 of 1/4 of Section 27, T 12 N, R 9 E
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Columbia	11	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: Pocket Penetration (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S1	21	7 6 9 10	1–2	SILTY SAND, yellowish brown (10YR 5/6), fine to medium grained.						M				
S2	20	6 7 9 10	3–4	Same as above except, 10YR 5/4 (top section), 10YR 3/6 (bottom section), trace gravel.						M				
S3	22	7 6 9 6	5–7	Same as above except, 10YR 3/4 (bottom), 10YR 5/4 (top), trace little roots and sticks, trace gravel.	SM					M				
S4	21	4 5 6 5	8–10	Same as above except, 10YR (top), 10YR 4/6 (bottom), trace clay at bottom.						M				
S5	18	2 2 4 5	11–12	Same as above except, fine to coarse grained sand, little gravel, trace clay in top half, 10YR 3/6.						M				
S6	20	2 3 3 3	13–15	Same as above except, 10YR 6/8.						M				

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 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 be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-301 Use only as an attachment to Form 4400-122. Page 2 of 2

Sample Number and Type	Sample 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: Pocket Penetration (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			16	SILTY SAND, yellowish brown (10YR 5/6), fine to medium grained.										
S7	20	5 4 4 3	17							M				
			18											
			19											
S8	20	2 4 4 5	20							W				
			21											
					SM									
S9	23	4 4 3 6	22							W				
			23											
			24	Same as above except, 10YR 6/4.										
S10	21	3 2 4 10	25							W				
			26											
			27											
			28	End of boring at 28 ft bgs.										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WPL-Columbia SCS#: 25215135.00		MW-303

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Kevin Durst Badger State Drilling	11/12/2015	11/13/2015	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VY714			Feet	808.69 Feet	8.5 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 543655.7 N, 2122574 E
1/4 of 1/4 of Section 27, T 12 N, R 9 E
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N Feet ☐ S ☐ E Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Columbia	11	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: Pocket Penetration (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S1	20	5 8 15 10	1–3	SILTY SAND CLAY with GRAVEL, (fill), tan colored 10YR 7/6.	SM					M				
S2	24	7 7 7 17	4–5	Same as above except, grey/brown (10YR 5/4).						M				
S3	20	13 34 50/5	6–8	SILTY SAND, trace gravel, tan color (10YR 5/4).						M				
S4	14	30 50/5	9–10		SM					M				
S5	15	31 50/3	11–13							M				
S6	15	38 50/3	14–15	Same as above with an inch of rock (limestone).						M				

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

Signature for Zach Watson 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 be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-303 Use only as an attachment to Form 4400-122. Page 2 of 2

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: Pocket Penetration (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			16											
S7	10	50/4	17	SILTY SAND, trace gravel, tan color (10YR 5/4), with trace gravel.						M				
			18											
			19											
S8	18	28 37 50/4	20							M				
			21											
S9	0	50	22											Lost spoon tip no sample.
			23											
			24	Same as above except, fine to coarse grained sand, little gravel.	SM									
S10	15	35 50/5	25							M				
			26	Same as above except, tan (10YR 5/6).										
S11	14	7 50/3	27							W				
			28											
			29											
			30											
			31											
			32											
			33	End of boring at 33 ft bgs.										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WPL-Columbia SCS#: 25215135.00		MW-304

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Kevin Durst Badger State Drilling	11/12/2015	11/12/2015	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VY703			Feet	802.50 Feet	8.5 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 544671 N, 2122897 E /C/N
1/4 of 1/4 of Section 27, T 12 N, R 9 E
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Columbia	11	Portage

Sample Number and Type	Sample 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: Pocket Penetration (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1	TOPSOIL.	TOPSOIL									
				SILTY SAND, mostly fine, brown/tan (10YR 5/6).										
S1	24	7 8 10 12	2							M				
			3											
			4	Same as above except, trace gravel, brown tan to grey (top to bottom) 10YR 5/4.										
S2	24	14 22 26 31	5							M				
			6	Same as above except, brown/tan/grey assorted coloring.										
S3	24	16 18 22 24	7							M				
			8		SM									
			9	Same as above except, black/grey/brown, saturated area about 2" thick.										
S4	24	11 15 15 14	10							M				
			11	Same as above except, 10YR 5/3.										
S5	24	23 31 30 29	12							M				
			13											
			14	trace gravel.										
S6	20	9 10 7 5	15							M				

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

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

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State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-304 Use only as an attachment to Form 4400-122. Page 2 of 2

Sample										Soil Properties					
Number and Type	Length Att. & Recovered (in)	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	Pocket Penetration (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			16	SILTY SAND, mostly fine, brown/tan (10YR 5/6).										
S7	4		17							W				dropped spoon
			18											
			19	Same as above except, 10YR 6/3.	SM									
S8			20							W				
			21											
			22											
			23	End of boring at 23 ft bgs.										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

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

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WPL-Columbia SCS#: 25215135.00		MW-305

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Kevin Durst Badger State Drilling	11/13/2015	11/13/2015	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VY716			Feet	803.95 Feet	8.5 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 544776.1 N, 2121537 E S/C/N
1/4 of 1/4 of Section 27, T 12 N, R 9 E
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Columbia	11	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: Pocket Penetration (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1	TOPSOIL	TOPSOIL									
S1	18	5 8 9 7	2	SILTY SAND, mostly fine, brown/tan 10YR 5/8.						M				
S2	18	2 3 3 4	5							M				
S3	18	2 8 9 8	7	Same as above except, trace gravel, tan 10YR 6/8 at bottom.	SM					M				
S4	20	5 7 6 5	10	Same as above except, light tan 10YR 6/6, trace gravel, some large gravel chunks.						M				
S5	20	9 12 17 22	12	POORLY GRADED SAND, tan (10YR 6/8), trace gravel, some saturated areas.	SP					M				
S6	24	16 19 22 34	15	SILTY SAND, trace gravel, tan (10YR 5/6).	SM					W				

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

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

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State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-305 Use only as an attachment to Form 4400-122. Page 2 of 2

Sample										Soil Properties					
Number and Type	Length Att. & Recovered (in)	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	Pocket Penetration (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S7		31 30 41 50/2	16	SILTY SAND, trace gravel, tan (10YR 5/6), some large dolomite chunks.	SM					W				
			17											
			18	End of boring at 18 ft bgs.										

SCS # 25215135

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. ☐N. ☐S. ____ ft. ☐E. ☐W.	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 ☒E ☐W	Well Installed By: Name (first, last) and Firm: Kevin Duerst / Badger State Drilling
Distance from Waste/Source ____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number:

A. Protective pipe, top elevation 807.16 ft. MSL
B. Well casing, top elevation 806.89 ft. MSL
C. Land surface elevation 803.69 ft. MSL
D. Surface seal, bottom 791.69 ft. MSL or 12 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☒ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☒ 41 / Other ☐ ____

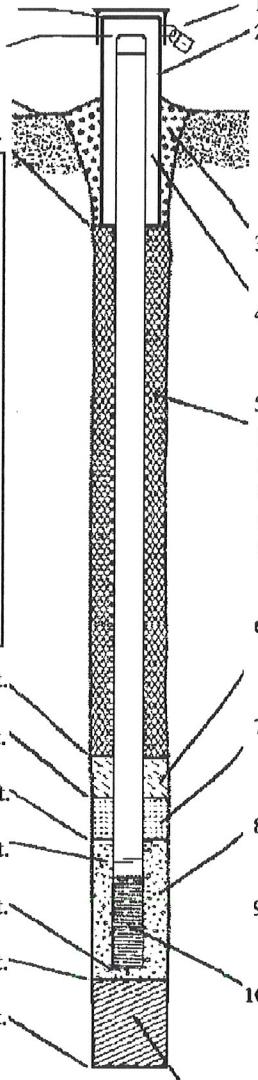
15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):

E. Bentonite seal, top 803.69 ft. MSL or 0 ft.
F. Fine sand, top 791.69 ft. MSL or 12 ft.
G. Filter pack, top 789.69 ft. MSL or 14 ft.
H. Screen joint, top 787.69 ft. MSL or 16 ft.
I. Well bottom 777.69 ft. MSL or 26 ft.
J. Filter pack, bottom 776.69 ft. MSL or 27 ft.
K. Borehole, bottom 775.69 ft. MSL or 28 ft.
L. Borehole, diameter 8.5 in.
M. O.D. well casing 2.4 in.
N. I.D. well casing 2.0 in.



1. Cap and lock? ☐ Yes ☒ No
2. Protective cover pipe:
a. Inside diameter: 6 in.
b. Length: 5 ft.
c. Material: Steel ☒ 04 / Other ☐ ____
d. Additional protection? ☒ Yes ☐ No
If yes, describe: bumper posts
3. Surface seal: Bentonite ☒ 30 / Concrete ☐ 01 / Other ☐ ____
4. Material between well casing and protective pipe: Bentonite ☒ 30 / Other ☐ ____
Bentonite to grade, sand above
5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. ____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. ____ % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. ____ Ft^3 volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☐ 02 / Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☑ 32
c. 4 ft3 Other ☐ ____
7. Fine sand material: Manufacturer, product name & mesh size
a. RW Sidley Inc. #7 ☐
b. Volume added 0.5 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
a. RW Sidley #5 ☐
b. Volume added 2 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ 23 / Flush threaded PVC schedule 80 ☐ 24 / Other ☐ ____
10. Screen material: PVC
a. Screen type: Factory cut ☒ 11 / Continuous slot ☐ 01 / Other ☐ ____
b. Manufacturer Johnson
c. Slot size: 0.01 in.
d. Slotted length: 10 ft.
11. Backfill material (below filter pack): Native / None ☐ 14 / Other ☒ ____

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 53718-6751

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.

SCS # 25215135

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. ☐N ☐S ____ ft. ☐E ☐W	Well Name: MW-303
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☐ Lat. ° ' " Long. ° ' " or	Wis. Unique Well No.: VY714 / DNR Well ID No.:
Facility ID	St. Plane 543655.7 ft. N, 2122574 ft. E. S/C/N	Date Well Installed: 11 / 13 / 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 NW 1/4 of Sec. 27, T. 12 N, R. 9 ☒E ☐W	Well Installed By: Name (first, last) and Firm: Kevin Duerst / Badger State Drilling
Distance from Waste/Source ____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number:

A. Protective pipe, top elevation 811.81 ft. MSL
B. Well casing, top elevation 811.52 ft. MSL
C. Land surface elevation 808.69 ft. MSL
D. Surface seal, bottom 789.69 ft. MSL or 19 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☒ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☒ 41 / Other ☐ ____

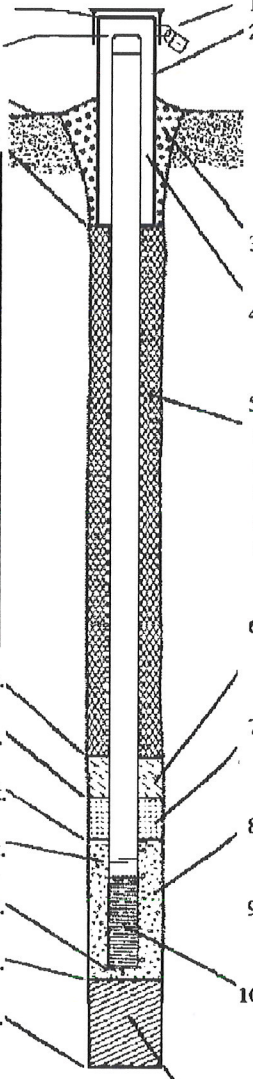
15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):

E. Bentonite seal, top 808.69 ft. MSL or 0 ft.
F. Fine sand, top 789.69 ft. MSL or 19 ft.
G. Filter pack, top 787.69 ft. MSL or 21 ft.
H. Screen joint, top 785.69 ft. MSL or 23 ft.
I. Well bottom 775.69 ft. MSL or 33 ft.
J. Filter pack, bottom 775.69 ft. MSL or 33 ft.
K. Borehole, bottom 774.69 ft. MSL or 34 ft.
L. Borehole, diameter 8.5 in.
M. O.D. well casing 2.4 in.
N. I.D. well casing 2.0 in.



1. Cap and lock? ☐ Yes ☒ No
2. Protective cover pipe:
a. Inside diameter: 6 in.
b. Length: 5 ft.
c. Material: steel — Steel ☒ 04 / Other ☐ ____
d. Additional protection? ☐ Yes ☐ No
If yes, describe: yes, bumper posts
3. Surface seal: Bentonite ☒ 30 / Concrete ☐ 01 / Other ☐ ____
4. Material between well casing and protective pipe: Bentonite to grade, sand in between — Bentonite ☒ 30 / Other ☐ ____
5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. ____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. ____ % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. ____ Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☐ 02 / Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☑ 32
c. 6.7 ft3 Other ☐ ____
7. Fine sand material: Manufacturer, product name & mesh size
a. RW Sidley Inc. #7 ☐
b. Volume added 0.5 ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. RW Sidley #5 ☐
b. Volume added 2.5 ft³
9. Well casing: Flush threaded PVC schedule 40 ☒ 23 / Flush threaded PVC schedule 80 ☐ 24 / Other ☐ ____
10. Screen material: PVC
a. Screen type: Factory cut ☒ 11 / Continuous slot ☐ 01 / Other ☐ ____
b. Manufacturer Johnson
c. Slot size: 0.01 in.
d. Slotted length: 10 ft.
11. Backfill material (below filter pack): Native — None ☐ 14 / Other ☒ ____

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

Signature: for Zach Watson
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.

SCS # 25215135

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. ☐N ☐S ___ ft. ☐E ☐W	Well Name: MW-304
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☐ Lat. ° ' " Long. ° ' " or	Wis. Unique Well No.: VY703 ____ DNR Well ID No.: ____
Facility ID: ____	St. Plane 544671 ft. N, 2122897 ft. E. S/C/N	Date Well Installed: 11 / 12 / 2015 (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; Badger State Drilling
Distance from Waste/Source ___ ft. Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number: ____

A. Protective pipe, top elevation 805.67 ft. MSL

B. Well casing, top elevation 805.42 ft. MSL

C. Land surface elevation 802.50 ft. MSL

D. Surface seal, bottom 793.50 ft. MSL or 9 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☒ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐ 50; Hollow Stem Auger ☒ 41; Other ☐ ____

15. Drilling fluid used: Water ☐ 02; Air ☐ 01; Drilling Mud ☐ 03; None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):

E. Bentonite seal, top 802.50 ft. MSL or 0 ft.

F. Fine sand, top 793.50 ft. MSL or 9 ft.

G. Filter pack, top 791.50 ft. MSL or 11 ft.

H. Screen joint, top 789.50 ft. MSL or 13 ft.

I. Well bottom 779.50 ft. MSL or 23 ft.

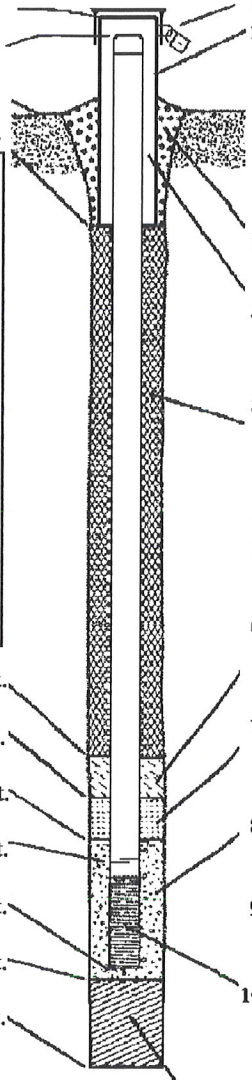
J. Filter pack, bottom 779.50 ft. MSL or 23 ft.

K. Borehole, bottom 779.50 ft. MSL or 23 ft.

L. Borehole, diameter 8.5 in.

M. O.D. well casing 2.4 in.

N. I.D. well casing 2.0 in.



1. Cap and lock? ☐ Yes ☒ No
2. Protective cover pipe:
a. Inside diameter: 6 in.
b. Length: 5 ft.
c. Material: steel — Steel ☐ 04; Other ☐ ____
d. Additional protection? ☐ Yes ☐ No
If yes, describe: yes, bumper posts
3. Surface seal: Bentonite ☒ 30; Concrete ☐ 01; Other ☐ ____
4. Material between well casing and protective pipe: Sand. Bentonite to grade — Bentonite ☒ 30; Other ☐ ____
5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. ____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. ____ % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. ____ Ft^3 volume added for any of the above
f. How installed: Tremie ☐ 01; Tremie pumped ☐ 02; Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☐ 32
c. 3.4 ft3 Other ☐ ____
7. Fine sand material: Manufacturer, product name & mesh size
a. RW Sidley Inc. #7 ☐
b. Volume added 0.5 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
a. RW Sidley #5 ☐
b. Volume added 1.5 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ 23; Flush threaded PVC schedule 80 ☐ 24; Other ☐ ____
10. Screen material: PVC
a. Screen type: Factory cut ☒ 11; Continuous slot ☐ 01; Other ☐ ____
b. Manufacturer Johnson
c. Slot size: 0.01 in.
d. Slotted length: 10 ft.
11. Backfill material (below filter pack): Native — None ☐ 14; Other ☒ ____

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

Signature: for Zach Watson | 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.

SCS # 25215135

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. ☐N ☐S ____ ft. ☐E ☐W	Well Name: MW-305
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☐ Lat. ____ ° ____ ' ____ " Long. ____ ° ____ ' ____ " or	Wis. Unique Well No.: VY716 / DNR Well ID No.:
Facility ID	St. Plane 544776.1 ft. N, 2121537 ft. E. S/C/N	Date Well Installed: 11 / 13 / 2015 (m m d d y y y y)
Type of Well: Well Code ____ / ____	Section Location of Waste/Source: SW 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 / Badger State Drilling
Distance from Waste/Source ____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number:

A. Protective pipe, top elevation 806.88 ft. MSL
B. Well casing, top elevation 806.32 ft. MSL
C. Land surface elevation 803.95 ft. MSL
D. Surface seal, bottom 794.95 ft. MSL or 9 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☒ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☒ No

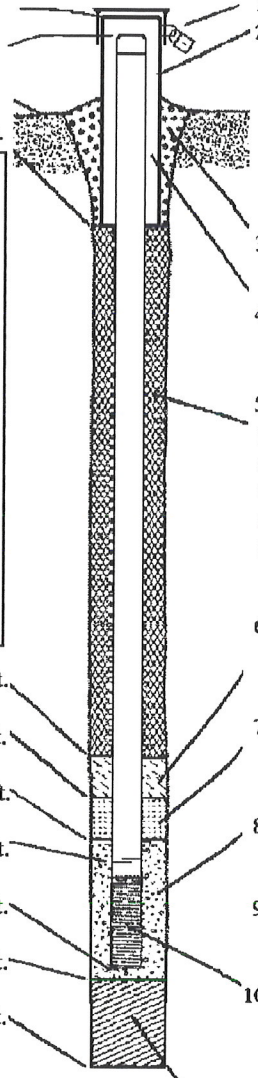
14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☒ 41 / Other ☐ ____

15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No
Describe ____

17. Source of water (attach analysis, if required):
____

E. Bentonite seal, top 803.95 ft. MSL or 0 ft.
F. Fine sand, top 794.95 ft. MSL or 9 ft.
G. Filter pack, top 792.95 ft. MSL or 11 ft.
H. Screen joint, top 789.95 ft. MSL or 13 ft.
I. Well bottom 779.95 ft. MSL or 23 ft.
J. Filter pack, bottom 779.95 ft. MSL or 23 ft.
K. Borehole, bottom 779.35 ft. MSL or 23.6 ft.
L. Borehole, diameter 8.5 in.
M. O.D. well casing 2.4 in.
N. I.D. well casing 2.0 in.



1. Cap and lock? ☐ Yes ☒ No
2. Protective cover pipe:
a. Inside diameter: 6 in.
b. Length: 5 ft.
c. Material: steel — Steel ☐ 04 / Other ☐ ____
d. Additional protection? ☐ Yes ☐ No
If yes, describe: yes, bumper posts
3. Surface seal: Bentonite ☒ 30 / Concrete ☐ 01 / Other ☐ ____
4. Material between well casing and protective pipe: Bentonite to grade, sand in between — Bentonite ☐ 30 / Other ☐ ____
5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. ____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. ____ % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. ____ Ft^3 volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☐ 02 / Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☑ 32
c. 2 ft3 Other ☐ ____
7. Fine sand material: Manufacturer, product name & mesh size
a. RW Sidley Inc. #7 ☐
b. Volume added 0.5 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
a. RW Sidley #5 ☐
b. Volume added 3 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ 23 / Flush threaded PVC schedule 80 ☐ 24 / Other ☐ ____
10. Screen material: PVC
a. Screen type: Factory cut ☒ 11 / Continuous slot ☐ 01 / Other ☐ ____
b. Manufacturer Johnson
c. Slot size: 0.01 in.
d. Slotted length: 10 ft.
11. Backfill material (below filter pack): Native — None ☐ 14 / Other ☒ ____

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

Signature: for Zach Watson
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.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

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

Facility/Project Name	County Name	Well Name
Alliant-Columbia	Columbia	MW-301

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	11	VY701	

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☒ 61
surged with block and bailed	☐ 42
surged with block and pumped	☐ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other _____	☐

3. Time spent developing well 120 min.

4. Depth of well (from top of well casisng) 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? (If yes, attach results) ☐ Yes ☒ No

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 21.72 ft.	21.77 ft.
Date	b. 12/02/2015 (m m d d y y y y)	12/02/2015
Time	c. 08:30 ☒ a.m. ☐ p.m.	10:30 ☒ a.m. ☐ p.m.
12. Sediment in well bottom	0.__ inches	0.__ inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☒ 20 Turbid ☐ 25 (Describe)
14. Total suspended solids	____.__ mg/l	____.__ mg/l
15. COD	____.__ mg/l	____.__ mg/l

Fill in if drilling fluids were used and well is at solid waste facility:

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: [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.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

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

Facility/Project Name	County Name	Well Name
Alliant - Columbia	Columbia	MW-302

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	11	VY702	

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☒ 61
surged with block and bailed	☐ 42
surged with block and pumped	☐ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other _____	☐

3. Time spent developing well 120 min.

4. Depth of well (from top of well casisng) 33.6 ft.

5. Inside diameter of well 2.00 in.

6. Volume of water in filter pack and well casing 5.4 gal.

7. Volume of water removed from well 60.0 gal.

8. Volume of water added (if any) ____.__ gal.

9. Source of water added _____

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

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 28.37 ft.	28.41 ft.
Date	b. 12/02/2015 (m m d d y y y y)	12/02/2015 (m m d d y y y y)
Time	c. 02:00 ☐ a.m. ☒ p.m.	04:00 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	0.__ inches	0.__ inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☒ 20 Turbid ☐ 25 (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: Pardeeville, WI 53954

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: [signature] for G.S.
Print Name: Gary Sterkel
Firm: SCS ENGINEERS

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

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

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

Facility/Project Name	County Name	Well Name
Alliant - Columbia	Columbia	MW-303

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	11	VY714	

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☒ 61
surged with block and bailed	☐ 42
surged with block and pumped	☐ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other _____	☐

3. Time spent developing well 120 min.

4. Depth of well (from top of well casisng) 35.8 ft.

5. Inside diameter of well 2.00 in.

6. Volume of water in filter pack and well casing 7.5 gal.

7. Volume of water removed from well 83.0 gal.

8. Volume of water added (if any) ____.__ gal.

9. Source of water added _____

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

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 28.30 ft.	28.38 ft.
Date	b. 12/02/2015 (m m d d y y y y)	12/02/2015 (m m d d y y y y)
Time	c. 11:45 ☒ a.m. ☐ p.m.	1:45 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	____.__ inches	____.__ inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☒ 20 Turbid ☐ 25 (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: Pardeeville, WI 53954

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: for G.S.
Print Name: Gary Sterkel
Firm: SCS ENGINEERS

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

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

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

Facility/Project Name	County Name	Well Name
Alliant - Columbia	Columbia	MW-304

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	11	VY703	

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☐ 61
surged with block and bailed	☐ 42
surged with block and pumped	☐ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other _____	☐

3. Time spent developing well 135 min.

4. Depth of well (from top of well casisng) 25.7 ft.

5. Inside diameter of well 2.00 in.

6. Volume of water in filter pack and well casing 8.0 gal.

7. Volume of water removed from well 88.0 gal.

8. Volume of water added (if any) ____.__ gal.

9. Source of water added _____

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

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 17.26 ft.	20.85 ft.
Date	b. 12/03/2015 (m m d d y y y y)	12/03/2015
Time	c. 11:00 ☒ a.m. ☐ p.m.	01:15 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	____.__ inches	____.__ inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☒ 20 Turbid ☐ 25 (Describe)
14. Total suspended solids	_____.__ mg/l	_____.__ mg/l
15. COD	_____.__ mg/l	_____.__ mg/l

Fill in if drilling fluids were used and well is at solid waste facility:

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: Pardeeville, WI 53954

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: for G. S.
Print Name: Gary Sterkel
Firm: SCS ENGINEERS

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

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

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

Facility/Project Name	County Name	Well Name
Alliant - Columbia	Columbia	MW-305

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	11	VY716	

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☒ 61
surged with block and bailed	☐ 42
surged with block and pumped	☐ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other _____	☐ __

3. Time spent developing well 120 min.

4. Depth of well (from top of well casisng) 25.6 ft.

5. Inside diameter of well 2.00 in.

6. Volume of water in filter pack and well casing 7.7 gal.

7. Volume of water removed from well 85.0 gal.

8. Volume of water added (if any) ____.__ gal.

9. Source of water added _____

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

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 18.61 ft.	18.62 ft.
Date	b. 12/02/2015 (m m d d y y y y)	12/02/2015
Time	c. 08:30 ☒ a.m. ☐ p.m.	11:30 ☒ a.m. ☐ p.m.
12. Sediment in well bottom	____.__ inches	____.__ inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☒ 20 Turbid ☐ 25 (Describe)
14. Total suspended solids	____.__ mg/l	____.__ mg/l
15. COD	____.__ mg/l	____.__ mg/l

Fill in if drilling fluids were used and well is at solid waste facility:

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: Pardeeville, WI 53954

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: for G.S.
Print Name: Gary Sterkel
Firm: SCS ENGINEERS

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

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project Wisconsin Power & Light

Location Columbia Generating Station

Boring No. MW-84A

Surface Elevation 813.4

Job No. C 7134

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								
No.	Type	↓	↓	N	Depth		q_u	W	LL	PL	D
						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'

State of Wisconsin
Department of Natural Resources

Route To:
☒ Solid Waste ☐ Haz. Waste
☐ Emergency Response ☐ Underground Tanks
☐ Wastewater ☐ Water Resources
☐ Other

Soil Boring Log Information
Form 4400-122 7-91

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WP&L - Columbia 3024.07		**M4R**

Boring Drilled By (Firm name and name of crew chief)	Date Drilling Started	Date Drilling Completed	Drilling Method
Environmental & Foundation Drilling, Crew: Frank, Jim, Leon	**8/22/96**	**8/22/96**	**4 1/4 HSA**

DNR Facility Well No.	WI Unique Well No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		M4R	Feet MSL	**803.6** Feet MSL	**8.0** Inches

Boring Location
State Plane **545093.90 N, 2122125.90 E** Lat ° ' "
NW 1/4 of **NW** 1/4 of Section **27** T **12** N,R **9E** Long ° ' "

Local Grid Location (If applicable)
☐ N Feet ☐ E
☐ S Feet ☐ W

County	DNR County Code	Civil Town/City/ or Village
Columbia	**11**	**Pacific**

Sample Number	Sample Length (In) Recovered	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	Comments
1	12	22	0–1	**SILTY SAND (SM)**, trace fine gravel, non-plastic, yellowish brown 10YR 5/6, no odor, loose, (Fill).	SM					M				SS
2	24	16	2–3	As above, occasional thin layers of light brown sand.										SS
3	15	17	4–5	As above. Color change to 10YR 5/4.										SS
4	24	25	6–7	As above, occasional 10YR 4/4 dark yellowish brown seams with more silt, trace clay.										SS
5	23	19	8–9	As above. 1" gravel (dark colored) at about 9.0 feet.										SS
			10–12											

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

Signature

Firm RMT
744 Heartland Trail, Madison Wisconsin
Tel: 608-831-4444, Fax: 608-831-3334

This form is authorized by Chapters 144, 147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than $10 nor more than $5,000 for each violation. Fined not less than $10 or more than $100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

APPENDIX C

State of Wisconsin
Department of Natural Resources

Soil Boring Log Information Supplement
Form 4400-122A
7-91

Boring Number **M4R** Use only as an attachment to Form 4400-122.

Sample Number	Sample Length (In) Recovered	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	Comments
6	22	34	13	As above.										SS
			14											
			15	Color change to 10YR 5/3 brown at 14.8 feet, (Native).						VM				
			16											
			17											
7	22	9	18	As above, no stratigraphy, 10YR 4/6 dark yellowish brown.						W	NV	NP	9.0%	SS
			19											
			20											
			21											
			22											
			23											
				End of boring at 23.5 feet.										

WELL DETAIL INFORMATION SHEET

JOB NO. C 7134

BORING NO. MW-84A

DATE 10/5/83

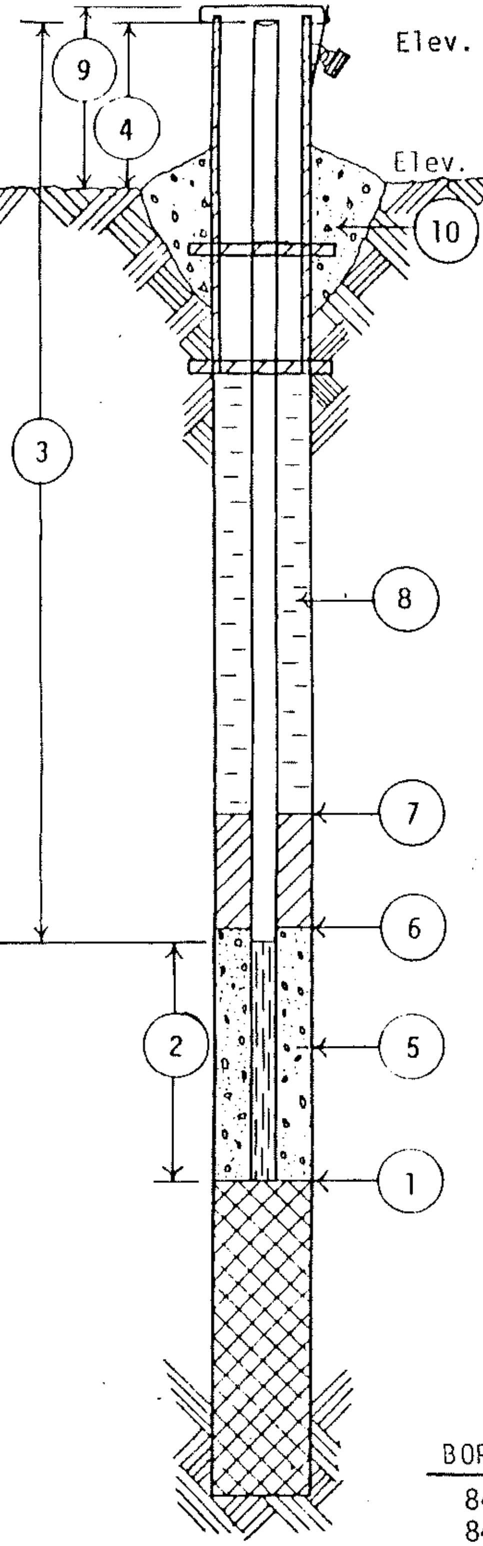
Elev. 814.57 Steel / 814.32 PVC

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"	

WARZYN ENGINEERING INC

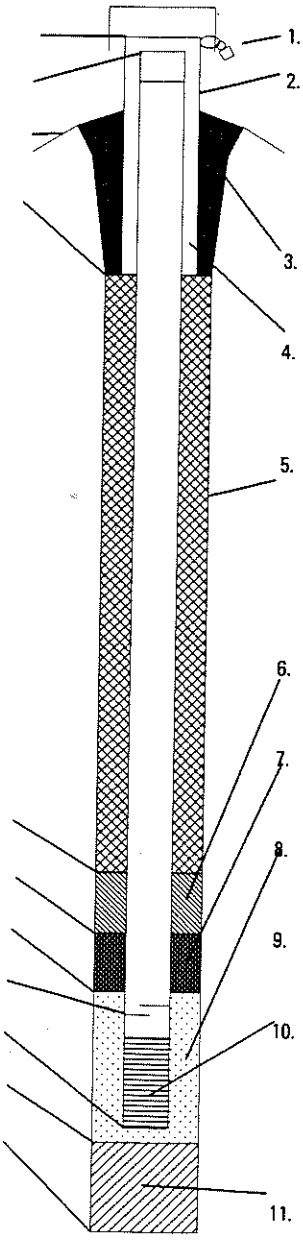
e of Wisconsin
partment of Natural Resources

Route to: Solid Waste ■ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ ____

...ONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 4-9(

acility/Project Name P&L Columbia	Local Grid Location of Well ■ N. 545093.9 ft. ☐ S. ■ E. 2122125.9 ft. ☐ W.	Well Name M4R
acility License, Permit or Monitoring Number 2325	Grid Origin Location Lat. ___ ___ ___ Long. ___ ___ ___ or St. Plane ____ ft. N, ____ ft. E.	Wis. Unique Well Number ____ DNR Well Number 133
ype of Well: Water Table Observation Well ■ 11 Piezometer ☐ 12	Section Location of Waste/Source NW¼ of NW¼ of Sec. 27, T 12N, R 9 ■ E. ☐ W.	Date Well Installed 0 8 / 2 2 / 9 6 M M D D Y Y
Distance Well is From Waste/Source Boundary 120 ft.	Location of Well Relative to Waste/Source U ☐ Upgradient S ☐ Sidegradient D ■ Downgradient N ☐ Not Known	Well Installed By: (Persons' Name and Firm) Frank Badula Environmental & Foundation Drilling
s Well A Point of Enforcement Std. Application? ☐ Yes ■ No		



Protective pipe, top elevation	805.94 ft. MSL
Well casing, top elevation	806.10 ft. MSL
Land surface elevation	803.6 ft. MSL
Surface seal, bottom	803.1 ft. MSL or 0.5 ft.
Bentonite seal, top	803.1 ft. MSL or 0.5 ft.
Fine sand, top	794.6 ft. MSL or 9.0 ft.
Filter pack, top	792.6 ft. MSL or 11.0 ft.
Screen joint, top	790.6 ft. MSL or 13.0 ft.
Well bottom	780.6 ft. MSL or 23.0 ft.
Filter pack, bottom	780.1 ft. MSL or 23.5 ft.
Borehole, bottom	780.1 ft. MSL or 23.5 ft.
Borehole, diameter	8.0 in.
O.D. well casing	2.38 in.
D. well casing	2.03 in.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ■
SM ■ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? Yes ■ No ☐

14. Drilling method used: Rotary ☐ 50
Hollow Stem Auger ■ 41
____ Other ☐

15. Drilling fluid used: Water ☐ 02 Air ☐ 01
Drilling Mud ☐ 03 None ■ 99

16. Drilling additives used? Yes ☐ No ■

Describe ____

17. Source of water (attach analysis):

1. Cap and lock? ■ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 4.0 i
b. Length: 7.0 f
c. Material: Steel ■ 04
Other ☐
d. Additional protection? ■ Yes ☐ No
If yes, describe: Bumper posts

3. Surface seal: Bentonite ■ 30
Concrete ☐ 01
____ Other ☐

4. Material between well casing and protective pipe: Bentonite ■ 30
Annular space seal ☐
____ Other ☐

5. Annular space seal:
b. ___ Lbs/gal mud weight....
c. ___ Lbs/gal mud weight.....
d. ___ % Bentonite.....
e. ___ lb volume added for any of the above
f. How installed:
a. Granular Bentonite ☐ 33
Bentonite-sand slurry ☐ 35
Bentonite slurry ☐ 31
Bentonite-cement grout ☐ 50
Tremie ☐ 01
Tremie pumped ☐ 02
Gravity ■ 08

6. Bentonite seal:
b. ☐ 1/4 in. ■ 3/8 in. ☐ 1/2 in.
c. ____
a. Bentonite granules ☐ 33
Bentonite pellets ■ 32
Other ☐

7. Fine sand material: Manufacturer, product name, mesh size
a. Unimin silica sand
b. Volume added 75 lbs

8. Filter pack material: Manufacturer, product, mesh size
a. Badger Mining Co. (#30)
b. Volume added 400 lbs

9. Well casing:
Flush threaded PVC schedule 40 ■ 23
Flush threaded PVC schedule 80 ☐ 24
____ Other ☐

10. Screen Material: PVC
a. Screen type:
Factory cut ■ 11
Continuous slot ☐ 01
____ Other ☐
b. Manufacturer Timco
c. Slot size: 0.010 in
d. Slotted length: 10.0 ft

11. Backfill material (below filter pack):
None ■ 14
____ Other ☐

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

Signature

Firm
RMT, Inc.

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5,000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

I:\WPMSN\PJT\00-03024\07\B0003024.07A 12/31/9

APPENDIX D
APPENDIX E
APPENDIX F
APPENDIX G

ate of Wisconsin
epartment of Natural Resources

MONITORING WELL DEVELOPMENT
Form 4400-113B Rev. 4-90

Route to: Solid Waste ■ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

cility/Project Name	County Name	Well Name	
P&L Columbia	Columbia	M4R	
cility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well Number
2325	11		133

		Before Development	After Development
Can this well be purged dry?	☐ Yes ■ No		
Well development method			
surged with bailer and bailed	☐ 41		
surged with bailer and pumped	■ 61		
surged with block and bailed	☐ 42		
surged with block and pumped	☐ 62		
surged with block, bailed and pumped	☐ 70		
compressed air	☐ 20		
bailed only	☐ 10		
pumped only	☐ 51		
pumped slowly	☐ 50		
Other _____	☐		
11. Depth to Water (from top of well casing)		a. 19.90 ft.	20.05 ft.
Date		b. 08/23/96 m m d d y y ■ a.m.	08/23/96 m m d d y y ■ a.m.
Time		c. 8:30 ☐ p.m.	10:30 ☐ p.m.
12. Sediment in well bottom		0. inches	0. inches
13. Water clarity		Clear ☐ 10 Turbid ■ 15 (Describe) Brn, very silty	Clear ■ 20 Turbid ☐ 25 (Describe)
Time spent developing well	120 min.		
Depth of well (from top of well casing)	253. ft.		
Inside diameter of well	2.0 in.		
Volume of water in filter pack and well casing	4.2 gal.		
Volume of water removed from well	70. gal.		
Volume of water added (if any)	0. gal.		
Source of water added			
Fill in if drilling fluids were used and well is at solid waste facility:			
14. Total suspended solids		_____ mg/l	190. mg/l
15. COD		_____ mg/l	N/A. mg/l

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

. Additional comments on development: Well was surged w/PVC bailer for 30 nutes and then pumped.

me	Volume Removed (gal.)	pH	Temperature (°C)	Conductivity (μmhos)
40	0 (initial)	6.12	15.2	660
25	10	6.73	14.0	670
40	25	6.95	13.7	610
50	35	6.90	13.7	600
55	45	6.87	13.6	600
:00	55	6.92	13.6	600
:10	70	6.95	13.7	600

ell developed by: Person's Name and Firm

me: Meredith Westover

m: RMT, Inc.

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

Signature: _____

Print Initials: M L W

Firm: RMT, Inc.

OTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

I:\WPMSN\PJT\00-03024\07\B0003024.07A 12/31/96

APPENDIX D
APPENDIX E
APPENDIX F
APPENDIX G

Appendix C

Laboratory Reports

C1 – February 2022 Assessment Monitoring

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

March 07, 2022

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on February 25, 2022. 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

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

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40241083001	**FIELD BLANK**	Water	02/24/22 13:35	02/25/22 08:35
40241083002	**MW 303**	Water	02/24/22 14:00	02/25/22 08:35
40241083003	**MW 305**	Water	02/24/22 15:10	02/25/22 08:35

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Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40241083001	**FIELD BLANK**	EPA 6020B	KXS	2
40241083002	**MW 303**	EPA 6020B	KXS	1
			KPR	7
40241083003	**MW 305**	EPA 6020B	KXS	1
			KPR	7

PASI-G = Pace Analytical Services - Green Bay

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Green Bay, WI 54302
(920)469-2436

SUMMARY OF DETECTION

Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40241083002	**MW 303**					
EPA 6020B	Arsenic	28.8	ug/L	1.0	03/01/22 08:55	
	Field pH	9.53	Std. Units		02/24/22 14:00	
	Field Specific Conductance	1439	umhos/cm		02/24/22 14:00	
	Oxygen, Dissolved	3.53	mg/L		02/24/22 14:00	
	REDOX	205.0	mV		02/24/22 14:00	
	Turbidity	2.53	NTU		02/24/22 14:00	
	Static Water Level	782.34	feet		02/24/22 14:00	
	Temperature, Water (C)	9.6	deg C		02/24/22 14:00	
40241083003	**MW 305**					
EPA 6020B	Molybdenum	35.8	ug/L	1.5	03/01/22 09:24	
	Field pH	9.36	Std. Units		02/24/22 15:10	
	Field Specific Conductance	677	umhos/cm		02/24/22 15:10	
	Oxygen, Dissolved	1.28	mg/L		02/24/22 15:10	
	REDOX	203.5	mV		02/24/22 15:10	
	Turbidity	0.09	NTU		02/24/22 15:10	
	Static Water Level	786.49	feet		02/24/22 15:10	
	Temperature, Water (C)	17.2	deg C		02/24/22 15:10	

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ANALYTICAL RESULTS

Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

Sample: FIELD BLANK **Lab ID: 40241083001** Collected: 02/24/22 13:35 Received: 02/25/22 08:35 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Arsenic	**<0.28**	ug/L	1.0	0.28	1	02/28/22 06:16	03/01/22 08:40	7440-38-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	02/28/22 06:16	03/01/22 08:40	7439-98-7	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

Sample: MW 303 **Lab ID: 40241083002** Collected: 02/24/22 14:00 Received: 02/25/22 08:35 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Arsenic	**28.8**	ug/L	1.0	0.28	1	02/28/22 06:16	03/01/22 08:55	7440-38-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**9.53**	Std. Units			1		02/24/22 14:00		
Field Specific Conductance	**1439**	umhos/cm			1		02/24/22 14:00		
Oxygen, Dissolved	**3.53**	mg/L			1		02/24/22 14:00	7782-44-7	
REDOX	**205.0**	mV			1		02/24/22 14:00		
Turbidity	**2.53**	NTU			1		02/24/22 14:00		
Static Water Level	**782.34**	feet			1		02/24/22 14:00		
Temperature, Water (C)	**9.6**	deg C			1		02/24/22 14:00		

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ANALYTICAL RESULTS

Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

Sample: MW 305 **Lab ID: 40241083003** Collected: 02/24/22 15:10 Received: 02/25/22 08:35 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Molybdenum	**35.8**	ug/L	1.5	0.44	1	02/28/22 06:16	03/01/22 09:24	7439-98-7	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**9.36**	Std. Units			1		02/24/22 15:10		
Field Specific Conductance	**677**	umhos/cm			1		02/24/22 15:10		
Oxygen, Dissolved	**1.28**	mg/L			1		02/24/22 15:10	7782-44-7	
REDOX	**203.5**	mV			1		02/24/22 15:10		
Turbidity	**0.09**	NTU			1		02/24/22 15:10		
Static Water Level	**786.49**	feet			1		02/24/22 15:10		
Temperature, Water (C)	**17.2**	deg C			1		02/24/22 15:10		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

QC Batch: 409100
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40241083001, 40241083002, 40241083003

METHOD BLANK: 2357989 Matrix: Water
Associated Lab Samples: 40241083001, 40241083002, 40241083003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	ug/L	<0.28	1.0	03/01/22 08:33	
Molybdenum	ug/L	<0.44	1.5	03/01/22 08:33	

LABORATORY CONTROL SAMPLE: 2357990

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	250	254	102	80-120	
Molybdenum	ug/L	250	242	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2357991 2357992

Parameter	Units	40241083002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	28.8	250	250	284	284	102	102	75-125	0	20	
Molybdenum	ug/L	126	250	250	373	377	99	101	75-125	1	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

Pace Analytical Services, LLC
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QUALIFIERS

Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

DEFINITIONS

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.

Pace Analytical Services, LLC
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(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25222067.00 ALLIANT COLUMBIA
Pace Project No.: 40241083

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40241083001	**FIELD BLANK**	EPA 3010A	409100	EPA 6020B	409192
40241083002	**MW 303**	EPA 3010A	409100	EPA 6020B	409192
40241083003	**MW 305**	EPA 3010A	409100	EPA 6020B	409192
40241083002	**MW 303**				
40241083003	**MW 305**				

Pace Analytical®

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here 40241083

ALL SHADED AREAS are for LAB USE ONLY

Company: SCS

Billing Information:

Address: 2830 Dairy Dr.

Report To: Meg Blodgett

Email To:

Copy To:

Site Collection Info/Address:

Customer Project Name/Number: 25222067.00

State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Phone:
Email:

Site/Facility ID #:

Compliance Monitoring? [ ] Yes [ ] No

Collected By (print): Ethan Schafer

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Paul A. Grover for Ethan

Turnaround Date Required:

Immediately Packed on Ice: [ ] Yes [ ] No

Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [ ] No
Analysis: ______

Container Preservative Type **

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Analyses

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	As	Molybdenum	Lab Sample # / Comments
Field Blank	DI	G			2-24-22	13:35		1	X	X	001
MW 303	GW	G			↓	14:00		1	X		002
MW 305	GW	G			↓	15:10		1		X	003

Lab Profile/Line:

Lab Sample Receipt Checklist:
- Custody Seals Present/Intact Y N NA
- Custody Signatures Present Y N NA
- Collector Signature Present Y N NA
- Bottles Intact Y N NA
- Correct Bottles Y N NA
- Sufficient Volume Y N NA
- Samples Received on Ice Y N NA
- VOA - Headspace Acceptable Y N NA
- USDA Regulated Soils Y N NA
- Samples in Holding Time Y N NA
- Residual Chlorine Present Y N NA
- Cl Strips: ______
- Sample pH Acceptable Y N NA
- pH Strips: ______
- Sulfide Present Y N NA
- Lead Acetate Strips: ______

2/25/22 MP See SCUR

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used: 2/25/22 MP See SCUR

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2731015

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
- Temp Blank Received: Y N NA
- Therm ID#: 2/25/22 MP
- Cooler 1 Temp Upon Receipt: ____oC
- Cooler 1 Therm Corr. Factor: see ____oC
- Cooler 1 Corrected Temp: ____oC
- Comments: SCUR

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
Paul A. Grover	2-24-22 1630			Table #:
CS logistics	0835 2/25/22	Morgan Delpace	0835 2/25/22	Acctnum: Template: Prelogin:
				PM: PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Sample Preservation Receipt Form

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

Client Name: SCS Project # 40241083

All containers needing preservation have been checked and noted below: ☒Yes ☐No ☐N/A Initial when completed: MP Date/Time:

Lab Lot# of pH paper: 10D0104 Lab Std #ID of preservation (if pH adjusted):

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

2/12 5/12 2/12 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
BG1U	1 liter clear glass
AG1H	1 liter amber glass HCL
AG4S	125 mL amber glass H2SO4
AG4U	120 mL amber glass unpres
AG5U	100 mL amber glass unpres
AG2S	500 mL amber glass H2SO4
BG3U	250 mL clear glass unpres

BP1U	1 liter plastic unpres
BP3U	250 mL plastic unpres
BP3B	250 mL plastic NaOH
BP3N	250 mL plastic HNO3
BP3S	250 mL plastic H2SO4

VG9A	40 mL clear ascorbic
DG9T	40 mL amber Na Thio
VG9U	40 mL clear vial unpres
VG9H	40 mL clear vial HCL
VG9M	40 mL clear vial MeOH
VG9D	40 mL clear vial DI

JGFU	4 oz amber jar unpres
JG9U	9 oz amber jar unpres
WGFU	4 oz clear jar unpres
WPFU	4 oz plastic jar unpres
SP5T	120 mL plastic Na Thiosulfate
ZPLC	ziploc bag
GN	

Pace Analytical® 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)

Project #:

WO#: 40241083

40241083

Client Name: SCS

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 - 111 **Type of Ice:** (Wet) Blue Dry None ☒ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 2 /Corr: 2

Temp Blank Present: ☒ yes ☐ no **Biological Tissue is Frozen:** ☐ yes ☐ no

Person examining contents:

Date: 2/25/22 Initials: MP

Labeled By Initials: AP

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:	☒Yes ☐No ☐N/A	1. +2 cc 2/25/22 MP
Chain of Custody Filled Out:	☐Yes ☒No ☐N/A	2. PM#, preservation, invoice info, filter y/n 2/25/22 MP
Chain of Custody Relinquished:	☒Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☒Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☒Yes ☐No	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☒No	6.
Rush Turn Around Time Requested:	☐Yes ☒No	7.
Sufficient Volume: For Analysis: ☒Yes ☐No MS/MSD: ☐Yes ☒No ☐N/A		8.
Correct Containers Used:	☒Yes ☐No	9.
-Pace Containers Used:	☒Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☒N/A	
Containers Intact:	☒Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☒N/A	11.
Sample Labels match COC: 2/25/22 MP	☒Yes (☒No) ☐N/A	12. 002" GW-303" "GW-305" 2/25/22 MP
-Includes date/time/ID/Analysis Matrix: W		
Trip Blank Present:	☐Yes ☐No ☒N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☒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 logi

C2 – April 2022 Assessment Monitoring

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

May 13, 2022

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on April 15, 2022. 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: Matt Bizjack, Alliant Energy
Sherren Clark, SCS Engineers
Tom Karwoski, SCS ENGINEERS
Nicole Kron, SCS ENGINEERS
Ryan Matzuk, SCS Engineers
Jeff Maxted, ALLIANT ENERGY
Marc Morandi, ALLIANT ENERGY

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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CERTIFICATIONS

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

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 #: 460198
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

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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(920)469-2436

SAMPLE SUMMARY

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40243482001	**MW-84A**	Water	04/13/22 14:20	04/15/22 07:10
40243482002	**MW-301**	Water	04/13/22 15:40	04/15/22 07:10

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40243482001	**MW-84A**	EPA 6020B	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			MEA	7	PASI-G
		EPA 903.1	RPS	1	PASI-PA
		EPA 904.0	JSM	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	SRK	1	PASI-G
		EPA 9040	YER	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40243482002	**MW-301**	EPA 6020B	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			MEA	7	PASI-G
		EPA 903.1	RPS	1	PASI-PA
		EPA 904.0	JSM	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	SRK	1	PASI-G
		EPA 9040	YER	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: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

Sample: MW-84A **Lab ID: 40243482001** Collected: 04/13/22 14:20 Received: 04/15/22 07:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Antimony	**<0.15**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 02:08	7440-36-0	
Arsenic	**0.31J**	ug/L	1.0	0.28	1	04/18/22 06:24	05/01/22 02:08	7440-38-2	
Barium	**13.5**	ug/L	2.3	0.70	1	04/18/22 06:24	05/01/22 02:08	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	04/18/22 06:24	05/01/22 02:08	7440-41-7	
Boron	**10.5**	ug/L	10.0	3.0	1	04/18/22 06:24	05/01/22 02:08	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 02:08	7440-43-9	
Calcium	**75100**	ug/L	254	76.2	1	04/18/22 06:24	05/01/22 02:08	7440-70-2	
Chromium	**2.2J**	ug/L	3.4	1.0	1	04/18/22 06:24	05/01/22 02:08	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	04/18/22 06:24	05/01/22 02:08	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	04/18/22 06:24	05/01/22 02:08	7439-92-1	
Lithium	**0.36J**	ug/L	1.0	0.22	1	04/18/22 06:24	05/01/22 02:08	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	04/18/22 06:24	05/01/22 02:08	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	04/18/22 06:24	05/01/22 02:08	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	04/18/22 06:24	05/01/22 02:08	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay								
Mercury	**<0.066**	ug/L	0.20	0.066	1	04/20/22 09:45	04/21/22 07:52	7439-97-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.34**	Std. Units			1		04/13/22 14:20		
Field Specific Conductance	**600.2**	umhos/cm			1		04/13/22 14:20		
Oxygen, Dissolved	**9.33**	mg/L			1		04/13/22 14:20	7782-44-7	
REDOX	**200.6**	mV			1		04/13/22 14:20		
Turbidity	**0.00**	NTU			1		04/13/22 14:20		
Static Water Level	**785.02**	feet			1		04/13/22 14:20		
Temperature, Water (C)	**9.9**	deg C			1		04/13/22 14:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**334**	mg/L	20.0	8.7	1		04/15/22 16:44		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.010	1		04/18/22 10:50		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**5.2**	mg/L	2.0	0.43	1		05/10/22 22:07	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/10/22 22:07	16984-48-8	
Sulfate	**1.4J**	mg/L	2.0	0.44	1		05/10/22 22:07	14808-79-8	M0

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

Sample: MW-301 **Lab ID: 40243482002** Collected: 04/13/22 15:40 Received: 04/15/22 07:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Antimony	**0.31J**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 02:37	7440-36-0	
Arsenic	**0.47J**	ug/L	1.0	0.28	1	04/18/22 06:24	05/01/22 02:37	7440-38-2	
Barium	**7.8**	ug/L	2.3	0.70	1	04/18/22 06:24	05/01/22 02:37	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	04/18/22 06:24	05/01/22 02:37	7440-41-7	
Boron	**28.7**	ug/L	10.0	3.0	1	04/18/22 06:24	05/01/22 02:37	7440-42-8	
Cadmium	**0.30J**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 02:37	7440-43-9	
Calcium	**97300**	ug/L	254	76.2	1	04/18/22 06:24	05/01/22 02:37	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	04/18/22 06:24	05/01/22 02:37	7440-47-3	
Cobalt	**0.32J**	ug/L	1.0	0.12	1	04/18/22 06:24	05/01/22 02:37	7440-48-4	
Lead	**3.1**	ug/L	1.0	0.24	1	04/18/22 06:24	05/01/22 02:37	7439-92-1	
Lithium	**0.56J**	ug/L	1.0	0.22	1	04/18/22 06:24	05/01/22 02:37	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	04/18/22 06:24	05/01/22 02:37	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	04/18/22 06:24	05/01/22 02:37	7782-49-2	
Thallium	**0.32J**	ug/L	1.0	0.14	1	04/18/22 06:24	05/01/22 02:37	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay								
Mercury	**<0.066**	ug/L	0.20	0.066	1	04/20/22 09:45	04/21/22 07:59	7439-97-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**6.60**	Std. Units			1		04/13/22 15:40		
Field Specific Conductance	**747.0**	umhos/cm			1		04/13/22 15:40		
Oxygen, Dissolved	**2.47**	mg/L			1		04/13/22 15:40	7782-44-7	
REDOX	**207.5**	mV			1		04/13/22 15:40		
Turbidity	**0.00**	NTU			1		04/13/22 15:40		
Static Water Level	**785.44**	feet			1		04/13/22 15:40		
Temperature, Water (C)	**7.1**	deg C			1		04/13/22 15:40		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**422**	mg/L	20.0	8.7	1		04/15/22 16:44		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.0**	Std. Units	0.10	0.010	1		04/18/22 10:53		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**1.9J**	mg/L	2.0	0.43	1		05/10/22 23:43	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/10/22 23:43	16984-48-8	
Sulfate	**12.7**	mg/L	2.0	0.44	1		05/10/22 23:43	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

QC Batch: 413634
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243482001, 40243482002

METHOD BLANK: 2381580 Matrix: Water
Associated Lab Samples: 40243482001, 40243482002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.066	0.20	04/21/22 07:47	

LABORATORY CONTROL SAMPLE: 2381581

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.9	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2381582 2381583

Parameter	Units	40243482001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.066	5	5	5.0	5.0	100	101	85-115	1	20	

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

QC Batch: 413354
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243482001, 40243482002

METHOD BLANK: 2380530 Matrix: Water
Associated Lab Samples: 40243482001, 40243482002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	05/01/22 00:40	
Arsenic	ug/L	<0.28	1.0	05/01/22 00:40	
Barium	ug/L	<0.70	2.3	05/01/22 00:40	
Beryllium	ug/L	<0.25	1.0	05/01/22 00:40	
Boron	ug/L	<3.0	10.0	05/01/22 00:40	
Cadmium	ug/L	<0.15	1.0	05/01/22 00:40	
Calcium	ug/L	<76.2	254	05/01/22 00:40	
Chromium	ug/L	<1.0	3.4	05/01/22 00:40	
Cobalt	ug/L	<0.12	1.0	05/01/22 00:40	
Lead	ug/L	<0.24	1.0	05/01/22 00:40	
Lithium	ug/L	<0.22	1.0	05/01/22 00:40	
Molybdenum	ug/L	<0.44	1.5	05/01/22 00:40	
Selenium	ug/L	<0.32	1.1	05/01/22 00:40	
Thallium	ug/L	<0.14	1.0	05/01/22 00:40	

LABORATORY CONTROL SAMPLE: 2380531

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	250	261	104	80-120	
Arsenic	ug/L	250	263	105	80-120	
Barium	ug/L	250	249	99	80-120	
Beryllium	ug/L	250	270	108	80-120	
Boron	ug/L	250	250	100	80-120	
Cadmium	ug/L	250	268	107	80-120	
Calcium	ug/L	10000	9930	99	80-120	
Chromium	ug/L	250	254	102	80-120	
Cobalt	ug/L	250	248	99	80-120	
Lead	ug/L	250	266	106	80-120	
Lithium	ug/L	250	250	100	80-120	
Molybdenum	ug/L	250	249	100	80-120	
Selenium	ug/L	250	278	111	80-120	
Thallium	ug/L	250	252	101	80-120	

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2380532 2380533

Parameter	Units	40243482001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.15	250	250	256	257	102	103	75-125	0	20	
Arsenic	ug/L	0.31J	250	250	256	259	102	103	75-125	1	20	
Barium	ug/L	13.5	250	250	260	258	99	98	75-125	1	20	
Beryllium	ug/L	<0.25	250	250	260	260	104	104	75-125	0	20	
Boron	ug/L	10.5	250	250	255	248	98	95	75-125	3	20	
Cadmium	ug/L	<0.15	250	250	258	259	103	104	75-125	0	20	
Calcium	ug/L	75100	10000	10000	86700	85700	116	106	75-125	1	20	
Chromium	ug/L	2.2J	250	250	256	252	102	100	75-125	2	20	
Cobalt	ug/L	<0.12	250	250	244	241	98	96	75-125	1	20	
Lead	ug/L	<0.24	250	250	267	267	107	107	75-125	0	20	
Lithium	ug/L	0.36J	250	250	250	249	100	99	75-125	0	20	
Molybdenum	ug/L	<0.44	250	250	252	250	101	100	75-125	1	20	
Selenium	ug/L	<0.32	250	250	264	268	106	107	75-125	1	20	
Thallium	ug/L	<0.14	250	250	257	256	103	103	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

QC Batch: 413340
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243482001, 40243482002

METHOD BLANK: 2380206 Matrix: Water
Associated Lab Samples: 40243482001, 40243482002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	04/15/22 16:44	

LABORATORY CONTROL SAMPLE: 2380207

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	555	524	94	80-120	

SAMPLE DUPLICATE: 2380208

Parameter	Units	40243482001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	334	332	1	10	

SAMPLE DUPLICATE: 2380209

Parameter	Units	40243482002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	422	412	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

QC Batch: 413406
QC Batch Method: EPA 9040
Analysis Method: EPA 9040
Analysis Description: 9040 pH
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243482001, 40243482002

SAMPLE DUPLICATE: 2380677

Parameter	Units	40243487001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	10.7	10.7	0	20	H6

SAMPLE DUPLICATE: 2380701

Parameter	Units	40243447003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.5	8.4	1	20	1q,H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

QC Batch: 414946
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243482001, 40243482002

METHOD BLANK: 2389209 Matrix: Water
Associated Lab Samples: 40243482001, 40243482002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	05/10/22 20:23	
Fluoride	mg/L	<0.095	0.32	05/10/22 20:23	
Sulfate	mg/L	<0.44	2.0	05/10/22 20:23	

LABORATORY CONTROL SAMPLE: 2389210

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.1	106	90-110	
Fluoride	mg/L	2	2.1	107	90-110	
Sulfate	mg/L	20	21.4	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2389211 2389212

Parameter	Units	40243482001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.2	20	20	25.3	25.6	101	102	90-110	1	15	
Fluoride	mg/L	<0.095	2	2	2.1	2.2	106	108	90-110	2	15	
Sulfate	mg/L	1.4J	20	20	23.7	24.0	111	113	90-110	1	15	M0

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REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

Sample: MW-84A **Lab ID: 40243482001** Collected: 04/13/22 14:20 Received: 04/15/22 07:10 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	**0.254 ± 0.354 (0.590) C:NA T:97%**	pCi/L	05/03/22 12:00	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.357 ± 0.315 (0.634) C:76% T:90%**	pCi/L	05/02/22 12:15	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.611 ± 0.669 (1.22)**	pCi/L	05/04/22 22:02	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

Sample: MW-301 **Lab ID: 40243482002** Collected: 04/13/22 15:40 Received: 04/15/22 07:10 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	**0.000 ± 0.289 (0.649) C:NA T:99%**	pCi/L	05/03/22 12:11	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.179 ± 0.282 (0.610) C:80% T:92%**	pCi/L	05/02/22 12:15	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.179 ± 0.571 (1.26)**	pCi/L	05/04/22 22:02	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

QC Batch: 498723
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 40243482001, 40243482002

METHOD BLANK: 2413743 Matrix: Water
Associated Lab Samples: 40243482001, 40243482002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.232 ± 0.242 (0.655) C:NA T:96%	pCi/L	05/03/22 11:40	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

QC Batch: 498724
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 40243482001, 40243482002

METHOD BLANK: 2413744 Matrix: Water
Associated Lab Samples: 40243482001, 40243482002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.105 ± 0.277 (0.621) C:77% T:92%	pCi/L	05/02/22 12:14	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

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

1q	Due to the sample matrix, DI water was added to this sample on a one to one basis and the sample was stirred before analysis.
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.

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25222067.00 COLUMBIA CCR BACK
Pace Project No.: 40243482

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40243482001	**MW-84A**	EPA 3010A	413354	EPA 6020B	413520
40243482002	**MW-301**	EPA 3010A	413354	EPA 6020B	413520
40243482001	**MW-84A**	EPA 7470	413634	EPA 7470	413681
40243482002	**MW-301**	EPA 7470	413634	EPA 7470	413681
40243482001	**MW-84A**				
40243482002	**MW-301**				
40243482001	**MW-84A**	EPA 903.1	498723		
40243482002	**MW-301**	EPA 903.1	498723		
40243482001	**MW-84A**	EPA 904.0	498724		
40243482002	**MW-301**	EPA 904.0	498724		
40243482001	**MW-84A**	Total Radium Calculation	502166		
40243482002	**MW-301**	Total Radium Calculation	502166		
40243482001	**MW-84A**	SM 2540C	413340		
40243482002	**MW-301**	SM 2540C	413340		
40243482001	**MW-84A**	EPA 9040	413406		
40243482002	**MW-301**	EPA 9040	413406		
40243482001	**MW-84A**	EPA 300.0	414946		
40243482002	**MW-301**	EPA 300.0	414946		

#1

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here: 40243482

ALL SHADED AREAS are for LAB USE ONLY

Company: SCS Engineers	Billing Information: Same
Address: 2830 Dairy Dr. Madison, WI.	
Report To: Thomas Karwoski	Email To: mBlodgett@scsengineers.com
Copy To: Meghan Blodgett	Site Collection Info/Address:
Customer Project Name/Number: Columbia 25222067.00	State: WI County/City: Columbia/Portage Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET
Phone: 608-224-2830 Email:	Site/Facility ID #:
Collected By (print): Adam Dalton	Purchase Order #: Quote #:
Collected By (signature):	Turnaround Date Required:
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Compliance Monitoring? [ ] Yes [ ] No

DW PWS ID #: DW Location Code:

Immediately Packed on Ice: [ ] Yes [ ] No

Field Filtered (if applicable): [ ] Yes [ ] No

Analysis: _____

Container Preservative Type **: 1 1 HCl

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: Radium 226/228	Metals	pH	TDS, Cl, F, SO4	Lab Sample # / Comments
MW-84A			4/13/22	1420				5	x	x	x	x	4115C08 001
MW-301			4/13/22	1540				5	x	x	x	x	002

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips: 4/15/22	

LAB USE ONLY:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2764151

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:

Temp Blank Received: (Y) N NA

Therm ID#: 113

Cooler 1 Temp Upon Receipt: 1 oC

Cooler 1 Therm Corr. Factor: .1 oC

Cooler 1 Corrected Temp: 1.1 oC

Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
SCS	4/14/22 1030		
CS logistics	4/15/22 0710	Thyke BD Pace	4/15/22 0710

MTJL LAB USE ONLY

Table #:

Acctnum:

Template:

Prelogin:

PM:

PB:

Trip Blank Received: Y N (NA)

HCL MeOH TSP Other

Non Conformance(s): YES / NO

Sample Preservation Receipt Form

Client Name: SCS Engineers Project # 40243482

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

Initial when completed: TP Date/ Time:

Lab Lot# of pH paper: 1CD3112 Lab Std #ID of preservation (if pH adjusted):

Pace 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)
	AG1U	BG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	VG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN							
001										2		1														2				X		2.5 / 5 / 10
002										2		1														2				X		2.5 / 5 / 10
003																																2.5 / 5 / 10
004																																2.5 / 5 / 10
005																																2.5 / 5 / 10
006																																2.5 / 5 / 10
007																																2.5 / 5 / 10
008																																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

VP 4/15/22

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
BG1U	1 liter clear glass
AG1H	1 liter amber glass HCL
AG4S	125 mL amber glass H2SO4
AG4U	120 mL amber glass unpres
AG5U	100 mL amber glass unpres
AG2S	500 mL amber glass H2SO4
BG3U	250 mL clear glass unpres

BP1U	1 liter plastic unpres
BP3U	250 mL plastic unpres
BP3B	250 mL plastic NaOH
BP3N	250 mL plastic HNO3
BP3S	250 mL plastic H2SO4

VG9A	40 mL clear ascorbic
DG9T	40 mL amber Na Thio
VG9U	40 mL clear vial unpres
VG9H	40 mL clear vial HCL
VG9M	40 mL clear vial MeOH
VG9D	40 mL clear vial DI

JGFU	4 oz amber jar unpres
JG9U	9 oz amber jar unpres
WGFU	4 oz clear jar unpres
WPFU	4 oz plastic jar unpres
SP5T	120 mL plastic Na Thiosulfate
ZPLC	ziploc bag
GN	1L plastic HNO3

Page 1 of 2

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40243482

40243482

Client Name: SCS Engineers

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 - 113 **Type of Ice:** (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 1 /Corr: 1.1

Temp Blank Present: ☑ yes ☐ no **Biological Tissue is Frozen:** ☐ yes ☐ no

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

Person examining contents:
Date: 4/15/22 /Initials: TP

Labeled By Initials: AD

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☐Yes ☑No ☐N/A	2. PM # TP 4/15/22
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No	6.
Rush Turn Around Time Requested:	☐Yes ☑No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD:	☐Yes ☑No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
Trip Blank Present:	☐Yes ☐No ☑N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☑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 login

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

May 16, 2022

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on April 15, 2022. 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: Matt Bizjack, Alliant Energy
Sherren Clark, SCS Engineers
Tom Karwoski, SCS ENGINEERS
Nicole Kron, SCS ENGINEERS
Ryan Matzuk, SCS Engineers
Jeff Maxted, ALLIANT ENERGY
Marc Morandi, ALLIANT ENERGY

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

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 #: 460198
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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SAMPLE SUMMARY

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40243488001	**MW-305**	Water	04/11/22 12:05	04/15/22 07:10
40243488002	**MW-4R**	Water	04/11/22 13:25	04/15/22 07:10
40243488003	**FIELD BLANK- P POND**	Water	04/11/22 13:25	04/15/22 07:10
40243488004	**MW-304**	Water	04/11/22 13:25	04/15/22 07:10
40243488005	**MW-303**	Water	04/12/22 10:00	04/15/22 07:10

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SAMPLE ANALYTE COUNT

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40243488001	**MW-305**	EPA 6020B	KXS	14	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	SRK	1	PASI-G
		EPA 9040	YER	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40243488002	**MW-4R**	EPA 6020B	KXS	14	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	SRK	1	PASI-G
		EPA 9040	YER	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40243488003	**FIELD BLANK- P POND**	EPA 6020B	KXS	14	PASI-G
		EPA 7470	AJT	1	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	SRK	1	PASI-G
		EPA 9040	YER	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40243488004	**MW-304**	EPA 6020B	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			MEA	7	PASI-G
		EPA 903.1	RPS	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	SRK	1	PASI-G
		EPA 9040	YER	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40243488005	**MW-303**	EPA 6020B	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G

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SAMPLE ANALYTE COUNT

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
			MEA	7	PASI-G
		EPA 903.1	RPS	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	SRK	1	PASI-G
		EPA 9040	YER	1	PASI-G
		EPA 300.0	HMB	3	PASI-G

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

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Sample: MW-305 **Lab ID: 40243488001** Collected: 04/11/22 12:05 Received: 04/15/22 07:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Antimony	**0.33J**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 04:20	7440-36-0	
Arsenic	**0.59J**	ug/L	1.0	0.28	1	04/18/22 06:24	05/01/22 04:20	7440-38-2	
Barium	**16.9**	ug/L	2.3	0.70	1	04/18/22 06:24	05/01/22 04:20	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	04/18/22 06:24	05/01/22 04:20	7440-41-7	
Boron	**957**	ug/L	10.0	3.0	1	04/18/22 06:24	05/01/22 04:20	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 04:20	7440-43-9	
Calcium	**97000**	ug/L	254	76.2	1	04/18/22 06:24	05/01/22 04:20	7440-70-2	
Chromium	**1.3J**	ug/L	3.4	1.0	1	04/18/22 06:24	05/01/22 04:20	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	04/18/22 06:24	05/01/22 04:20	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	04/18/22 06:24	05/01/22 04:20	7439-92-1	
Lithium	**<0.22**	ug/L	1.0	0.22	1	04/18/22 06:24	05/01/22 04:20	7439-93-2	
Molybdenum	**45.9**	ug/L	1.5	0.44	1	04/18/22 06:24	05/01/22 04:20	7439-98-7	
Selenium	**21.5**	ug/L	1.1	0.32	1	04/18/22 06:24	05/01/22 04:20	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	04/18/22 06:24	05/01/22 04:20	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay								
Mercury	**<0.066**	ug/L	0.20	0.066	1	04/20/22 09:45	04/21/22 08:38	7439-97-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**8.52**	Std. Units			1		04/11/22 12:05		
Field Specific Conductance	**755**	umhos/cm			1		04/11/22 12:05		
Oxygen, Dissolved	**4.09**	mg/L			1		04/11/22 12:05	7782-44-7	
REDOX	**203.7**	mV			1		04/11/22 12:05		
Turbidity	**0.00**	NTU			1		04/11/22 12:05		
Static Water Level	**787.87**	feet			1		04/11/22 12:05		
Temperature, Water (C)	**14.0**	deg C			1		04/11/22 12:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**484**	mg/L	20.0	8.7	1		04/15/22 16:48		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**8.4**	Std. Units	0.10	0.010	1		04/25/22 10:51		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**58.5**	mg/L	2.0	0.43	1		05/04/22 22:36	16887-00-6	
Fluoride	**0.21J**	mg/L	0.32	0.095	1		05/06/22 16:43	16984-48-8	
Sulfate	**274**	mg/L	40.0	8.9	20		05/05/22 03:03	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Sample: MW-4R **Lab ID: 40243488002** Collected: 04/11/22 13:25 Received: 04/15/22 07:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Antimony	**0.20J**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 04:27	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	04/18/22 06:24	05/01/22 04:27	7440-38-2	
Barium	**21.2**	ug/L	2.3	0.70	1	04/18/22 06:24	05/01/22 04:27	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	04/18/22 06:24	05/01/22 04:27	7440-41-7	
Boron	**1160**	ug/L	10.0	3.0	1	04/18/22 06:24	05/01/22 04:27	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 04:27	7440-43-9	
Calcium	**75900**	ug/L	254	76.2	1	04/18/22 06:24	05/01/22 04:27	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	04/18/22 06:24	05/01/22 04:27	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	04/18/22 06:24	05/01/22 04:27	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	04/18/22 06:24	05/01/22 04:27	7439-92-1	
Lithium	**2.2**	ug/L	1.0	0.22	1	04/18/22 06:24	05/01/22 04:27	7439-93-2	
Molybdenum	**42.5**	ug/L	1.5	0.44	1	04/18/22 06:24	05/01/22 04:27	7439-98-7	
Selenium	**3.0**	ug/L	1.1	0.32	1	04/18/22 06:24	05/01/22 04:27	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	04/18/22 06:24	05/01/22 04:27	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay								
Mercury	**<0.066**	ug/L	0.20	0.066	1	04/20/22 09:45	04/21/22 08:41	7439-97-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.05**	Std. Units			1		04/11/22 13:25		
Field Specific Conductance	**754.0**	umhos/cm			1		04/11/22 13:25		
Oxygen, Dissolved	**0.63**	mg/L			1		04/11/22 13:25	7782-44-7	
REDOX	**208.8**	mV			1		04/11/22 13:25		
Turbidity	**0.00**	NTU			1		04/11/22 13:25		
Static Water Level	**788.26**	feet			1		04/11/22 13:25		
Temperature, Water (C)	**10.3**	deg C			1		04/11/22 13:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**476**	mg/L	20.0	8.7	1		04/15/22 16:48		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.010	1		04/25/22 10:59		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**65.5**	mg/L	20.0	4.3	10		05/05/22 03:18	16887-00-6	
Fluoride	**0.29J**	mg/L	0.32	0.095	1		05/06/22 16:58	16984-48-8	
Sulfate	**184**	mg/L	20.0	4.4	10		05/05/22 03:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Sample: FIELD BLANK- P POND **Lab ID: 40243488003** Collected: 04/11/22 13:25 Received: 04/15/22 07:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Antimony	**<0.15**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 01:09	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	04/18/22 06:24	05/01/22 01:09	7440-38-2	
Barium	**<0.70**	ug/L	2.3	0.70	1	04/18/22 06:24	05/01/22 01:09	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	04/18/22 06:24	05/01/22 01:09	7440-41-7	
Boron	**<3.0**	ug/L	10.0	3.0	1	04/18/22 06:24	05/01/22 01:09	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 01:09	7440-43-9	
Calcium	**<76.2**	ug/L	254	76.2	1	04/18/22 06:24	05/01/22 01:09	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	04/18/22 06:24	05/01/22 01:09	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	04/18/22 06:24	05/01/22 01:09	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	04/18/22 06:24	05/01/22 01:09	7439-92-1	
Lithium	**<0.22**	ug/L	1.0	0.22	1	04/18/22 06:24	05/01/22 01:09	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	04/18/22 06:24	05/01/22 01:09	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	04/18/22 06:24	05/01/22 01:09	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	04/18/22 06:24	05/01/22 01:09	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay								
Mercury	**<0.066**	ug/L	0.20	0.066	1	04/20/22 09:45	04/21/22 08:43	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		04/15/22 16:48		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**6.1**	Std. Units	0.10	0.010	1		04/25/22 11:11		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**<0.43**	mg/L	2.0	0.43	1		05/04/22 23:06	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/06/22 17:13	16984-48-8	
Sulfate	**<0.44**	mg/L	2.0	0.44	1		05/04/22 23:06	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Sample: MW-304 **Lab ID: 40243488004** Collected: 04/11/22 13:25 Received: 04/15/22 07:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Antimony	**<0.15**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 04:35	7440-36-0	
Arsenic	**0.87J**	ug/L	1.0	0.28	1	04/18/22 06:24	05/01/22 04:35	7440-38-2	
Barium	**35.4**	ug/L	2.3	0.70	1	04/18/22 06:24	05/01/22 04:35	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	04/18/22 06:24	05/01/22 04:35	7440-41-7	
Boron	**664**	ug/L	10.0	3.0	1	04/18/22 06:24	05/01/22 04:35	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 04:35	7440-43-9	
Calcium	**84900**	ug/L	254	76.2	1	04/18/22 06:24	05/01/22 04:35	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	04/18/22 06:24	05/01/22 04:35	7440-47-3	
Cobalt	**0.79J**	ug/L	1.0	0.12	1	04/18/22 06:24	05/01/22 04:35	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	04/18/22 06:24	05/01/22 04:35	7439-92-1	
Lithium	**<0.22**	ug/L	1.0	0.22	1	04/18/22 06:24	05/01/22 04:35	7439-93-2	
Molybdenum	**9.8**	ug/L	1.5	0.44	1	04/18/22 06:24	05/01/22 04:35	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	04/18/22 06:24	05/01/22 04:35	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	04/18/22 06:24	05/01/22 04:35	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay								
Mercury	**<0.066**	ug/L	0.20	0.066	1	04/20/22 09:45	04/21/22 08:45	7439-97-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.22**	Std. Units			1		04/11/22 13:25		
Field Specific Conductance	**830.0**	umhos/cm			1		04/11/22 13:25		
Oxygen, Dissolved	**0.21**	mg/L			1		04/11/22 13:25	7782-44-7	
REDOX	**197.6**	mV			1		04/11/22 13:25		
Turbidity	**0.96**	NTU			1		04/11/22 13:25		
Static Water Level	**788.20**	feet			1		04/11/22 13:25		
Temperature, Water (C)	**10.6**	deg C			1		04/11/22 13:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**492**	mg/L	20.0	8.7	1		04/15/22 16:48		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.4**	Std. Units	0.10	0.010	1		04/25/22 11:16		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**52.9**	mg/L	2.0	0.43	1		05/04/22 23:21	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/06/22 17:28	16984-48-8	
Sulfate	**117**	mg/L	10.0	2.2	5		05/05/22 19:50	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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(920)469-2436

ANALYTICAL RESULTS

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Sample: MW-303 **Lab ID: 40243488005** Collected: 04/12/22 10:00 Received: 04/15/22 07:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Antimony	**0.31J**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 04:42	7440-36-0	
Arsenic	**27.1**	ug/L	1.0	0.28	1	04/18/22 06:24	05/01/22 04:42	7440-38-2	
Barium	**5.5**	ug/L	2.3	0.70	1	04/18/22 06:24	05/01/22 04:42	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	04/18/22 06:24	05/01/22 04:42	7440-41-7	
Boron	**2890**	ug/L	100	30.3	10	04/18/22 06:24	05/02/22 19:32	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	04/18/22 06:24	05/01/22 04:42	7440-43-9	
Calcium	**4950**	ug/L	254	76.2	1	04/18/22 06:24	05/01/22 04:42	7440-70-2	
Chromium	**44.1**	ug/L	3.4	1.0	1	04/18/22 06:24	05/01/22 04:42	7440-47-3	
Cobalt	**0.59J**	ug/L	1.0	0.12	1	04/18/22 06:24	05/01/22 04:42	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	04/18/22 06:24	05/01/22 04:42	7439-92-1	
Lithium	**0.31J**	ug/L	1.0	0.22	1	04/18/22 06:24	05/01/22 04:42	7439-93-2	
Molybdenum	**174**	ug/L	1.5	0.44	1	04/18/22 06:24	05/01/22 04:42	7439-98-7	
Selenium	**87.2**	ug/L	1.1	0.32	1	04/18/22 06:24	05/01/22 04:42	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	04/18/22 06:24	05/01/22 04:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay								
Mercury	**<0.066**	ug/L	0.20	0.066	1	04/20/22 09:45	04/21/22 08:47	7439-97-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**9.46**	Std. Units			1		04/12/22 10:00		
Field Specific Conductance	**1670.0**	umhos/cm			1		04/12/22 10:00		
Oxygen, Dissolved	**1.63**	mg/L			1		04/12/22 10:00	7782-44-7	
REDOX	**210.5**	mV			1		04/12/22 10:00		
Turbidity	**0.00**	NTU			1		04/12/22 10:00		
Static Water Level	**783.40**	feet			1		04/12/22 10:00		
Temperature, Water (C)	**10.2**	deg C			1		04/12/22 10:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**1090**	mg/L	20.0	8.7	1		04/15/22 16:49		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**9.5**	Std. Units	0.10	0.010	1		04/25/22 11:19		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**10.6J**	mg/L	40.0	8.6	20		05/10/22 18:39	16887-00-6	D3
Fluoride	**<1.9**	mg/L	6.3	1.9	20		05/10/22 18:39	16984-48-8	D3
Sulfate	**634**	mg/L	40.0	8.9	20		05/10/22 18:39	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

QC Batch: 413634 | Analysis Method: EPA 7470
QC Batch Method: EPA 7470 | Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243488001, 40243488002, 40243488003, 40243488004, 40243488005

METHOD BLANK: 2381580 Matrix: Water
Associated Lab Samples: 40243488001, 40243488002, 40243488003, 40243488004, 40243488005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.066	0.20	04/21/22 07:47	

LABORATORY CONTROL SAMPLE: 2381581

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.9	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2381582 2381583

Parameter	Units	40243482001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.066	5	5	5.0	5.0	100	101	85-115	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

QC Batch: 413354
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243488001, 40243488002, 40243488003, 40243488004, 40243488005

METHOD BLANK: 2380530 Matrix: Water
Associated Lab Samples: 40243488001, 40243488002, 40243488003, 40243488004, 40243488005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	05/01/22 00:40	
Arsenic	ug/L	<0.28	1.0	05/01/22 00:40	
Barium	ug/L	<0.70	2.3	05/01/22 00:40	
Beryllium	ug/L	<0.25	1.0	05/01/22 00:40	
Boron	ug/L	<3.0	10.0	05/01/22 00:40	
Cadmium	ug/L	<0.15	1.0	05/01/22 00:40	
Calcium	ug/L	<76.2	254	05/01/22 00:40	
Chromium	ug/L	<1.0	3.4	05/01/22 00:40	
Cobalt	ug/L	<0.12	1.0	05/01/22 00:40	
Lead	ug/L	<0.24	1.0	05/01/22 00:40	
Lithium	ug/L	<0.22	1.0	05/01/22 00:40	
Molybdenum	ug/L	<0.44	1.5	05/01/22 00:40	
Selenium	ug/L	<0.32	1.1	05/01/22 00:40	
Thallium	ug/L	<0.14	1.0	05/01/22 00:40	

LABORATORY CONTROL SAMPLE: 2380531

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	250	261	104	80-120	
Arsenic	ug/L	250	263	105	80-120	
Barium	ug/L	250	249	99	80-120	
Beryllium	ug/L	250	270	108	80-120	
Boron	ug/L	250	250	100	80-120	
Cadmium	ug/L	250	268	107	80-120	
Calcium	ug/L	10000	9930	99	80-120	
Chromium	ug/L	250	254	102	80-120	
Cobalt	ug/L	250	248	99	80-120	
Lead	ug/L	250	266	106	80-120	
Lithium	ug/L	250	250	100	80-120	
Molybdenum	ug/L	250	249	100	80-120	
Selenium	ug/L	250	278	111	80-120	
Thallium	ug/L	250	252	101	80-120	

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

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2380532 2380533

Parameter	Units	40243482001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.15	250	250	256	257	102	103	75-125	0	20	
Arsenic	ug/L	0.31J	250	250	256	259	102	103	75-125	1	20	
Barium	ug/L	13.5	250	250	260	258	99	98	75-125	1	20	
Beryllium	ug/L	<0.25	250	250	260	260	104	104	75-125	0	20	
Boron	ug/L	10.5	250	250	255	248	98	95	75-125	3	20	
Cadmium	ug/L	<0.15	250	250	258	259	103	104	75-125	0	20	
Calcium	ug/L	75100	10000	10000	86700	85700	116	106	75-125	1	20	
Chromium	ug/L	2.2J	250	250	256	252	102	100	75-125	2	20	
Cobalt	ug/L	<0.12	250	250	244	241	98	96	75-125	1	20	
Lead	ug/L	<0.24	250	250	267	267	107	107	75-125	0	20	
Lithium	ug/L	0.36J	250	250	250	249	100	99	75-125	0	20	
Molybdenum	ug/L	<0.44	250	250	252	250	101	100	75-125	1	20	
Selenium	ug/L	<0.32	250	250	264	268	106	107	75-125	1	20	
Thallium	ug/L	<0.14	250	250	257	256	103	103	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

QC Batch: 413340 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243488001, 40243488002, 40243488003, 40243488004, 40243488005

METHOD BLANK: 2380206 Matrix: Water
Associated Lab Samples: 40243488001, 40243488002, 40243488003, 40243488004, 40243488005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	04/15/22 16:44	

LABORATORY CONTROL SAMPLE: 2380207

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	555	524	94	80-120	

SAMPLE DUPLICATE: 2380208

Parameter	Units	40243482001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	334	332	1	10	

SAMPLE DUPLICATE: 2380209

Parameter	Units	40243482002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	422	412	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

QC Batch: 413997
QC Batch Method: EPA 9040
Analysis Method: EPA 9040
Analysis Description: 9040 pH
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243488001, 40243488002, 40243488003, 40243488004, 40243488005

SAMPLE DUPLICATE: 2383964

Parameter	Units	40243488001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.4	8.4	0	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

QC Batch: 414730
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243488001, 40243488002, 40243488003, 40243488004

METHOD BLANK: 2387879 Matrix: Water
Associated Lab Samples: 40243488001, 40243488002, 40243488003, 40243488004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	05/04/22 11:51	
Fluoride	mg/L	<0.095	0.32	05/04/22 11:51	
Sulfate	mg/L	<0.44	2.0	05/04/22 11:51	

LABORATORY CONTROL SAMPLE: 2387880

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	20.5	102	90-110	
Fluoride	mg/L	2	2.0	100	90-110	
Sulfate	mg/L	20	20.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2387881 2387882

Parameter	Units	40243924001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	224	400	400	655	655	108	108	90-110	0	15	
Sulfate	mg/L	182	400	400	614	615	108	108	90-110	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2387883 2387884

Parameter	Units	40243485003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	0.79J	20	20	22.4	22.7	108	110	90-110	1	15	
Fluoride	mg/L	<0.095	2	2	2.1	2.1	106	107	90-110	1	15	
Sulfate	mg/L	22.1	20	20	44.3	44.6	111	112	90-110	1	15	M0

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

QC Batch: 415066
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40243488005

METHOD BLANK: 2389806 Matrix: Water
Associated Lab Samples: 40243488005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	05/10/22 16:11	
Fluoride	mg/L	<0.095	0.32	05/10/22 16:11	
Sulfate	mg/L	<0.44	2.0	05/10/22 16:11	

LABORATORY CONTROL SAMPLE: 2389807

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.1	106	90-110	
Fluoride	mg/L	2	2.1	104	90-110	
Sulfate	mg/L	20	21.4	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2389808 2389809

Parameter	Units	40243486002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	0.82J	20	20	22.6	22.6	109	109	90-110	0	15	
Fluoride	mg/L	<0.095	2	2	2.1	2.1	107	107	90-110	0	15	
Sulfate	mg/L	9.4	20	20	31.9	32.0	113	113	90-110	0	15	M0

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Sample: MW-305 **Lab ID: 40243488001** Collected: 04/11/22 12:05 Received: 04/15/22 07:10 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	**-0.114 ± 0.354 (0.805) C:NA T:71%**	pCi/L	05/09/22 12:39	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.761 ± 0.506 (0.976) C:78% T:72%**	pCi/L	05/12/22 12:39	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.761 ± 0.860 (1.78)**	pCi/L	05/13/22 17:20	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Sample: MW-4R **Lab ID: 40243488002** Collected: 04/11/22 13:25 Received: 04/15/22 07:10 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	**0.0901 ± 0.206 (0.122) C:NA T:83%**	pCi/L	05/09/22 12:39	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.337 ± 0.412 (0.873) C:78% T:72%**	pCi/L	05/12/22 12:39	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.427 ± 0.618 (0.995)**	pCi/L	05/13/22 17:20	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Sample: FIELD BLANK- P POND **Lab ID: 40243488003** Collected: 04/11/22 13:25 Received: 04/15/22 07:10 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	**-0.0890 ± 0.203 (0.479) C:NA T:86%**	pCi/L	05/09/22 12:39	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.332 ± 0.483 (1.04) C:81% T:67%**	pCi/L	05/12/22 12:39	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.332 ± 0.686 (1.52)**	pCi/L	05/13/22 17:20	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Sample: MW-304 **Lab ID: 40243488004** Collected: 04/11/22 13:25 Received: 04/15/22 07:10 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	**0.000 ± 0.255 (0.573) C:NA T:71%**	pCi/L	05/10/22 11:38	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.256 ± 0.433 (0.944) C:65% T:71%**	pCi/L	05/02/22 15:22	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.256 ± 0.688 (1.52)**	pCi/L	05/10/22 18:06	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Sample: MW-303 **Lab ID: 40243488005** Collected: 04/12/22 10:00 Received: 04/15/22 07:10 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	**-0.211 ± 0.249 (0.633) C:NA T:84%**	pCi/L	05/10/22 11:38	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.164 ± 0.362 (0.805) C:65% T:84%**	pCi/L	05/02/22 15:22	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.164 ± 0.611 (1.44)**	pCi/L	05/10/22 18:06	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

QC Batch: 499319
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 40243488004, 40243488005

METHOD BLANK: 2416758 Matrix: Water
Associated Lab Samples: 40243488004, 40243488005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.0885 ± 0.274 (0.624) C:NA T:88%	pCi/L	05/10/22 11:38	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

QC Batch: 499322
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 40243488004, 40243488005

METHOD BLANK: 2416760 Matrix: Water
Associated Lab Samples: 40243488004, 40243488005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.0866 ± 0.337 (0.813) C:64% T:88%	pCi/L	05/02/22 15:21	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

QC Batch: 499307
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 40243488001, 40243488002, 40243488003

METHOD BLANK: 2416742 Matrix: Water
Associated Lab Samples: 40243488001, 40243488002, 40243488003

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.0212 ± 0.241 (0.566) C:74% T:92%	pCi/L	05/02/22 12:18	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

QC Batch: 499306
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 40243488001, 40243488002, 40243488003

METHOD BLANK: 2416737 Matrix: Water
Associated Lab Samples: 40243488001, 40243488002, 40243488003

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.0809 ± 0.194 (0.486) C:NA T:92%	pCi/L	05/09/22 12:11	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40243488001	**MW-305**	EPA 3010A	413354	EPA 6020B	413520
40243488002	**MW-4R**	EPA 3010A	413354	EPA 6020B	413520
40243488003	**FIELD BLANK- P POND**	EPA 3010A	413354	EPA 6020B	413520
40243488004	**MW-304**	EPA 3010A	413354	EPA 6020B	413520
40243488005	**MW-303**	EPA 3010A	413354	EPA 6020B	413520
40243488001	**MW-305**	EPA 7470	413634	EPA 7470	413681
40243488002	**MW-4R**	EPA 7470	413634	EPA 7470	413681
40243488003	**FIELD BLANK- P POND**	EPA 7470	413634	EPA 7470	413681
40243488004	**MW-304**	EPA 7470	413634	EPA 7470	413681
40243488005	**MW-303**	EPA 7470	413634	EPA 7470	413681
40243488001	**MW-305**				
40243488002	**MW-4R**				
40243488004	**MW-304**				
40243488005	**MW-303**				
40243488001	**MW-305**	EPA 903.1	499306		
40243488002	**MW-4R**	EPA 903.1	499306		
40243488003	**FIELD BLANK- P POND**	EPA 903.1	499306		
40243488004	**MW-304**	EPA 903.1	499319		
40243488005	**MW-303**	EPA 903.1	499319		
40243488001	**MW-305**	EPA 904.0	499307		
40243488002	**MW-4R**	EPA 904.0	499307		
40243488003	**FIELD BLANK- P POND**	EPA 904.0	499307		
40243488004	**MW-304**	EPA 904.0	499322		
40243488005	**MW-303**	EPA 904.0	499322		
40243488001	**MW-305**	Total Radium Calculation	504429		
40243488002	**MW-4R**	Total Radium Calculation	504429		
40243488003	**FIELD BLANK- P POND**	Total Radium Calculation	504429		
40243488004	**MW-304**	Total Radium Calculation	503509		
40243488005	**MW-303**	Total Radium Calculation	503509		
40243488001	**MW-305**	SM 2540C	413340		
40243488002	**MW-4R**	SM 2540C	413340		
40243488003	**FIELD BLANK- P POND**	SM 2540C	413340		
40243488004	**MW-304**	SM 2540C	413340		
40243488005	**MW-303**	SM 2540C	413340		
40243488001	**MW-305**	EPA 9040	413997		
40243488002	**MW-4R**	EPA 9040	413997		
40243488003	**FIELD BLANK- P POND**	EPA 9040	413997		
40243488004	**MW-304**	EPA 9040	413997		
40243488005	**MW-303**	EPA 9040	413997		
40243488001	**MW-305**	EPA 300.0	414730		
40243488002	**MW-4R**	EPA 300.0	414730		
40243488003	**FIELD BLANK- P POND**	EPA 300.0	414730		
40243488004	**MW-304**	EPA 300.0	414730		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25222067.00 COLUMBIA CCR PPOND
Pace Project No.: 40243488

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40243488005	**MW-303**	EPA 300.0	415066		

#4

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here: 40243488

ALL SHADED AREAS are for LAB USE ONLY

Company: SCS Engineers	Billing Information: Same
Address: 2830 Dairy Dr.	
Report To: Thomas Karwoski	Email To: mBlodgett@scsengineers.com
Copy To: Meghan Blodgett	Site Collection Info/Address: Columbia Generating Station
Customer Project Name/Number: Columbia 25222067.00	State: WI / County/City: Columbia / Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET
Phone: 608-224-2830 Email:	Site/Facility ID #: / Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): Aden Watson	Purchase Order #: / Quote #: / DW PWS ID #: / DW Location Code:
Collected By (signature):	Turnaround Date Required: / Immediately Packed on Ice: [Yes] [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) / Field Filtered (if applicable): [ ] Yes [No] Analysis:

Container Preservative Type **: 1 1 U U

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: Metals	Radium 226/228	pH	TDS, Cl, F, SO4	Lab Profile/Line
MW-305	GW		4/11/22	1205				5	X	X	X	X	001
MW-4R	GW		4/11/22	1325				5	X	X	X	X	002
Field Blank-Pond			4/11/22	1325				5	X	X	X	X	003
MW-304	GW		4/11/22	1325				5	X	X	X	X	004
MW-303	GW		4/12/22	1000				5	X	X	X	X	005

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	NA
Custody Signatures Present	Y	N	NA
Collector Signature Present	Y	N	NA
Bottles Intact	Y	N	NA
Correct Bottles	Y	N	NA
Sufficient Volume	Y	N	NA
Samples Received on Ice	Y	N	NA
VOA - Headspace Acceptable	Y	N	NA
USDA Regulated Soils	Y	N	NA
Samples in Holding Time	Y	N	NA
Residual Chlorine Present	Y	N	NA
Cl Strips:			
Sample pH Acceptable	Y	N	NA
pH Strips:			
Sulfide Present	Y	N	NA
Lead Acetate Strips:			

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2764171

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info: 4/15/22
Temp Blank Received: Y N NA
Therm ID#: S2-918
Cooler 1 Temp Upon Receipt: 0 oC
Cooler 1 Therm Corr. Factor: — oC
Cooler 1 Corrected Temp: 0 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
SCS	4/14/22 1030		
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
SCS Logistics	4/15/22 0710		4/15/22 0710
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Pace Container Order #942565 #4 402443488

Addresses

Order By :		Ship To :		Return To:	
Company	SCS ENGINEERS	Company	SCSMADISON:lims40	Company	Pace Analytical Green Bay
Contact	Blodgett, Meghan	Contact	Ethan Schaefer	Contact	Milewsky, Dan
Email	mblodgett@scsengineers.com	Email	mblodgett@scsengineers.com	Email	dan.milewsky@pacelabs.com
Address	2830 Dairy Drive	Address	2830 Dairy Drive	Address	1241 Bellevue Street
Address 2		Address 2		Address 2	Suite 9
City	Madison	City	Madison	City	Green Bay
State	WI Zip 53718	State	WI Zip 53718	State	WI Zip 54302
Phone	608-216-7362	Phone	608-216-7362	Phone	(920)469-2436

Info

Project Name	25219067 Columbia CCR Primary Pond	**Due Date**	04/08/2022	**Profile**	3946	**Quote**	
Project Manager	Milewsky, Dan	**Return Date**		**Carrier**	Most Economical	**Location**	

Trip Blanks

- [ ] Include Trip Blanks

Bottle Labels

- [ ] Blank
- [ ] Pre-Printed No Sample IDs
- [X] Pre-Printed With Sample IDs

Bottles

- [ ] Boxed Cases
- [ ] Individually Wrapped
- [X] Grouped By Sample ID/Matrix

Return Shipping Labels

- [ ] No Shipper
- [ ] With Shipper

COC Options

- [X] Number of Blanks
- [ ] Pre-Printed

Misc

- [ ] Sampling Instructions
- [ ] Custody Seal
- [ ] Temp. Blanks
- [X] Coolers
- [ ] Syringes
- [ ] Extra Bubble Wrap
- [ ] Short Hold/Rush Stickers
- [X] DI Water 3 Liter(s)
- [ ] USDA Regulated Soils

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
6	WT	Radium 226	1L Plastic HNO3 pres	6	0		
6	WT	Radium 228	1L Plastic HNO3 pres	6	0		
6	WT	Metals	250mL plastic w/HNO3	6	0	M-1-203-04BB	
6	WT	pH	250mL plastic unpres	6	0	M-2-035-02BB	
6	WT	TDS, Cl, F, SO4	250mL plastic unpres	6	0	M-2-035-02BB	

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 :	04/07/2022
Prepared By:	Mai Yer Her
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:	

F-ALL-C-009-rev.00, 19Dec2016

Sample Preservation Receipt Form

Client Name: SCS

Project # 40243488

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

Lab Lot# of pH paper: 1003112 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: [initials] Date/ Time:

Pace Lab #	Glass: AG1U	BG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	Plastic: BP1U	BP3U	BP3B	BP3N	BP3S	Vials: VG9A	DG9T	VG9U	VG9H	VG9M	VG9D	Jars: JGFU	JG9U	WGFU	WPFU	General: SP5T	ZPLC	GN	VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001										2		1														2					✓		2.5 / 5 / 10
002										2		1														2					✓		2.5 / 5 / 10
003										2		1														2					✓		2.5 / 5 / 10
004										2		1														2					✓		2.5 / 5 / 10
005										2		1														2							2.5 / 5 / 10
006																																	2.5 / 5 / 10
007																																	2.5 / 5 / 10
008																																	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

[initials] 4/15/22

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

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

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

4/15/22 [initials]

Page 1 of 2

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40243488

40243488

Client Name: SCS

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 - 110 **Type of Ice:** (Wet) Blue Dry None ☐ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: /Corr:

Person examining contents:
Date: 4/15/22 Initials: CB

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

Labeled By Initials: AM

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:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☐Yes ☑No ☐N/A	2. pgH 4/15/22
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☑Yes ☐No	6.
Rush Turn Around Time Requested:	☐Yes ☑No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD: ☐Yes ☑No ☐N/A		8.
Correct Containers Used:	☑Yes ☐No	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: W	☐Yes ☐No ☐N/A	12. ok time 1625 4/15/22
Trip Blank Present:	☐Yes ☐No ☑N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☑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 login

C3 – July 2022 Assessment Monitoring

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

August 10, 2022

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25222067 COLUMBIA PRIMARY POND
Pace Project No.: 40248929

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on July 28, 2022. 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

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: Matt Bizjack, Alliant Energy
Sherren Clark, SCS Engineers
Tom Karwoski, SCS ENGINEERS
Nicole Kron, SCS ENGINEERS
Ryan Matzuk, SCS Engineers
Jeff Maxted, ALLIANT ENERGY
Marc Morandi, ALLIANT ENERGY

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: 25222067 COLUMBIA PRIMARY POND
Pace Project No.: 40248929

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: 25222067 COLUMBIA PRIMARY POND
Pace Project No.: 40248929

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40248929001	**MW 303**	Water	07/27/22 11:15	07/28/22 08:00
40248929002	**MW 305**	Water	07/27/22 12:15	07/28/22 08:00
40248929003	**FIELD BLANK**	Water	07/27/22 11:25	07/28/22 08:00

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(920)469-2436

SAMPLE ANALYTE COUNT

Project: 25222067 COLUMBIA PRIMARY POND
Pace Project No.: 40248929

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40248929001	**MW 303**	EPA 6020B	KXS	1
			KPR	7
40248929002	**MW 305**	EPA 6020B	KXS	1
			KPR	7
40248929003	**FIELD BLANK**	EPA 6020B	KXS	2

PASI-G = Pace Analytical Services - Green Bay

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 25222067 COLUMBIA PRIMARY POND
Pace Project No.: 40248929

Sample: MW 303 **Lab ID: 40248929001** Collected: 07/27/22 11:15 Received: 07/28/22 08:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Arsenic	**29.4**	ug/L	1.0	0.28	1	08/03/22 05:13	08/08/22 22:38	7440-38-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**9.61**	Std. Units			1		07/27/22 11:15		
Field Specific Conductance	**894**	umhos/cm			1		07/27/22 11:15		
Oxygen, Dissolved	**8.62**	mg/L			1		07/27/22 11:15	7782-44-7	
REDOX	**80.6**	mV			1		07/27/22 11:15		
Turbidity	**0.00**	NTU			1		07/27/22 11:15		
Static Water Level	**783.07**	feet			1		07/27/22 11:15		
Field Temperature, C	**12.6**	deg C			1		07/27/22 11:15		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 25222067 COLUMBIA PRIMARY POND
Pace Project No.: 40248929

Sample: MW 305 **Lab ID: 40248929002** Collected: 07/27/22 12:15 Received: 07/28/22 08:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Molybdenum	**35.1**	ug/L	1.5	0.44	1	08/03/22 05:13	08/08/22 22:53	7439-98-7	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**9.12**	Std. Units			1		07/27/22 12:15		
Field Specific Conductance	**633**	umhos/cm			1		07/27/22 12:15		
Oxygen, Dissolved	**5.07**	mg/L			1		07/27/22 12:15	7782-44-7	
REDOX	**77.4**	mV			1		07/27/22 12:15		
Turbidity	**0.00**	NTU			1		07/27/22 12:15		
Static Water Level	**787.03**	feet			1		07/27/22 12:15		
Temperature, Water (C)	**15.3**	deg C			1		07/27/22 12:15		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 25222067 COLUMBIA PRIMARY POND
Pace Project No.: 40248929

Sample: FIELD BLANK **Lab ID: 40248929003** Collected: 07/27/22 11:25 Received: 07/28/22 08:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Arsenic	**<0.28**	ug/L	1.0	0.28	1	08/03/22 05:13	08/08/22 21:40	7440-38-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	08/03/22 05:13	08/08/22 21:40	7439-98-7	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 25222067 COLUMBIA PRIMARY POND
Pace Project No.: 40248929

QC Batch: 422459
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40248929001, 40248929002, 40248929003

METHOD BLANK: 2433302 Matrix: Water
Associated Lab Samples: 40248929001, 40248929002, 40248929003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	ug/L	<0.28	1.0	08/08/22 21:32	
Molybdenum	ug/L	<0.44	1.5	08/08/22 21:32	

LABORATORY CONTROL SAMPLE: 2433303

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	250	265	106	80-120	
Molybdenum	ug/L	250	256	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2433304 2433305

Parameter	Units	40248808001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.47J	250	250	267	268	107	107	75-125	0	20	
Molybdenum	ug/L	1.7	250	250	255	258	101	103	75-125	1	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

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: 25222067 COLUMBIA PRIMARY POND
Pace Project No.: 40248929

DEFINITIONS

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.

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25222067 COLUMBIA PRIMARY POND
Pace Project No.: 40248929

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40248929001	**MW 303**	EPA 3010A	422459	EPA 6020B	422542
40248929002	**MW 305**	EPA 3010A	422459	EPA 6020B	422542
40248929003	**FIELD BLANK**	EPA 3010A	422459	EPA 6020B	422542
40248929001	**MW 303**				
40248929002	**MW 305**				

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here: 40248929

ALL SHADED AREAS are for LAB USE ONLY

Company: SCS	Billing Information:
Address: 2830 Dairy Dr	
Report To: Meg Blodgett	Email To:
Copy To:	Site Collection Info/Address:
Customer Project Name/Number: 25222067	State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET
Phone: Email:	Site/Facility ID #: Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): Paul A. Groves	Purchase Order #: Quote #: DW PWS ID #: DW Location Code:
Collected By (signature): Paul A. Groves	Turnaround Date Required: Immediately Packed on Ice: [Yes] [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [No] Analysis:

Container Preservative Type **

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Analyses: Arsenic; Molybdenum

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Lab Sample # / Comments
MW 303	GW	G			7/27/22	11:15		1	001
MW 305	GW	G				12:15		1	002
Field Blank	DI	G			↓	11:25		1	003

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used: 0

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2825502

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#:
Cooler 1 Temp Upon Receipt: 1 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Paul A. Groves	7/27/22 15:30		
CS Logistics	7/28/22 0800		7/28/22 0800

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Sample Preservation Receipt Form

Client Name: SCS Project # LUB48929

All containers needing preservation have been checked and noted below: ☐Yes ☐No ☐N/A Initial when completed: JP Date/Time:

Lab Lot# of pH paper: 10031111 Lab Std #ID of preservation (if pH adjusted):

Pace Lab #	Glass: AG1U	BG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	Plastic: BP1U	BP3U	BP3B	BP3N	BP3S	Vials: VG9A	DG9T	VG9U	VG9H	VG9M	VG9D	Jars: JGFU	JG9U	WGFU	WPFU	General: SP5T	ZPLC	GN	VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001												I																		X		2.5 / 5 / 10
002												I																		X		2.5 / 5 / 10
003												I																		X		2.5 / 5 / 10
004																																2.5 / 5 / 10
005																																2.5 / 5 / 10
006																																2.5 / 5 / 10
007																																2.5 / 5 / 10
008																																2.5 / 5 / 10
009																																2.5 / 5 / 10
010																																2.5 / 5 / 10
011																																2.5 / 5 / 10
012																				JP 7/28/22												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
BG1U	1 liter clear glass
AG1H	1 liter amber glass HCL
AG4S	125 mL amber glass H2SO4
AG4U	120 mL amber glass unpres
AG5U	100 mL amber glass unpres
AG2S	500 mL amber glass H2SO4
BG3U	250 mL clear glass unpres

BP1U	1 liter plastic unpres
BP3U	250 mL plastic unpres
BP3B	250 mL plastic NaOH
BP3N	250 mL plastic HNO3
BP3S	250 mL plastic H2SO4

VG9A	40 mL clear ascorbic
DG9T	40 mL amber Na Thio
VG9U	40 mL clear vial unpres
VG9H	40 mL clear vial HCL
VG9M	40 mL clear vial MeOH
VG9D	40 mL clear vial DI

JGFU	4 oz amber jar unpres
JG9U	9 oz amber jar unpres
WGFU	4 oz clear jar unpres
WPFU	4 oz plastic jar unpres
SP5T	120 mL plastic Na Thiosulfate
ZPLC	ziploc bag
GN	

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40248929

40248929

Client Name: SCS

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 - 118 **Type of Ice:** (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 3 /Corr: 3.5

Temp Blank Present: ☑ yes ☐ no **Biological Tissue is Frozen:** ☐ yes ☐ no

Person examining contents: Date: 7/28/22 /Initials: TP

Labeled By Initials: NK

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:	☑Yes	☐No	☐N/A
Chain of Custody Filled Out:	☐Yes	☑No	☐N/A
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A
Sampler Name & Signature on COC:	☑Yes	☐No	☐N/A
Samples Arrived within Hold Time:	☑Yes	☐No	
- VOA Samples frozen upon receipt	☐Yes	☐No	
Short Hold Time Analysis (<72hr):	☐Yes	☑No	
Rush Turn Around Time Requested:	☐Yes	☑No	
Sufficient Volume:			
For Analysis: ☑Yes ☐No MS/MSD:	☐Yes	☑No	☐N/A
Correct Containers Used:	☑Yes	☐No	
-Pace Containers Used:	☑Yes	☐No	☐N/A
-Pace IR Containers Used:	☐Yes	☐No	☑N/A
Containers Intact:	☑Yes	☐No	
Filtered volume received for Dissolved tests	☐Yes	☐No	☑N/A
Sample Labels match COC:	☑Yes	☐No	☐N/A
-Includes date/time/ID/Analysis Matrix: W			
Trip Blank Present:	☐Yes	☐No	☑N/A
Trip Blank Custody Seals Present	☐Yes	☐No	☑N/A
Pace Trip Blank Lot # (if purchased):			

1. +2 CC TP 7/28/22
2. Billing Info, preserve, Qt# TP 7/28/22
3.
4.
5. Date/Time:
6.
7.
8.
9.
10.
11.
12.
13.

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 login

Appendix D

Historical Monitoring Results

Single Location

Name: WPL - Columbia

Location ID: M-4R
Number of Sampling Dates: 19

Parameter Name	Units	12/22/2015	4/4/2016	7/7/2016	10/12/2016	1/25/2017	4/11/2017	6/5/2017	8/9/2017	10/24/2017	4/23/2018	8/7/2018	10/24/2018	4/1/2019	10/7/2019	5/27/2020	10/7/2020	4/13/2021	10/11/2021	4/11/2022
Boron	ug/L	1000	461	453	793	866	512	464	973	1910	905	704	1140	788	1120	644	1360	730	2290	1160
Calcium	ug/L	105000	79400	68900	94300	103000	84800	90300	91600	67100	86400	99700	84100	106000	82400	106000	98000	110000	90400	75900
Chloride	mg/L	45.9	23.8	37.2	33.6	36.5	44	37.1	40.8	49.3	51.6	48.2	26.3	31.4	33.9	50	53.3	49.6	67.8	65.5
Fluoride	mg/L	0.22	<0.2	<0.2	0.16	0.38	0.18	0.2	0.23	<0.5	0.16	0.13	<0.1	0.17	0.17	0.13	0.27	0.23	0.26	0.29
Field pH	Std. Units	7.41	7.55	7.26	7.67	7.27	7.55	7.07	7.13	7.52	7.44	7.18	7.13	7.24	7.44	7.29	7.47	7.18	7.41	7.05
Sulfate	mg/L	112	102	88.5	82.8	144	127	131	139	187	162	151	89.2	149	128	162	203	193	236	184
Total Dissolved Solids	mg/L	544	440	410	468	570	484	494	544	474	516	646	424	524	432	594	604	556	628	476
Antimony	ug/L	0.13	0.14	0.13	<0.073	0.24	0.14	0.26	0.15	--	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	0.23	0.2
Arsenic	ug/L	0.17	0.2	0.18	0.25	0.47	<0.099	0.33	<0.28	--	0.36	<0.28	<0.28	<0.28	0.37	0.39	0.44	<0.28	<0.28	<0.28
Barium	ug/L	25.4	16.3	17.6	27.5	24	22.5	22.3	23.8	--	16.5	23.9	23.7	24.1	21	24.2	25.3	25.1	25.8	21.2
Beryllium	ug/L	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.18	<0.18	--	0.3	<0.18	<0.18	<0.18	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Cadmium	ug/L	<0.089	<0.089	0.21	<0.089	0.1	<0.089	0.084	<0.081	--	<0.081	--	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Chromium	ug/L	0.68	1.6	<0.39	0.49	0.4	0.7	<1	<1	--	<1	<1	1.3	<1	1.4	1.2	<1	<1	<1	<1
Cobalt	ug/L	0.33	0.11	0.16	0.11	0.31	0.32	0.27	0.21	--	0.16	0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Lead	ug/L	0.067	<0.04	0.73	<0.04	0.094	<0.04	<0.2	<0.2	--	<0.2	--	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24
Lithium	ug/L	4.3	1.7	1.5	2.6	6.1	3.2	1.2	3.7	--	4.8	1.9	1.1	1.8	1.8	1.4	2.2	1.8	2.5	2.2
Mercury	ug/L	<0.1	<0.1	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	<0.084	<0.084	--	<0.084	--	<0.066	<0.066	<0.066
Molybdenum	ug/L	14.6	9.9	13.2	11.6	17.6	14.5	11.9	15.8	--	19.1	14.7	15.4	29.4	27.6	25.6	27.6	41.1	60.7	42.5
Selenium	ug/L	3	6.4	15.3	7.7	10.5	13.3	9.7	15	--	8.6	5.5	4.1	12.6	1.8	11.7	1.6	3.7	2.3	3
Thallium	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	0.18	<0.14	--	0.21	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Total Radium	pCi/L	0.771	0.247	1.74	0.549	1.7	1.21	0.936	0.689	--	0.741	0.48	0.33	0.76	0.244	0.123	0.485	0.139	0.498	0.427
Radium-226	pCi/L	0.764	0.16	0.635	0.467	0.984	0.933	0.168	0.439	--	0.217	0.239	0.139	0.211	0.103	0.119	0	-0.073	-0.174	0.0901
Radium-228	pCi/L	0.007	0.0865	1.1	0.0824	0.72	0.274	0.768	0.25	--	0.524	0.241	0.191	0.549	0.141	0.0036	0.485	0.139	0.498	0.337
Field Specific Conductance	umhos/cm	954	535	662	1332	819	1212	660.4	751	612	790	881	819	888	705	869	948	845	955	754
Oxygen, Dissolved	mg/L	0.9	3.63	0.1	0.68	0.11	0.92	1.71	0.1	0.6	1.16	0.28	1.12	1.21	2.65	4	0.11	0.27	--	0.63
Field Oxidation Potential	mV	106	129.6	52.4	20.9	-0.5	46	82.2	-53.6	170	40.1	118.6	137.3	190.4	177.4	203.6	217.8	128.7	150.5	208.8
Groundwater Elevation	feet	801.22	811.83	801.07	801.52	789.64	787.95	787.83	788.54	788	790.43	787.63	788.47	789.44	790.65	787.73	787.74	786.34	786.33	788.26
Temperature	deg C	15	11.7	13.9	16.5	14.9	11.7	12.1	15	15.8	10.6	13.9	16.4	11.2	15	11	14.3	10.3	15.6	10.3
Turbidity	NTU	--	0	0.05	0.24	0.43	0.23	0.39	0.47	2.71	0.42	0.08	3.54	1.56	1.6	0.16	0	0	0	0
pH at 25 Degrees C	Std. Units	7.3	7.6	7.3	7.1	7.2	7.5	7.4	7.6	7.5	7.4	7.3	7.4	7.4	7.4	7.7	7.5	7.5	7.8	7.6

Single Location

Name: WPL - Columbia

Location ID: MW-84A
Number of Sampling Dates: 22

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	10/14/2021	4/13/2022
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	11.1	10.5
Calcium	ug/L	74000	72200	67600	--	74000	76000	70800	73200	76100	74900	77500	76600	76000	74000	80100	73500	72700	77600	69200	69100	75300	75100
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	3.5	5.2
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	<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	7.42	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	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	326	334
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	<0.15	<0.15
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	0.41	0.31
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	12.9	13.5
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	<0.25	<0.25
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	<0.15	<0.15
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	1.9	2.2
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	0.12	<0.12
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	<0.24	<0.24
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	0.28	0.36
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	<0.093	<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	<0.44	<0.44
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	<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	<0.14	<0.14	<0.14	<0.14	<0.14	0.66	0.19	<0.14
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	0.243	0.611
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	0	0.254
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	0.243	0.357
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	598.9	600.2
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	9.25	9.33
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	89.7	200.6
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	784.96	785.02
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	12.5	9.9
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	3.41	0
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	7.8	7.6

Single Location

Name: WPL - Columbia

Location ID: MW-301
Number of Sampling Dates: 21

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	10/14/2021	4/13/2022
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	31.4	28.7
Calcium	ug/L	126000	115000	108000	118000	129000	124000	120000	111000	108000	87200	112000	105000	101000	126000	114000	113000	112000	93000	117000	67800	97300
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	2.7	1.9
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	<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	7.01	6.6
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	17.4	12.7
Total Dissolved Solids	mg/L	478	486	464	490	444	514	502	458	462	362	464	502	424	462	418	462	452	412	472	334	422
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	<0.15	0.31
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	0.35	0.47
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	7.7	7.8
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	<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	<0.15	0.3
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	<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	0.34	0.32
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	<0.24	3.1
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	0.46	0.56
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	<0.093	<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	<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	<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	0.17	0.32
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	0.172	0.179
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	0.172	0
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	-0.0327	0.179
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	597.2	747
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	0.25	2.47
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	57.8	207.5
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	785.28	785.44
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	11.1	7.1
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	3.21	0
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	7.3	7

Single Location

Name: WPL - Columbia

Location ID: MW-303
Number of Sampling Dates: 26

Parameter Name	Units	12/21/2015	4/4/2016	7/7/2016	7/28/2016	10/12/2016	1/26/2017	4/10/2017	6/6/2017	8/8/2017	10/23/2017	4/24/2018	8/8/2018	9/21/2018	10/24/2018	4/1/2019	6/19/2019	10/7/2019	5/27/2020	10/7/2020	2/25/2021	4/12/2021	7/20/2021	10/12/2021	2/24/2022	4/12/2022	7/27/2022
Boron	ug/L	3000	2130	1680	--	1770	1790	1990	1970	2080	1870	2330	1410	--	2360	2770	--	2560	2700	2520	--	2440	--	2690	--	2890	--
Calcium	ug/L	9830	36000	14200	--	44500	7330	33700	35500	20700	8850	4610	25600	--	28200	9290	--	22300	27400	19700	--	10400	--	5530	--	4950	--
Chloride	mg/L	29.6	8	45.9	--	<0.5	14.2	16.7	8.1	11.7	8.3	<10	<10	--	2.6	3.7	--	2.7	2.3	2	--	2.5	--	12.4	--	10.6	--
Fluoride	mg/L	<2	0.28	<4	--	<0.1	<1	<2	0.3	<1	<0.5	<2	<2	--	0.16	0.54	--	0.19	<0.48	0.19	--	<0.95	--	<1.9	--	<1.9	--
Field pH	Std. Units	9.93	9.43	9.48	9.13	9.75	9.94	9.85	9.1	9	9.2	10.01	9.3	9.15	8.89	9.92	8.98	9.33	8.68	9.21	9.16	9.24	9.07	9.31	9.53	9.46	9.61
Sulfate	mg/L	597	311	352	--	438	453	506	445	356	467	527	449	--	327	390	--	299	326	312	--	345	--	369	--	634	--
Total Dissolved Solids	mg/L	1230	562	724	--	694	794	778	686	678	806	948	792	--	516	726	--	574	570	532	--	610	--	660	--	1090	--
Antimony	ug/L	0.92	0.23	0.32	--	0.076	0.23	0.14	<0.15	<0.15	--	0.28	0.15	--	<0.15	0.29	--	0.31	0.22	<0.15	--	0.93	--	0.55	--	0.31	--
Arsenic	ug/L	49.2	12.6	27.9	--	13.4	27	12.1	9.1	12	--	39.1	8.7	6	7.8	33.2	5.3	10.2	5.9	9.5	7.7	10.4	13.9	18.6	28.8	27.1	29.4
Barium	ug/L	19.1	13.6	7.5	--	19.6	6.1	16	14.5	10.5	--	5.1	14.3	--	16.6	6.5	--	11.4	13.8	10	--	7.8	--	5.1	--	5.5	--
Beryllium	ug/L	<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	0.36	<0.25	--	<0.25	--	<0.25	--	<0.25	--
Cadmium	ug/L	<0.089	<0.089	<0.089	--	<0.089	<0.089	<0.089	<0.081	<0.081	--	<0.081	--	--	<0.15	<0.15	--	<0.15	0.3	<0.15	--	0.67	--	0.27	--	<0.15	--
Chromium	ug/L	50.6	60	66.3	--	79.9	73.4	71	65.1	65.3	--	97.1	56.8	--	49.1	71.2	--	62	42.8	46.4	--	44.1	--	50.2	--	44.1	--
Cobalt	ug/L	1.8	0.46	0.6	--	0.47	0.54	0.48	0.42	0.37	--	0.8	0.58	--	0.4	0.54	--	0.51	0.49	0.23	--	0.7	--	0.74	--	0.59	--
Lead	ug/L	1.4	0.11	0.15	--	<0.04	<0.04	<0.04	<0.2	<0.2	--	<0.2	--	--	<0.24	<0.24	--	<0.24	0.32	<0.24	--	0.76	--	0.32	--	<0.24	--
Lithium	ug/L	1.6	1	0.77	--	1.3	0.59	1.2	1.1	0.86	--	0.61	1.1	--	1.3	0.74	--	1	1.2	0.69	--	0.93	--	0.62	--	0.31	--
Mercury	ug/L	<0.1	<0.1	<0.13	--	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	--	<0.084	<0.084	--	--	<0.084	--	--	<0.066	--	<0.066	--	<0.066	--
Molybdenum	ug/L	195	62.6	69.5	--	91.9	91.2	103	87	81.6	--	138	94.8	84.7	85.5	106	64.1	87	67.1	67.1	--	67.1	--	78	--	174	--
Selenium	ug/L	126	24	26.6	--	25	32.8	25.9	18.3	19.7	--	52.9	25.1	15.8	15.1	36.5	--	16.4	18.7	17.2	--	22.4	--	28.1	--	87.2	--
Thallium	ug/L	<0.14	<0.14	0.15	--	<0.14	<0.14	<0.14	<0.14	<0.14	--	<0.14	<0.14	--	<0.14	<0.14	--	<0.14	0.28	<0.14	--	0.89	--	0.3	--	<0.14	--
Total Radium	pCi/L	1.65	0.56	--	0.591	0.0851	1.24	0.016	2.41	0.795	--	0.5	0.237	--	0.744	0.677	--	0.422	0.382	0.722	--	0.846	--	0.539	--	0.164	--
Radium-226	pCi/L	1.25	0.375	--	0.0662	-0.377	-0.776	-0.162	0.145	0.459	--	0.0558	0	--	0.328	0.39	--	0.0995	0.168	0.0515	--	0.263	--	-0.355	--	-0.211	--
Radium-228	pCi/L	0.404	0.185	--	0.525	0.0851	1.24	0.016	2.26	0.336	--	0.444	0.237	--	0.416	0.287	--	0.322	0.214	0.67	--	0.583	--	0.539	--	0.164	--
Field Specific Conductance	umhos/cm	2130	641	1076	1154	1946	1134	1826	931	936	1093	1447	1095	856	823	1176	712	865	828	801	845	927	1058	1078	1439	1670	894
Oxygen, Dissolved	mg/L	1.7	4.95	2.91	3.86	7.24	6.92	6.88	6.9	5.53	5.4	4.53	7.59	8.2	8.93	5.59	7.21	7.93	9.15	7.62	7.45	7.02	6.49	--	3.53	1.63	8.62
Field Oxidation Potential	mV	43	30.6	-2.3	22.1	26.2	-55.3	3.9	57.5	-22	285	-22.3	126.1	20.4	70.1	19.9	206.4	65.9	116.1	183	151	51.4	67.5	110.1	205	210.5	80.6
Groundwater Elevation	feet	784.11	783.58	784.6	784.35	786.18	785.28	786	786.49	785.42	783.92	783.27	785.2	786.5	787.51	786.52	786.81	787.02	785.56	785.16	784.27	784.07	783.64	783.09	782.34	783.4	783.07
Temperature	deg C	11.2	10.7	12.2	11.9	12.1	11.6	10.7	11.3	12.5	12.3	10.9	12.7	13.28	12.5	10.8	13	12.4	11.6	12.6	11	11.4	13.1	12.1	9.6	10.2	12.6
Turbidity	NTU	--	0	4.27	3.38	0.14	1.52	0.74	0.41	2.09	5.67	1.42	3.51	44.4	4.71	2.4	2.24	3.31	0	0	3.04	1.82	0.57	0	2.53	0	0
pH at 25 Degrees C	Std. Units	9.5	8.8	9	--	8.8	9.2	9.1	8.9	9.1	9.3	9.4	8.9	--	8.6	9.1	--	8.8	8.2	8.8	--	9	--	9.2	--	9.5	--

Single Location

Name: WPL - Columbia

Location ID: MW-304
Number of Sampling Dates: 19

Parameter Name	Units	12/21/2015	4/4/2016	7/7/2016	10/13/2016	1/26/2017	4/10/2017	6/5/2017	8/8/2017	10/23/2017	4/24/2018	8/8/2018	10/24/2018	4/2/2019	10/7/2019	5/27/2020	10/7/2020	4/12/2021	10/11/2021	4/11/2022
Boron	ug/L	609	420	445	659	614	496	486	570	732	430	632	892	413	613	469	784	568	1090	664
Calcium	ug/L	78800	77600	72000	77000	65700	79100	75200	79700	78300	77900	84900	72400	88300	82900	84000	75100	78900	86600	84900
Chloride	mg/L	34.2	29.3	34.2	31.4	42.8	23.5	42.3	37.5	39.5	30.1	39.1	36.9	30.8	29.4	25.2	43.9	44.7	56.6	52.9
Fluoride	mg/L	0.27	<0.2	0.23	<0.5	0.26	0.1	0.19	0.12	0.13	<0.1	<1	0.14	<0.1	<0.1	<0.095	0.17	0.16	0.15	<0.095
Field pH	Std. Units	7.17	7.45	7.25	7.71	7.59	7.64	7.2	7.13	7.78	7.16	7.21	7.11	7.28	7.35	7.09	7.18	7.3	7.07	7.22
Sulfate	mg/L	71.9	71.7	66.2	46.8	56.9	63.6	97.1	68.5	57.2	43.5	76	34.1	33.1	40	42.4	55.9	85.5	129	117
Total Dissolved Solids	mg/L	420	434	402	406	388	422	500	454	390	406	530	384	394	428	412	442	434	522	492
Antimony	ug/L	0.72	<0.073	<0.073	<0.073	<0.073	<0.073	<0.15	<0.15	--	<0.15	<0.15	<0.15	<0.15	0.29	0.25	<0.15	0.86	0.44	<0.15
Arsenic	ug/L	2.3	1.1	1.2	1.8	0.99	0.98	1.1	1	--	0.64	0.76	1.6	0.63	3.2	1.3	2.8	1.8	1.6	0.87
Barium	ug/L	42.9	34.8	28.2	39.5	28.2	30.9	30.9	33.3	--	26.2	35.2	33.6	26.7	34.8	30.8	37.4	32.5	46.4	35.4
Beryllium	ug/L	0.34	<0.13	<0.13	<0.13	<0.13	<0.13	<0.18	<0.18	--	<0.18	<0.18	<0.18	<0.18	<0.25	0.26	<0.25	0.86	<0.25	<0.25
Cadmium	ug/L	0.64	<0.089	0.12	<0.089	<0.089	<0.089	<0.081	<0.081	--	<0.081	--	<0.15	<0.15	<0.15	0.19	<0.15	0.79	0.36	<0.15
Chromium	ug/L	2.1	1.5	<0.39	<0.39	<0.39	0.65	1.9	<1	--	<1	<1	<1	<1	<1	<1	<1	1.1	<1	<1
Cobalt	ug/L	1.9	1.2	0.62	0.83	0.73	0.62	0.76	0.8	--	0.36	1.1	0.88	0.67	0.92	0.69	0.65	0.84	1.2	0.79
Lead	ug/L	1.1	0.47	0.43	<0.04	<0.04	0.16	<0.2	<0.2	--	<0.2	--	<0.24	<0.24	<0.24	0.29	<0.24	0.89	0.52	<0.24
Lithium	ug/L	0.93	0.51	0.17	0.14	<0.11	0.16	<0.14	<0.14	--	<0.14	<0.14	<0.19	<0.19	<0.22	0.3	<0.22	1.1	0.45	<0.22
Mercury	ug/L	<0.1	<0.1	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	<0.084	<0.084	--	<0.084	--	<0.066	<0.066	<0.066
Molybdenum	ug/L	15.6	9.2	21.9	17.1	14.4	10.1	15.6	11.8	--	3.2	12.3	10.2	3	4.8	3.9	12	13	13.5	9.8
Selenium	ug/L	1	<0.21	<0.21	<0.21	<0.21	<0.21	<0.32	<0.32	--	<0.32	<0.32	<0.32	<0.32	<0.32	0.33	<0.32	1.1	0.35	<0.32
Thallium	ug/L	0.68	0.15	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	--	0.15	<0.14	<0.14	<0.14	<0.14	0.33	<0.14	1	0.46	<0.14
Total Radium	pCi/L	1.03	0.474	2.24	0.885	1.25	0.74	1.88	0.777	--	0.94	0.474	0.678	0.911	0.443	0.302	0.435	1.22	0.371	0.256
Radium-226	pCi/L	0.759	0.18	-0.084	0	0.426	0.413	0.437	0.266	--	0.136	-0.061	0.244	0.703	-0.154	0.0533	0	0.219	-0.184	0
Radium-228	pCi/L	0.267	0.294	2.24	0.885	0.819	0.327	1.44	0.511	--	0.804	0.474	0.434	0.208	0.443	0.249	0.435	1	0.371	0.256
Field Specific Conductance	umhos/cm	770	535	680	1211	624.9	1.105	660	704	628	686.4	785	707	747	729	711	776	751	847	830
Oxygen, Dissolved	mg/L	0.8	0.45	0.33	0.59	1.96	0.58	1.37	0.69	0.3	1.45	0.29	1.08	0.3	0.28	0.61	0.31	0.36	--	0.21
Field Oxidation Potential	mV	96	-65.2	21.2	-68.7	-58.7	-22.2	-15.3	-43.7	94	-18	24.8	-43	14.2	-97	54.2	-99.7	27.3	63.9	197.6
Groundwater Elevation	feet	786.13	792.16	787.36	788.18	789.34	788.22	788.58	789.52	788.97	789.69	788.25	789.05	789.72	790.41	789.3	788.52	787.99	787.78	788.2
Temperature	deg C	13.7	9.7	16.4	16.3	12.4	10.4	13.4	17.9	17.4	10.6	20.1	16.7	8.3	18.5	16.2	18.3	10.6	18.3	10.6
Turbidity	NTU	--	0	2.57	2.19	1.2	5.43	12.84	1.54	6.2	1.22	2.35	5.89	5.27	2.61	4.35	1.1	3.19	0.38	0.96
pH at 25 Degrees C	Std. Units	7.3	7.4	7.3	7.3	7.7	7.6	7.4	7.4	7.5	7.4	7.3	7.5	7.3	7.3	7.6	7.4	7.4	7.7	7.4

Single Location

Name: WPL - Columbia

Location ID: MW-305
Number of Sampling Dates: 23

Parameter Name	Units	12/21/2015	4/4/2016	7/8/2016	10/13/2016	1/25/2017	6/5/2017	8/7/2017	10/24/2017	4/23/2018	8/7/2018	10/24/2018	4/1/2019	10/7/2019	5/27/2020	10/7/2020	12/11/2020	2/25/2021	4/12/2021	7/20/2021	10/11/2021	2/24/2022	4/11/2022	7/27/2022
Boron	ug/L	1020	525	1110	1270	733	1240	2470	2200	1200	1360	1600	692	1430	1040	1650	--	--	668	--	1650	--	957	--
Calcium	ug/L	46400	37500	47300	56700	96500	75500	80200	94100	64800	91200	60200	74700	93000	103000	112000	--	--	235000	--	149000	--	97000	--
Chloride	mg/L	37.1	25.3	32.4	29.4	46.1	37.1	46.9	50.2	50.6	45.7	26.2	35.8	29.3	51.3	44.9	--	--	68.2	--	63	--	58.5	--
Fluoride	mg/L	0.76	0.7	0.44	0.65	0.53	0.41	0.46	0.64	0.37	0.18	0.36	0.33	0.36	0.3	0.47	--	--	<0.095	--	0.31	--	0.21	--
Field pH	Std. Units	7.93	8.68	8.04	8.25	8.17	7.72	7.82	8.48	9.12	8.01	7.7	8.04	7.75	8.48	8.64	8.43	8.68	8.67	8.71	8.95	9.36	8.52	9.12
Sulfate	mg/L	105	78.7	99.2	108	274	185	243	252	191	276	123	200	480	305	391	--	--	649	--	446	--	274	--
Total Dissolved Solids	mg/L	258	228	282	298	530	408	490	490	386	614	312	418	496	556	572	--	--	1020	--	730	--	484	--
Antimony	ug/L	0.81	0.32	0.43	0.51	0.71	0.55	0.68	--	0.26	0.42	0.58	0.16	0.46	0.3	0.42	--	--	0.31	--	0.59	--	0.33	--
Arsenic	ug/L	0.56	0.34	0.26	0.27	0.78	0.37	0.43	--	0.48	0.42	0.4	<0.28	0.49	0.75	0.95	--	--	0.95	--	1.4	--	0.59	--
Barium	ug/L	9.8	3.9	6.4	9.4	12.7	8.2	12.9	--	6	13.5	11	8.4	15	14.2	20.2	--	--	30	--	29.3	--	16.9	--
Beryllium	ug/L	0.19	<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	--	--	<0.25	--	<0.25	--	<0.25	--
Cadmium	ug/L	0.31	<0.089	<0.089	<0.089	0.34	0.18	0.13	--	<0.081	--	<0.15	<0.15	<0.15	<0.15	<0.15	--	--	<0.15	--	<0.15	--	<0.15	--
Chromium	ug/L	1.4	1.6	1.1	0.83	1.5	1.5	<1	--	<1	<1	1.1	1.3	1.1	<1	<1	--	--	<1	--	1.1	--	1.3	--
Cobalt	ug/L	0.37	0.069	0.07	<0.036	0.44	0.26	0.2	--	<0.085	<0.085	0.13	<0.12	<0.12	<0.12	<0.12	--	--	<0.12	--	<0.12	--	<0.12	--
Lead	ug/L	0.38	0.056	0.27	0.2	0.38	<0.2	<0.2	--	<0.2	--	<0.24	<0.24	<0.24	<0.24	<0.24	--	--	<0.24	--	<0.24	--	<0.24	--
Lithium	ug/L	0.5	0.24	<0.11	0.34	0.21	0.17	0.15	--	<0.14	<0.14	0.24	<0.19	<0.22	<0.22	<0.22	--	--	<0.22	--	<0.22	--	<0.22	--
Mercury	ug/L	<0.1	<0.1	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	<0.084	<0.084	--	<0.084	--	--	--	<0.066	--	<0.066	--	<0.066	--
Molybdenum	ug/L	33.2	37.3	34.8	40.2	69.1	41.3	68.7	--	54.4	55.7	45.6	47.7	56.2	60.5	102	99	107	106	77	124	35.8	45.9	35.1
Selenium	ug/L	3.7	3	4.8	3.7	6.8	3.9	5.2	--	6.9	4.8	5.4	3.2	7.7	4.2	7.6	--	--	8	--	4.5	--	21.5	--
Thallium	ug/L	0.44	<0.14	<0.14	<0.14	0.45	0.15	0.2	--	0.16	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	--	--	<0.14	--	<0.14	--	<0.14	--
Total Radium	pCi/L	0.253	0.0515	1.43	0.99	0.838	0.839	0.103	--	0.353	0.717	0.924	0.799	0.727	0.71	0.577	--	--	0.418	--	0.483	--	0.761	--
Radium-226	pCi/L	0.253	-0.037	0.112	0.594	0	0.128	-0.121	--	0.189	0.219	0.578	0.39	0.232	0.0976	0.0596	--	--	-0.199	--	0.0522	--	-0.114	--
Radium-228	pCi/L	-0.223	0.0515	1.32	0.396	0.838	0.711	0.103	--	0.164	0.498	0.346	0.409	0.495	0.612	0.517	--	--	0.418	--	0.431	--	0.761	--
Field Specific Conductance	umhos/cm	492	285.6	489.1	861	727	558.4	689	630	579.5	813	565	683	751	814	857	834	955	1373	1046	1068	677	755	633
Oxygen, Dissolved	mg/L	5.5	5.6	1.17	1.38	2.31	3.06	0.55	1.3	0.78	2.04	2.78	5.14	3.53	3.16	1.53	1.75	2.33	2.7	2.38	--	1.28	4.09	5.07
Field Oxidation Potential	mV	234	67.3	96.1	-31.4	-27.6	73.6	99.5	115	-3.3	129.9	102.6	164.8	165.5	211.2	215.8	112.4	170	51.5	103.3	151.8	203.5	203.7	77.4
Groundwater Elevation	feet	788.96	812.15	789.26	789.78	789.36	789.79	789.3	788.14	787.67	788.56	790.04	790.07	790.36	787.78	787.96	788.19	788.36	788.11	788.39	787.75	786.49	787.87	787.03
Temperature	deg C	24.3	10.9	17	26.1	18.2	12.8	21.8	26.7	12.1	19.6	25.7	11.8	23.4	12.1	21.9	20.8	15.9	13.6	18.2	24.2	17.2	14	15.3
Turbidity	NTU	--	0	0.96	0.59	1.61	0	0.56	2.67	5.98	0.05	3.52	1.34	1.97	0	0	0	0.85	1.14	0	0	0.09	0	0
pH at 25 Degrees C	Std. Units	7.9	7.9	7.9	7.3	8	7.9	7.8	8	8.2	8.1	7.8	7.9	7.7	8.4	8.4	--	--	8.3	--	8.7	--	8.4	--

Appendix E

Statistical Evaluation

E1 – February 2022 LCLs

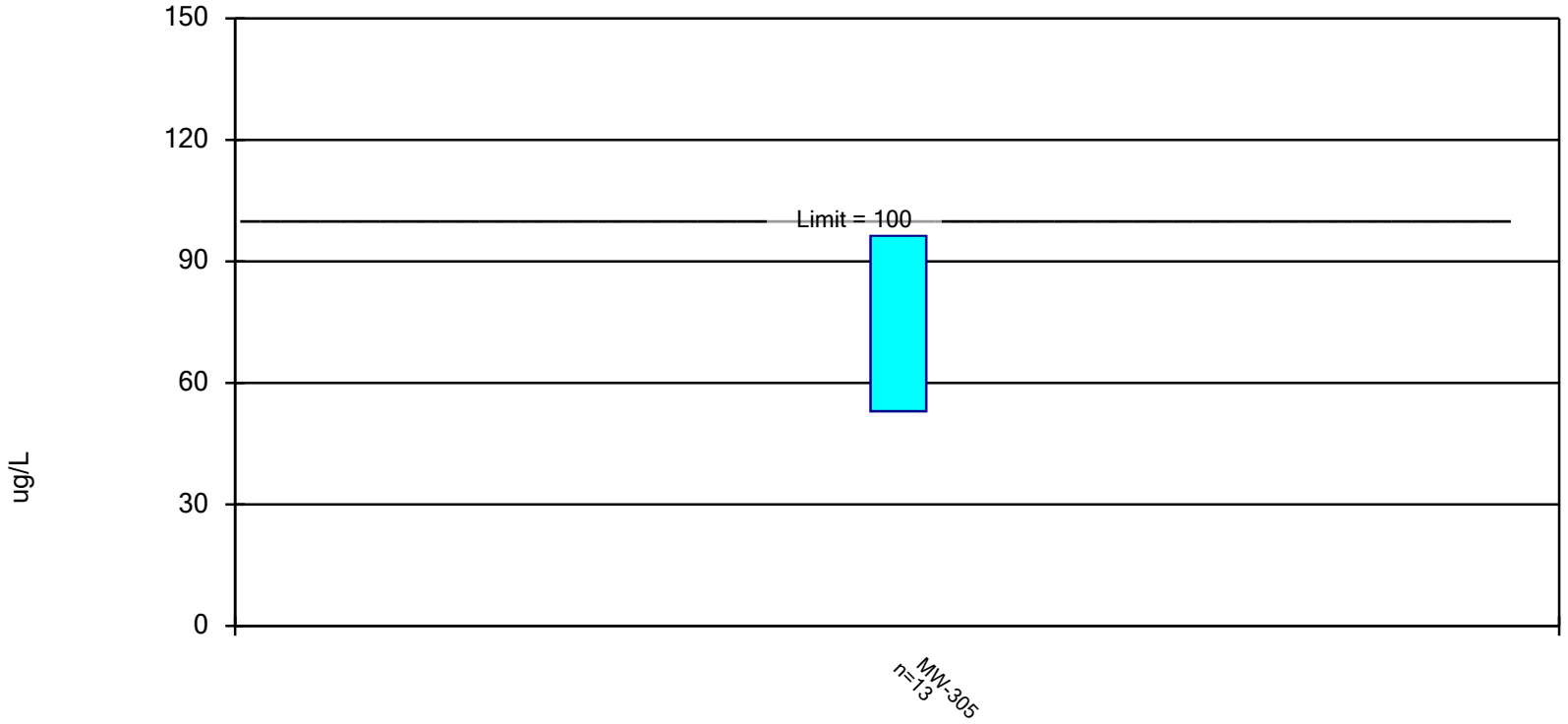
Confidence Interval

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020 Printed 4/25/2022, 12:35 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Molybdenum (ug/L)	MW-305	96.36	53.01	100	No	13	0	No	0.01	Param.

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum Analysis Run 4/25/2022 12:34 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Confidence Interval

Constituent: Molybdenum (ug/L) Analysis Run 4/25/2022 12:35 PM View: COL Primary Pond
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-305
4/23/2018	54.4
8/7/2018	55.7
10/24/2018	45.6
4/1/2019	47.7
10/7/2019	56.2
5/27/2020	60.5
10/7/2020	102
12/11/2020	99
2/25/2021	107
4/12/2021	106
7/20/2021	77
10/11/2021	124
2/24/2022	35.8
Mean	74.68
Std. Dev.	29.16
Upper Lim.	96.36
Lower Lim.	53.01

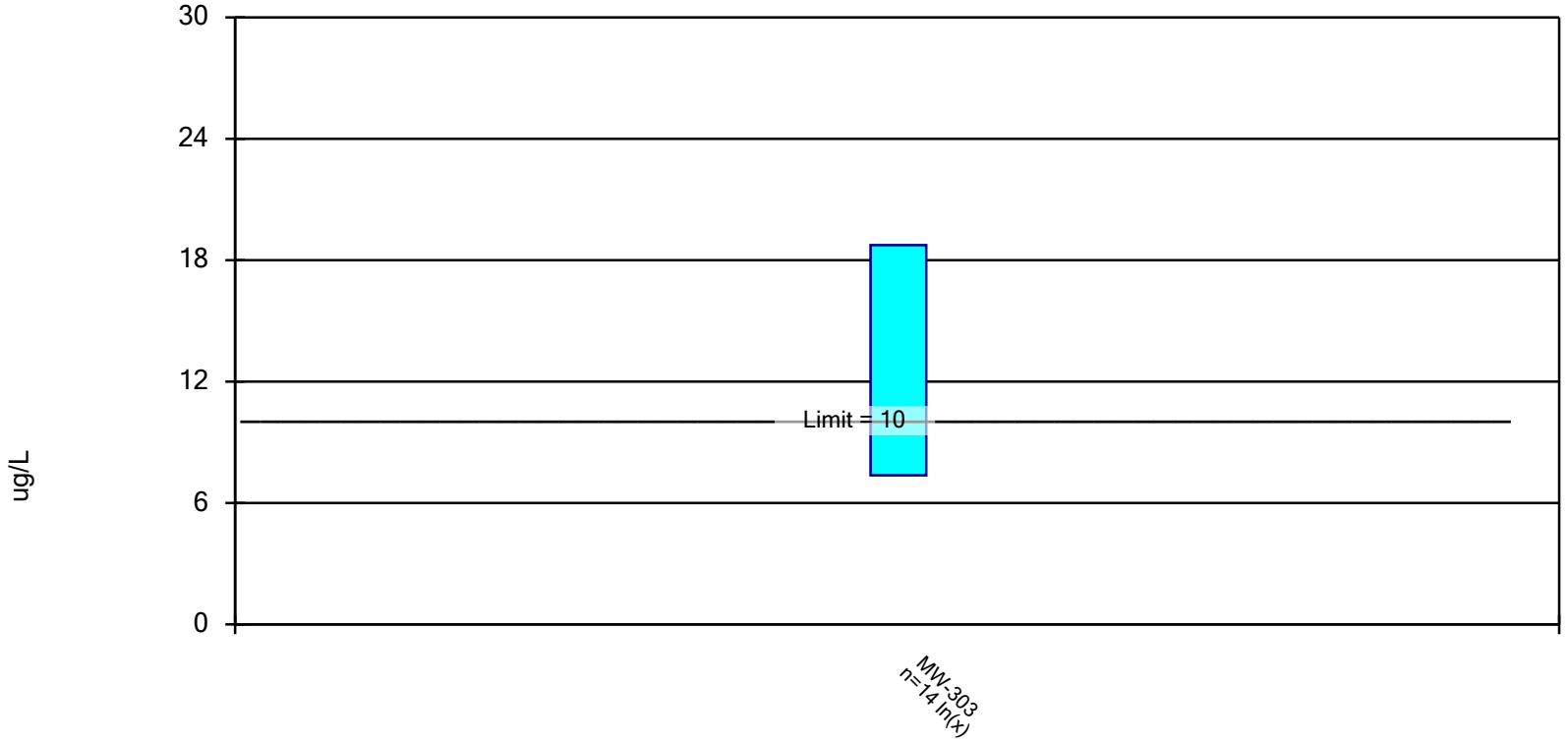
Confidence Interval

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020 Printed 4/25/2022, 12:13 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Arsenic (ug/L)	MW-303	18.74	7.367	10	No	14	0	ln(x)	0.01	Param.

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic Analysis Run 4/25/2022 12:11 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Confidence Interval

Constituent: Arsenic (ug/L) Analysis Run 4/25/2022 12:13 PM View: COL Primary Pond
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-303
4/24/2018	39.1
8/8/2018	8.7
9/21/2018	6
10/24/2018	7.8
4/1/2019	33.2
6/19/2019	5.3
10/7/2019	10.2
5/27/2020	5.9
10/7/2020	9.5
2/25/2021	7.7
4/12/2021	10.4
7/20/2021	13.9
10/12/2021	18.6
2/24/2022	28.8
Mean	14.65
Std. Dev.	11.07
Upper Lim.	18.74
Lower Lim.	7.367

E2 – April 2022 LCLs

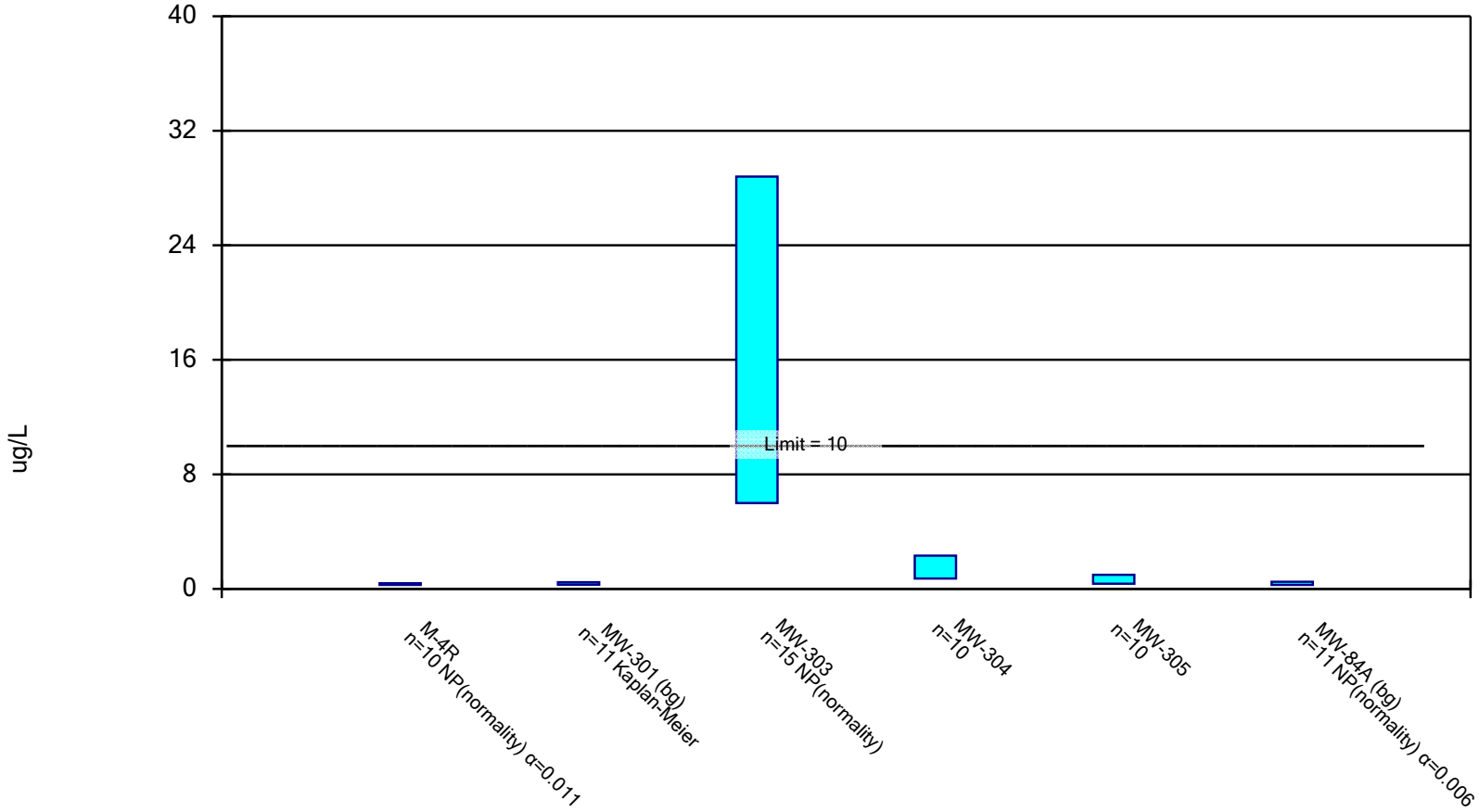
Confidence Interval

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020 Printed 6/17/2022, 1:48 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Arsenic (ug/L)	M-4R	0.39	0.28	10	No	10	60	No	0.011	NP (normality)
Arsenic (ug/L)	MW-301 (bg)	0.4637	0.2926	10	No	11	36.36	No	0.01	Param.
Arsenic (ug/L)	MW-303	28.8	6	10	No	15	0	No	0.01	NP (normality)
Arsenic (ug/L)	MW-304	2.316	0.7238	10	No	10	0	No	0.01	Param.
Arsenic (ug/L)	MW-305	0.977	0.365	10	No	10	10	No	0.01	Param.
Arsenic (ug/L)	MW-84A (bg)	0.49	0.28	10	No	11	27.27	No	0.006	NP (normality)
Molybdenum (ug/L)	M-4R	43.05	17.69	100	No	10	0	No	0.01	Param.
Molybdenum (ug/L)	MW-301 (bg)	0.44	0.44	100	No	11	100	No	0.006	NP (NDs)
Molybdenum (ug/L)	MW-303	138	64.1	100	No	12	0	No	0.01	NP (normality)
Molybdenum (ug/L)	MW-304	13	3.2	100	No	10	0	No	0.011	NP (normality)
Molybdenum (ug/L)	MW-305	93.2	52.05	100	No	14	0	No	0.01	Param.
Molybdenum (ug/L)	MW-84A (bg)	0.44	0.44	100	No	11	90.91	No	0.006	NP (NDs)
Selenium (ug/L)	M-4R	9.121	1.859	50	No	10	0	No	0.01	Param.
Selenium (ug/L)	MW-301 (bg)	0.49	0.32	50	No	11	81.82	No	0.006	NP (NDs)
Selenium (ug/L)	MW-303	52.9	15.8	50	No	11	0	No	0.006	NP (normality)
Selenium (ug/L)	MW-304	0.35	0.32	50	No	10	70	No	0.011	NP (normality)
Selenium (ug/L)	MW-305	8	4.2	50	No	10	0	No	0.011	NP (normality)
Selenium (ug/L)	MW-84A (bg)	0.32	0.32	50	No	11	90.91	No	0.006	NP (NDs)

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic Analysis Run 6/17/2022 1:46 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Confidence Interval

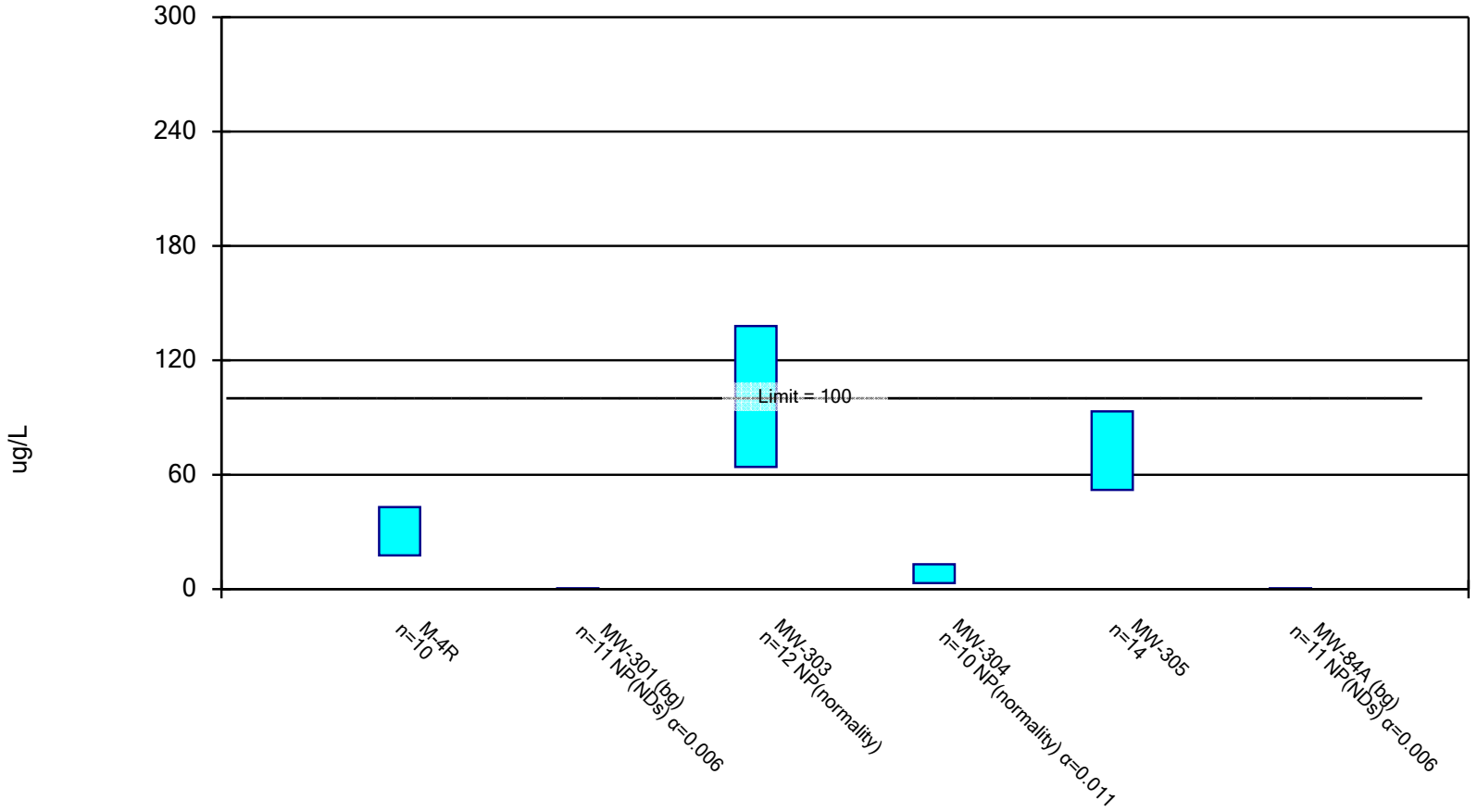
Constituent: Arsenic (ug/L) Analysis Run 6/17/2022 1:48 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	M-4R	MW-301 (bg)	MW-303	MW-304	MW-305	MW-84A (bg)
4/23/2018	0.36 (J)				0.48 (J)	
4/24/2018			39.1	0.64 (J)		
4/25/2018		<0.28 (U)				<0.28 (U)
8/7/2018	<0.28 (U)				0.42 (J)	
8/8/2018		0.45 (J)	8.7	0.76 (J)		<0.28 (U)
9/21/2018			6			
10/24/2018	<0.28 (U)	<0.28 (U)	7.8	1.6	0.4 (J)	0.33 (J)
4/1/2019	<0.28 (U)		33.2		<0.28 (U)	
4/2/2019		0.4 (J)		0.63 (J)		
4/3/2019						<0.28 (U)
6/19/2019			5.3			
10/7/2019	0.37 (J)		10.2	3.2	0.49 (J)	
10/9/2019		0.42 (J)				0.46 (J)
2/3/2020		<0.28 (U)				0.38 (J)
5/27/2020	0.39 (J)		5.9	1.3	0.75 (J)	
5/29/2020		0.33 (J)				0.34 (J)
10/7/2020	0.44 (J)		9.5	2.8	0.95 (J)	
10/8/2020		0.62 (J)				0.49 (J)
2/25/2021			7.7			
4/12/2021			10.4	1.8	0.95 (J)	
4/13/2021	<0.28 (U)					
4/14/2021		<0.28 (U)				0.91 (J)
7/20/2021			13.9			
10/11/2021	<0.28 (U)			1.6	1.4	
10/12/2021			18.6			
10/14/2021		0.35 (J)				0.41 (J)
2/24/2022			28.8			
4/11/2022	<0.28 (U)			0.87 (J)	0.59 (J)	
4/12/2022			27.1			
4/13/2022		0.47 (J)				0.31 (J)
Mean	0.324	0.3782	15.48	1.52	0.671	0.4064
Std. Dev.	0.06041	0.1077	11.14	0.8924	0.3429	0.1821
Upper Lim.	0.39	0.4637	28.8	2.316	0.977	0.49
Lower Lim.	0.28	0.2926	6	0.7238	0.365	0.28

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum Analysis Run 6/17/2022 1:46 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

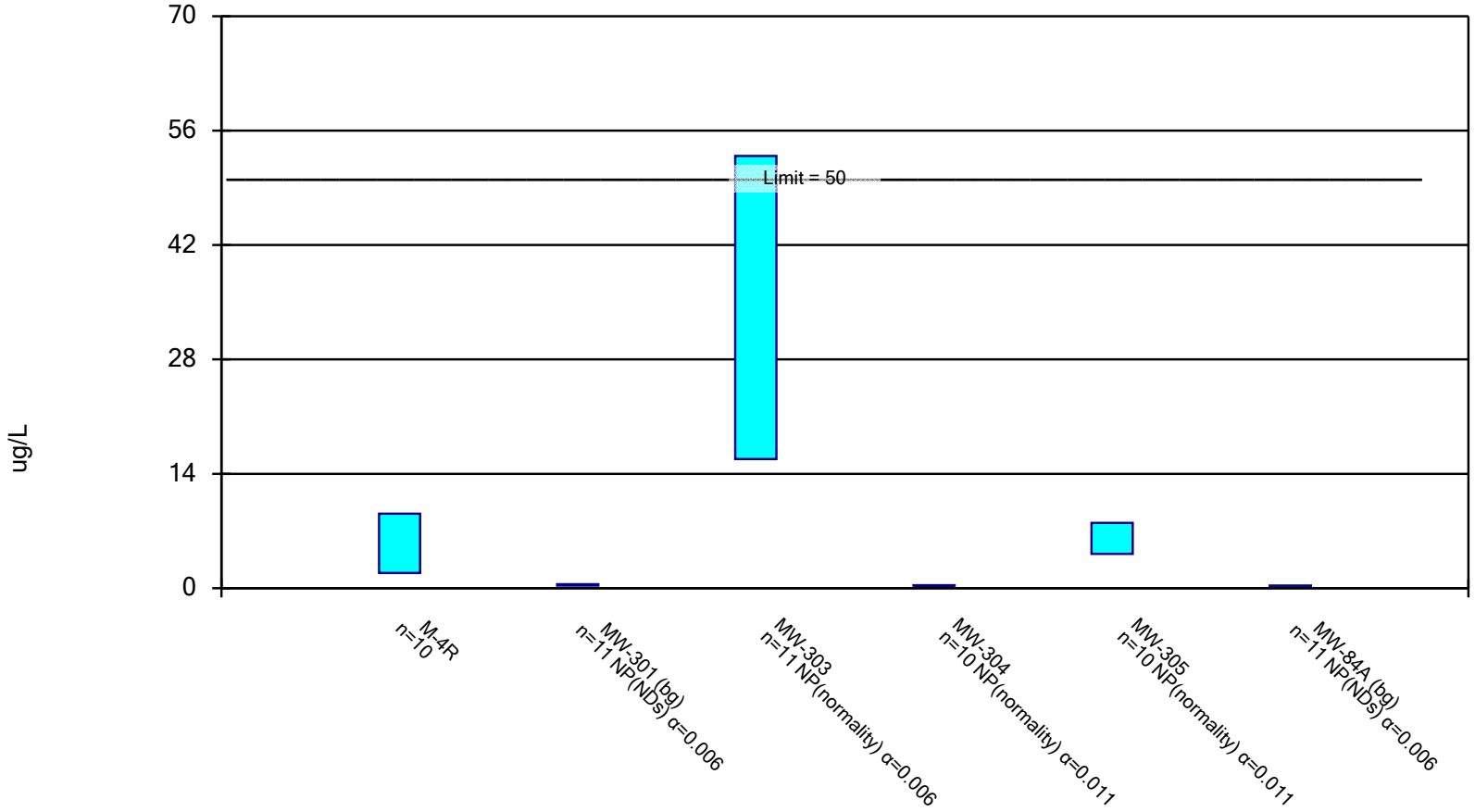
Confidence Interval

Constituent: Molybdenum (ug/L) Analysis Run 6/17/2022 1:48 PM View: COL Primary Pond
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	M-4R	MW-301 (bg)	MW-303	MW-304	MW-305	MW-84A (bg)
4/23/2018	19.1				54.4	
4/24/2018			138	3.2		
4/25/2018		<0.44 (U)				<0.44 (U)
8/7/2018	14.7				55.7	
8/8/2018		<0.44 (U)	94.8	12.3		<0.44 (U)
9/21/2018			84.7			
10/24/2018	15.4	<0.44 (U)	85.5	10.2	45.6	<0.44 (U)
4/1/2019	29.4		106		47.7	
4/2/2019		<0.44 (U)		3		
4/3/2019						<0.44 (U)
6/19/2019			64.1			
10/7/2019	27.6		87	4.8	56.2	
10/9/2019		<0.44 (U)				<0.44 (U)
2/3/2020		<0.44 (U)				<0.44 (U)
5/27/2020	25.6		67.1	3.9	60.5	
5/29/2020		<0.44 (U)				<0.44 (U)
10/7/2020	27.6		67.1	12	102	
10/8/2020		<0.44 (U)				<0.44 (U)
12/11/2020					99	
2/25/2021					107	
4/12/2021			67.1	13	106	
4/13/2021	41.1					
4/14/2021		<0.44 (U)				0.62 (J)
7/20/2021					77	
10/11/2021	60.7			13.5	124	
10/12/2021			78			
10/14/2021		<0.44 (U)				<0.44 (U)
2/24/2022					35.8	
4/11/2022	42.5			9.8	45.9	
4/12/2022			174			
4/13/2022		<0.44 (U)				<0.44 (U)
Mean	30.37	0.44	92.78	8.57	72.63	0.4564
Std. Dev.	14.21	0	33.02	4.342	29.05	0.05427
Upper Lim.	43.05	0.44	138	13	93.2	0.44
Lower Lim.	17.69	0.44	64.1	3.2	52.05	0.44

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium Analysis Run 6/17/2022 1:46 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Confidence Interval

Constituent: Selenium (ug/L) Analysis Run 6/17/2022 1:48 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	M-4R	MW-301 (bg)	MW-303	MW-304	MW-305	MW-84A (bg)
4/23/2018	8.6				6.9	
4/24/2018			52.9	<0.32 (U)		
4/25/2018		<0.32 (U)				<0.32 (U)
8/7/2018	5.5				4.8	
8/8/2018		0.71 (J)	25.1	<0.32 (U)		<0.32 (U)
9/21/2018			15.8			
10/24/2018	4.1	<0.32 (U)	15.1	<0.32 (U)	5.4	<0.32 (U)
4/1/2019	12.6		36.5		3.2	
4/2/2019		0.49 (J)		<0.32 (U)		
4/3/2019						<0.32 (U)
10/7/2019	1.8		16.4	<0.32 (U)	7.7	
10/9/2019		<0.32 (U)				<0.32 (U)
2/3/2020		<0.32 (U)				<0.32 (U)
5/27/2020	11.7		18.7	0.33 (J)	4.2	
5/29/2020		<0.32 (U)				<0.32 (U)
10/7/2020	1.6		17.2	<0.32	7.6	
10/8/2020		<0.32 (U)				<0.32 (U)
4/12/2021			22.4	1.1	8	
4/13/2021	3.7					
4/14/2021		<0.32 (U)				0.48 (J)
10/11/2021	2.3			0.35 (J)	4.5	
10/12/2021			28.1			
10/14/2021		<0.32 (U)				<0.32 (U)
4/11/2022	3			<0.32 (U)	21.5	
4/12/2022			87.2			
4/13/2022		<0.32 (U)				<0.32 (U)
Mean	5.49	0.3709	30.49	0.402	7.38	0.3345
Std. Dev.	4.07	0.1235	21.96	0.2454	5.234	0.04824
Upper Lim.	9.121	0.49	52.9	0.35	8	0.32
Lower Lim.	1.859	0.32	15.8	0.32	4.2	0.32

E3 – July 2022 LCLs

November 8, 2022
File No. 25222067.00

TECHNICAL MEMORANDUM

SUBJECT: Statistical Evaluation of Groundwater Monitoring Results
Columbia Primary Pond, July 2022

PREPARED BY: Sherren Clark

REVIEWED BY: Tom Karwoski

STATISTICAL METHOD

To evaluate whether arsenic or molybdenum is at a statistically significant level (SSL) above the groundwater protection standard (GPS), a confidence interval approach was used. The United States Environmental Protection Agency's Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities (EPA 530-R-09-007, March 2009) recommends the use of confidence intervals for comparison of assessment monitoring data to fixed GPS values. Specifically, the suggested approach for comparing assessment groundwater monitoring data to GPS values based on long-term chronic health risk, such as drinking water Maximum Contaminant Levels (MCLs), is to compare the lower confidence limit (LCL) around the arithmetic mean with the fixed GPS.

An LCL evaluation was completed for arsenic and molybdenum, which are the only Appendix IV parameters that have been detected at a concentration exceeding the GPS in at least one sample result since assessment monitoring was initiated. The LCLs were calculated with Sanitas™ using historical concentrations measured since assessment monitoring began in April 2018.

As discussed below, additional evaluation of the arsenic results for MW-303 was performed to evaluate whether recently increasing arsenic concentrations represent a significant shift or trend in the data that would affect the LCL evaluation.

The results of the LCL evaluation, as described in more detail below, indicated that neither arsenic nor molybdenum is at an SSL above the GPS.

ARSENIC EVALUATION

The LCL evaluation for arsenic at MW-303 is provided in **Attachment B1**, along with a time series plot of arsenic in samples from MW-303 since the initiation of background monitoring. The LCL was calculated based on the monitoring data collected since assessment monitoring began in April 2018. The LCL is below the GPS, indicating that molybdenum is not at an SSL above the GPS.

As shown on the time series plot, arsenic concentrations at MW-303 have been highly variable since background monitoring began in December 2015. Concentrations were initially highly variable from

event to event, then stayed relatively low during 2019 and 2020, and have generally increased in 2021 and 2022. Although the recent concentrations have been increasing, they fall within the range of previously observed concentrations, so do not necessarily represent a change in conditions.

To evaluate whether the recent data represent a change in the sample population, the assessment monitoring data were evaluated for the presence of a trend or a shift. Trend analysis was performed using both linear regression and the Mann-Kendall non-parametric trend analysis, and no significant trend was detected. To evaluate whether a significant shift in the data has occurred, the Mann-Whitney test was used to compare the most recent eight sample results to the earlier data collected since assessment monitoring was initiated. No significant difference was detected between the two populations. The trend analyses and Mann-Whitney analysis are provided in **Attachment B2**.

To incorporate the arsenic results collected during the background sampling at MW-303, the trend analyses and Mann-Whitney analysis were also performed using the complete data set beginning in December 2015, as shown in **Attachment B3**. For this case, the Mann-Whitney analysis compares the background data for MW-303 to the compliance data. No significant trend or shift in the population of arsenic concentrations was detected.

Because the recent arsenic data do not appear to represent a change in the population of arsenic concentrations detected at MW-303, the calculation of the LCL based on the complete assessment monitoring data set is appropriate. As a second check, the LCL was also calculated based on the most recent eight arsenic results, as shown in **Attachment B4**. The LCL was below the GPS, consistent with the results for the complete assessment monitoring data set.

MOLYBDENUM EVALUATION

The LCL evaluation for molybdenum at MW-305 is provided in **Attachment B5**, along with a time series plot of molybdenum in samples from MW-305 since the initiation of background monitoring. The LCL is below the GPS, indicating that molybdenum is not at an SSL above the GPS. The last three samples from MW-305 have had molybdenum concentrations well below the GPS.

SCC/AJR/TK

Encl. Attachments B1 through B5

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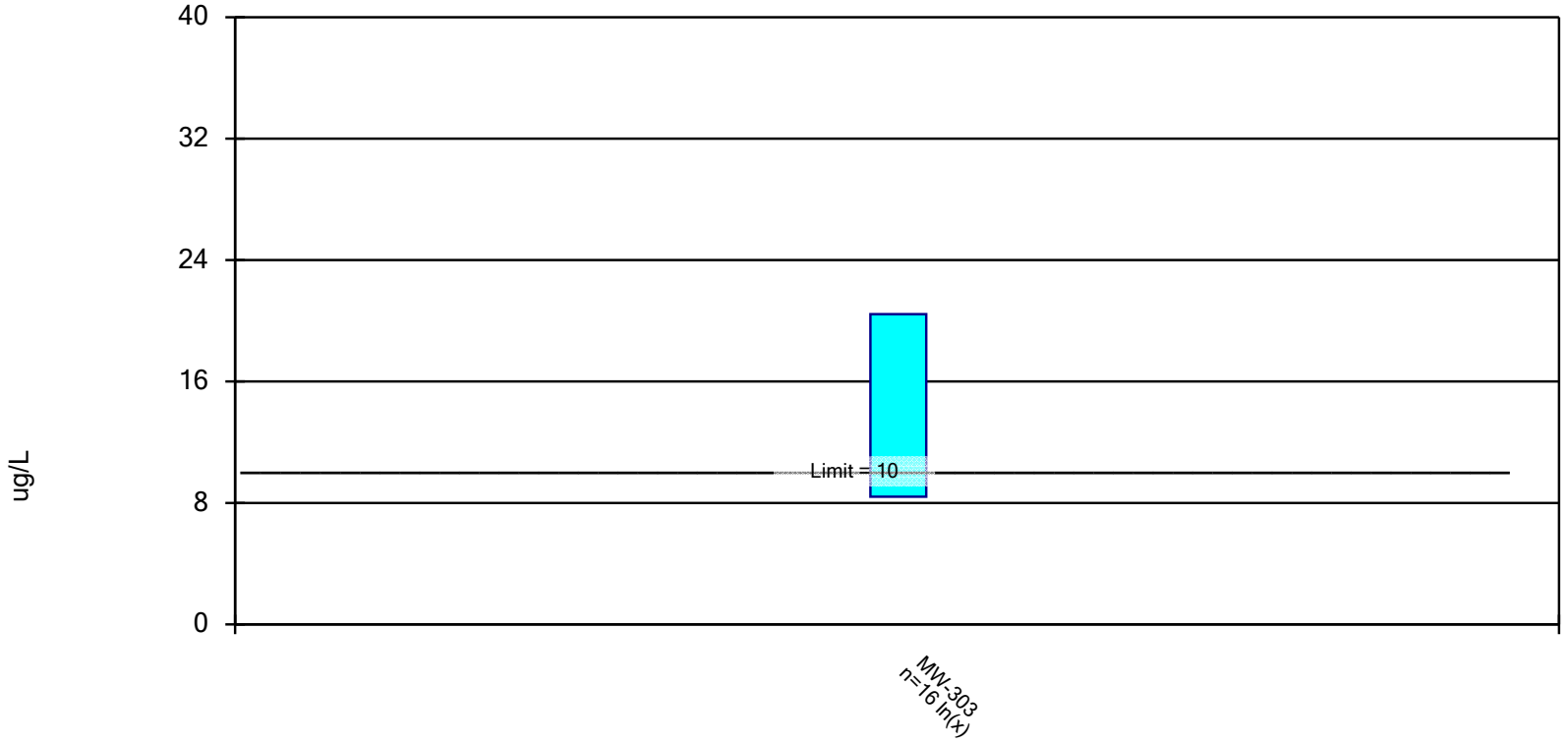
Attachment B1

Arsenic Confidence Interval and Time Series Plot

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic Analysis Run 11/5/2022 3:03 PM View: COL Primary Pond

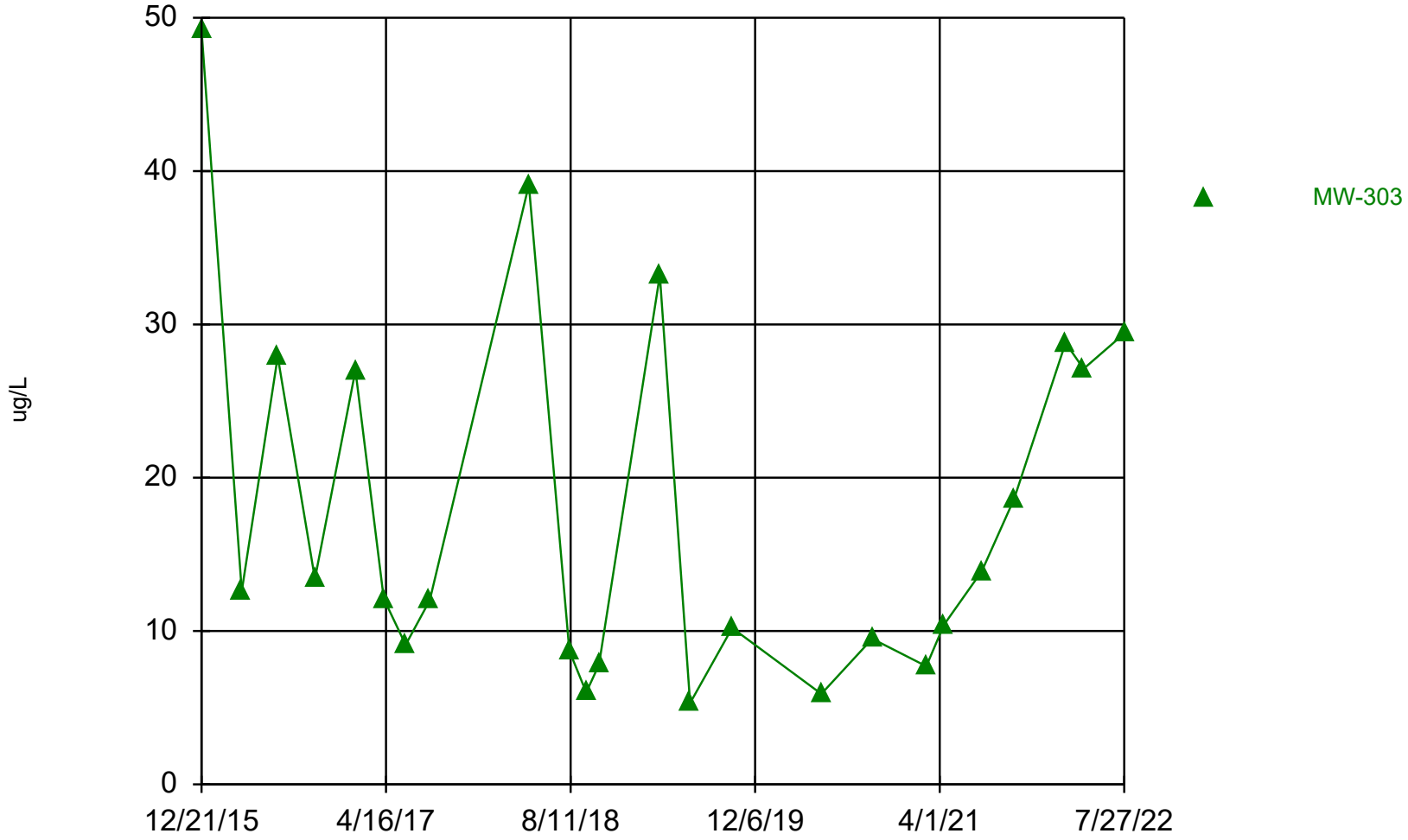
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Confidence Interval

Constituent: Arsenic (ug/L) Analysis Run 11/5/2022 3:11 PM View: COL Primary Pond
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-303
4/24/2018	39.1
8/8/2018	8.7
9/21/2018	6
10/24/2018	7.8
4/1/2019	33.2
6/19/2019	5.3
10/7/2019	10.2
5/27/2020	5.9
10/7/2020	9.5
2/25/2021	7.7
4/12/2021	10.4
7/20/2021	13.9
10/12/2021	18.6
2/24/2022	28.8
4/12/2022	27.1
7/27/2022	29.4
Mean	16.35
Std. Dev.	11.31
Upper Lim.	20.44
Lower Lim.	8.407

Arsenic



Time Series Analysis Run 11/5/2022 3:10 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Time Series

Constituent: Arsenic (ug/L) Analysis Run 11/5/2022 3:11 PM View: COL Primary Pond
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

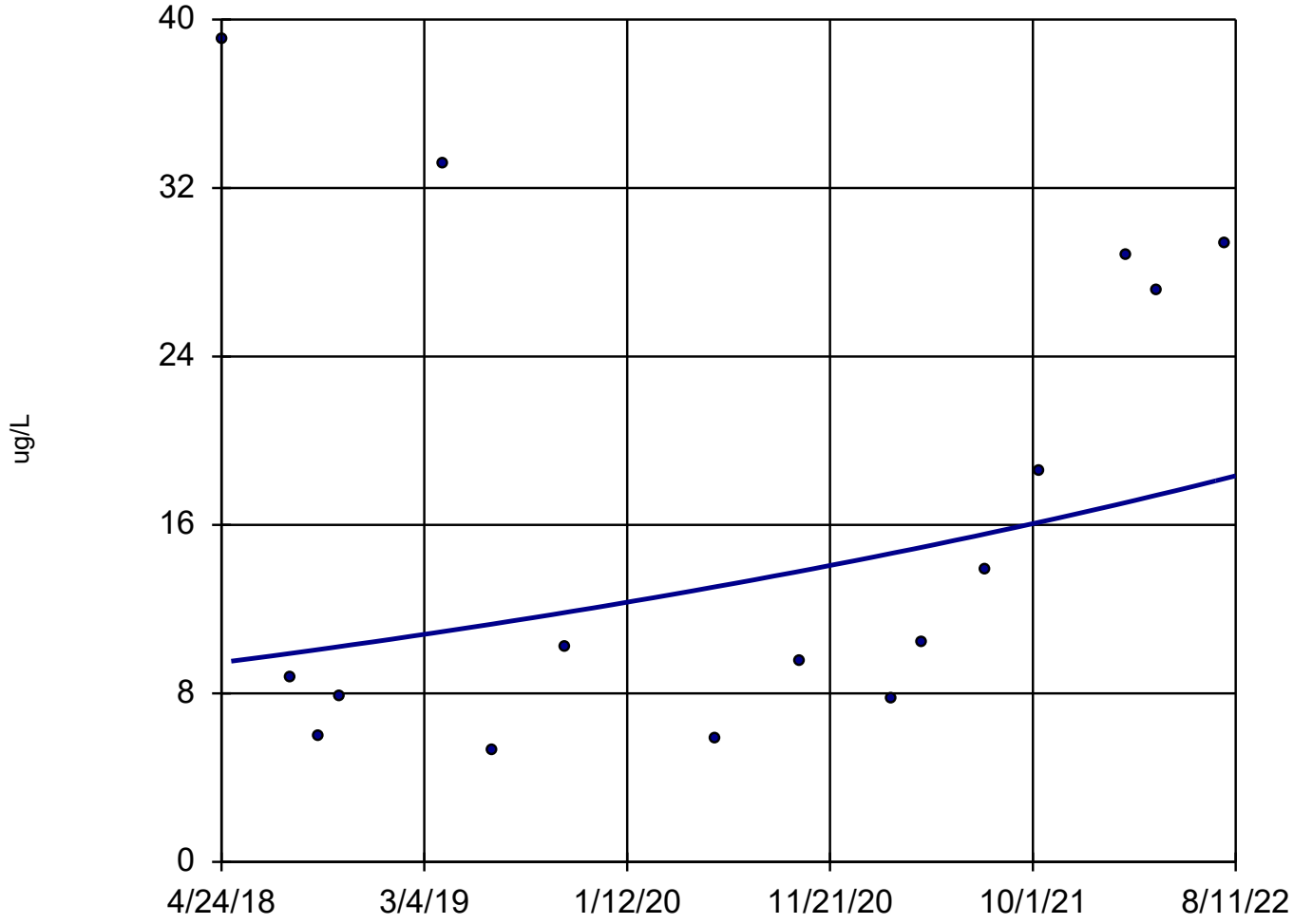
	MW-303
12/21/2015	49.2
4/4/2016	12.6
7/7/2016	27.9
10/12/2016	13.4
1/26/2017	27
4/10/2017	12.1
6/6/2017	9.1
8/8/2017	12
4/24/2018	39.1
8/8/2018	8.7
9/21/2018	6
10/24/2018	7.8
4/1/2019	33.2
6/19/2019	5.3
10/7/2019	10.2
5/27/2020	5.9
10/7/2020	9.5
2/25/2021	7.7
4/12/2021	10.4
7/20/2021	13.9
10/12/2021	18.6
2/24/2022	28.8
4/12/2022	27.1
7/27/2022	29.4

Attachment B2

Arsenic Trend and Mann-Whitney Analysis – Assessment Monitoring Data

Arsenic

MW-303



n = 16

Slope = 0.1537
natural log units/year.

alpha = 0.02
t = 1.291
critical = 2.264

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.9214 after natural
log transformation,
critical = 0.887.

Linear Regression Analysis Run 11/5/2022 3:01 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Linear Regression

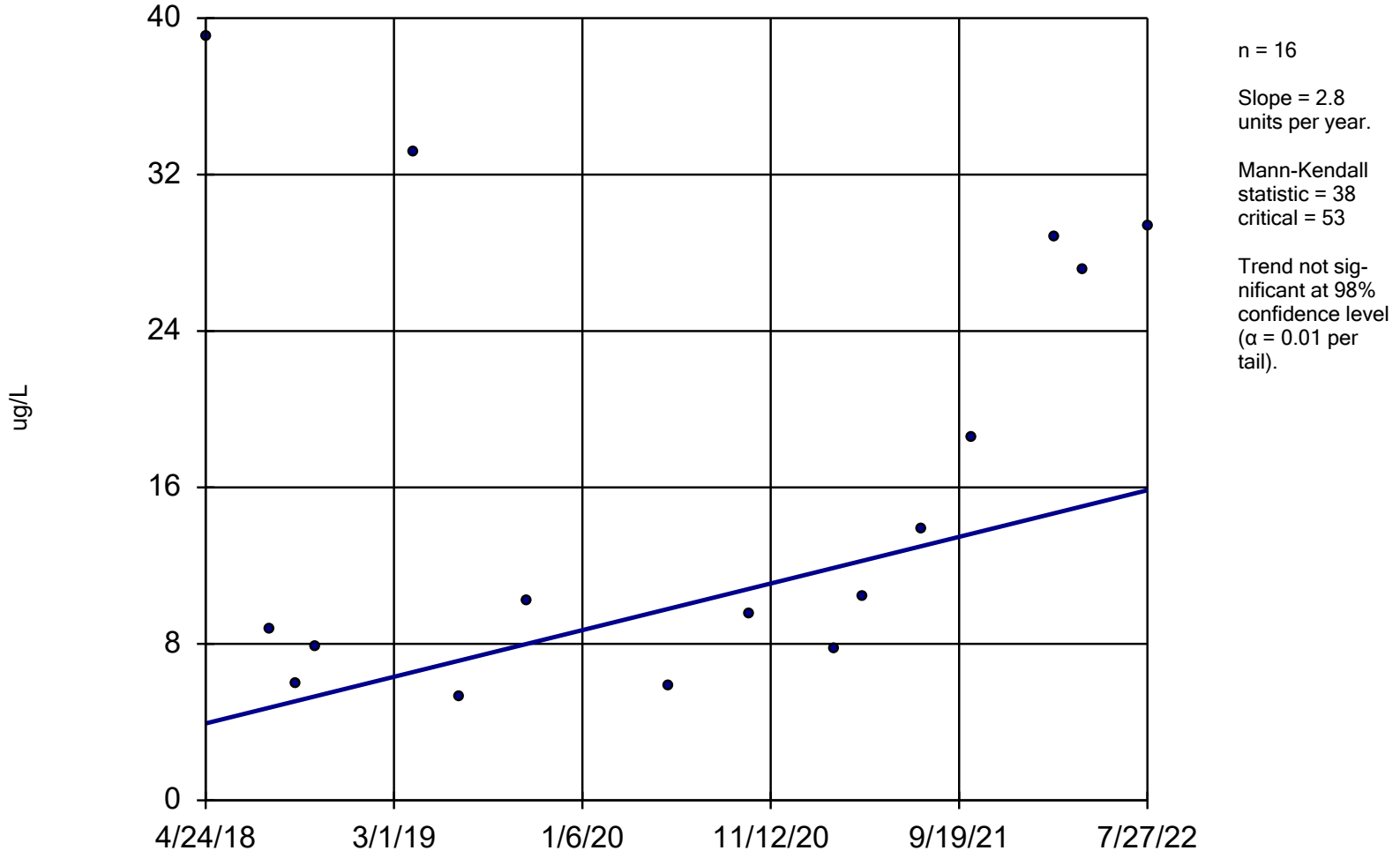
Constituent: Arsenic (ug/L) Analysis Run 11/5/2022 3:11 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-303
4/24/2018	39.1
8/8/2018	8.7
9/21/2018	6
10/24/2018	7.8
4/1/2019	33.2
6/19/2019	5.3
10/7/2019	10.2
5/27/2020	5.9
10/7/2020	9.5
2/25/2021	7.7
4/12/2021	10.4
7/20/2021	13.9
10/12/2021	18.6
2/24/2022	28.8
4/12/2022	27.1
7/27/2022	29.4

Arsenic

MW-303



n = 16

Slope = 2.8 units per year.

Mann-Kendall statistic = 38 critical = 53

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope and 98% Confidence Band Analysis Run 11/5/2022 3:01 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Sen's Slope Estimator

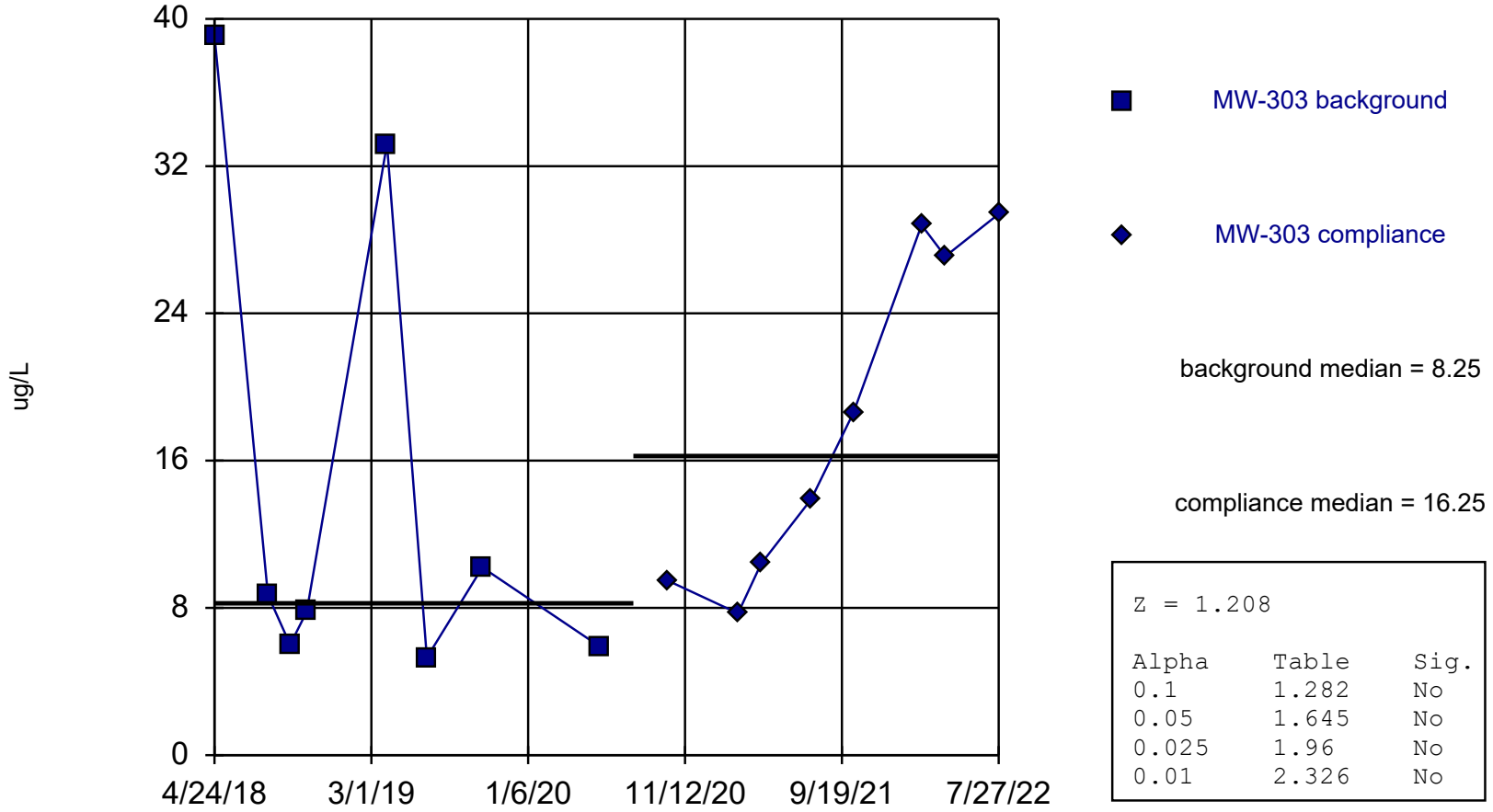
Constituent: Arsenic (ug/L) Analysis Run 11/5/2022 3:11 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-303
4/24/2018	39.1
8/8/2018	8.7
9/21/2018	6
10/24/2018	7.8
4/1/2019	33.2
6/19/2019	5.3
10/7/2019	10.2
5/27/2020	5.9
10/7/2020	9.5
2/25/2021	7.7
4/12/2021	10.4
7/20/2021	13.9
10/12/2021	18.6
2/24/2022	28.8
4/12/2022	27.1
7/27/2022	29.4

Arsenic

MW-303



Z = 1.208

Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 11/7/2022 3:49 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Arsenic (ug/L) Analysis Run 11/7/2022 3:51 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

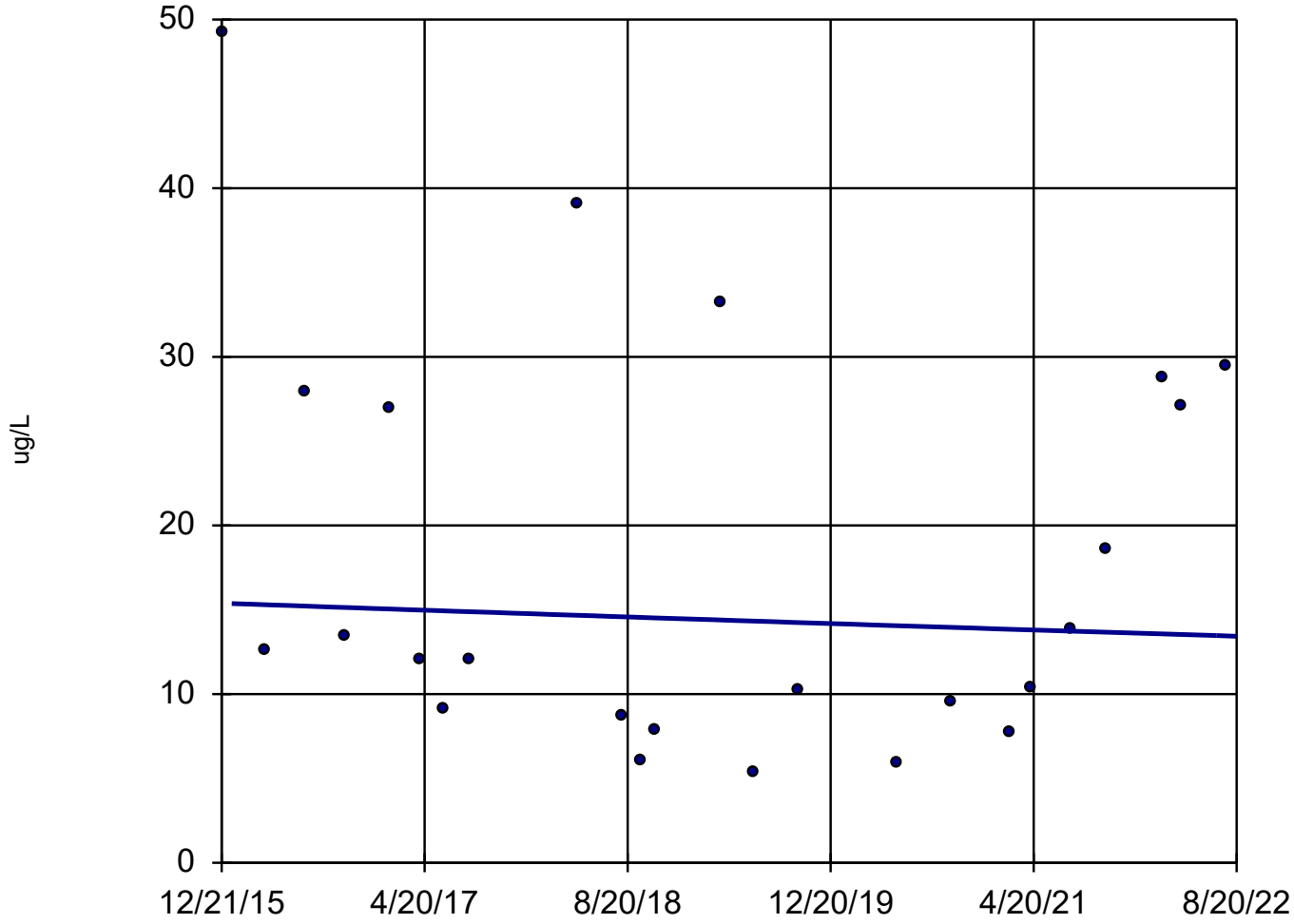
	MW-303	MW-303
4/24/2018	39.1	
8/8/2018	8.7	
9/21/2018	6	
10/24/2018	7.8	
4/1/2019	33.2	
6/19/2019	5.3	
10/7/2019	10.2	
5/27/2020	5.9	
10/7/2020		9.5
2/25/2021		7.7
4/12/2021		10.4
7/20/2021		13.9
10/12/2021		18.6
2/24/2022		28.8
4/12/2022		27.1
7/27/2022		29.4

Attachment B3

Arsenic Trend and Mann-Whitney Analysis – Complete Monitoring Data

Arsenic

MW-303



n = 24

Slope = -0.02042
natural log units/year.

alpha = 0.02
t = -0.3094
critical = 2.183

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.9315 after natural
log transformation,
critical = 0.884.

Linear Regression Analysis Run 11/5/2022 2:59 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Linear Regression

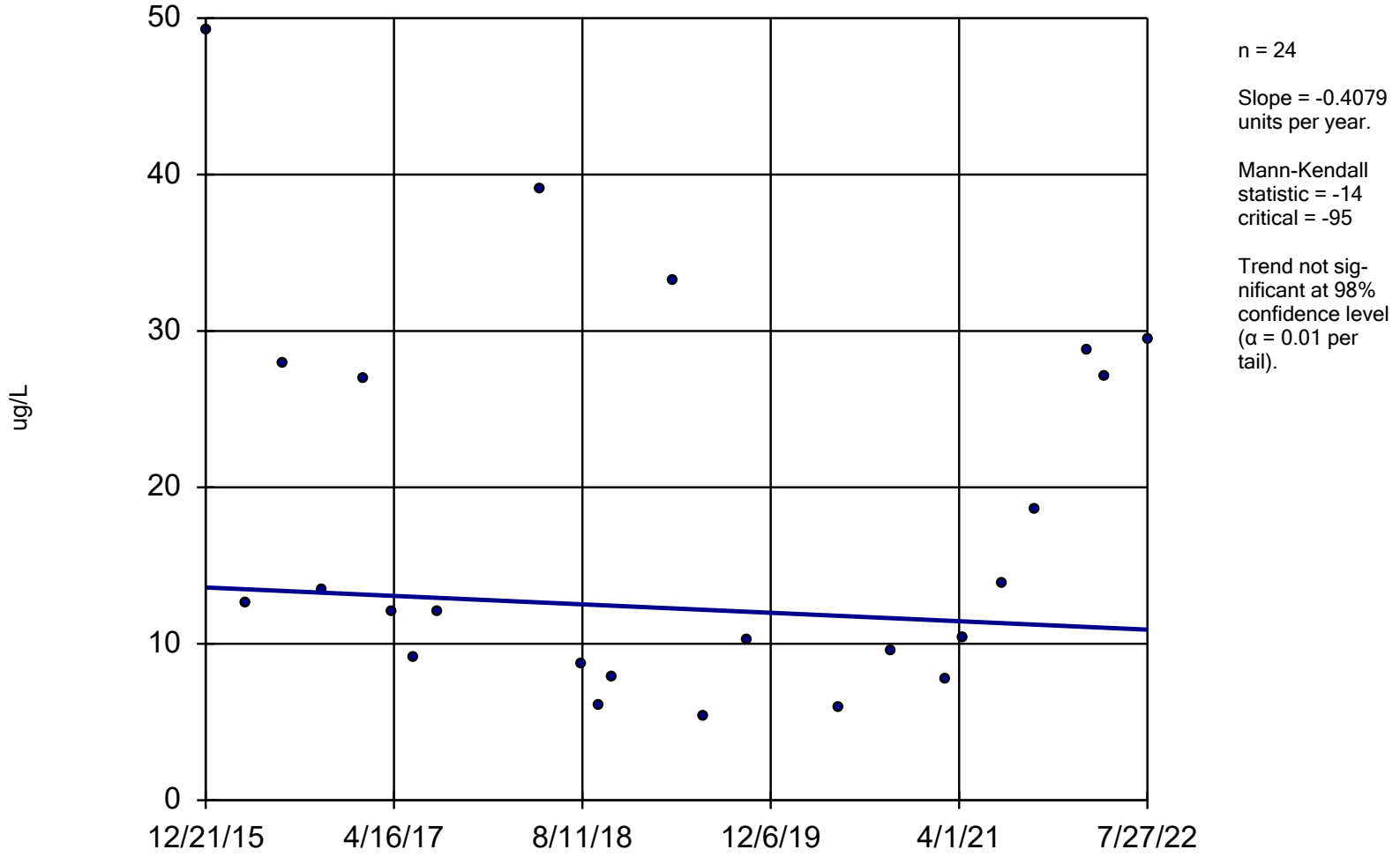
Constituent: Arsenic (ug/L) Analysis Run 11/5/2022 3:11 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-303
12/21/2015	49.2
4/4/2016	12.6
7/7/2016	27.9
10/12/2016	13.4
1/26/2017	27
4/10/2017	12.1
6/6/2017	9.1
8/8/2017	12
4/24/2018	39.1
8/8/2018	8.7
9/21/2018	6
10/24/2018	7.8
4/1/2019	33.2
6/19/2019	5.3
10/7/2019	10.2
5/27/2020	5.9
10/7/2020	9.5
2/25/2021	7.7
4/12/2021	10.4
7/20/2021	13.9
10/12/2021	18.6
2/24/2022	28.8
4/12/2022	27.1
7/27/2022	29.4

Arsenic

MW-303



n = 24

Slope = -0.4079 units per year.

Mann-Kendall statistic = -14
critical = -95

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope and 98% Confidence Band Analysis Run 11/5/2022 3:00 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

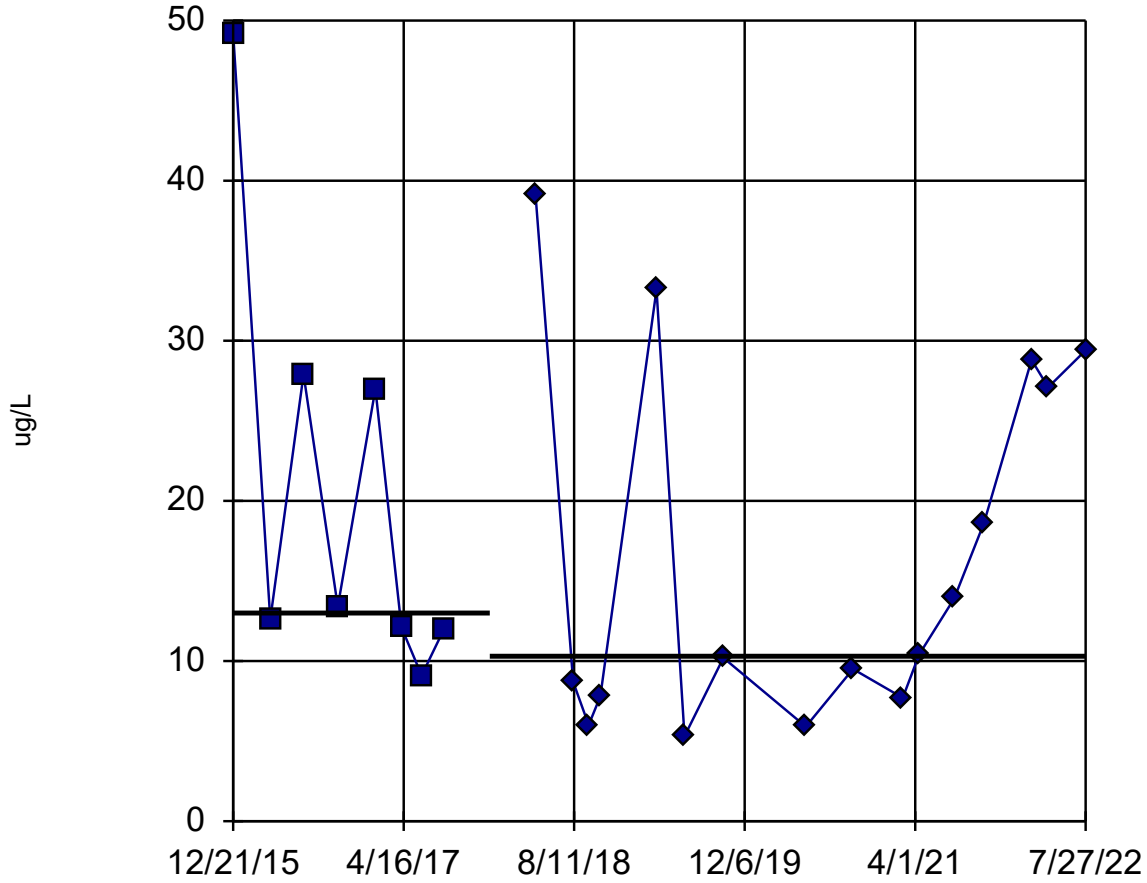
Sen's Slope Estimator

Constituent: Arsenic (ug/L) Analysis Run 11/5/2022 3:11 PM View: COL Primary Pond
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-303
12/21/2015	49.2
4/4/2016	12.6
7/7/2016	27.9
10/12/2016	13.4
1/26/2017	27
4/10/2017	12.1
6/6/2017	9.1
8/8/2017	12
4/24/2018	39.1
8/8/2018	8.7
9/21/2018	6
10/24/2018	7.8
4/1/2019	33.2
6/19/2019	5.3
10/7/2019	10.2
5/27/2020	5.9
10/7/2020	9.5
2/25/2021	7.7
4/12/2021	10.4
7/20/2021	13.9
10/12/2021	18.6
2/24/2022	28.8
4/12/2022	27.1
7/27/2022	29.4

Arsenic

MW-303



Z = -1.072

Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 11/5/2022 3:00 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Arsenic (ug/L) Analysis Run 11/5/2022 3:11 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

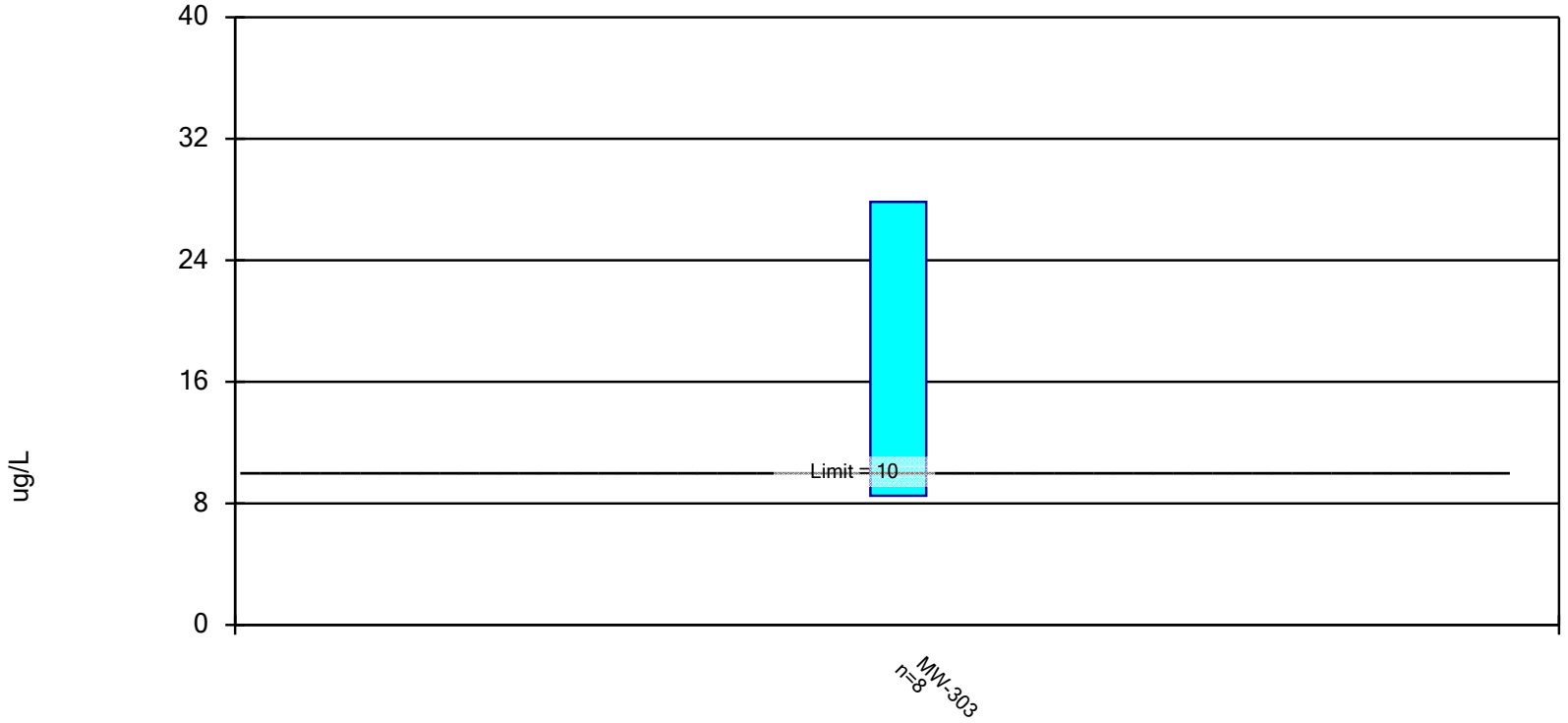
	MW-303	MW-303
12/21/2015	49.2	
4/4/2016	12.6	
7/7/2016	27.9	
10/12/2016	13.4	
1/26/2017	27	
4/10/2017	12.1	
6/6/2017	9.1	
8/8/2017	12	
4/24/2018		39.1
8/8/2018		8.7
9/21/2018		6
10/24/2018		7.8
4/1/2019		33.2
6/19/2019		5.3
10/7/2019		10.2
5/27/2020		5.9
10/7/2020		9.5
2/25/2021		7.7
4/12/2021		10.4
7/20/2021		13.9
10/12/2021		18.6
2/24/2022		28.8
4/12/2022		27.1
7/27/2022		29.4

Attachment B4

Arsenic Confidence Interval – Last Eight Events

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic Analysis Run 11/5/2022 6:53 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Confidence Interval

Constituent: Arsenic (ug/L) Analysis Run 11/5/2022 6:53 PM View: COL Primary Pond
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-303
10/7/2020	9.5
2/25/2021	7.7
4/12/2021	10.4
7/20/2021	13.9
10/12/2021	18.6
2/24/2022	28.8
4/12/2022	27.1
7/27/2022	29.4
Mean	18.18
Std. Dev.	9.122
Upper Lim.	27.84
Lower Lim.	8.507

Attachment B5

Molybdenum Confidence Interval and Time Series Plot

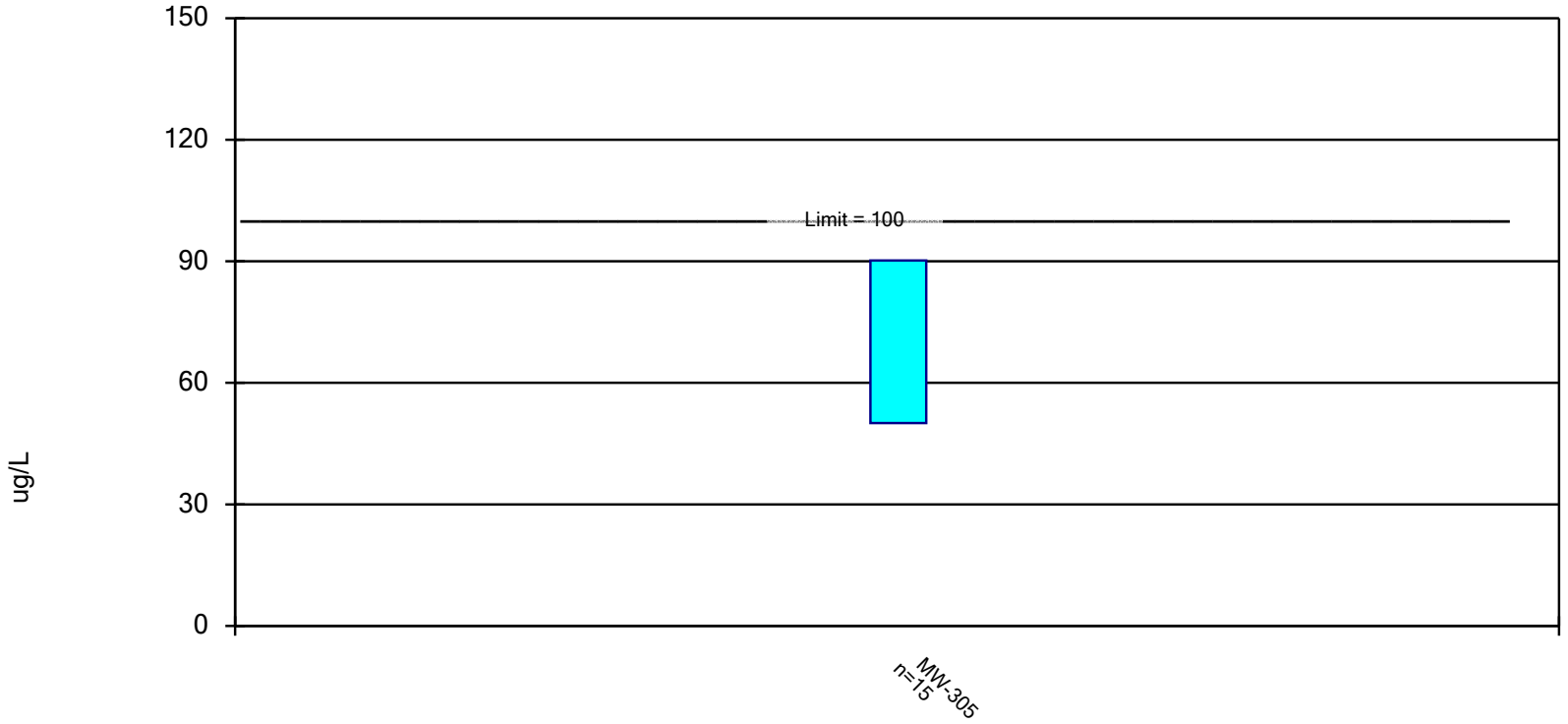
Confidence Interval

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020 Printed 10/5/2022, 11:14 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Molybdenum (ug/L)	MW-305	90.2	50.05	100	No	15	0	No	0.01	Param.

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum Analysis Run 10/5/2022 11:13 AM View: COL Primary Pond

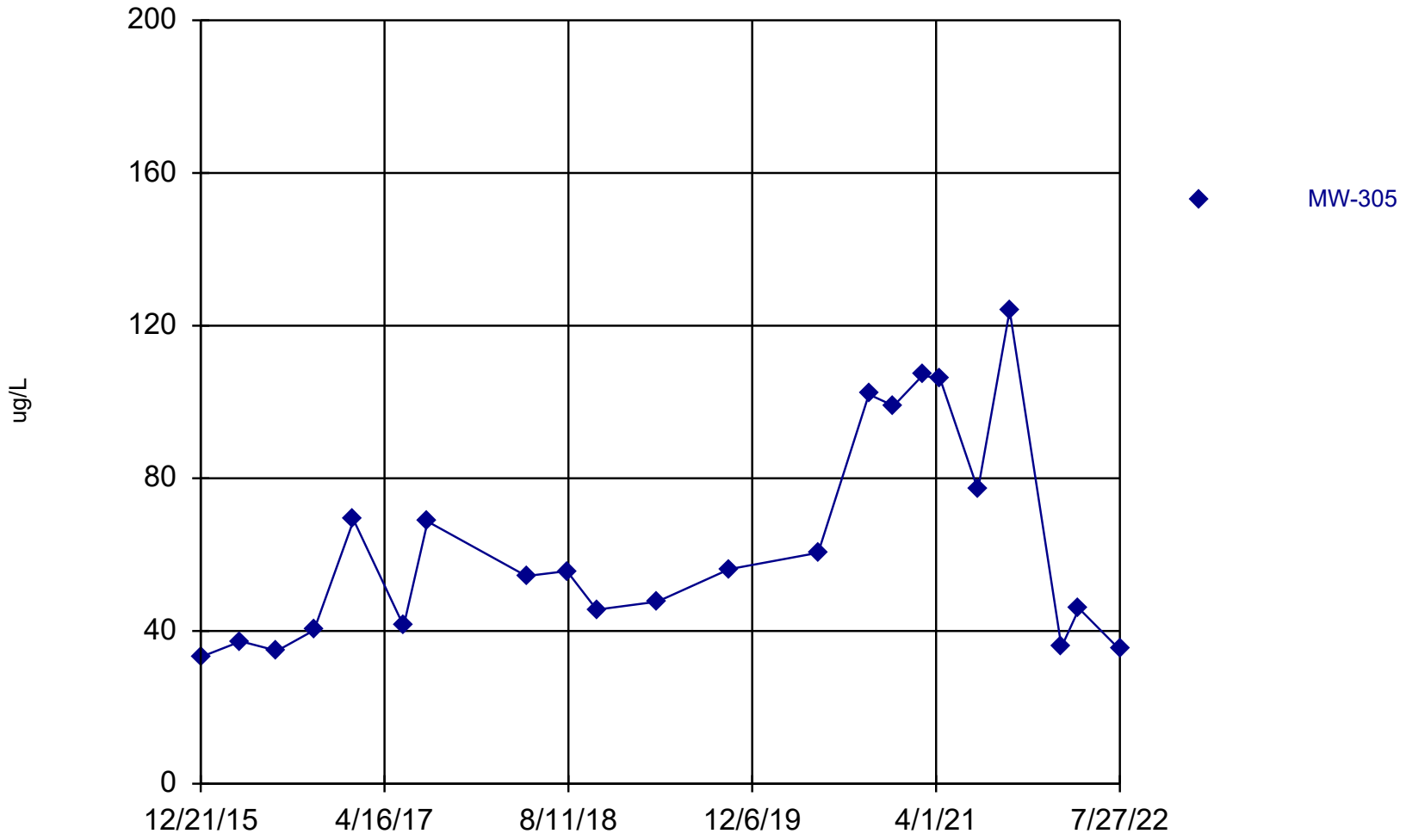
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Confidence Interval

Constituent: Molybdenum (ug/L) Analysis Run 10/5/2022 11:14 AM View: COL Primary Pond
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-305
4/23/2018	54.4
8/7/2018	55.7
10/24/2018	45.6
4/1/2019	47.7
10/7/2019	56.2
5/27/2020	60.5
10/7/2020	102
12/11/2020	99
2/25/2021	107
4/12/2021	106
7/20/2021	77
10/11/2021	124
2/24/2022	35.8
4/11/2022	45.9
7/27/2022	35.1
Mean	70.13
Std. Dev.	29.62
Upper Lim.	90.2
Lower Lim.	50.05

Molybdenum



Time Series Analysis Run 11/5/2022 3:11 PM View: COL Primary Pond

Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Time Series

Constituent: Molybdenum (ug/L) Analysis Run 11/5/2022 3:11 PM View: COL Primary Pond
Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

	MW-305
12/21/2015	33.2
4/4/2016	37.3
7/8/2016	34.8
10/13/2016	40.2
1/25/2017	69.1
6/5/2017	41.3
8/7/2017	68.7
4/23/2018	54.4
8/7/2018	55.7
10/24/2018	45.6
4/1/2019	47.7
10/7/2019	56.2
5/27/2020	60.5
10/7/2020	102
12/11/2020	99
2/25/2021	107
4/12/2021	106
7/20/2021	77
10/11/2021	124
2/24/2022	35.8
4/11/2022	45.9
7/27/2022	35.1