2023 Annual Groundwater Monitoring and Corrective Action Report

Columbia Energy Center
Dry Ash Disposal Facility, Modules 4, 5, and 6
Pardeeville, Wisconsin

Prepared for:

Alliant Energy

SCS ENGINEERS

25223067.00 | January 31, 2024

2830 Dairy Drive
Madison, WI 53718-6751
608-224-2830

OVERVIEW OF CURRENT STATUS

Columbia Energy Center, Dry Ash Disposal Facility, Modules 4, 5, and 6
2023 Annual Report

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

Category	Rule Requirement	Site Status
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;	Detection
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;	Detection
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 and November 2022</u> Boron: MW-309 Calcium: MW-309 Chloride: MW-310 <u>April and June 2023</u> Boron: MW-309 Sulfate: MW-309
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	Alternative Source Demonstrations prepared for October 2022 and April 2023 events during 2023. Assessment monitoring not required.

Category	Rule Requirement	Site Status
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:	Not applicable – Appendix IV sampling not required
	(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;	
	(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	
	(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	
	(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	
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 – Site is in detection monitoring
Corrective Action	(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	Not applicable – Site is in detection monitoring

Table of Contents

Section Page

Tables

Figures

Appendices

I:\25223067.00\Deliverables\2023 - Fed CCR Annual Report - COL Mod 4-6\240131_2023 Annual CCR GW Report COL MOD 4-6 LF_Final.docx

1.0 INTRODUCTION

This 2023 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 2023 Annual Groundwater Monitoring and Corrective Action Report for the CCR Unit.

This report covers the period of groundwater monitoring from January 1, 2023, through December 31, 2023.

The Columbia Energy Center (COL) Dry Disposal Ash Facility is an active CCR landfill and includes an existing CCR unit and two new CCR landfill units. Module 4 of the new unit became operational in 2018 and Modules 5 and 6 became active in 2021. The groundwater monitoring system for COL Mod 4-6 was certified on December 9, 2021. The additional CCR units include existing CCR unit COL Mod 1-3 and new CCR unit COL Mod 10-11. The groundwater monitoring system addressed in this report is evaluating conditions at:

- COL Dry Ash Disposal Facility – Modules 4, 5, and 6 (Mod 4-6)

The system is designed to detect monitored constituents at the waste boundary of Mod 4-6 of the COL Dry Ash Disposal Facility as required by 40 CFR 257.91(d). The groundwater monitoring system consists of two upgradient and three downgradient monitoring wells (**Table 1** and **Figure 2**). Separate groundwater monitoring systems evaluate groundwater conditions for Modules 1-3 and Modules 10-11 of the COL Dry Ash Disposal Facility.

2.0 BACKGROUND

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

- 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 Ash Disposal Facility Mod 4-6. 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-309, MW-310, and MW-311, the unconsolidated materials were identified as consisting primarily of silty sand, sand, and gravels. The boring log for previously installed monitoring well MW-84A shows silty sand and sand as the primary unconsolidated materials at this location. All CCR monitoring wells are screened within the unconsolidated sand unit. Boring logs for the downgradient monitoring wells used to evaluate the COL Ash Disposal Facility Mod 4-6 CCR unit are included in Appendix B.

Shallow groundwater at the site generally flows to the north and west across the existing landfill area. The April 2023 water levels and apparent flow directions reflect the influence of a temporary dewatering system installed to lower groundwater levels in the area of the Primary Pond as part of the closure project for that CCR Unit. The water table elevations and groundwater flow directions for the April 2023 monitoring event are shown on Figure 3, and the water table elevations and groundwater flow directions for the October 2023 monitoring event are shown on Figure 4. The groundwater elevation data for the CCR monitoring wells are provided in Table 3. Calculated 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 three downgradient monitoring wells (Table 1 and Figure 2). The background wells include MW-301 and MW-84A. The downgradient wells include MW-309, MW-310, and MW-311. The CCR Rule wells are installed within the sand and gravel aquifer. Well depths range from approximately 29 to 52 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 of the site location is provided on **Figure 1.** A map showing the Dry Ash Disposal Facility Mod 4-6 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 Mod 4-6 of the Dry Ash Disposal Facility in 2023.

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;

Groundwater sampling events were completed in April, June, October, and November 2023 at COL Dry Ash Disposal Modules 4-6 as part of ongoing detection monitoring. Samples collected in June and November 2023 were collected for limited parameters at select wells during retest events for the April and October 2023 sampling events, respectively.

Groundwater samples collected during the semiannual events, in April and October 2023, were analyzed for the Appendix III constituents. The retest sampling events in June and November 2023 were limited to a subset of the Appendix III constituent list. The June retesting was performed for select parameters that exceeded the upper prediction limits (UPLs) in the April sampling event. The November retesting was performed for select parameters that exceeded the UPLs in the October sampling event. 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 or assessment monitoring program is included in **Table 2**.

The validation and evaluation of the October and November 2022 monitoring event data was completed and transmitted to WPL on January 26, 2023. The validation and evaluation of the April and June 2023 monitoring event data was completed and transmitted to WPL on August 24, 2023. The validation and evaluation of the October 2023 monitoring event and November 2023 retest sampling event data was in progress at the end of 2023 and will be transmitted to WPL in 2024; therefore, the October and November 2023 monitoring results and analytical report will be included in the 2024 annual report. The October and November 2023 groundwater elevation data is included in this report.

The sampling results for Appendix III parameters in October 2022 are summarized in **Table 5A.** The sampling results for Appendix III parameters in April 2023 are summarized in **Table 5B.** Field parameter results for the October 2022, November 2022, April 2023, and June 2023 sampling events are provided in **Table 6**. The analytical laboratory reports for October 2022, November 2022, April 2023, and June 2023 are provided in **Appendix C**. Historical results for each monitoring well through April 2023 are summarized in **Appendix D**.

The October 2022 analyses for the samples collected from background wells MW-84A and MW-301 are provided in two laboratory reports: an initial report and a reanalysis report. The reanalysis only affects Appendix IV parameters, which are not required for the Mod 4-6 LF CCR Unit, but are required for other CCR Units at COL. The background well samples were reanalyzed for select metals because the original results were flagged for detections in the method blank sample and/or were not consistent with historical results. The reanalysis was completed within the method holding time, the metals were not detected in the method blank, and no other flags were applied to the results. Based on the quality control review, the reanalysis results were considered to be more accurate than the original analyses.

The November 2022 retesting for select parameters was performed in conjunction with additional sampling performed for the State monitoring program; therefore, the laboratory report for the retesting includes additional wells and parameters that are not relevant to the Federal CCR Rule sampling. Only the retest results performed for the CCR Rule sampling are included in **Table 5**.

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 were no transitions between monitoring programs during 2023. The COL Dry Ash Disposal Facility, Mod 4-6 remained in the detection monitoring program.

In 2023, the monitoring results for the October 2022 and April 2023 monitoring events were evaluated for statistically significant increases (SSIs) in detection monitoring parameters relative to background. The comparison to background was based on a prediction limit approach, comparing the results to intrawell UPLs.

The intrawell UPLs were calculated in January 2020 using background data collected through September 2018, prior to CCR placement in Mod 4. The January 2020 statistical analysis was included as an appendix in the 2021 Annual Groundwater Monitoring Report.

For the October 2022 event, SSIs for boron, calcium, and chloride were identified. For the April 2023 event, SSIs for boron and sulfate were identified.

Alternative source demonstrations (ASDs) were completed for the October 2022 and April 2023 events, demonstrating that sources other than the CCR unit were the likely cause of the observed concentrations of boron, calcium, chloride, and sulfate. The ASD reports are provided in **Appendix E**.

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 2023 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 was in detection monitoring throughout 2023.

Summary of Key Actions Completed.

- Statistical evaluation and determination of SSIs for the October 2022 and April 2023 monitoring events.
- ASD reports for the SSIs identified from the October 2022 and April 2023 monitoring events.
- Two semiannual groundwater sampling and analysis events (April and October 2023).
- Two resampling events at MW-309 in June and November 2023.

Description of Any Problems Encountered. No problems were encountered for Mod 4-6 in 2023.

Discussion of Actions to Resolve the Problems. Not applicable.

Projection of Key Activities for the Upcoming Year (2024).

- Statistical evaluation and determination of any SSIs for the October 2023 and April 2024 monitoring events, including any retesting events.
- If an SSI is determined, then within 90 days either:
  - Complete alternative source demonstration (if applicable), or
  - Establish an assessment monitoring program.
- Two semiannual groundwater sampling and analysis events (April and October 2024).

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. No alternative detection monitoring frequency has been proposed.

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.

The ASD reports prepared to address the SSIs observed for the October 2022 and April 2023 sampling events are provided in **Appendix E**. The ASD reports are certified by a qualified professional engineer.

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 not been initiated.

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).

Not applicable. Assessment monitoring has not been initiated.

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. Assessment monitoring has not been initiated.

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.

[This page left blank intentionally]

Tables

Table 1. Groundwater Monitoring Well Network
Columbia Energy Center - Dry Ash Disposal Facility - Modules 4-6
SCS Engineers Project #25223067.00

Monitoring Well	Location in Monitoring Network	Role in Monitoring Network
MW-84A	Upgradient	Background
MW-301	Upgradient	Background
MW-309	Downgradient	Compliance
MW-310	Downgradient	Compliance
MW-311	Downgradient	Compliance

Created by:	NLB	Date:	11/29/2023
Last revision by:	NLB	Date:	11/29/2023
Checked by:	BR	Date:	12/4/2023

Table 2. Groundwater Samples Summary
Columbia Energy Center - Dry Ash Disposal Facility - Modules 4-6
SCS Engineers Project #25223067.00

Sample Dates	Downgradient Wells			Background Wells	
	MW-309	MW-310	MW-311	MW-84A	MW-301
April 26-27, 2023	D	D	D	D	D
June 29, 2023	D-R	--	--	--	--
October 9-11, 2023	D	D	D	D	D
November 9, 2023	D-R	--	--	--	--
Total Samples	4	2	2	2	2

Abbreviations:
D = Detection Monitoring
D-R = Detection Monitoring Retest Sample
-- = Not Sampled

Created by:	NLB	Date:	12/4/2023
Last revision by:	NLB	Date:	12/4/2023
Checked by:	BR	Date:	12/4/2023

Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25223067.00

	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
Dry Ash Facility (Facility ID #03025)	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	778.12	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	aband	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	aband	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	aband	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
	February 20-23, 2023	aband	aband	NM	783.57	NM	784.48	NM	NM	NM	785.25	NM	NM	NM	NM	NM	NM	NM	NM	NM
	March 27-28, 2023	aband	aband	NM	784.52	NM	785.23	NM	NM	NM	786.21	NM	NM	NM	NM	NM	NM	NM	NM	NM
	April 24-27, 2023	aband	aband	787.76	785.79	785.35	786.22	786.12	784.99	786.05	786.97	786.86	786.67	786.76	786.59	787.53	787.11	785.87	785.85	785.55
	May 16, 2023	aband	aband	787.79	785.64	785.25	786.06	786.05	785.39	785.77	786.88	786.79	786.74	786.95	786.75	787.47	787.05	786.23	786.21	785.97
	May 30-31, 2023	aband	aband	NM	785.23	NM	785.70	NM	NM	NM	786.57	NM	NM	NM	NM	NM	NM	NM	NM	NM
	October 9-11, 2023	aband	aband	785.33	782.57	782.39	783.55	783.40	782.94	dry	784.39	784.31	784.24	784.63	784.36	784.89	784.36	783.86	783.59	783.69
	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

Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25223067.00

	Well Number	M-3	M-4R	MW-39A	MW-39B	MW-48A	MW-48B	MW-57	MW-59	MW-216R	MW-217	MW-220RR
	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
	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
	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
	October 8, 2013	781.22	786.67	NM	NM	783.69	783.58	NM	NM	783.39	782.27	782.36
	October 15, 2013	NM	NM	782.94	782.81	NM	NM	782.47	783.49	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
	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
	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
	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
	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
	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
	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
	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
	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
	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
	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
	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
	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
	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 #25223067.00

	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	MW-312	MW-313	MW-314	MW-315	MW-316
	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	826.786	820.3	821.57	819.78	808.49
	Screen Length (ft)	10	10	10	10	10	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	52.5				43.7
	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	784.29				774.79
	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	NI	NI	NI	NI	NI
	April 4-5, 2016	786.78	785.81	785.48	788.08	789.61	789.09	785.29	785.63	786.37	--	--	--	--	--	--	NI	NI	NI	NI	NI
	July 7-8, 2016	786.31	786.28	784.60	787.36	789.26	787.43	785.19	785.05	785.89	--	--	--	--	--	--	NI	NI	NI	NI	NI
	July 28, 2016	NM	NM	784.35	NM	NM	NM	NM	784.86	785.61	--	--	--	--	--	--	NI	NI	NI	NI	NI
	October 11-13, 2016	787.64	787.76	786.18	788.18	789.78	787.88	787.36	786.45	787.22	--	--	--	--	--	--	NI	NI	NI	NI	NI
	December 29, 2016	787.37	787.05	NM	NM	NM	NM	785.66	785.72	786.63	--	--	--	--	--	--	NI	NI	NI	NI	NI
	January 25-26, 2017	787.27	786.89	785.28	789.34	789.36	789.64	785.88	785.98	786.70	785.50	785.36	785.73	--	--	--	NI	NI	NI	NI	NI
	April 10 & 11, 2017	787.89	787.55	786.00	788.22	789.57	787.95	786.39	786.30	787.16	786.22	785.64	786.51	--	--	--	NI	NI	NI	NI	NI
	June 6, 2017	788.25	788.37	786.49	788.58	789.79	787.83	787.27	786.66	787.63	786.85	786.07	786.46	--	--	--	NI	NI	NI	NI	NI
	August 7-9, 2017	787.34	787.55	785.42	789.52	789.30	788.54	786.11	785.81	786.68	785.69	785.19	785.37	--	--	--	NI	NI	NI	NI	NI
	October 23-24, 2017	785.89	785.94	783.92	788.97	788.14	788.00	784.13	784.50	785.32	783.97	784.79	784.17	--	--	--	NI	NI	NI	NI	NI
	February 21, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.19	783.05	783.02	NI	NI	NI	NI	NI
	March 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.10	783.10	783.00	NI	NI	NI	NI	NI
	April 23-25, 2018	785.29	784.37	783.27	789.69	787.67	790.43	783.09	781.77	785.88	783.24	783.65	782.65	783.07	782.97	781.83	NI	NI	NI	NI	NI
	May 24, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.79	785.09	NM	785.45	785.97	786.11	NI	NI	NI	NI	NI
	June 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.03	786.64	786.47	NI	NI	NI	NI	NI
	July 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.27	786.35	786.55	NI	NI	NI	NI	NI
	August 7, 2018	787.06	NM	785.20	788.25	788.56	787.63	NM	NM	786.55	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	August 22, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.54	785.40	785.46	NI	NI	NI	NI	NI
	September 21, 2018	NM	788.37	786.50	NM	NM	NM	787.90	787.01	NM	NM	NM	NM	787.08	787.24	787.66	NI	NI	NI	NI	NI
	October 22-24, 2018	788.98	789.16	787.51	789.05	790.04	788.47	788.77	787.88	788.32	787.66	786.57	787.81	787.99	788.18	788.64	NI	NI	NI	NI	NI
	April 1-4, 2019	787.04	787.56	786.52	789.72	790.07	789.44	786.63	786.82	787.35	786.72	786.71	787.53	786.30	786.38	786.38	NI	NI	NI	NI	NI
	June 12, 2019	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	787.25	NM	NI	NI	NI	NI	NI
	June 19, 2019	NM	NM	786.81	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	October 7-9, 2019	788.47	788.31	787.02	790.41	790.36	790.65	NM	NM	NM	787.47	786.99	787.18	787.26	787.94	787.64	NI	NI	NI	NI	NI
	December 13, 2019	--	--	--	--	--	--	--	--	--	787.03	785.68	786.43	--	--	--	NI	NI	NI	NI	NI
CCR Rule Wells (cont.)	December 23, 2019	--	--	--	--	--	--	--	--	--	--	--	--	--	775.22	--	NI	NI	NI	NI	NI
	January 17, 2020	--	--	785.58	--	--	--	--	--	--	--	--	--	--	--	--	NI	NI	NI	NI	NI
	February 3, 2020	787.24	NM	NM	NM	NM	NM	NM	NM	786.50	785.77	785.57	786.48	NM	NM	NM	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	NI	NI	NI	NI	NI
	June 30, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.18	NM	NM	NI	NI	NI	NI	NI
	August 6, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.93	NM	NM	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	December 11, 2020	NM	NM	NM	NM	788.19	NM	NM	NM	NM	NM	NM	NM	785.26	785.26	NM	NI	NI	NI	NI	NI
	February 25, 2021	NM	NM	784.27	NM	788.36	NM	NM	784.75	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	June 11, 2021	NM	NM	NM	NM	NM	NM	784.19	784.66	NM	NM	NM	NM	784.20	784.05	NM	NI	NI	NI	NI	NI
	July 20, 2021	NM	NM	783.64	NM	788.39	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	December 21, 2021	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	782.93	NM	NM	NI	NI	NI	NI	NI
	February 24, 2022	NM	NM	782.34	NM	786.49	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	July 27, 2022	NM	NM	783.07	NM	787.03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	November 30, 2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	781.62	781.14	781.15	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	January 12-13, 2023	785.20	784.55	NM	NM	NM	NM	782.75	784.10	784.88	NM	NM	NM	782.57	782.45	782.32	NI	NI	NI	NI	NI
	January 20, 2023	NM	NM	NM	788.08	NM	NM	NM	NM	NM	782.15	782.11	784.98	NM	NM	NM	NM	NM	NM	NM	NI
	January 24, 2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.73	783.36	783.63	783.77	NI
	February 20-23, 2023	785.56	784.98	NM	NM	NM	NM	NM	NM	NM	783.04	782.91	785.32	783.31	783.34	783.40	783.50	783.59	783.82	783.96	NI
	March 27-28, 2023	786.83	785.87	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.84	783.98	784.43	NM	784.12	784.41	784.57	NI
	April 24-27, 2023	787.57	786.87	784.38	784.03	NM	782.59	785.79	786.22	786.97	784.82	784.25	787.75	785.05	785.18	785.69	NM	785.21	785.43	785.59	NI
	May 5, 2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.55	NM	NM	NM	780.49
	May 16, 2023	787.43	787.07	783.88	784.12	dry	781.64	785.64	786.06	786.88	784.65	783.89	786.88	785.15	785.11	785.39	785.97	785.46	785.68	785.88	780.48
	May 30-31, 2023	787.04	786.89	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	784.90	784.69	784.97	NM	785.24	785.55	785.77	NM
	June 29-30, 2023	786.32	786.39	NM	NM	NM	NM	784.32	785.04	785.92	NM	NM	NM	784.12	783.84	783.97	NM	784.67	784.95	785.17	NM
	July 31, 2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.96	784.26	784.49	NM
	August 31, 2023	NM	785.30	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	782.47	NM	NM	783.55	783.83	783.97	NM
	October 9-11, 2023	784.67	784.65	781.21	780.09	779.93	780.54	782.57	783.55	784.39	NM	NM	783.09	782.58	782.32	782.22	783.69	783.10	783.33	783.59	780.30
	November 9, 2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	782.76	NM	NM	NM	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	774.29	820.30	821.57	819.78	764.79

Created by: MDB Date: 5/6/2013
Last revision by: NLB Date: 11/29/2023
Checked by: EMS Date: 11/29/2023
Proj Mgr QA/QC: TK Date: 11/11/2023

Notes:
NM = not measured
(1) The depth to water at MW-84A was not measured prior to purging for sampling during the October 3-5, 2017 sampling event.
The level was allowed to return to static and was measured on October 10, 2017.
(2) 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'.

Table 4. Horizontal Gradients and Flow Velocity
Columbia Energy Center - Dry Ash Disposal Facility - Modules 4-6
SCS Engineers Project #25223067.00
January - December 2023

	Flow Path A - North				
Sampling Dates	**h1 (ft)**	**h2 (ft)**	**Δl (ft)**	**Δh/Δl (ft/ft)**	**V (ft/d)**
4/24-27/2023	786.00	785.05	929	0.0010	0.002

	Flow Path A - Northwest				
Sampling Dates	**h1 (ft)**	**h2 (ft)**	**Δl (ft)**	**Δh/Δl (ft/ft)**	**V (ft/d)**
10/9-11/2023	784.00	782.58	1235	0.0011	0.002

Wells	**K Values (cm/sec)**	**K Values (ft/d)**
MW-309	2.12E-04	0.60
MW-310	1.91E-04	0.54
MW-311	6.12E-04	1.73
Geometric Mean	2.92E-04	0.83

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

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

Created by: NDK Date: 8/2/2022
Last revision by: RM Date: 1/2/2024
Checked by: NLB Date: 1/2/2024

Table 5. Groundwater Analytical Results Summary
Columbia Dry Ash Disposal Facility - MOD 4-6 LF / SCS Engineers Project #25223067.00

Parameter Name	Background Wells				Compliance Wells												
	MW-84A		MW-301		MW-309					MW-310				MW-311			
	10/27/2022	4/27/2023	10/27/2022	4/27/2023	Intrawell UPL	10/26/2022	11/30/2022	4/26/2023	6/29/2023	Intrawell UPL	10/26/2022	11/30/2022	4/26/2023	Intrawell UPL	10/27/2022	4/26/2023	
Groundwater Elevation (ft above msl)	784.57	786.97	784.91	787.57		781.50	781.62	785.05	784.12		780.96	781.14	785.18		781.23	785.69	
Appendix III																	
Boron, µg/L	12.2	10.3	37.5	20.1	42.2	46.6	49.3	50.8	59.4	81.9	71.3	--	57.5	49.8	34.2	23.0	
Calcium, µg/L	78,400	68,600	628,000 P6	120,000	99,900	162,000	153000	35,500	--	56,000	68,900	55,500	36,800	84,200	66,300	52,800	
Chloride, mg/L	3.4	3.0	2.3	1.5 J	901	796	--	372	--	205	323	215	128	4.41	1.2 J	2.1	
Fluoride, mg/L	<0.095	<0.095	<0.095	<0.095	DQ	<0.095	--	<0.095	--	DQ	<0.095	--	<0.095	DQ	<0.095	<0.095	
Field pH, Std. Units	7.31	7.01	6.80	6.65	8.18	7.23	--	7.61	7.72	8.12	7.61	--	7.27	8.07	7.50	7.48	
Sulfate, mg/L	1.1 J	1.3 J	11.6	12.3	53.1	28.9	--	143	147	118	32.8	--	102	131	15.5	22.2	
Total Dissolved Solids, mg/L	302	326	282	526	1,730	1670	--	1,250	--	759	750	--	654	462	268	292	

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

Abbreviations:
mg/L = milligrams per liter
µg/L = micrograms per liter
SSI = Statistically Significant Increase
LOD = Limit of Detection
DQ= Double Quantification
LOQ = Limit of Quantitation

Lab Notes:
J = Estimated concentration at or above the LOD and below the LOQ.
P6 = Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

Note:
1. Intrawell UPLs based on 1-of-2 retesting approach; therefore, there is no SSI unless the original sample result and a retest result are above the UPL.
2. Intrawell UPL for fluoride is based on the double quantification rule, because fluoride was not detected above the LOQ in the background samples.

Created by: NDK Date: 9/19/2022
Last revision by: BR Date: 8/4/2023
Checked by: RM Date: 12/12/2023
Scientist/PM QA/QC: TK Date: 1/1/2024

I:\25223067.00\Deliverables\2023 - Fed CCR Annual Report - COL Mod 4-6\Tables\[Table 5 - MOD 4-6LF Annual Analytical Results Summary.xlsx]Table 5 - Analytical

Table 6. Groundwater Field Data Summary

Columbia Energy Center - Dry Ash Disposal Facility - Modules 4-6 / SCS Engineers Project #25223067.00

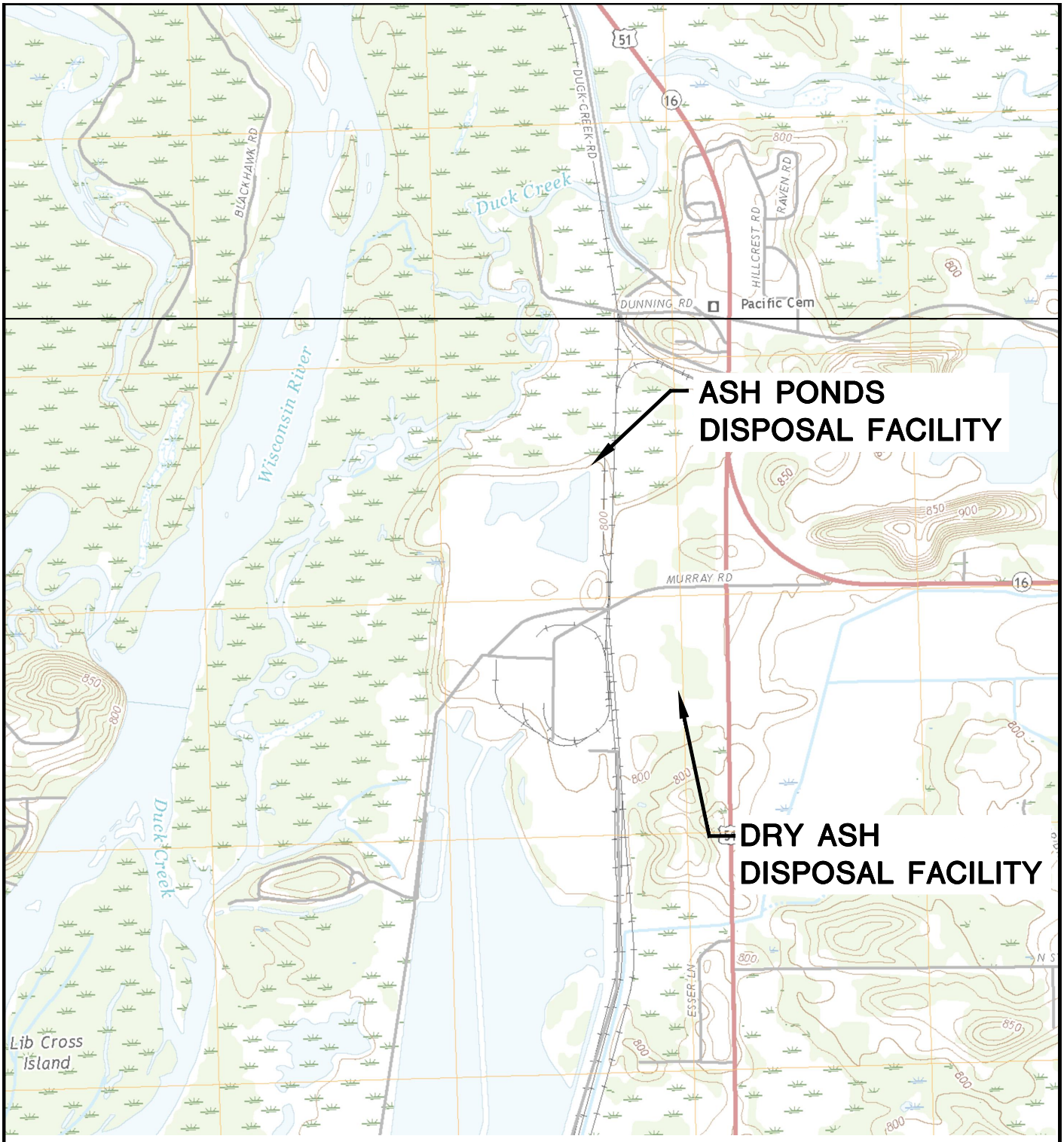
Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Oxygen, Dissolved (mg/L)	Field Specific Conductance (umhos/cm)	Field Oxidation Potential (mV)	Turbidity (NTU)
MW-84A	10/27/2022	784.57	11.7	7.31	8.31	585	40	0.00
	4/27/2023	786.97	10.7	7.01	9.37	557	103	0.72
MW-301	10/27/2022	784.91	10.8	6.80	0.10	508	81	0.00
	4/27/2023	787.57	8.0	6.65	6.50	857	95	0.00
MW-309	10/26/2022	781.50	12.9	7.23	8.49	2591	41	1.81
	11/30/2023	781.62	7.7	7.30	8.97	2746	156	0.31
	4/26/2023	785.05	10.8	7.61	10.96	2073	107	1.90
	6/29/2023	784.12	13.9	7.72	9.22	3282	217	0.00
MW-310	10/26/2022	780.96	13.0	7.61	8.66	1404	31	1.58
	11/30/2023	781.14	10.8	7.67	9.46	1200	147	0.51
	4/26/2023	785.18	10.8	7.27	11.38	1040	113	2.25
MW-311	10/27/2022	781.23	11.9	7.50	8.92	487	35	0.00
	4/26/2023	785.69	9.8	7.48	10.58	485	118	0.39

Created by: DK Date: 9/2/2022

Last revision by: NLB Date: 8/1/2023

Checked by: BLR Date: 8/2/2023

Figures

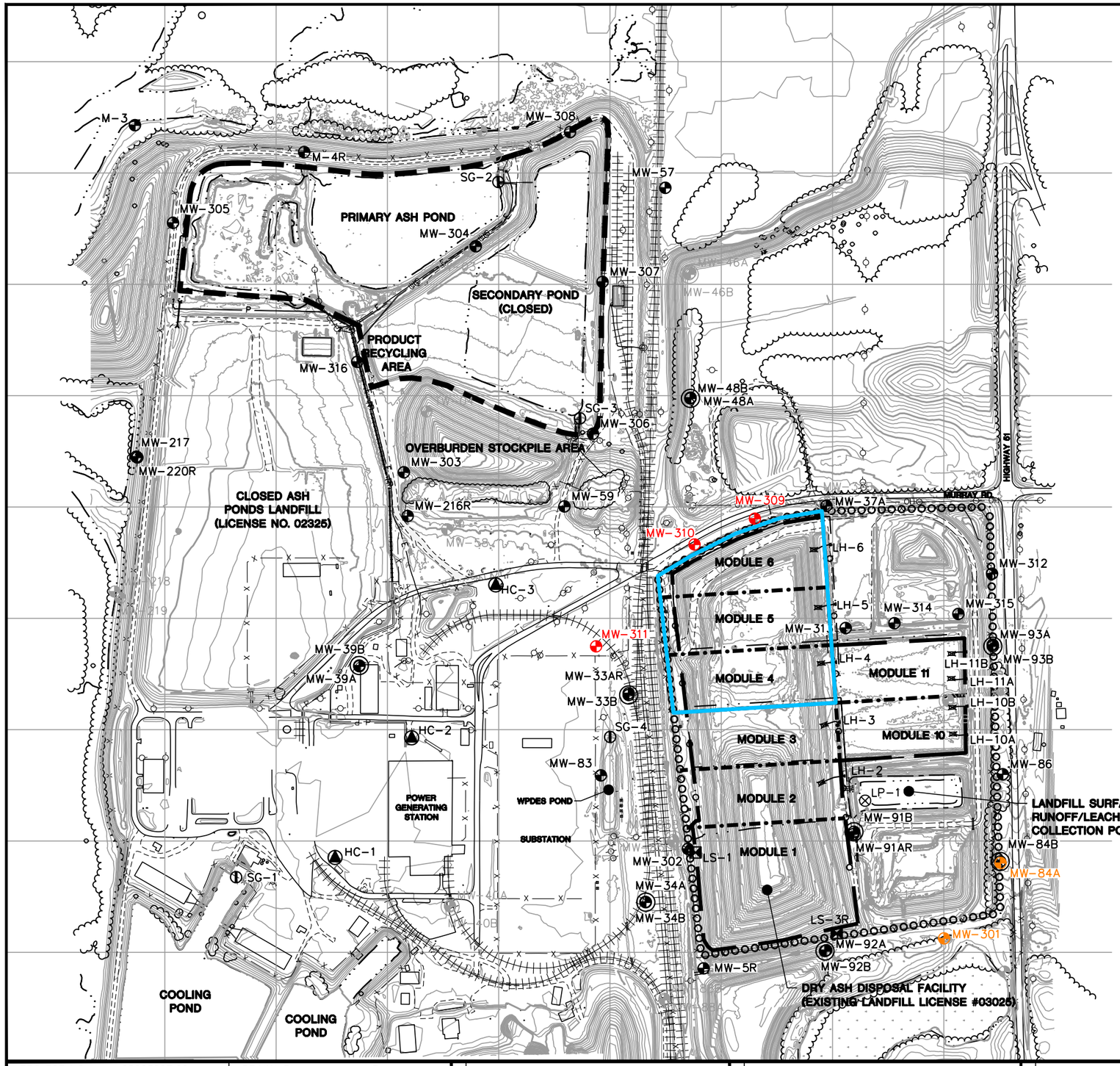


N

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 SURVEYS BY SCS ENGINEERS IN MAY 2019, DECEMBER 2020, NOVEMBER 2021, AND DECEMBER 2021, AND BY DRONE SURVEY BY AMES IN NOVEMBER 2022.
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. MONITORING WELL MW-316 WAS INSTALLED BY HORIZON CONSTRUCTION & EXPLORATION ON APRIL 27, 2023.
9. BACKGROUND MONITORING WELLS FOR THE MODULES 4-6 DRY ASH DISPOSAL FACILITY ARE: MW-301 AND MW-84A.

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25223067.00	DRAWN BY:	KP
DRAWN:	12/02/2019	CHECKED BY:	RM
REVISED:	01/09/2024	APPROVED BY:	TK 1/10/2024

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

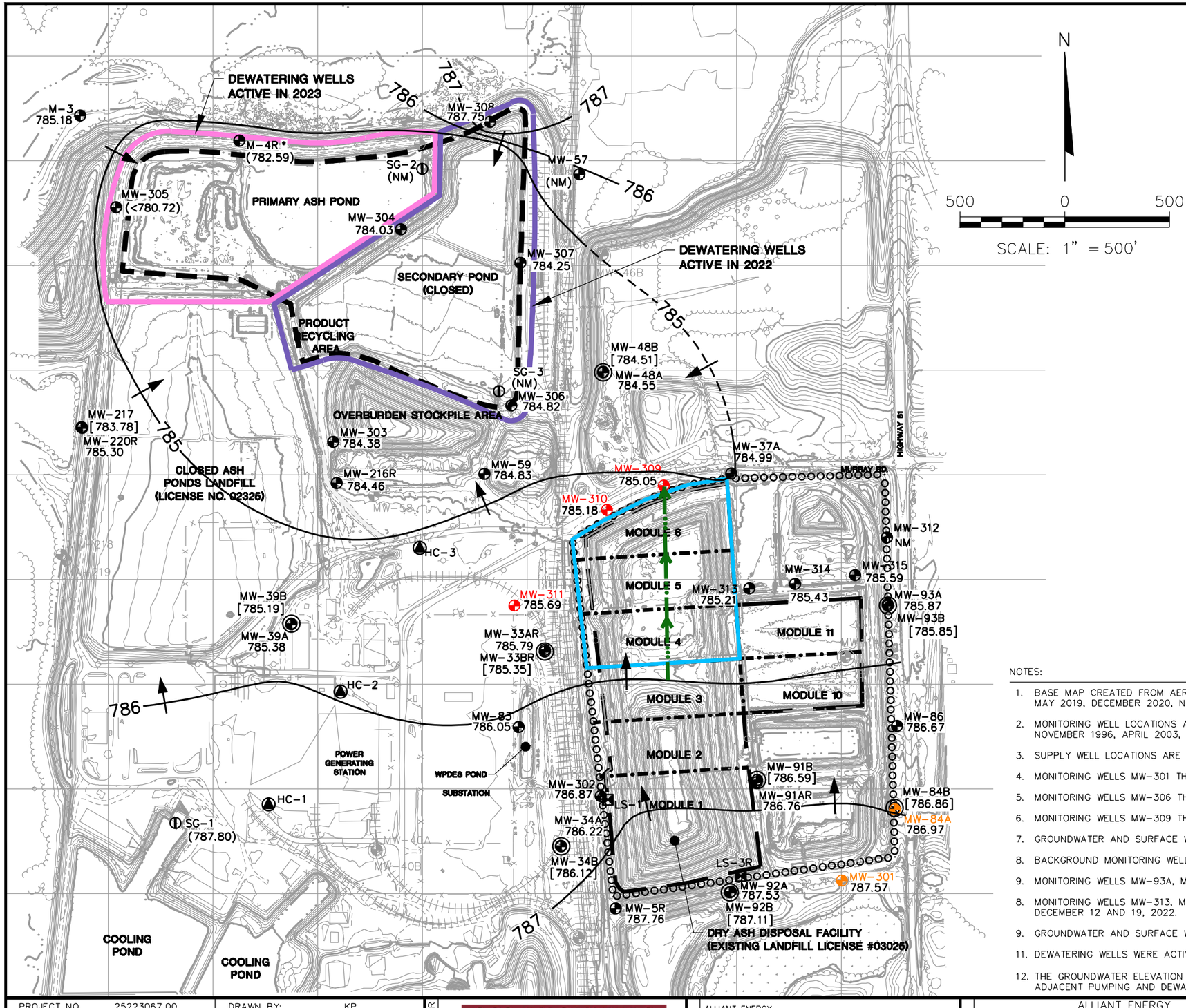
CLIENT: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WI 53954

SITE: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
MODULES 4-6 DRY ASH DISPOSAL FACILITY
PARDEEVILLE, WI

SITE PLAN AND MONITORING
WELL LOCATIONS

FIGURE
2

I:\25223067.00\Drawings\Module 4\Site Plan and Monitoring Well Locations.dwg, 1/9/2024 10:38:34 AM



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
- LYSIMETER
- ABANDONED WATER TABLE WELL
- ABANDONED PIEZOMETER
- 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
- PRIMARY POND DEWATERING WELLS ACTIVE IN 2023
- SECONDARY POND DEWATERING WELLS ACTIVE IN 2022

NOTES:

1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014, AND GROUND SURVEYS BY SCS ENGINEERS IN MAY 2019, DECEMBER 2020, NOVEMBER 2021, AND DECEMBER 2021, AND BY DRONE SURVEY BY AMES IN NOVEMBER 2022.
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 MODULE 4-6 DRY ASH FACILITY ARE: MW-301 AND MW-84A.
9. MONITORING WELLS MW-93A, MW-93B, AND MW-312 INSTALLED BY CASCADE ENVIRONMENTAL ON MARCH 25-28, 2022.
8. MONITORING WELLS MW-313, MW-314, AND MW-315 WERE INSTALLED BY HORIZON CONSTRUCTION & EXPLORATION ON DECEMBER 12 AND 19, 2022.
9. GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED ON APRIL 24-27, 2023.
11. DEWATERING WELLS WERE ACTIVE AROUND THE PRIMARY POND DURING THE APRIL 2023 SAMPLING EVENT.
12. THE GROUNDWATER ELEVATION FOR M-4R (*) WAS NOT USED FOR CONTOURING OF THE WATER TABLE (SHALLOW) DUE TO ADJACENT PUMPING AND DEWATERING ACTIVITIES.

PROJECT NO.	25223067.00	DRAWN BY:	KP
DRAWN:	10/12/2023	CHECKED BY:	NLB
REVISED:	01/22/2024	APPROVED BY:	TK 1/29/2024

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

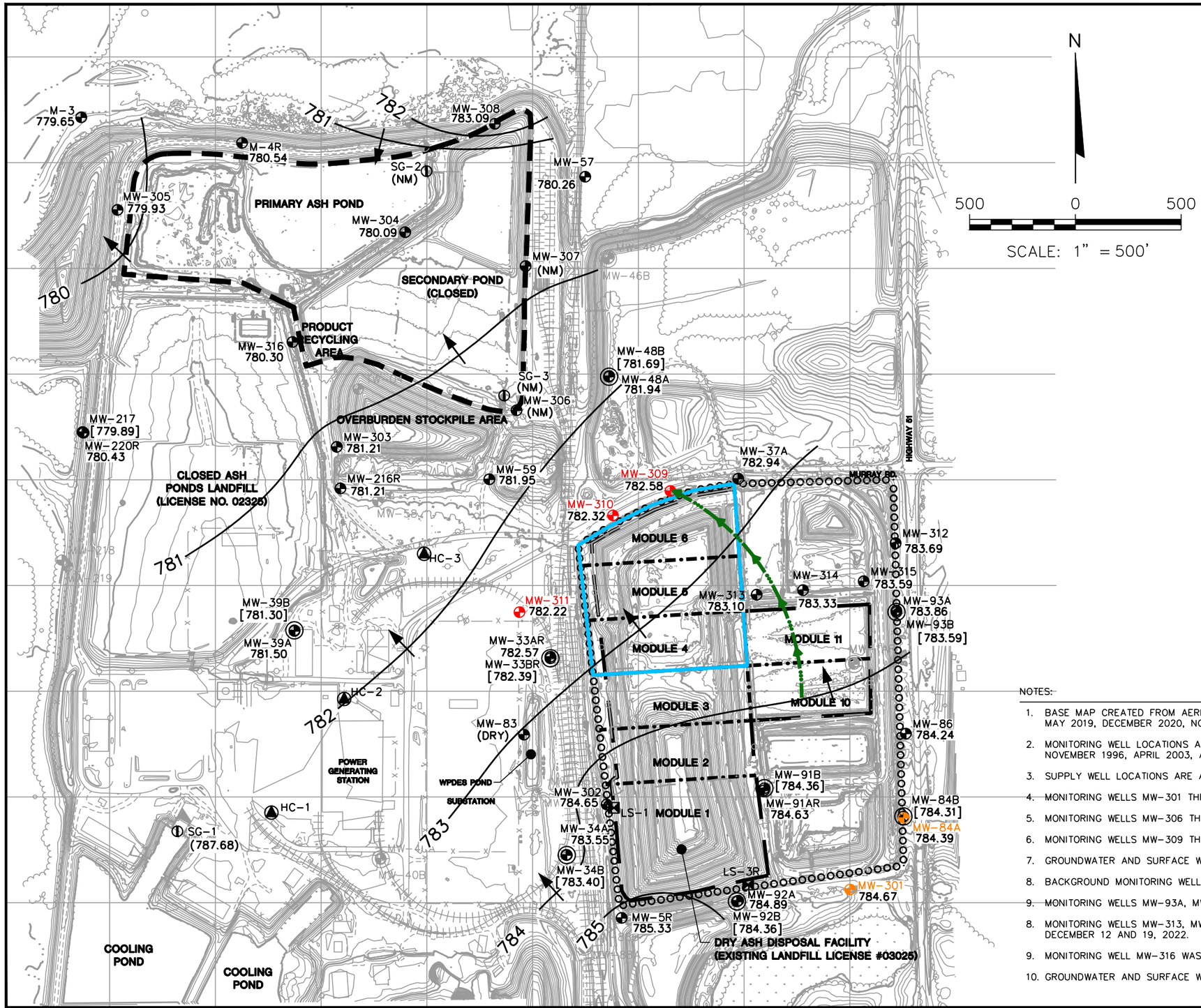
CLIENT: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WI 53954

SITE: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
MODULES 4-6 DRY ASH DISPOSAL FACILITY
PARDEEVILLE, WI

WATER TABLE MAP
APRIL 2023

FIGURE
3

I:\25223067.00\Drawings\Module 4\Water Table Map-April 2023.dwg, 1/22/2024 9:41:17 AM



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
- LYSIMETER
- ABANDONED WATER TABLE WELL
- ABANDONED PIEZOMETER
- 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 SURVEYS BY SCS ENGINEERS IN MAY 2019, DECEMBER 2020, NOVEMBER 2021, AND DECEMBER 2021, AND BY DRONE SURVEY BY AMES IN NOVEMBER 2022.
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 MODULE 4-6 DRY ASH FACILITY ARE: MW-301 AND MW-84A.
9. MONITORING WELLS MW-93A, MW-93B, AND MW-312 INSTALLED BY CASCADE ENVIRONMENTAL ON MARCH 25-28, 2022.
8. MONITORING WELLS MW-313, MW-314, AND MW-315 WERE INSTALLED BY HORIZON CONSTRUCTION & EXPLORATION ON DECEMBER 12 AND 19, 2022.
9. MONITORING WELL MW-316 WAS INSTALLED BY HORIZON CONSTRUCTION & EXPLORATION ON APRIL 27, 2023.
10. GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED OCTOBER 2023.

PROJECT NO.	25223067.00	DRAWN BY:	KP
DRAWN:	11/13/2023	CHECKED BY:	NLB
REVISED:	01/09/2024	APPROVED BY:	TK 1/10/2024

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
MODULES 4-6 DRY ASH DISPOSAL FACILITY
PARDEEVILLE, WI

WATER TABLE MAP
OCTOBER 2023

FIGURE
4

I:\25223067.00\Drawings\Module 4\Water Table Map-October 2023.dwg, 1/9/2024 10:43:27 AM

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

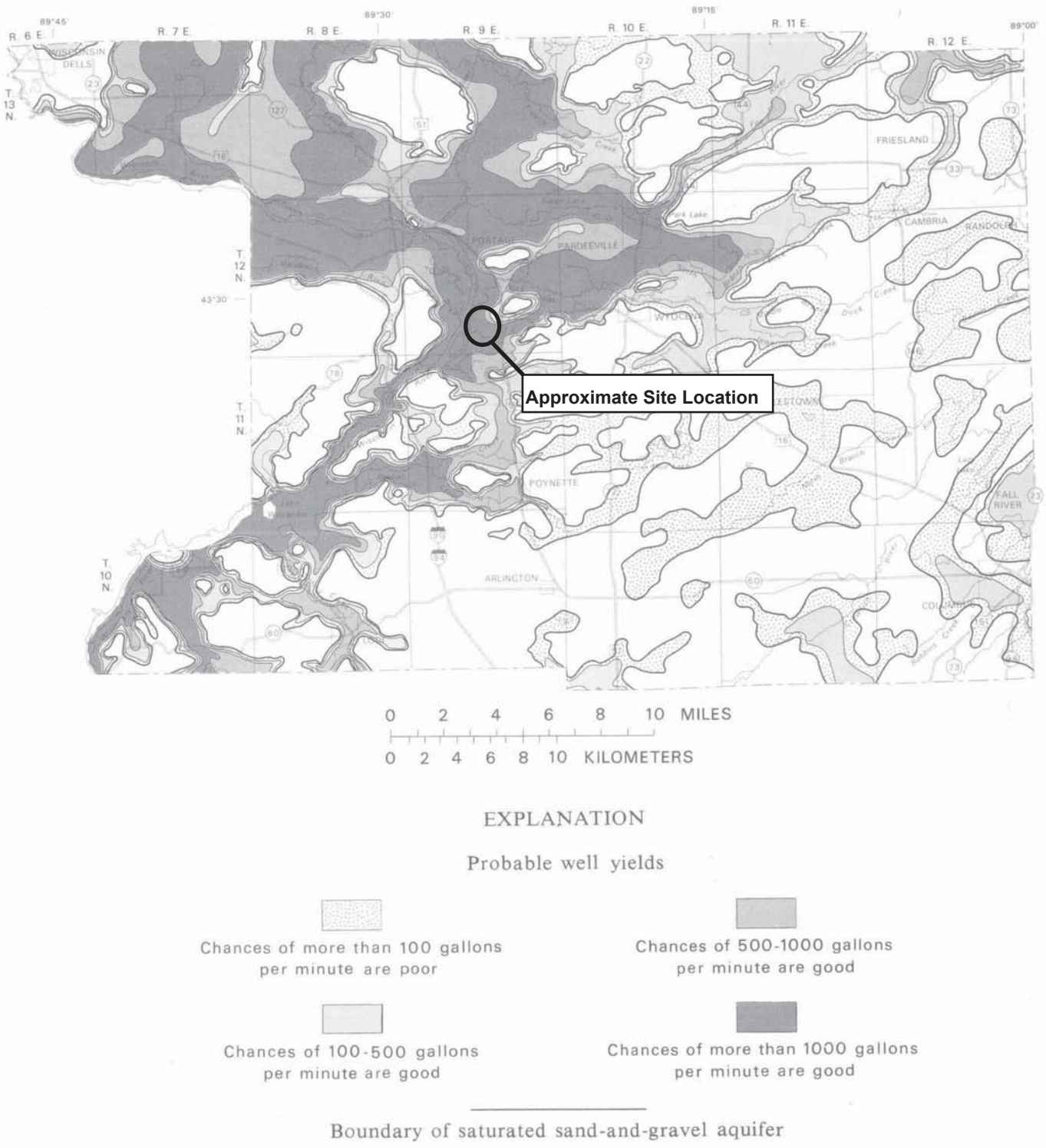
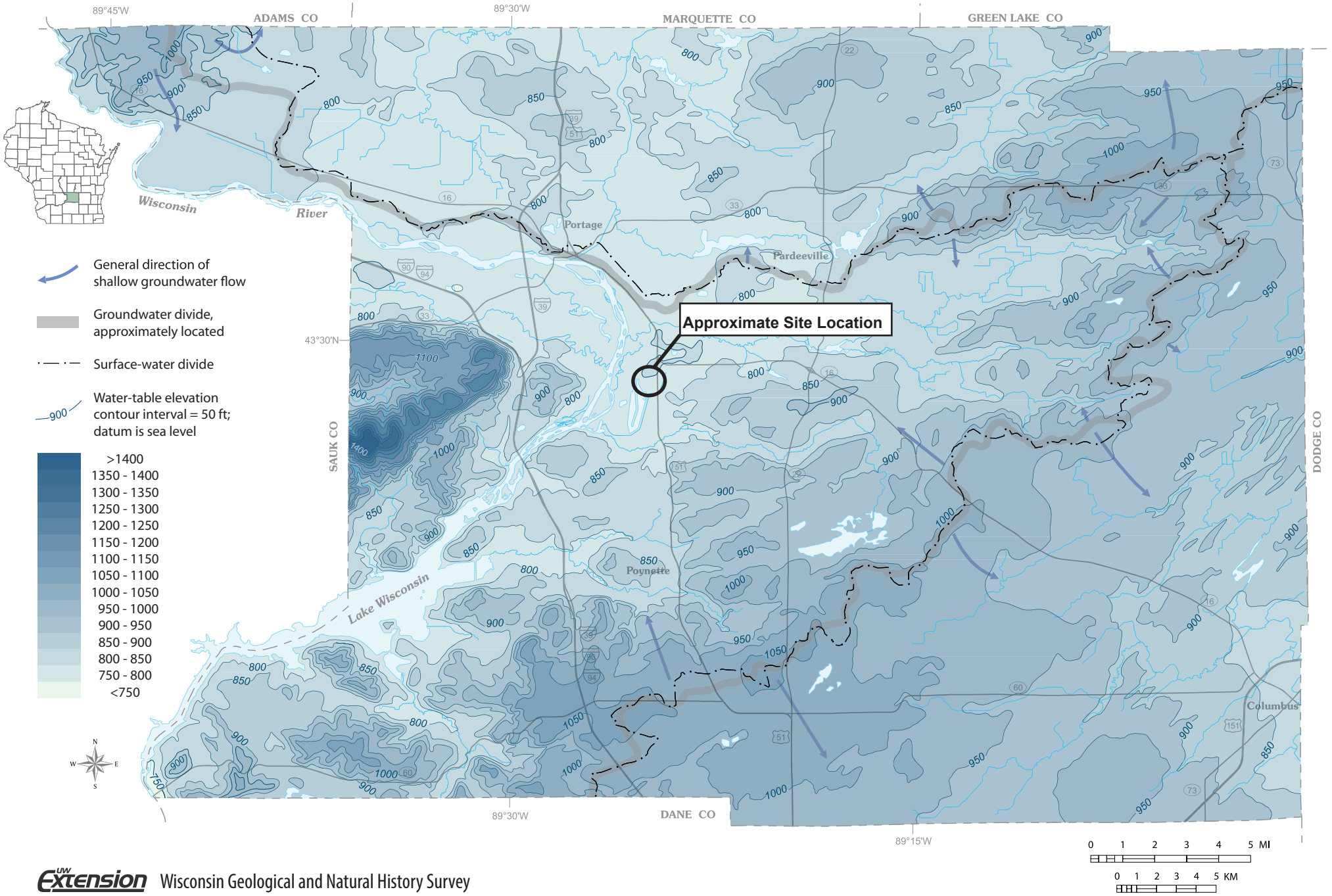


Figure 9. Probably well yields from the sand-and-gravel aquifer.

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



Wisconsin Geological and Natural History Survey

02/26/2024 Classification: Internal FOIA 3238674

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

Appendix B

Boring Logs and Well Construction Documentation

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'

WELL DETAIL INFORMATION SHEET

JOB NO. C 7134

BORING NO. MW-84A

DATE 10/5/83

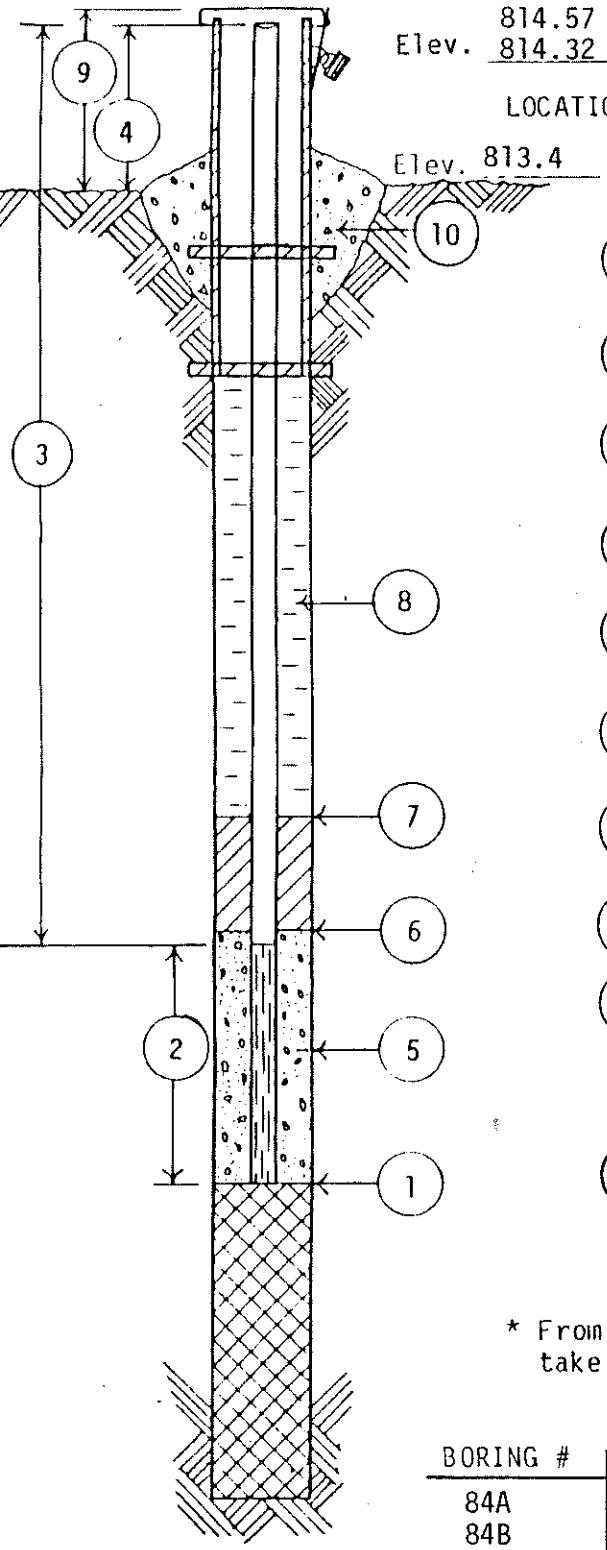
Elev. 814.57 Steel
814.32 PVC

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.

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 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	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	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 - Alliant Columbia Generating Station SCS#: 25217156.01		MW-309

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mark Crampton Badger State Drilling, Co.	2/13/2018	2/14/2018	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VR111		MW-309	26.7 Feet MSL	809.88 Feet MSL	8.5 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 543,448 N, 2,124,151 E S/C/N
NW 1/4 of SE 1/4 of Section 27, T 12 N, R 9 E
Lat ° ' "
Long ° ' "
Local Grid Location Feet ☐ N ☐ S Feet ☐ E ☐ W

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

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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1–8	Hydrovaced boring to 8.5 below ground surface; open hole.										
S1	20	11 14 18	9–10	POORLY GRADED SAND, fine to coarse, yellow, (10YR 7/6), rounded grains.					N/A	M				
S2	20	12 15 20 28	11–12	Same but with trace gravel.	SP				N/A	M				
S3	24	16 20 26	13–15	Same as above but with no gravel.					N/A	M				

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

Signature

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

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be 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-309 Use only as an attachment to Form 4400-122.

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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			16	POORLY GRADED SAND, fine to coarse, yellow, (10YR 7/6), rounded grains, trace silt.										
S4	22	11 17 32 41	17						N/A	M				
			18											
			19											
S5		22 29 36	20						N/A	M				
			21											
S6	24	18 20 28 36	22						N/A	M				
			23											
			24											
S7		18 24 32	25						N/A	M				
			26		SP									
S8	22	14 18 30 40	27						N/A	W				Depth to water at ~ 26 feet.
			28											
			29											
S9	22	22 32 34	30						N/A	W				
			31											
			32											
			33											
			34											
			35											
			36											
				End of Boring at 36.5 feet 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 - Alliant Columbia Generating Station SCS#: 25217156.01		MW-310

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Dave Cruise Badger State Drilling, Co.	2/13/2018	2/13/2018	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VR110		MW-310	27.9 Feet MSL	810.96 Feet MSL	8.5 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 543,332 N, 2,123,880 E S/C/N
NW 1/4 of SE 1/4 of Section 27, T 12 N, R 9 E
Lat ° ' "
Long ° ' "
Local Grid Location Feet ☐ N ☐ S Feet ☐ E ☐ W

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

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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1	Hydrovaced boring to 8 feet below ground surface; open hole.										
			2											
			3											
			4											
			5											
			6											
			7											
			8											
S1	18	4 6 8 8	9	POORLY GRADED SAND AND GRAVEL, fine to medium sand, coarse gravel, brownish yellow, (10YR 6/6), angular gravel, round sand.	SP				N/A	M				
			10											
			11	Same as above but trace gravel.										
S2	24	18 27 38 40	12						N/A	M				
			13											
			14											
S3	24	26 32 40 38	15						N/A	M				

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

Signature

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

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be 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-310 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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			16	POORLY GRADED SAND AND GRAVEL, fine to medium sand, coarse gravel, brownish yellow, (10YR 6/6), angular gravel, round sand.										
S4	10	25 50/5	17						N/A	M				Tough drilling.
			18											
			19											
S5	24	38 60 50/4	20						N/A	M				
			21											
S6	12	38 50/5	22						N/A	M				
			23											
			24											
S7	24	32 46 50/4	25						N/A	M				
			26		SP									
S8	16	25 40 50/5	27						N/A	W				Depth to water at ~26 feet.
			28											
			29											
S9		32 25 50/5	30						N/A	W				
			31											
			32											
			33											
			34											
			35											
			36											
				End of Boring at 36.5 feet 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 - Alliant Columbia Generating Station SCS#: 25217156.01		MW-311

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mark Crampton Badger State Drilling, Co.	2/14/2018	2/14/2018	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VR112		MW-311	23.5 Feet MSL	806.53 Feet MSL	8.5 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 542,874 N, 2,123,437 E S/C/N
NE 1/4 of SW 1/4 of Section 27, T 12 N, R 9 E
Lat ___ ° ___ ' ___ "
Long ___ ° ___ ' ___ "
Local Grid Location: Feet ☐ N ☐ S Feet ☐ E ☐ W

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

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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1–8	Hydrovaced boring to 8 feet below ground surface; open hole.										
S1	24	12 16 20 24	9–10	POORLY GRADED SAND AND GRAVEL, fine to coarse sand, coarse gravel, yellow, (10YR 7/6), rounded sand, angular gravel.					N/A	M				
S2	24	17 27 30 38	11–12	Same as above but with trace silt.	SP				N/A	M				
S3	24	18 26 31	13–15						N/A	M				

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

Signature	Firm	Tel: (608) 224-2830
	SCS Engineers 2830 Dairy Drive Madison, WI 53711	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-311 Use only as an attachment to Form 4400-122.

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: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			16	POORLY GRADED SAND AND GRAVEL, fine to coarse sand, coarse gravel, yellow, (10YR 7/6), rounded sand, angular gravel, trace silt.										
S4	24	18 30 40 50/5	17						N/A	M				
			18											
S5	24	30 40 45	19						N/A	M				
			20											
			21											
S6	8	45 34 50/3	22						N/A	M+/W				
			23											
			24		SP									
S7	18	46 50/5	25						N/A	W				Depth to water at ~25 feet.
			26											
S8	20	46 54 54 50/4	27						N/A	W				
			28											
			29											
S9	24	25 38 50/5	30	Same as above but with thin silt seams.					N/A	W				
			31											
			32											
			33	End of Boring at 33 feet 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 ☐ ___

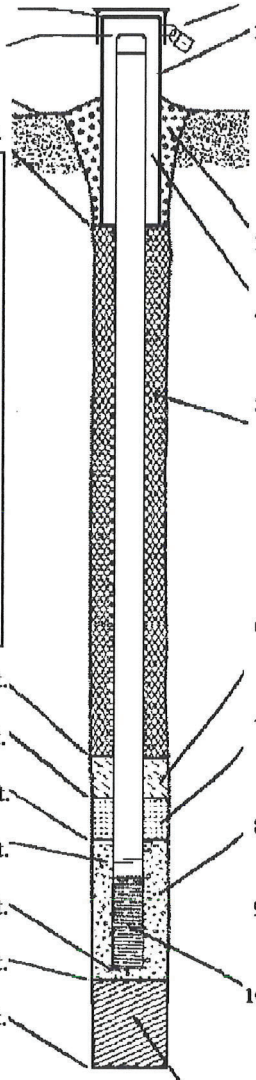
15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☒ 99

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 # 25217156.01

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 Generating Station	**Local Grid Location of Well** ☒ N. ☐ S. 543447.673 ft. ☒ E. ☐ W. 2124151.113 ft.	**Well Name** MW-309
Facility License, Permit or Monitoring No.	**Local Grid Origin** ☐ (estimated: ☐) or **Well Location** ☐ Lat. ° ' " Long. ° ' " or	**Wis. Unique Well No.** VR111
Facility ID	St. Plane ft. N, ft. E. S/C/N	**DNR Well ID No.**
Type of Well Well Code 11 / MW	**Section Location of Waste/Source** NW 1/4 of SE 1/4 of Sec. 27, T. 12 N, R. 09 ☒ E ☐ W	**Date Well Installed** 02 / 14 / 2018 (m m d d y y y y)
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
		Well Installed By: Name (first, last) and Firm Mark Crampton Badger State Drilling Co., Inc.

A. Protective pipe, top elevation 813.59 ft. MSL
B. Well casing, top elevation 813.28 ft. MSL
C. Land surface elevation 809.88 ft. MSL
D. Surface seal, bottom 807.61 ft. MSL or 2.27 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 ☐

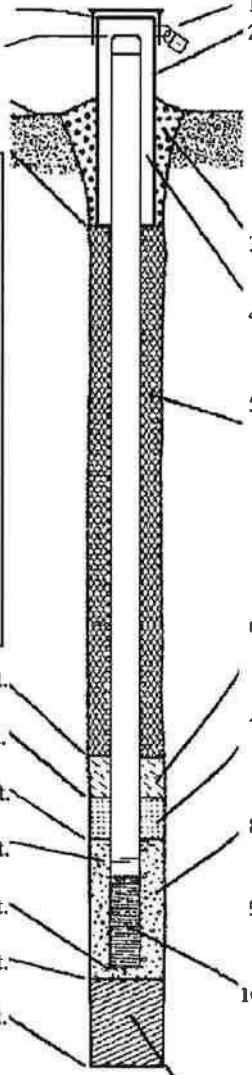
15. Drilling fluid used: Water ☐ 02 Air ☐ 01
Drilling Mud ☐ 03 None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe --

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

E. Bentonite seal, top 807.61 ft. MSL or 2.27 ft.
F. Fine sand, top 788.61 ft. MSL or 21.27 ft.
G. Filter pack, top 786.61 ft. MSL or 23.27 ft.
H. Screen joint, top 785.61 ft. MSL or 24.27 ft.
I. Well bottom 775.61 ft. MSL or 34.27 ft.
J. Filter pack, bottom 773.38 ft. MSL or 36.5 ft.
K. Borehole, bottom 773.38 ft. MSL or 36.5 ft.
L. Borehole, diameter 8.5 in.
M. O.D. well casing 2.38 in.
N. I.D. well casing 2.01 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:
3. Surface seal: Bentonite ☒ 30 Concrete ☐ 01 Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ 30
Filter Sand (#5) 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. 0.342 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. Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. RW Sidley #7 (1 bag) ☒
b. Volume added ft^3
8. Filter pack material: Manufacturer, product name & mesh size
a. RW Sidley #5 (6 bags) ☒
b. Volume added 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 Monoflex
c. Slot size: 0.010 in.
d. Slotted length: 10 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: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

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

SCS # 25217156.01

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 Generating Station	Local Grid Location of Well: ☒ N. ☐ S. 543331.971 ft. ☒ E. ☐ W. 2123879.85 ft.	Well Name: MW-310
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☐ Lat. ° ' " Long. ° ' " or	Wis. Unique Well No.: VR110 DNR Well ID No.:
Facility ID	St. Plane ft. N, ft. E. S/C/N	Date Well Installed: 02 / 13 / 2018 (m m d d y y y y)
Type of Well: Well Code 11 / MW	Section Location of Waste/Source: NW 1/4 of SE 1/4 of Sec. 27, T. 12 N, R. 09 ☒ E ☐ W	Well Installed By: Name (first, last) and Firm: Dave Cruise; Badger State Drilling Co., Inc.
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 813.93 ft. MSL
B. Well casing, top elevation 813.62 ft. MSL
C. Land surface elevation 810.96 ft. MSL
D. Surface seal, bottom 809.21 ft. MSL or 1.75 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 ☐

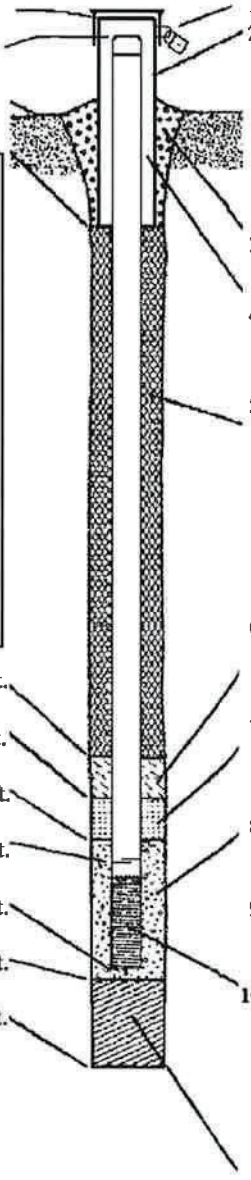
15. Drilling fluid used: Water ☐ 02 Air ☐ 01 Drilling Mud ☐ 03 None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe --

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

E. Bentonite seal, top 809.21 ft. MSL or 1.75 ft.
F. Fine sand, top 789.21 ft. MSL or 21.75 ft.
G. Filter pack, top 787.21 ft. MSL or 23.75 ft.
H. Screen joint, top 785.21 ft. MSL or 25.75 ft.
I. Well bottom 775.21 ft. MSL or 35.75 ft.
J. Filter pack, bottom 774.46 ft. MSL or 36.5 ft.
K. Borehole, bottom 774.46 ft. MSL or 36.5 ft.
L. Borehole, diameter 8.5 in.
M. O.D. well casing 2.38 in.
N. I.D. well casing 2.01 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:
3. Surface seal: Bentonite ☒ 30 Concrete ☐ 01 Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ 30 Other ☒
Filter Sand (#5)
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. 0.369 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. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. RW Sidley #7 (1 bag) ☒
b. Volume added ____ ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. RW Sidley #5 (7 bags) ☒
b. Volume added ____ 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 Monoflex
c. Slot size: 0.010 in.
d. Slotted length: 10 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: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

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

SCS # 25217156.01

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 Generating Station	**Local Grid Location of Well** ☒ N. ☐ S. 542874.39 ft. ☒ E. ☐ W. 2123437.50 ft.	**Well Name** MW-311
Facility License, Permit or Monitoring No.	**Local Grid Origin** ☐ (estimated: ☐) or **Well Location** ☐ Lat. ° ' " Long. ° ' " or	**Wis. Unique Well No.** VR112
Facility ID	St. Plane ft. N, ft. E. S/C/N	**DNR Well ID No.**
Type of Well Well Code 11 / MW	**Section Location of Waste/Source** NE 1/4 of SW 1/4 of Sec. 27 T. 12 N, R. 09 ☒ E ☐ W	**Date Well Installed** 02 / 14 / 2018 (m m d d y y y y)
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
		Well Installed By: Name (first, last) and Firm Mark Crampton Badger State Drilling Co., Inc.

A. Protective pipe, top elevation 810.05 ft. MSL
B. Well casing, top elevation 809.74 ft. MSL
C. Land surface elevation 806.53 ft. MSL
D. Surface seal, bottom 803.55 ft. MSL or 2.98 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 ☐

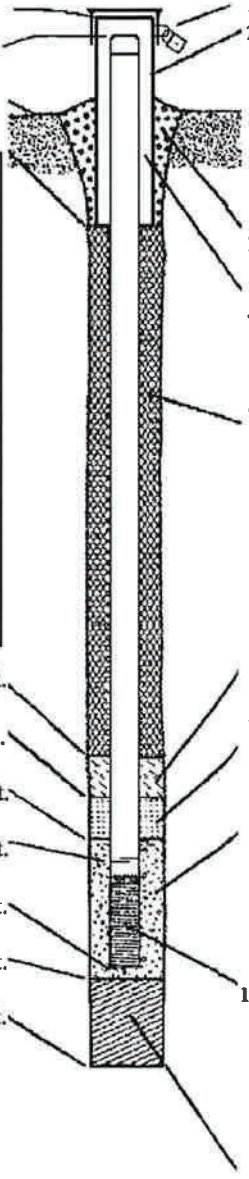
15. Drilling fluid used: Water ☐ 02 Air ☐ 01 Drilling Mud ☐ 03 None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe --

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

E. Bentonite seal, top 803.55 ft. MSL or 2.98 ft.
F. Fine sand, top 787.55 ft. MSL or 18.98 ft.
G. Filter pack, top 785.55 ft. MSL or 20.98 ft.
H. Screen joint, top 783.55 ft. MSL or 22.98 ft.
I. Well bottom 773.55 ft. MSL or 32.98 ft.
J. Filter pack, bottom 773.53 ft. MSL or 33 ft.
K. Borehole, bottom 773.53 ft. MSL or 33 ft.
L. Borehole, diameter 8.5 in.
M. O.D. well casing 2.38 in.
N. I.D. well casing 2.01 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:
3. Surface seal: Bentonite ☒ 30 Concrete ☐ 01 Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ 30 Other ☒
Filter Sand (#5)
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. 0.288 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. Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. RW Sidley #7 (1 bag) ☒
b. Volume added ft^3
8. Filter pack material: Manufacturer, product name & mesh size
a. RW Sidley #5 (6 bags) ☒
b. Volume added 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 Monoflex
c. Slot size: 0.010 in.
d. Slotted length: 10 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: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

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

SCS # 25217156.01

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
WPL - Alliant Columbia Generating Station	Columbia	MW-309

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	11	VR111	

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 75 min.

4. Depth of well (from top of well casisng) 37.67 ft.

5. Inside diameter of well 2.0 in.

6. Volume of water in filter pack and well casing 7.04 gal.

7. Volume of water removed from well 50.0 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. 30.07 ft.	32.29 ft.
Date	b. 02/16/2018 (m m d d y y y y)	02/16/2018
Time	c. 12:47 ☐ a.m. ☒ p.m.	13:50 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	___.__ inches	___.__ inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15	Clear ☒ 20 Turbid ☐ 25
(Describe)	Brown Silty	
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: Kyle Last Name: Kramer
Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

17. Additional comments on development:
Two cycles of well purging dry and recharging.

Name and Address of Facility Contact /Owner/Responsible Party
First Name: Nate Last Name: Sievers
Facility/Firm: Wisconsin Power and Light
Street: W8375 Murray Road
City/State/Zip: Pardeeville, Wisconsin 53954

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: Kyle Kramer
Print Name: Kyle Kramer
Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

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

SCS # 25217156.01

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
WPL - Alliant Columbia Generating Station	Columbia	MW-310

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	11	VR110	

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 171 min.

4. Depth of well (from top of well casisng) 38.41 ft.

5. Inside diameter of well 2.0 in.

6. Volume of water in filter pack and well casing 7.28 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. 30.55 ft.	32.30 ft.
Date	b. 2/16/2018	2/16/2018
Time	c. 9:45 ☒ a.m. ☐ p.m.	12:36 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	---.- inches	---.- inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15	Clear ☒ 20 Turbid ☐ 25
(Describe)	brown silty	

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: Kyle Last Name: Kramer
Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

17. Additional comments on development:
Four cycles of well purging dry and recharging.

Name and Address of Facility Contact /Owner/Responsible Party
First Name: Nate Last Name: Sievers
Facility/Firm: Wisconsin Power and Light
Street: W8375 Murray Road
City/State/Zip: Pardeeville, Wisconsin 53954

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: [signature]
Print Name: Kyle Kramer
Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

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

SCS # 25217156.01

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
WPL - Alliant Columbia Generating Station	Columbia	MW-311

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	11	VR112	

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 168 min.

4. Depth of well (from top of well casisng) 36.19 ft.

5. Inside diameter of well 2.0 in.

6. Volume of water in filter pack and well casing 8.74 gal.

7. Volume of water removed from well 100.0 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. 26.75 ft.	28.51 ft.
Date	b. 2/16/2018 (m m d d y y y y)	2/16/2018
Time	c. 2:00 ☐ a.m. ☒ p.m.	4:48 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	---.- inches	---.- inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15	Clear ☒ 20 Turbid ☐ 25
(Describe)	brown, silly	

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: Kyle Last Name: Kramer
Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

17. Additional comments on development:

Name and Address of Facility Contact /Owner/Responsible Party
First Name: Nate Last Name: Sievers
Facility/Firm: Columbia Dry Ash & Ash Pond Disposal Facilities
Street: W8375 Murray Road
City/State/Zip: Pardeeville, Wisconsin 53954

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: Kyle Kramer
Print Name: Kyle Kramer
Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

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

Appendix C

Laboratory Reports

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

December 02, 2022

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on October 29, 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
Jenny Coughlin, Alliant Energy
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 CCR BACKGRND
Pace Project No.: 40253965

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
South Carolina Certification #: 83006001
Texas Certification #: T104704529-21-8
Virginia VELAP Certification ID: 11873
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-21-00008
Federal Fish & Wildlife Permit #: 51774A

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 CCR BACKGRND
Pace Project No.: 40253965

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40253965001	**MW-301**	Water	10/27/22 16:35	10/29/22 09:15
40253965002	**MW-84A**	Water	10/27/22 15:25	10/29/22 09:15

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 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40253965001	**MW-301**	EPA 6020B	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			JXA	7	PASI-G
		EPA 903.1	JDZ	1	PASI-PA
		EPA 904.0	ZPC	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
40253965002	**MW-84A**	EPA 6020B	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			JXA	7	PASI-G
		EPA 903.1	JDZ	1	PASI-PA
		EPA 904.0	ZPC	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 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

Sample: MW-301 **Lab ID: 40253965001** Collected: 10/27/22 16:35 Received: 10/29/22 09:15 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	11/18/22 06:38	11/30/22 11:56	7440-36-0	
Arsenic	**0.30J**	ug/L	1.0	0.28	1	11/18/22 06:38	11/30/22 11:56	7440-38-2	
Barium	**7.5**	ug/L	2.3	0.70	1	11/18/22 06:38	12/01/22 17:45	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	11/18/22 06:38	12/01/22 17:45	7440-41-7	
Boron	**37.5**	ug/L	10.0	3.0	1	11/18/22 06:38	11/30/22 11:56	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	11/18/22 06:38	11/30/22 11:56	7440-43-9	
Calcium	**62800**	ug/L	2540	762	10	11/18/22 06:38	11/30/22 12:55	7440-70-2	P6
Chromium	**<1.0**	ug/L	3.4	1.0	1	11/18/22 06:38	11/30/22 11:56	7440-47-3	
Cobalt	**0.46J**	ug/L	1.0	0.12	1	11/18/22 06:38	11/30/22 11:56	7440-48-4	B
Lead	**<0.24**	ug/L	1.0	0.24	1	11/18/22 06:38	11/30/22 11:56	7439-92-1	
Lithium	**0.37J**	ug/L	1.0	0.22	1	11/18/22 06:38	11/30/22 11:56	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	11/18/22 06:38	11/30/22 11:56	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	11/18/22 06:38	11/30/22 11:56	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	11/18/22 06:38	11/30/22 11:56	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	11/03/22 07:25	11/04/22 08:00	7439-97-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**6.80**	Std. Units			1		10/27/22 16:35		
Field Specific Conductance	**507.5**	umhos/cm			1		10/27/22 16:35		
Oxygen, Dissolved	**0.10**	mg/L			1		10/27/22 16:35	7782-44-7	
REDOX	**80.9**	mV			1		10/27/22 16:35		
Turbidity	**0.00**	NTU			1		10/27/22 16:35		
Static Water Level	**784.91**	feet			1		10/27/22 16:35		
Temperature, Water (C)	**10.8**	deg C			1		10/27/22 16:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**282**	mg/L	20.0	8.7	1		11/01/22 11:31		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.1**	Std. Units	0.10	0.010	1		11/03/22 13:55		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**2.3**	mg/L	2.0	0.43	1		11/12/22 13:03	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		11/14/22 12:02	16984-48-8	M0
Sulfate	**11.6**	mg/L	2.0	0.44	1		11/12/22 13:03	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 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

Sample: MW-84A **Lab ID: 40253965002** Collected: 10/27/22 15:25 Received: 10/29/22 09:15 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	**0.29J**	ug/L	1.0	0.15	1	11/18/22 06:38	11/30/22 13:25	7440-36-0	B
Arsenic	**0.72J**	ug/L	1.0	0.28	1	11/18/22 06:38	11/30/22 13:25	7440-38-2	
Barium	**13.7**	ug/L	2.3	0.70	1	11/18/22 06:38	12/01/22 18:14	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	11/18/22 06:38	12/01/22 18:14	7440-41-7	
Boron	**12.2**	ug/L	10.0	3.0	1	11/18/22 06:38	11/30/22 13:25	7440-42-8	
Cadmium	**0.22J**	ug/L	1.0	0.15	1	11/18/22 06:38	11/30/22 13:25	7440-43-9	B
Calcium	**78400**	ug/L	254	76.2	1	11/18/22 06:38	11/30/22 13:25	7440-70-2	
Chromium	**2.2J**	ug/L	3.4	1.0	1	11/18/22 06:38	11/30/22 13:25	7440-47-3	
Cobalt	**0.25J**	ug/L	1.0	0.12	1	11/18/22 06:38	11/30/22 13:25	7440-48-4	B
Lead	**0.26J**	ug/L	1.0	0.24	1	11/18/22 06:38	11/30/22 13:25	7439-92-1	
Lithium	**0.41J**	ug/L	1.0	0.22	1	11/18/22 06:38	11/30/22 13:25	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	11/18/22 06:38	11/30/22 13:25	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	11/18/22 06:38	11/30/22 13:25	7782-49-2	
Thallium	**0.33J**	ug/L	1.0	0.14	1	11/18/22 06:38	11/30/22 13:25	7440-28-0	B
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	11/03/22 07:25	11/04/22 08:02	7439-97-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.31**	Std. Units			1		10/27/22 15:25		
Field Specific Conductance	**585.2**	umhos/cm			1		10/27/22 15:25		
Oxygen, Dissolved	**8.31**	mg/L			1		10/27/22 15:25	7782-44-7	
REDOX	**39.9**	mV			1		10/27/22 15:25		
Turbidity	**0.00**	NTU			1		10/27/22 15:25		
Static Water Level	**784.57**	feet			1		10/27/22 15:25		
Temperature, Water (C)	**11.7**	deg C			1		10/27/22 15:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**302**	mg/L	20.0	8.7	1		11/01/22 11:32		
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		11/03/22 13:56		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**3.4**	mg/L	2.0	0.43	1		11/12/22 14:11	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		11/14/22 12:45	16984-48-8	
Sulfate	**1.1J**	mg/L	2.0	0.44	1		11/12/22 14:11	14808-79-8	

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 CCR BACKGRND
Pace Project No.: 40253965

QC Batch: 430492
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40253965001, 40253965002

METHOD BLANK: 2479204 Matrix: Water
Associated Lab Samples: 40253965001, 40253965002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.066	0.20	11/04/22 07:30	

LABORATORY CONTROL SAMPLE: 2479205

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2479206 2479207

Parameter	Units	40253959001 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	4.8	100	95	85-115	5	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

QUALITY CONTROL DATA

Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

QC Batch: 431884
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40253965001, 40253965002

METHOD BLANK: 2487054 Matrix: Water
Associated Lab Samples: 40253965001, 40253965002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	0.19J	1.0	11/30/22 12:41	
Arsenic	ug/L	<0.28	1.0	11/30/22 12:41	
Barium	ug/L	<0.70	2.3	12/01/22 17:30	
Beryllium	ug/L	<0.25	1.0	12/01/22 17:30	
Boron	ug/L	<3.0	10.0	11/30/22 12:41	
Cadmium	ug/L	0.20J	1.0	11/30/22 12:41	
Calcium	ug/L	<76.2	254	11/30/22 12:41	
Chromium	ug/L	<1.0	3.4	11/30/22 12:41	
Cobalt	ug/L	0.18J	1.0	11/30/22 12:41	
Lead	ug/L	<0.24	1.0	11/30/22 12:41	
Lithium	ug/L	<0.22	1.0	11/30/22 12:41	
Molybdenum	ug/L	<0.44	1.5	11/30/22 12:41	
Selenium	ug/L	<0.32	1.1	11/30/22 12:41	
Thallium	ug/L	0.18J	1.0	11/30/22 12:41	

LABORATORY CONTROL SAMPLE: 2487055

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	250	270	108	80-120	
Arsenic	ug/L	250	261	104	80-120	
Barium	ug/L	250	242	97	80-120	
Beryllium	ug/L	250	262	105	80-120	
Boron	ug/L	250	253	101	80-120	
Cadmium	ug/L	250	264	105	80-120	
Calcium	ug/L	10000	10200	102	80-120	
Chromium	ug/L	250	254	102	80-120	
Cobalt	ug/L	250	249	99	80-120	
Lead	ug/L	250	259	104	80-120	
Lithium	ug/L	250	263	105	80-120	
Molybdenum	ug/L	250	255	102	80-120	
Selenium	ug/L	250	272	109	80-120	
Thallium	ug/L	250	259	104	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
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2487056 2487057

Parameter	Units	40253965001 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	268	263	107	105	75-125	2	20	
Arsenic	ug/L	0.30J	250	250	260	260	104	104	75-125	0	20	
Barium	ug/L	7.5	250	250	250	245	97	95	75-125	2	20	
Beryllium	ug/L	<0.25	250	250	268	265	107	106	75-125	1	20	
Boron	ug/L	37.5	250	250	295	282	103	98	75-125	5	20	
Cadmium	ug/L	<0.15	250	250	259	254	104	102	75-125	2	20	
Calcium	ug/L	62800	10000	10000	72700	69600	99	69	75-125	4	20	P6
Chromium	ug/L	<1.0	250	250	251	247	100	99	75-125	1	20	
Cobalt	ug/L	0.46J	250	250	247	244	99	97	75-125	1	20	
Lead	ug/L	<0.24	250	250	260	257	104	103	75-125	1	20	
Lithium	ug/L	0.37J	250	250	272	255	109	102	75-125	6	20	
Molybdenum	ug/L	<0.44	250	250	256	255	102	102	75-125	0	20	
Selenium	ug/L	<0.32	250	250	271	267	108	107	75-125	1	20	
Thallium	ug/L	<0.14	250	250	258	257	103	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

QUALITY CONTROL DATA

Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

QC Batch: 430299
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40253965001, 40253965002

METHOD BLANK: 2477981 Matrix: Water
Associated Lab Samples: 40253965001, 40253965002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	11/01/22 11:27	

LABORATORY CONTROL SAMPLE: 2477982

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	585	546	93	80-120	

SAMPLE DUPLICATE: 2477983

Parameter	Units	40253952003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	658	652	1	10	

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

QUALITY CONTROL DATA

Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

QC Batch: 430502
QC Batch Method: EPA 9040
Analysis Method: EPA 9040
Analysis Description: 9040 pH
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40253965001, 40253965002

SAMPLE DUPLICATE: 2479241

Parameter	Units	40253453001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.0	7.0	0	20	H6

SAMPLE DUPLICATE: 2479545

Parameter	Units	40253825003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.4	7.4	0	20	H6

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

QUALITY CONTROL DATA

Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

QC Batch: 430807
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: 40253965001, 40253965002

METHOD BLANK: 2480961 Matrix: Water
Associated Lab Samples: 40253965001, 40253965002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	11/12/22 12:34	
Fluoride	mg/L	<0.095	0.32	11/14/22 11:33	
Sulfate	mg/L	<0.44	2.0	11/12/22 12:34	

LABORATORY CONTROL SAMPLE: 2480962

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.4	97	90-110	
Fluoride	mg/L	2	1.9	97	90-110	
Sulfate	mg/L	20	19.4	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2480963 2480964

Parameter	Units	40253965001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2.3	20	20	24.1	24.2	109	110	90-110	1	15	
Fluoride	mg/L	<0.095	2	2	2.5	2.4	123	121	90-110	2	15	M0
Sulfate	mg/L	11.6	20	20	32.8	33.1	106	107	90-110	1	15	

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

Sample: MW-301 **Lab ID: 40253965001** Collected: 10/27/22 16:35 Received: 10/29/22 09:15 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	**-0.169 ± 0.429 (0.940) C:NA T:90%**	pCi/L	11/22/22 13:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.00292 ± 0.343 (0.793) C:79% T:90%**	pCi/L	11/16/22 15:01	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.00292 ± 0.772 (1.73)**	pCi/L	11/22/22 17:11	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

Sample: MW-84A **Lab ID: 40253965002** Collected: 10/27/22 15:25 Received: 10/29/22 09:15 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	**0.267 ± 0.279 (0.393) C:NA T:96%**	pCi/L	11/22/22 13:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.406 ± 0.346 (0.700) C:82% T:96%**	pCi/L	11/16/22 15:01	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.673 ± 0.625 (1.09)**	pCi/L	11/22/22 17:11	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

QC Batch: 544795
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: 40253965001, 40253965002

METHOD BLANK: 2644705 Matrix: Water
Associated Lab Samples: 40253965001, 40253965002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.113 ± 0.314 (0.610) C:NA T:88%	pCi/L	11/22/22 12:52	

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40253965

QC Batch: 544797
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: 40253965001, 40253965002

METHOD BLANK: 2644706 Matrix: Water
Associated Lab Samples: 40253965001, 40253965002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.565 ± 0.314 (0.566) C:89% T:88%	pCi/L	11/16/22 11:48	

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 CCR BACKGRND
Pace Project No.: 40253965

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

B	Analyte was detected in the associated method blank.
H6	Analysis initiated outside of the 15 minute EPA required holding time.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

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 CCR BACKGRND
Pace Project No.: 40253965

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40253965001	**MW-301**	EPA 3010A	431884	EPA 6020B	431956
40253965002	**MW-84A**	EPA 3010A	431884	EPA 6020B	431956
40253965001	**MW-301**	EPA 7470	430492	EPA 7470	430560
40253965002	**MW-84A**	EPA 7470	430492	EPA 7470	430560
40253965001	**MW-301**				
40253965002	**MW-84A**				
40253965001	**MW-301**	EPA 903.1	544795		
40253965002	**MW-84A**	EPA 903.1	544795		
40253965001	**MW-301**	EPA 904.0	544797		
40253965002	**MW-84A**	EPA 904.0	544797		
40253965001	**MW-301**	Total Radium Calculation	549026		
40253965002	**MW-84A**	Total Radium Calculation	549026		
40253965001	**MW-301**	SM 2540C	430299		
40253965002	**MW-84A**	SM 2540C	430299		
40253965001	**MW-301**	EPA 9040	430502		
40253965002	**MW-84A**	EPA 9040	430502		
40253965001	**MW-301**	EPA 300.0	430807		
40253965002	**MW-84A**	EPA 300.0	430807		

Pace

CHAIN-OF-CUSTODY / Analytical Request Document

40253965

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at https://info.pacelabs.com/hubfs/pas-standard-terms.pdf.

Page : 1 Of 1

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:	
Company: SCS ENGINEERS	Report To: Meghan Blodgett	Attention:	
Address: 2830 Dairy Drive	Copy To:	Company Name:	
Madison, WI 53718		Address:	Regulatory Agency
Email: mblodgett@scsengineers.com	Purchase Order #:	Pace Quote:	
Phone: 608-216-7362 Fax:	Project Name: 25219067 Columbia CCR Background	Pace Project Manager: dan.milewsky@pacelabs.com,	State / Location
Requested Due Date:	Project #: 25222067	Pace Profile #: 3946-12	WI

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	Radium 226	Radium 228	Metals	TDS and pH	Chloride, Fluoride, Sulfate	Residual Chlorine (Y/N)	
	MATRIX: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Other OT, Tissue TS																	Requested Analysis Filtered (Y/N)	N	N	N	N	N		
1	MW-301	WT				10/27/22	1635												X	X	X	X	X		001
2	MW-84A	WT				10/27/22	1525												X	X	X	X	X		002
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Full List Metals = B, Ca, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li Hg, Mo, Se, Tl ALL SAMPLES UNFILTERED	Adam Watson SCS Eng	10/28/22	1538		10/29/22	915	0.2	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed:

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

Client Name: SCS Engineers

Sample Preservation Receipt Form

Project # 417253965

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

Lab Lot# of pH paper: WB0722 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: SB Date/ Time:

	Glass							Plastic						Vials						Jars				General								
Pace Lab #	AG1U	BG1U	AG1H	AG4S	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN 1	GN 2	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					X		2.5 / 5
002									2		1															2					X		2.5 / 5
003																																	2.5 / 5
004																																	2.5 / 5
005																																	2.5 / 5
006																																	2.5 / 5
007																																	2.5 / 5
008																																	2.5 / 5
009																																	2.5 / 5
010																																	2.5 / 5
011																																	2.5 / 5
012																																	2.5 / 5
013																																	2.5 / 5
014																										—							2.5 / 5
015																																	2.5 / 5
016																																	2.5 / 5
017																																	2.5 / 5
018																																	2.5 / 5
019																																	2.5 / 5
020																																	2.5 / 5

10/3/22 SB

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

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
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
BP2Z	500 mL plastic NaOH + Zn

VG9C	40 mL clear ascorbic w/ HCl
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 1	1 Liter plastic NaOH
GN 2	

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40253965

40253965

Client Name: SCS Engineering

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 - 123 **Type of Ice:** (Wet) Blue Dry None ☐ Meltwater Only

Cooler Temperature Uncorr: 0 /Corr: 0.2

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: 12/21/22 /Initials: SG

Labeled By Initials: NK

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
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.
- DI 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.
Correct Type: Pace Green Bay, Pace IR, Non-Pace		
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.
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

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

December 02, 2022

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25222067 COLUMBIA CCR MOD 4
Pace Project No.: 40253964

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on October 29, 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
Jenny Coughlin, Alliant Energy
Tom Karwoski, SCS ENGINEERS
Nicole Kron, SCS ENGINEERS
Ryan Matzuk, SCS Engineers
Jeff Maxted, ALLIANT ENERGY
Marc Morandi, ALLIANT ENERGY

REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: 25222067 COLUMBIA CCR MOD 4
Pace Project No.: 40253964

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
South Carolina Certification #: 83006001
Texas Certification #: T104704529-21-8
Virginia VELAP Certification ID: 11873
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-21-00008
Federal Fish & Wildlife Permit #: 51774A

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 CCR MOD 4
Pace Project No.: 40253964

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40253964001	**MW-309**	Water	10/26/22 14:20	10/29/22 09:15
40253964002	**MW-310**	Water	10/26/22 15:35	10/29/22 09:15
40253964003	**MW-311**	Water	10/27/22 10:10	10/29/22 09:15
40253964004	**FIELD BLANK MOD4**	Water	10/26/22 15:35	10/29/22 09:15

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

SAMPLE ANALYTE COUNT

Project: 25222067 COLUMBIA CCR MOD 4
Pace Project No.: 40253964

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40253964001	**MW-309**	EPA 6020B	KXS	2
			JXA	7
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40253964002	**MW-310**	EPA 6020B	KXS	2
			JXA	7
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40253964003	**MW-311**	EPA 6020B	KXS	2
			JXA	7
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40253964004	**FIELD BLANK MOD4**	EPA 6020B	KXS	2
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3

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 CCR MOD 4
Pace Project No.: 40253964

Sample: MW-309 **Lab ID: 40253964001** Collected: 10/26/22 14:20 Received: 10/29/22 09:15 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								
Boron	**46.6**	ug/L	10.0	3.0	1	11/18/22 06:38	11/30/22 14:24	7440-42-8	
Calcium	**162000**	ug/L	254	76.2	1	11/18/22 06:38	11/30/22 14:24	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.23**	Std. Units			1		10/26/22 14:20		
Field Specific Conductance	**2,591**	umhos/cm			1		10/26/22 14:20		
Oxygen, Dissolved	**8.49**	mg/L			1		10/26/22 14:20	7782-44-7	
REDOX	**41.0**	mV			1		10/26/22 14:20		
Turbidity	**1.81**	NTU			1		10/26/22 14:20		
Static Water Level	**781.50**	feet			1		10/26/22 14:20		
Temperature, Water (C)	**12.9**	deg C			1		10/26/22 14:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**1670**	mg/L	20.0	8.7	1		11/01/22 11:30		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.5**	Std. Units	0.10	0.010	1		11/03/22 13:55		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**796**	mg/L	40.0	8.6	20		11/09/22 04:56	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		11/08/22 18:24	16984-48-8	
Sulfate	**28.9**	mg/L	2.0	0.44	1		11/08/22 18:24	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 COLUMBIA CCR MOD 4
Pace Project No.: 40253964

Sample: MW-310 **Lab ID: 40253964002** Collected: 10/26/22 15:35 Received: 10/29/22 09:15 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								
Boron	**71.3**	ug/L	10.0	3.0	1	11/18/22 06:38	11/30/22 14:31	7440-42-8	
Calcium	**68900**	ug/L	254	76.2	1	11/18/22 06:38	11/30/22 14:31	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.61**	Std. Units			1		10/26/22 15:35		
Field Specific Conductance	**1,404**	umhos/cm			1		10/26/22 15:35		
Oxygen, Dissolved	**8.66**	mg/L			1		10/26/22 15:35	7782-44-7	
REDOX	**31.3**	mV			1		10/26/22 15:35		
Turbidity	**1.58**	NTU			1		10/26/22 15:35		
Static Water Level	**780.96**	feet			1		10/26/22 15:35		
Temperature, Water (C)	**13.0**	deg C			1		10/26/22 15:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**750**	mg/L	20.0	8.7	1		11/01/22 11:31		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.010	1		11/03/22 13:55		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**323**	mg/L	20.0	4.3	10		11/09/22 05:11	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		11/08/22 18:39	16984-48-8	
Sulfate	**32.8**	mg/L	2.0	0.44	1		11/08/22 18:39	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 COLUMBIA CCR MOD 4
Pace Project No.: 40253964

Sample: MW-311 **Lab ID: 40253964003** Collected: 10/27/22 10:10 Received: 10/29/22 09:15 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								
Boron	**34.2**	ug/L	10.0	3.0	1	11/18/22 06:38	11/30/22 14:38	7440-42-8	
Calcium	**66300**	ug/L	254	76.2	1	11/18/22 06:38	11/30/22 14:38	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.50**	Std. Units			1		10/27/22 10:10		
Field Specific Conductance	**487.0**	umhos/cm			1		10/27/22 10:10		
Oxygen, Dissolved	**8.92**	mg/L			1		10/27/22 10:10	7782-44-7	
REDOX	**34.5**	mV			1		10/27/22 10:10		
Turbidity	**0.00**	NTU			1		10/27/22 10:10		
Static Water Level	**781.23**	feet			1		10/27/22 10:10		
Temperature, Water (C)	**11.9**	deg C			1		10/27/22 10:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**268**	mg/L	20.0	8.7	1		11/01/22 11:31		
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		11/03/22 13:55		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**1.2J**	mg/L	2.0	0.43	1		11/08/22 18:54	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		11/08/22 18:54	16984-48-8	
Sulfate	**15.5**	mg/L	2.0	0.44	1		11/08/22 18:54	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 COLUMBIA CCR MOD 4
Pace Project No.: 40253964

Sample: FIELD BLANK MOD4 **Lab ID: 40253964004** Collected: 10/26/22 15:35 Received: 10/29/22 09:15 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								
Boron	**<3.0**	ug/L	10.0	3.0	1	11/18/22 06:38	11/30/22 15:30	7440-42-8	
Calcium	**<76.2**	ug/L	254	76.2	1	11/18/22 06:38	11/30/22 15:30	7440-70-2	
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		11/01/22 11:31		
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		11/03/22 13:55		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		11/08/22 19:09	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		11/08/22 19:09	16984-48-8	
Sulfate	**<0.44**	mg/L	2.0	0.44	1		11/08/22 19:09	14808-79-8	

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 CCR MOD 4
Pace Project No.: 40253964

QC Batch: 431884
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40253964001, 40253964002, 40253964003, 40253964004

METHOD BLANK: 2487054 Matrix: Water
Associated Lab Samples: 40253964001, 40253964002, 40253964003, 40253964004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.0	10.0	11/30/22 12:41	
Calcium	ug/L	<76.2	254	11/30/22 12:41	

LABORATORY CONTROL SAMPLE: 2487055

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	250	253	101	80-120	
Calcium	ug/L	10000	10200	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2487056 2487057

Parameter	Units	40253965001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	37.5	250	250	295	282	103	98	75-125	5	20	
Calcium	ug/L	62800	10000	10000	72700	69600	99	69	75-125	4	20	P6

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

QUALITY CONTROL DATA

Project: 25222067 COLUMBIA CCR MOD 4
Pace Project No.: 40253964

QC Batch: 430299
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40253964001, 40253964002, 40253964003, 40253964004

METHOD BLANK: 2477981 Matrix: Water
Associated Lab Samples: 40253964001, 40253964002, 40253964003, 40253964004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	11/01/22 11:27	

LABORATORY CONTROL SAMPLE: 2477982

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	585	546	93	80-120	

SAMPLE DUPLICATE: 2477983

Parameter	Units	40253952003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	658	652	1	10	

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

QUALITY CONTROL DATA

Project: 25222067 COLUMBIA CCR MOD 4
Pace Project No.: 40253964

QC Batch: 430502
QC Batch Method: EPA 9040
Analysis Method: EPA 9040
Analysis Description: 9040 pH
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40253964001, 40253964002, 40253964003, 40253964004

SAMPLE DUPLICATE: 2479241

Parameter	Units	40253453001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.0	7.0	0	20	H6

SAMPLE DUPLICATE: 2479545

Parameter	Units	40253825003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.4	7.4	0	20	H6

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

QUALITY CONTROL DATA

Project: 25222067 COLUMBIA CCR MOD 4
Pace Project No.: 40253964

QC Batch: 430680
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: 40253964001, 40253964002, 40253964003, 40253964004

METHOD BLANK: 2480305 Matrix: Water
Associated Lab Samples: 40253964001, 40253964002, 40253964003, 40253964004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	11/08/22 15:11	
Fluoride	mg/L	<0.095	0.32	11/08/22 15:11	
Sulfate	mg/L	<0.44	2.0	11/08/22 15:11	

LABORATORY CONTROL SAMPLE: 2480306

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.6	108	90-110	
Fluoride	mg/L	2	2.1	106	90-110	
Sulfate	mg/L	20	21.6	108	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2480307 2480308

Parameter	Units	40253823001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	275	200	200	462	457	94	91	90-110	1	15	
Fluoride	mg/L	<0.095	2	2	1.5	1.5	75	76	90-110	0	15	M0
Sulfate	mg/L	34.3	200	200	248	242	107	104	90-110	3	15	

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 CCR MOD 4
Pace Project No.: 40253964

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.

ANALYTE QUALIFIERS

H6	Analysis initiated outside of the 15 minute EPA required holding time.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

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 CCR MOD 4
Pace Project No.: 40253964

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40253964001	**MW-309**	EPA 3010A	431884	EPA 6020B	431956
40253964002	**MW-310**	EPA 3010A	431884	EPA 6020B	431956
40253964003	**MW-311**	EPA 3010A	431884	EPA 6020B	431956
40253964004	**FIELD BLANK MOD4**	EPA 3010A	431884	EPA 6020B	431956
40253964001	**MW-309**				
40253964002	**MW-310**				
40253964003	**MW-311**				
40253964001	**MW-309**	SM 2540C	430299		
40253964002	**MW-310**	SM 2540C	430299		
40253964003	**MW-311**	SM 2540C	430299		
40253964004	**FIELD BLANK MOD4**	SM 2540C	430299		
40253964001	**MW-309**	EPA 9040	430502		
40253964002	**MW-310**	EPA 9040	430502		
40253964003	**MW-311**	EPA 9040	430502		
40253964004	**FIELD BLANK MOD4**	EPA 9040	430502		
40253964001	**MW-309**	EPA 300.0	430680		
40253964002	**MW-310**	EPA 300.0	430680		
40253964003	**MW-311**	EPA 300.0	430680		
40253964004	**FIELD BLANK MOD4**	EPA 300.0	430680		

CHAIN-OF-CUSTODY / Analytical Request Document

L#25539164

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at https://info.pacelabs.com/hubfs/pas-standard-terms.pdf.

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:	
Company: SCS ENGINEERS	Report To: Meghan Blodgett	Attention:	
Address: 2830 Dairy Drive	Copy To:	Company Name:	Regulatory Agency
Madison, WI 53718		Address:	
Email: mblodgett@scsengineers.com	Purchase Order #:	Pace Quote:	
Phone: 608-216-7362 Fax:	Project Name: 25219067 Columbia CCR Mod 4-6	Pace Project Manager: dan.milewsky@pacelabs.com,	State / Location
Requested Due Date:	Project #: 25222067	Pace Profile #: 3946-13	WI

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	Metals (B/Ca)	Chloride/Fluoride/Sulfate	TDS and pH	Residual Chlorine (Y/N)	
		MATRIX: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Other OT, Tissue TS																Requested Analysis Filtered (Y/N)	N	N	N		
1		WT																					
2	MW-309	WT				10/26/22	1420		3	2		1							X	X	X		001
3	MW-310	WT				10/26/22	1535		3	2		1							X	X	X		002
4	MW-311	WT				10/27/22	1010		3	2		1							X	X	X		003
5	FIELD BLANK MOD4	WT				10/26/22	1535		3	2		1							X	X	X		004
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
ALL SAMPLES UNFILTERED	Adam Watson SCS Eng	10/28/22	1530	Cunkway	10/28/22	905	0.2	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed:

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

Sample Preservation Receipt Form

Client Name: SCS Engineers Project # HI0253964

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

Lab Lot# of pH paper: 10220722 Lab Std #ID of preservation (if pH adjusted):

Pace Lab #	Glass: AG1U	BG1U	AG1H	AG4S	AG5U	AG2S	BG3U	Plastic: BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	Vials: VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	Jars: JGFU	JG9U	WGFU	WPFU	General: SP5T	ZPLC	GN 1	GN 2	VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001									0222		1																				X		2.5 / 5
002									0222		1																				X		2.5 / 5
003									0222		1																				X		2.5 / 5
004									0222		1																				X		2.5 / 5
005																																		2.5 / 5
006																																		2.5 / 5
007																																		2.5 / 5
008																																		2.5 / 5
009																																		2.5 / 5
010																																		2.5 / 5
011																																		2.5 / 5
012																																		2.5 / 5
013																																		2.5 / 5
014																																		2.5 / 5
015																																		2.5 / 5
016																																		2.5 / 5
017																																		2.5 / 5
018																																		2.5 / 5
019																																		2.5 / 5
020																																		2.5 / 5

10/31/2286

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: _____ Headspace in VOA Vials (>6mm) : ☐Yes ☐No ☑N/A ***If yes look in headspace column**

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	VG9C	40 mL clear ascorbic w/ HCl	JGFU	4 oz amber jar unpres
BG1U	1 liter clear glass	BP3U	250 mL plastic unpres	DG9T	40 mL amber Na Thio	JG9U	9 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP3B	250 mL plastic NaOH	VG9U	40 mL clear vial unpres	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9H	40 mL clear vial HCL	WPFU	4 oz plastic jar unpres
AG5U	100 mL amber glass unpres	BP3S	250 mL plastic H2SO4	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH + Zn	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres					GN 1	
						GN 2	

Page 1 of 2

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40253964

40253964

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 - 123 **Type of Ice:** (Wet) Blue Dry None ☐ Meltwater Only

Cooler Temperature Uncorr: 0 /Corr: 0.2

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: 10/3/22 Initials: SG
Labeled By Initials: NK

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
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.
- DI 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.
Correct Type: Pace Green Bay, Pace IR, Non-Pace		
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.
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

Page 2 of 2

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

December 29, 2022

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25222067 COLUMBIA CCR BACKGRND
Pace Project No.: 40255945

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on December 14, 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
Jenny Coughlin, Alliant Energy
Tom Karwoski, 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 CCR BACKGRND
Pace Project No.: 40255945

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
South Carolina Certification #: 83006001
Texas Certification #: T104704529-21-8
Virginia VELAP Certification ID: 11873
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-21-00008
Federal Fish & Wildlife Permit #: 51774A

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 CCR BACKGRND
Pace Project No.: 40255945

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40255945001	**MW-301**	Water	10/27/22 16:35	12/14/22 09:20
40255945002	**MW-84A**	Water	10/27/22 15:25	12/14/22 09:20

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 COLUMBIA CCR BACKGRND
Pace Project No.: 40255945

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40255945001	**MW-301**	EPA 6020B	KXS	1
40255945002	**MW-84A**	EPA 6020B	KXS	5

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 CCR BACKGRND
Pace Project No.: 40255945

Sample: MW-301 **Lab ID: 40255945001** Collected: 10/27/22 16:35 Received: 12/14/22 09:20 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								
Cobalt	**0.52J**	ug/L	1.0	0.12	1	12/19/22 06:07	12/21/22 03:38	7440-48-4	

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 CCR BACKGRND
Pace Project No.: 40255945

Sample: MW-84A **Lab ID: 40255945002** Collected: 10/27/22 15:25 Received: 12/14/22 09:20 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	12/19/22 06:07	12/21/22 03:46	7440-36-0	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	12/19/22 06:07	12/21/22 03:46	7440-43-9	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	12/19/22 06:07	12/21/22 03:46	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	12/19/22 06:07	12/21/22 03:46	7439-92-1	
Thallium	**<0.14**	ug/L	1.0	0.14	1	12/19/22 06:07	12/21/22 03:46	7440-28-0	

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 CCR BACKGRND
Pace Project No.: 40255945

QC Batch: 434044
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40255945001, 40255945002

METHOD BLANK: 2498851 Matrix: Water
Associated Lab Samples: 40255945001, 40255945002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	12/21/22 00:57	
Cadmium	ug/L	<0.15	1.0	12/21/22 00:57	
Cobalt	ug/L	<0.12	1.0	12/21/22 00:57	
Lead	ug/L	<0.24	1.0	12/21/22 00:57	
Thallium	ug/L	<0.14	1.0	12/21/22 00:57	

LABORATORY CONTROL SAMPLE: 2498852

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	250	242	97	80-120	
Cadmium	ug/L	250	242	97	80-120	
Cobalt	ug/L	250	237	95	80-120	
Lead	ug/L	250	237	95	80-120	
Thallium	ug/L	250	228	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2498853 2498854

Parameter	Units	40255857001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	5.8J	250	250	256	247	100	96	75-125	4	20	
Cadmium	ug/L	8.2J	250	250	250	246	97	95	75-125	2	20	
Cobalt	ug/L	5.2J	250	250	247	242	97	95	75-125	2	20	
Lead	ug/L	5.5J	250	250	250	245	98	96	75-125	2	20	
Thallium	ug/L	2.9J	250	250	235	232	93	91	75-125	2	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 CCR BACKGRND
Pace Project No.: 40255945

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 CCR BACKGRND
Pace Project No.: 40255945

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40255945001	**MW-301**	EPA 3010A	434044	EPA 6020B	434141
40255945002	**MW-84A**	EPA 3010A	434044	EPA 6020B	434141

REPORT OF LABORATORY ANALYSIS

Pace

CHAIN-OF-CUSTODY / Analytical Request Document

40253965

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at https://info.pacelabs.com/hubfs/pas-standard-terms.pdf.

Page : 1 Of 1

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:	
Company: SCS ENGINEERS	Report To: Meghan Blodgett	Attention:	
Address: 2830 Dairy Drive	Copy To:	Company Name:	
Madison, WI 53718		Address:	Regulatory Agency
Email: mblodgett@scsengineers.com	Purchase Order #:	Pace Quote:	
Phone: 608-216-7362 Fax:	Project Name: 25219067 Columbia CCR Background	Pace Project Manager: dan.milewsky@pacelabs.com,	State / Location
Requested Due Date:	Project #: 25222067	Pace Profile #: 3946-12	WI

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	Radium 226	Radium 228	Metals	TDS and pH	Chloride, Fluoride, Sulfate							Residual Chlorine (Y/N)	
	MATRIX: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Other OT, Tissue TS																	Requested Analysis Filtered (Y/N)	N	N	N	N	N								
1	MW-301	WT				10/27/22	1635												X	X	X	X	X								001
2	MW-84A	WT				10/27/22	1525												X	X	X	X	X								002
3																															
4																															
5																															
6																															
7																															
8																															
9																															
10																															
11																															
12																															

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Full List Metals = B, Ca, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li Hg, Mo, Se, Tl ALL SAMPLES UNFILTERED	Adam Watson SCS Eng	10/28/22	1538		10/29/22	915	0.2	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed:

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

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

December 30, 2022

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on December 03, 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
Jenny Coughlin, Alliant Energy
Tom Karwoski, 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: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

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
South Carolina Certification #: 83006001
Texas Certification #: T104704529-21-8
Virginia VELAP Certification ID: 11873
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-21-00008
Federal Fish & Wildlife Permit #: 51774A

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40255561001	**MW-84A**	Water	12/02/22 12:15	12/03/22 09:00
40255561002	**MW-301**	Water	12/02/22 13:00	12/03/22 09:00
40255561003	**MW-33AR**	Water	12/02/22 09:25	12/03/22 09:00
40255561004	**MW-34A**	Water	12/02/22 10:10	12/03/22 09:00
40255561005	**MW-302**	Water	12/02/22 11:05	12/03/22 09:00
40255561006	**MW-309**	Water	11/30/22 14:20	12/03/22 09:00
40255561007	**MW-310**	Water	11/30/22 15:40	12/03/22 09:00
40255561008	**MW-311**	Water	11/30/22 16:20	12/03/22 09:00
40255561009	**FIELD BLANK MOD1-3LF**	Water	12/02/22 11:05	12/03/22 09:00
40255561010	**FIELD BLANK MOD4**	Water	11/30/22 15:40	12/03/22 09:00

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

SAMPLE ANALYTE COUNT

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40255561001	**MW-84A**	EPA 6010D	SIS	5
			KPR	7
		EPA 310.2	DAW	1
		EPA 353.2	DAW	1
40255561002	**MW-301**	EPA 6010D	SIS	5
			KPR	7
		EPA 310.2	DAW	1
		EPA 353.2	DAW	1
40255561003	**MW-33AR**	EPA 6010D	SIS	5
			KPR	7
		EPA 310.2	DAW	1
		EPA 353.2	DAW	1
40255561004	**MW-34A**	EPA 6010D	SIS	5
			KPR	7
		EPA 310.2	DAW	1
		EPA 353.2	DAW	1
40255561005	**MW-302**	EPA 6010D	SIS	5
			KPR	7
		EPA 310.2	DAW	1
		EPA 353.2	DAW	1
40255561006	**MW-309**	EPA 6010D	SIS	7
			KPR	7
		EPA 310.2	DAW	1
		EPA 353.2	DAW	1
40255561007	**MW-310**	EPA 6010D	SIS	6
			KPR	7
		EPA 300.0	HMB	1
		EPA 310.2	DAW	1
		EPA 353.2	DAW	1
40255561008	**MW-311**	EPA 6010D	SIS	5
			KPR	7
		EPA 310.2	DAW	1
		EPA 353.2	DAW	1
40255561009	**FIELD BLANK MOD1-3LF**	EPA 6010D	SIS	5
		EPA 310.2	DAW	1
		EPA 353.2	DAW	1
40255561010	**FIELD BLANK MOD4**	EPA 6010D	SIS	5

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 310.2	DAW	1
		EPA 353.2	DAW	1

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: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Sample: MW-84A **Lab ID: 40255561001** Collected: 12/02/22 12:15 Received: 12/03/22 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Copper	**<3.4**	ug/L	10.0	3.4	1	12/12/22 13:14	12/13/22 20:10	7440-50-8	
Manganese	**<1.5**	ug/L	5.0	1.5	1	12/12/22 13:14	12/13/22 20:10	7439-96-5	
Silver	**<3.2**	ug/L	10.0	3.2	1	12/12/22 13:14	12/13/22 20:10	7440-22-4	
Total Hardness by 2340B	**350**	mg/L	54.0	10.0	10	12/12/22 13:14	12/14/22 13:52		
Zinc	**<11.6**	ug/L	40.0	11.6	1	12/12/22 13:14	12/13/22 20:10	7440-66-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.29**	Std. Units			1		12/02/22 12:15		
Field Specific Conductance	**595.4**	umhos/cm			1		12/02/22 12:15		
Oxygen, Dissolved	**8.12**	mg/L			1		12/02/22 12:15	7782-44-7	
REDOX	**123.0**	mV			1		12/02/22 12:15		
Turbidity	**0.00**	NTU			1		12/02/22 12:15		
Static Water Level	**784.76**	feet			1		12/02/22 12:15		
Temperature, Water (C)	**11.0**	deg C			1		12/02/22 12:15		
310.2 Alkalinity	Analytical Method: EPA 310.2 Pace Analytical Services - Green Bay								
Alkalinity, Total as CaCO3	**345**	mg/L	25.0	7.4	1		12/07/22 12:24		
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2 Pace Analytical Services - Green Bay								
Nitrogen, NO2 plus NO3	**0.43**	mg/L	0.25	0.059	1		12/14/22 12:08		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Sample: MW-301 **Lab ID: 40255561002** Collected: 12/02/22 13:00 Received: 12/03/22 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Copper	**4.3J**	ug/L	10.0	3.4	1	12/12/22 13:14	12/13/22 20:18	7440-50-8	
Manganese	**47.2**	ug/L	5.0	1.5	1	12/12/22 13:14	12/13/22 20:18	7439-96-5	
Silver	**<3.2**	ug/L	10.0	3.2	1	12/12/22 13:14	12/13/22 20:18	7440-22-4	
Total Hardness by 2340B	**384**	mg/L	5.4	1.0	1	12/12/22 13:14	12/13/22 20:18		
Zinc	**<11.6**	ug/L	40.0	11.6	1	12/12/22 13:14	12/13/22 20:18	7440-66-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**6.84**	Std. Units			1		12/02/22 13:00		
Field Specific Conductance	**637.3**	umhos/cm			1		12/02/22 13:00		
Oxygen, Dissolved	**0.61**	mg/L			1		12/02/22 13:00	7782-44-7	
REDOX	**120.0**	mV			1		12/02/22 13:00		
Turbidity	**0.00**	NTU			1		12/02/22 13:00		
Static Water Level	**785.12**	feet			1		12/02/22 13:00		
Temperature, Water (C)	**10.3**	deg C			1		12/02/22 13:00		
310.2 Alkalinity	Analytical Method: EPA 310.2 Pace Analytical Services - Green Bay								
Alkalinity, Total as CaCO3	**361**	mg/L	25.0	7.4	1		12/07/22 12:25		
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2 Pace Analytical Services - Green Bay								
Nitrogen, NO2 plus NO3	**0.15J**	mg/L	0.25	0.059	1		12/14/22 12:09		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Sample: MW-33AR **Lab ID: 40255561003** Collected: 12/02/22 09:25 Received: 12/03/22 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Copper	**<3.4**	ug/L	10.0	3.4	1	12/12/22 13:14	12/13/22 20:21	7440-50-8	
Manganese	**<1.5**	ug/L	5.0	1.5	1	12/12/22 13:14	12/13/22 20:21	7439-96-5	
Silver	**<3.2**	ug/L	10.0	3.2	1	12/12/22 13:14	12/13/22 20:21	7440-22-4	
Total Hardness by 2340B	**319**	mg/L	5.4	1.0	1	12/12/22 13:14	12/13/22 20:21		
Zinc	**<11.6**	ug/L	40.0	11.6	1	12/12/22 13:14	12/13/22 20:21	7440-66-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.48**	Std. Units			1		12/02/22 09:25		
Field Specific Conductance	**725**	umhos/cm			1		12/02/22 09:25		
Oxygen, Dissolved	**9.01**	mg/L			1		12/02/22 09:25	7782-44-7	
REDOX	**141.6**	mV			1		12/02/22 09:25		
Turbidity	**0.12**	NTU			1		12/02/22 09:25		
Static Water Level	**781.91**	feet			1		12/02/22 09:25		
Temperature, Water (C)	**10.8**	deg C			1		12/02/22 09:25		
310.2 Alkalinity	Analytical Method: EPA 310.2 Pace Analytical Services - Green Bay								
Alkalinity, Total as CaCO3	**206**	mg/L	25.0	7.4	1		12/07/22 12:26		
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2 Pace Analytical Services - Green Bay								
Nitrogen, NO2 plus NO3	**1.9**	mg/L	0.25	0.059	1		12/14/22 12:10		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Sample: MW-34A **Lab ID: 40255561004** Collected: 12/02/22 10:10 Received: 12/03/22 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Copper	**<3.4**	ug/L	10.0	3.4	1	12/12/22 13:14	12/13/22 20:23	7440-50-8	
Manganese	**2.6J**	ug/L	5.0	1.5	1	12/12/22 13:14	12/13/22 20:23	7439-96-5	
Silver	**<3.2**	ug/L	10.0	3.2	1	12/12/22 13:14	12/13/22 20:23	7440-22-4	
Total Hardness by 2340B	**335**	mg/L	5.4	1.0	1	12/12/22 13:14	12/13/22 20:23		
Zinc	**<11.6**	ug/L	40.0	11.6	1	12/12/22 13:14	12/13/22 20:23	7440-66-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.45**	Std. Units			1		12/02/22 10:10		
Field Specific Conductance	**614.3**	umhos/cm			1		12/02/22 10:10		
Oxygen, Dissolved	**8.67**	mg/L			1		12/02/22 10:10	7782-44-7	
REDOX	**130.4**	mV			1		12/02/22 10:10		
Turbidity	**2.51**	NTU			1		12/02/22 10:10		
Static Water Level	**783.71**	feet			1		12/02/22 10:10		
Temperature, Water (C)	**12.4**	deg C			1		12/02/22 10:10		
310.2 Alkalinity	Analytical Method: EPA 310.2 Pace Analytical Services - Green Bay								
Alkalinity, Total as CaCO3	**188**	mg/L	25.0	7.4	1		12/07/22 12:27		
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2 Pace Analytical Services - Green Bay								
Nitrogen, NO2 plus NO3	**4.7**	mg/L	0.25	0.059	1		12/14/22 12:10		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Sample: MW-302 **Lab ID: 40255561005** Collected: 12/02/22 11:05 Received: 12/03/22 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Copper	**<3.4**	ug/L	10.0	3.4	1	12/12/22 13:14	12/13/22 20:29	7440-50-8	
Manganese	**2.0J**	ug/L	5.0	1.5	1	12/12/22 13:14	12/13/22 20:29	7439-96-5	
Silver	**<3.2**	ug/L	10.0	3.2	1	12/12/22 13:14	12/13/22 20:29	7440-22-4	
Total Hardness by 2340B	**388**	mg/L	5.4	1.0	1	12/12/22 13:14	12/13/22 20:29		
Zinc	**<11.6**	ug/L	40.0	11.6	1	12/12/22 13:14	12/13/22 20:29	7440-66-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.21**	Std. Units			1		12/02/22 11:05		
Field Specific Conductance	**662.0**	umhos/cm			1		12/02/22 11:05		
Oxygen, Dissolved	**8.41**	mg/L			1		12/02/22 11:05	7782-44-7	
REDOX	**127.6**	mV			1		12/02/22 11:05		
Turbidity	**0.28**	NTU			1		12/02/22 11:05		
Static Water Level	**784.48**	feet			1		12/02/22 11:05		
Temperature, Water (C)	**11.0**	deg C			1		12/02/22 11:05		
310.2 Alkalinity	Analytical Method: EPA 310.2 Pace Analytical Services - Green Bay								
Alkalinity, Total as CaCO3	**302**	mg/L	50.0	14.9	2		12/07/22 12:28		
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2 Pace Analytical Services - Green Bay								
Nitrogen, NO2 plus NO3	**7.1**	mg/L	0.25	0.059	1		12/14/22 12:11		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Sample: MW-309 **Lab ID: 40255561006** Collected: 11/30/22 14:20 Received: 12/03/22 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Boron	**49.3**	ug/L	40.0	17.3	1	12/12/22 13:14	12/13/22 20:31	7440-42-8	
Calcium	**153000**	ug/L	500	114	1	12/12/22 13:14	12/13/22 20:31	7440-70-2	
Copper	**<3.4**	ug/L	10.0	3.4	1	12/12/22 13:14	12/13/22 20:31	7440-50-8	
Manganese	**<1.5**	ug/L	5.0	1.5	1	12/12/22 13:14	12/13/22 20:31	7439-96-5	
Silver	**<3.2**	ug/L	10.0	3.2	1	12/12/22 13:14	12/13/22 20:31	7440-22-4	
Total Hardness by 2340B	**678**	mg/L	5.4	1.0	1	12/12/22 13:14	12/13/22 20:31		
Zinc	**<11.6**	ug/L	40.0	11.6	1	12/12/22 13:14	12/13/22 20:31	7440-66-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.30**	Std. Units			1		11/30/22 14:20		
Field Specific Conductance	**2746**	umhos/cm			1		11/30/22 14:20		
Oxygen, Dissolved	**8.97**	mg/L			1		11/30/22 14:20	7782-44-7	
REDOX	**155.5**	mV			1		11/30/22 14:20		
Turbidity	**0.31**	NTU			1		11/30/22 14:20		
Static Water Level	**781.62**	feet			1		11/30/22 14:20		
Temperature, Water (C)	**7.7**	deg C			1		11/30/22 14:20		
310.2 Alkalinity	Analytical Method: EPA 310.2 Pace Analytical Services - Green Bay								
Alkalinity, Total as CaCO3	**231**	mg/L	25.0	7.4	1		12/07/22 12:31		
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2 Pace Analytical Services - Green Bay								
Nitrogen, NO2 plus NO3	**1.2**	mg/L	0.25	0.059	1		12/14/22 12:14		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Sample: MW-310 **Lab ID: 40255561007** Collected: 11/30/22 15:40 Received: 12/03/22 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Calcium	**55500**	ug/L	500	114	1	12/12/22 13:14	12/13/22 20:33	7440-70-2	
Copper	**<3.4**	ug/L	10.0	3.4	1	12/12/22 13:14	12/13/22 20:33	7440-50-8	
Manganese	**<1.5**	ug/L	5.0	1.5	1	12/12/22 13:14	12/13/22 20:33	7439-96-5	
Silver	**<3.2**	ug/L	10.0	3.2	1	12/12/22 13:14	12/13/22 20:33	7440-22-4	
Total Hardness by 2340B	**397**	mg/L	5.4	1.0	1	12/12/22 13:14	12/13/22 20:33		
Zinc	**<11.6**	ug/L	40.0	11.6	1	12/12/22 13:14	12/13/22 20:33	7440-66-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.67**	Std. Units			1		11/30/22 15:40		
Field Specific Conductance	**1200**	umhos/cm			1		11/30/22 15:40		
Oxygen, Dissolved	**9.46**	mg/L			1		11/30/22 15:40	7782-44-7	
REDOX	**146.5**	mV			1		11/30/22 15:40		
Turbidity	**0.51**	NTU			1		11/30/22 15:40		
Static Water Level	**781.14**	feet			1		11/30/22 15:40		
Temperature, Water (C)	**10.8**	deg C			1		11/30/22 15:40		
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**215**	mg/L	10.0	2.2	5		12/28/22 16:32	16887-00-6	
310.2 Alkalinity	Analytical Method: EPA 310.2 Pace Analytical Services - Green Bay								
Alkalinity, Total as CaCO3	**270**	mg/L	25.0	7.4	1		12/07/22 12:32		
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2 Pace Analytical Services - Green Bay								
Nitrogen, NO2 plus NO3	**0.74**	mg/L	0.25	0.059	1		12/14/22 12:14		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Sample: MW-311 **Lab ID: 40255561008** Collected: 11/30/22 16:20 Received: 12/03/22 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Copper	**<3.4**	ug/L	10.0	3.4	1	12/12/22 13:14	12/13/22 20:35	7440-50-8	
Manganese	**<1.5**	ug/L	5.0	1.5	1	12/12/22 13:14	12/13/22 20:35	7439-96-5	
Silver	**<3.2**	ug/L	10.0	3.2	1	12/12/22 13:14	12/13/22 20:35	7440-22-4	
Total Hardness by 2340B	**284**	mg/L	5.4	1.0	1	12/12/22 13:14	12/13/22 20:35		
Zinc	**<11.6**	ug/L	40.0	11.6	1	12/12/22 13:14	12/13/22 20:35	7440-66-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.49**	Std. Units			1		11/30/22 16:20		
Field Specific Conductance	**492.2**	umhos/cm			1		11/30/22 16:20		
Oxygen, Dissolved	**9.21**	mg/L			1		11/30/22 16:20	7782-44-7	
REDOX	**132.0**	mV			1		11/30/22 16:20		
Turbidity	**0.17**	NTU			1		11/30/22 16:20		
Static Water Level	**781.15**	feet			1		11/30/22 16:20		
Temperature, Water (C)	**10.3**	deg C			1		11/30/22 16:20		
310.2 Alkalinity	Analytical Method: EPA 310.2 Pace Analytical Services - Green Bay								
Alkalinity, Total as CaCO3	**270**	mg/L	50.0	14.9	2		12/07/22 12:37		
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2 Pace Analytical Services - Green Bay								
Nitrogen, NO2 plus NO3	**0.47**	mg/L	0.25	0.059	1		12/14/22 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: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Sample: FIELD BLANK MOD1-3LF **Lab ID: 40255561009** Collected: 12/02/22 11:05 Received: 12/03/22 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Copper	**<3.4**	ug/L	10.0	3.4	1	12/12/22 13:14	12/13/22 20:37	7440-50-8	
Manganese	**<1.5**	ug/L	5.0	1.5	1	12/12/22 13:14	12/13/22 20:37	7439-96-5	
Silver	**<3.2**	ug/L	10.0	3.2	1	12/12/22 13:14	12/13/22 20:37	7440-22-4	
Total Hardness by 2340B	**<1.0**	mg/L	5.4	1.0	1	12/12/22 13:14	12/13/22 20:37		
Zinc	**<11.6**	ug/L	40.0	11.6	1	12/12/22 13:14	12/13/22 20:37	7440-66-6	
310.2 Alkalinity	Analytical Method: EPA 310.2 Pace Analytical Services - Green Bay								
Alkalinity, Total as CaCO3	**8.0J**	mg/L	25.0	7.4	1		12/07/22 12:40		
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2 Pace Analytical Services - Green Bay								
Nitrogen, NO2 plus NO3	**<0.059**	mg/L	0.25	0.059	1		12/14/22 12:16		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Sample: FIELD BLANK MOD4 **Lab ID: 40255561010** Collected: 11/30/22 15:40 Received: 12/03/22 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Copper	**<3.4**	ug/L	10.0	3.4	1	12/12/22 13:14	12/13/22 20:39	7440-50-8	
Manganese	**<1.5**	ug/L	5.0	1.5	1	12/12/22 13:14	12/13/22 20:39	7439-96-5	
Silver	**<3.2**	ug/L	10.0	3.2	1	12/12/22 13:14	12/13/22 20:39	7440-22-4	
Total Hardness by 2340B	**<1.0**	mg/L	5.4	1.0	1	12/12/22 13:14	12/13/22 20:39		
Zinc	**<11.6**	ug/L	40.0	11.6	1	12/12/22 13:14	12/13/22 20:39	7440-66-6	
310.2 Alkalinity	Analytical Method: EPA 310.2 Pace Analytical Services - Green Bay								
Alkalinity, Total as CaCO3	**<7.4**	mg/L	25.0	7.4	1		12/07/22 12:41		
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2 Pace Analytical Services - Green Bay								
Nitrogen, NO2 plus NO3	**<0.059**	mg/L	0.25	0.059	1		12/14/22 12:16		

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

QC Batch: 433474 — Analysis Method: EPA 6010D
QC Batch Method: EPA 3010A — Analysis Description: 6010D MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40255561001, 40255561002, 40255561003, 40255561004, 40255561005, 40255561006, 40255561007, 40255561008, 40255561009, 40255561010

METHOD BLANK: 2495648 — Matrix: Water
Associated Lab Samples: 40255561001, 40255561002, 40255561003, 40255561004, 40255561005, 40255561006, 40255561007, 40255561008, 40255561009, 40255561010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<17.3	40.0	12/13/22 20:06	
Calcium	ug/L	<114	500	12/13/22 20:06	
Copper	ug/L	<3.4	10.0	12/13/22 20:06	
Manganese	ug/L	<1.5	5.0	12/13/22 20:06	
Silver	ug/L	<3.2	10.0	12/13/22 20:06	
Total Hardness by 2340B	mg/L	<1.0	5.4	12/13/22 20:06	
Zinc	ug/L	<11.6	40.0	12/13/22 20:06	

LABORATORY CONTROL SAMPLE: 2495649

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	250	247	99	80-120	
Calcium	ug/L	10000	10200	102	80-120	
Copper	ug/L	250	261	104	80-120	
Manganese	ug/L	250	260	104	80-120	
Silver	ug/L	125	116	93	80-120	
Total Hardness by 2340B	mg/L		67.4			
Zinc	ug/L	250	252	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2495650 2495651

Parameter	Units	40255561001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	<17.3	250	250	263	265	100	101	75-125	1	20	
Calcium	ug/L	75200	10000	10000	85700	85700	105	104	75-125	0	20	
Copper	ug/L	<3.4	250	250	263	265	105	105	75-125	1	20	
Manganese	ug/L	<1.5	250	250	260	260	104	104	75-125	0	20	
Silver	ug/L	<3.2	125	125	118	118	94	94	75-125	0	20	
Total Hardness by 2340B	mg/L	350			416	416				0	20	
Zinc	ug/L	<11.6	250	250	253	252	100	100	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

QUALITY CONTROL DATA

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

QC Batch: 433928
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: 40255561007

METHOD BLANK: 2497712 Matrix: Water
Associated Lab Samples: 40255561007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	12/29/22 01:28	

LABORATORY CONTROL SAMPLE: 2497713

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	20.3	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2497714 2497715

Parameter	Units	40255416003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	719J	20000	20000	22500	21300	109	103	90-110	5	15	

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

QUALITY CONTROL DATA

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

QC Batch: 433127 — Analysis Method: EPA 310.2
QC Batch Method: EPA 310.2 — Analysis Description: 310.2 Alkalinity
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40255561001, 40255561002, 40255561003, 40255561004, 40255561005, 40255561006, 40255561007, 40255561008, 40255561009, 40255561010

METHOD BLANK: 2493238 — Matrix: Water
Associated Lab Samples: 40255561001, 40255561002, 40255561003, 40255561004, 40255561005, 40255561006, 40255561007, 40255561008, 40255561009, 40255561010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<7.4	25.0	12/07/22 12:18	

LABORATORY CONTROL SAMPLE: 2493239

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	100	99.0	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2493240 2493241

Parameter	Units	40255561005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	302	200	200	504	506	101	102	90-110	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2493242 2493243

Parameter	Units	40255561008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	270	200	200	476	472	103	101	90-110	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

QUALITY CONTROL DATA

Project: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

QC Batch: 433750 — Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 — Analysis Description: 353.2 Nitrate + Nitrite, preserved
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40255561001, 40255561002, 40255561003, 40255561004, 40255561005, 40255561006, 40255561007, 40255561008, 40255561009, 40255561010

METHOD BLANK: 2496502 — Matrix: Water
Associated Lab Samples: 40255561001, 40255561002, 40255561003, 40255561004, 40255561005, 40255561006, 40255561007, 40255561008, 40255561009, 40255561010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	<0.059	0.25	12/14/22 12:00	

LABORATORY CONTROL SAMPLE: 2496503

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2496504 2496505

Parameter	Units	40255416011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	3.1	2.5	2.5	5.7	5.6	102	99	90-110	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2496506 2496507

Parameter	Units	40255582004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	<0.059	2.5	2.5	2.6	2.6	104	103	90-110	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: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

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: WPL-COLUMBIA ENERGY CENTER
Pace Project No.: 40255561

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40255561001	**MW-84A**	EPA 3010A	433474	EPA 6010D	433648
40255561002	**MW-301**	EPA 3010A	433474	EPA 6010D	433648
40255561003	**MW-33AR**	EPA 3010A	433474	EPA 6010D	433648
40255561004	**MW-34A**	EPA 3010A	433474	EPA 6010D	433648
40255561005	**MW-302**	EPA 3010A	433474	EPA 6010D	433648
40255561006	**MW-309**	EPA 3010A	433474	EPA 6010D	433648
40255561007	**MW-310**	EPA 3010A	433474	EPA 6010D	433648
40255561008	**MW-311**	EPA 3010A	433474	EPA 6010D	433648
40255561009	**FIELD BLANK MOD1-3LF**	EPA 3010A	433474	EPA 6010D	433648
40255561010	**FIELD BLANK MOD4**	EPA 3010A	433474	EPA 6010D	433648
40255561001	**MW-84A**				
40255561002	**MW-301**				
40255561003	**MW-33AR**				
40255561004	**MW-34A**				
40255561005	**MW-302**				
40255561006	**MW-309**				
40255561007	**MW-310**				
40255561008	**MW-311**				
40255561007	**MW-310**	EPA 300.0	433928		
40255561001	**MW-84A**	EPA 310.2	433127		
40255561002	**MW-301**	EPA 310.2	433127		
40255561003	**MW-33AR**	EPA 310.2	433127		
40255561004	**MW-34A**	EPA 310.2	433127		
40255561005	**MW-302**	EPA 310.2	433127		
40255561006	**MW-309**	EPA 310.2	433127		
40255561007	**MW-310**	EPA 310.2	433127		
40255561008	**MW-311**	EPA 310.2	433127		
40255561009	**FIELD BLANK MOD1-3LF**	EPA 310.2	433127		
40255561010	**FIELD BLANK MOD4**	EPA 310.2	433127		
40255561001	**MW-84A**	EPA 353.2	433750		
40255561002	**MW-301**	EPA 353.2	433750		
40255561003	**MW-33AR**	EPA 353.2	433750		
40255561004	**MW-34A**	EPA 353.2	433750		
40255561005	**MW-302**	EPA 353.2	433750		
40255561006	**MW-309**	EPA 353.2	433750		
40255561007	**MW-310**	EPA 353.2	433750		
40255561008	**MW-311**	EPA 353.2	433750		
40255561009	**FIELD BLANK MOD1-3LF**	EPA 353.2	433750		
40255561010	**FIELD BLANK MOD4**	EPA 353.2	433750		

REPORT OF LABORATORY ANALYSIS

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

40255561

ALL SHADED AREAS are for LAB USE ONLY

Company: SCS Engineers	Billing Information: Same
Address: 2830 Dairy Dr, Madison WI.	
Report To: Meghan Blodgett	Email To: MBlodgett@scsengineers.com
Copy To: Thomas Karwoski	Site Collection Info/Address: W8375 Murray Rd.
Customer Project Name/Number: WPL-Columbia Energy Center	State: WI County/City: Pardeeville Time Zone Collected: [ ] PT [ ] MT [CT] ET
Phone: 608-224-2830 Email:	Site/Facility ID #: Compliance Monitoring? [X] Yes [ ] No
Collected By (print): Adam Watson	Purchase Order #: Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: Immediately Packed on Ice: [X] 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 [X] No Analysis:

Container Preservative Type **: 1 3 2

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 + Hardness	Alkalinity	Nitrate + Nitrite	Lab Profile/Line:
MW-84A	GW	Grab			12/2/22	1215						001
MW-301						1300						002
MW-33AR						925						003
MW-34A						1010						004
MW-302						1105						005
MW-309					11/30/22	1420						006
MW-310						1540						007
MW-311						1620						008
(1) Fieldblank MOD2-3LF					12/2/22	1105						009
(2) Fieldblank					11/30/22	1540						010

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 (Blue) See SCurk 12/2/22 mp

Packing Material Used:

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

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

Lab Tracking #: 2785233

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: oC
Cooler 1 Therm Corr. Factor: oC
Cooler 1 Corrected Temp: oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
SCS	12/2/22 1520		
Cs logistics	12/2/22 900		12/2/22 900

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

(1) + (2) labadded to COC per PM, received with other samples in shipment 12/2/22 mp

Sample Preservation Receipt Form

Client Name: SCS Project # 40255561

All containers needing preservation have been checked and noted below: ☒Yes ☐No ☐N/A Initial when completed: MP Date/Time: 12/2/22 10:30am

Lab Lot# of pH paper. 10307222 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	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN 1	GN 2							
001									1		1	1																			3	X	2.5 / 5
002									1		1	1																					2.5 / 5
003									1		1	1																					2.5 / 5
004									1		1	1																					2.5 / 5
005									1		1	1																					2.5 / 5
006									1		1	1																					2.5 / 5
007									1		1	1																					2.5 / 5
008									1		1	1																					2.5 / 5
009									1		1	1																					2.5 / 5
010									1		1	1																					2.5 / 5
011									X																								2.5 / 5
012									12/6/22 MP																								2.5 / 5
013																																	2.5 / 5
014																																	2.5 / 5
015																																	2.5 / 5
016																																	2.5 / 5
017																																	2.5 / 5
018																																	2.5 / 5
019																																	2.5 / 5
020																																	2.5 / 5

12/6/22 MP

Exceptions to preservation check VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: _____ Headspace in VOA Vials (>6mm) · ☐Yes ☐No ☒N/A *If yes look in headspace column

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	VG9C	40 mL clear ascorbic w/ HCl	JGFU	4 oz amber jar unpres
BG1U	1 liter clear glass	BP3U	250 mL plastic unpres	DG9T	40 mL amber Na Thio	JG9U	9 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP3B	250 mL plastic NaOH	VG9U	40 mL clear vial unpres	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9H	40 mL clear vial HCL	WPFU	4 oz plastic jar unpres
AG5U	100 mL amber glass unpres	BP3S	250 mL plastic H2SO4	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH + Zn	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres					GN 1	
						GN 2	

Page 1 of 2

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO#: 40255561

40255561

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 12/12/22 MP

Thermometer Used SR - 124 **Type of Ice:** (Wet) Blue Dry None ☐ Meltwater Only

Cooler Temperature Uncorr. 2° /Corr: 2°

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: 12/2/22 Initials: MP
Labeled By Initials: YH

Chain of Custody Present:	☒Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☒Yes ☐No ☐N/A	2.
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.
- DI 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:		8.
For Analysis: ☒Yes ☐No MS/MSD:	☐Yes ☒No ☐N/A	
Correct Containers Used:	☒Yes ☐No	9.
Correct Type: Pace Green Bay, Pace IR, Non-Pace		
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. DUP BP35" MW-310" placed by time 12/2/22 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

Table 2. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Columbia Energy Center / SCS Engineers Project #25219067

			COC #1 - Background Wells		COC #2 - Landfill Modules 1-3							COC #3 - Landfill Modules 4-6				Primary Pond					Secondary Pond			
		Parameter	MW-301	MW-84A	MW-302	MW-33AR	MW-34A	MW-93A	MW-93B	MW-312	FIELD BLANK - MOD1-3LF	MW-309	MW-310	MW-311	FIELD BLANK - MOD4	MW-303	MW-304	MW-305	M-4R	FIELD BLANK - PPOND	MW-306	MW-307	MW-308	FIELD BLANK - SCPOND
Lab Parameters	Appendix III Parameters (Detection Monitoring)	Boron						Removed from sampling program																
		Calcium																						
		Chloride																						
		Fluoride																						
		pH																						
		Sulfate																						
		TDS																						
	Appendix IV Parameters (Assessment Monitoring)	Antimony																						
		Arsenic																						
		Barium																						
		Beryllium																						
		Cadmium																						
		Chromium																						
		Cobalt																						
		Fluoride																						
		Lead																						
		Lithium																						
		Mercury																						
		Molybdenum																						
		Selenium																						
		Thallium																						
		Radium 226+228																						
	Additional WDNR Parameters	Alkalinity	x	x	x	x	x			x		x	x	x	x									
		Hardness	x	x	x	x	x			x		x	x	x	x									
		Nitrate + Nitrite as N	x	x	x	x	x			x		x	x	x	x									
		Copper	x	x	x	x	x			x		x	x	x	x									
		Manganese	x	x	x	x	x			x		x	x	x	x									
		Silver	x	x	x	x	x			x		x	x	x	x									
		Zinc	x	x	x	x	x			x		x	x	x	x									
Field Parameters	CCR Rule Field Parameters	Groundwater Elevation	x	x	x	x	x					x	x	x										
		pH	x	x	x	x	x					x	x	x										
	Low-Flow Sampling Field Parameters	Well Depth																						
		Specific Conductance	x	x	x	x	x					x	x	x										
		Dissolved Oxygen	x	x	x	x	x					x	x	x										
		ORP	x	x	x	x	x					x	x	x										
		Temperature	x	x	x	x	x					x	x	x										
		Turbidity	x	x	x	x	x					x	x	x										
		Color	x	x	x	x	x					x	x	x										
		Odor	x	x	x	x	x					x	x	x										

Notes: All samples are unfiltered (total).

X:\ereports\40255h\40255561\[2022 Nov_COL CCR.xls]Sheet1

Dan Milewsky

From: Blodgett, Meghan <mblodgett@scsengineers.com>
Sent: Tuesday, December 13, 2022 3:30 PM
To: Dan Milewsky
Cc: Clark, Sherren; Kron, Nicole; Matzuk, Ryan
Subject: RE: Columbia, 40255561_coc

Thanks, Dan. 6010 is fine. Please add the following analytes:

MW-309: boron and calcium
MW-310: calcium and chloride

You'll see the field data shortly.

Meghan Blodgett
SCS Engineers
Madison, WI
608-345-9221 (C)
mblodgett@scsengineers.com

www.scsengineers.com

-----Original Message-----
From: Dan Milewsky <Dan.Milewsky@pacelabs.com>
Sent: Tuesday, December 13, 2022 3:20 PM
To: Blodgett, Meghan <mblodgett@scsengineers.com>
Cc: Clark, Sherren <SClark@scsengineers.com>; Kron, Nicole <NKron@scsengineers.com>; Matzuk, Ryan <RMatzuk@scsengineers.com>
Subject: RE: Columbia, 40255561_coc

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

May 15, 2023

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on April 28, 2023. 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
Natalie Burris, SCS ENGINEERS
Sherren Clark, SCS Engineers
Jenny Coughlin, Alliant Energy
Tom Karwoski, SCS ENGINEERS
Ryan Matzuk, SCS Engineers
Jeff Maxted, ALLIANT ENERGY

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

CERTIFICATIONS

Project: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

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
South Carolina Certification #: 83006001
Texas Certification #: T104704529-21-8
Virginia VELAP Certification ID: 11873
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-21-00008
Federal Fish & Wildlife Permit #: 51774A

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40261478001	**MW-309**	Water	04/26/23 12:40	04/28/23 08:40
40261478002	**MW-310**	Water	04/26/23 11:30	04/28/23 08:40
40261478003	**MW-311**	Water	04/26/23 12:25	04/28/23 08:40
40261478004	**FIELD BLANK MOD4**	Water	04/26/23 13:00	04/28/23 08:40

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

SAMPLE ANALYTE COUNT

Project: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40261478001	**MW-309**	EPA 6020B	KXS	2
			LB	7
		SM 2540C	HNT	1
		EPA 9040	SRK	1
		EPA 300.0	HMB	3
40261478002	**MW-310**	EPA 6020B	KXS	2
			LB	7
		SM 2540C	HNT	1
		EPA 9040	SRK	1
		EPA 300.0	HMB	3
40261478003	**MW-311**	EPA 6020B	KXS	2
			LB	7
		SM 2540C	HNT	1
		EPA 9040	SRK	1
		EPA 300.0	HMB	3
40261478004	**FIELD BLANK MOD4**	EPA 6020B	KXS	2
		SM 2540C	HNT	1
		EPA 9040	SRK	1
		EPA 300.0	HMB	3

PASI-G = Pace Analytical Services - Green Bay

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

Sample: MW-309 **Lab ID: 40261478001** Collected: 04/26/23 12:40 Received: 04/28/23 08:40 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								
Boron	**50.8**	ug/L	10.0	3.0	1	05/02/23 05:28	05/10/23 23:35	7440-42-8	
Calcium	**35500**	ug/L	254	76.2	1	05/02/23 05:28	05/10/23 23:35	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.61**	Std. Units			1		04/26/23 12:40		
Field Specific Conductance	**2073.0**	umhos/cm			1		04/26/23 12:40		
Oxygen, Dissolved	**10.96**	mg/L			1		04/26/23 12:40	7782-44-7	
REDOX	**107.0**	mV			1		04/26/23 12:40		
Turbidity	**1.90**	NTU			1		04/26/23 12:40		
Static Water Level	**785.05**	feet			1		04/26/23 12:40		
Temperature, Water (C)	**10.8**	deg C			1		04/26/23 12:40		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**1250**	mg/L	20.0	8.7	1		05/01/23 10:53		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.010	1		05/02/23 17:20		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**372**	mg/L	40.0	8.6	20		05/15/23 12:46	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/12/23 00:43	16984-48-8	
Sulfate	**143**	mg/L	40.0	8.9	20		05/15/23 12:46	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: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

Sample: MW-310 **Lab ID: 40261478002** Collected: 04/26/23 11:30 Received: 04/28/23 08:40 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								
Boron	**57.5**	ug/L	10.0	3.0	1	05/02/23 05:28	05/10/23 23:42	7440-42-8	
Calcium	**36800**	ug/L	254	76.2	1	05/02/23 05:28	05/10/23 23:42	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.27**	Std. Units			1		04/26/23 11:30		
Field Specific Conductance	**1040.0**	umhos/cm			1		04/26/23 11:30		
Oxygen, Dissolved	**11.38**	mg/L			1		04/26/23 11:30	7782-44-7	
REDOX	**112.6**	mV			1		04/26/23 11:30		
Turbidity	**2.25**	NTU			1		04/26/23 11:30		
Static Water Level	**785.18**	feet			1		04/26/23 11:30		
Temperature, Water (C)	**10.8**	deg C			1		04/26/23 11:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**654**	mg/L	20.0	8.7	1		05/01/23 10:53		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.010	1		05/02/23 17:22		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**128**	mg/L	40.0	8.6	20		05/15/23 13:00	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/12/23 00:57	16984-48-8	
Sulfate	**102**	mg/L	40.0	8.9	20		05/15/23 13:00	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: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

Sample: MW-311 **Lab ID: 40261478003** Collected: 04/26/23 12:25 Received: 04/28/23 08:40 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								
Boron	**23.0**	ug/L	10.0	3.0	1	05/02/23 05:28	05/11/23 00:19	7440-42-8	
Calcium	**52800**	ug/L	254	76.2	1	05/02/23 05:28	05/11/23 00:19	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.48**	Std. Units			1		04/26/23 12:25		
Field Specific Conductance	**484.7**	umhos/cm			1		04/26/23 12:25		
Oxygen, Dissolved	**10.58**	mg/L			1		04/26/23 12:25	7782-44-7	
REDOX	**118.4**	mV			1		04/26/23 12:25		
Turbidity	**0.39**	NTU			1		04/26/23 12:25		
Static Water Level	**785.69**	feet			1		04/26/23 12:25		
Temperature, Water (C)	**9.8**	deg C			1		04/26/23 12:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**292**	mg/L	20.0	8.7	1		05/01/23 10:53		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.010	1		05/02/23 17:23		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**2.1**	mg/L	2.0	0.43	1		05/12/23 01:12	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/12/23 01:12	16984-48-8	
Sulfate	**22.2**	mg/L	2.0	0.44	1		05/12/23 01:12	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: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

Sample: FIELD BLANK MOD4 **Lab ID: 40261478004** Collected: 04/26/23 13:00 Received: 04/28/23 08:40 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								
Boron	**<3.0**	ug/L	10.0	3.0	1	05/02/23 05:28	05/10/23 19:55	7440-42-8	
Calcium	**<76.2**	ug/L	254	76.2	1	05/02/23 05:28	05/10/23 19:55	7440-70-2	
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		05/01/23 10:53		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**6.3**	Std. Units	0.10	0.010	1		05/02/23 17:36		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		05/12/23 01:26	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/12/23 01:26	16984-48-8	
Sulfate	**<0.44**	mg/L	2.0	0.44	1		05/12/23 01:26	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

QC Batch: 443772
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40261478001, 40261478002, 40261478003, 40261478004

METHOD BLANK: 2547952 Matrix: Water
Associated Lab Samples: 40261478001, 40261478002, 40261478003, 40261478004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.0	10.0	05/10/23 19:11	
Calcium	ug/L	<76.2	254	05/10/23 19:11	

LABORATORY CONTROL SAMPLE: 2547953

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	250	225	90	80-120	
Calcium	ug/L	10000	9600	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547954 2547955

Parameter	Units	40261411001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	32.0	250	250	249	245	87	85	75-125	2	20	
Calcium	ug/L	91800	10000	10000	104000	105000	124	132	75-125	1	20	P6

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

QUALITY CONTROL DATA

Project: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

QC Batch: 443675 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40261478001, 40261478002, 40261478003, 40261478004

METHOD BLANK: 2547666 Matrix: Water
Associated Lab Samples: 40261478001, 40261478002, 40261478003, 40261478004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	05/01/23 10:47	

LABORATORY CONTROL SAMPLE: 2547667

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	582	552	95	80-120	

SAMPLE DUPLICATE: 2547668

Parameter	Units	40261457001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	448	464	4	10	

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

QUALITY CONTROL DATA

Project: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

QC Batch: 443847
QC Batch Method: EPA 9040
Analysis Method: EPA 9040
Analysis Description: 9040 pH
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40261478001, 40261478002, 40261478003, 40261478004

SAMPLE DUPLICATE: 2548305

Parameter	Units	40261459003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.3	7.3	0	20	H6

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

QUALITY CONTROL DATA

Project: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

QC Batch: 444529
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: 40261478001, 40261478002, 40261478003, 40261478004

METHOD BLANK: 2551731 Matrix: Water
Associated Lab Samples: 40261478001, 40261478002, 40261478003, 40261478004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	05/11/23 21:07	
Fluoride	mg/L	<0.095	0.32	05/11/23 21:07	
Sulfate	mg/L	<0.44	2.0	05/11/23 21:07	

LABORATORY CONTROL SAMPLE: 2551732

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	20.2	101	90-110	
Fluoride	mg/L	2	2.0	101	90-110	
Sulfate	mg/L	20	20.1	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2551733 2551734

Parameter	Units	40261465015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	27.1J	400	400	433	429	101	101	90-110	1	15	
Fluoride	mg/L	<1.9	40	40	42.5	41.8	106	105	90-110	1	15	
Sulfate	mg/L	969	2000	2000	2860	2800	94	92	90-110	2	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2551735 2551736

Parameter	Units	40261749002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	21.4	20	20	42.5	42.6	105	106	90-110	0	15	
Fluoride	mg/L	0.16J	2	2	2.4	2.4	110	111	90-110	0	15	M0
Sulfate	mg/L	29.2	20	20	50.3	50.4	105	106	90-110	0	15	

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: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

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.

ANALYTE QUALIFIERS

H6	Analysis initiated outside of the 15 minute EPA required holding time.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25223067 COLUMBIA CCR MOD 4-6
Pace Project No.: 40261478

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40261478001	**MW-309**	EPA 3010A	443772	EPA 6020B	443833
40261478002	**MW-310**	EPA 3010A	443772	EPA 6020B	443833
40261478003	**MW-311**	EPA 3010A	443772	EPA 6020B	443833
40261478004	**FIELD BLANK MOD4**	EPA 3010A	443772	EPA 6020B	443833
40261478001	**MW-309**				
40261478002	**MW-310**				
40261478003	**MW-311**				
40261478001	**MW-309**	SM 2540C	443675		
40261478002	**MW-310**	SM 2540C	443675		
40261478003	**MW-311**	SM 2540C	443675		
40261478004	**FIELD BLANK MOD4**	SM 2540C	443675		
40261478001	**MW-309**	EPA 9040	443847		
40261478002	**MW-310**	EPA 9040	443847		
40261478003	**MW-311**	EPA 9040	443847		
40261478004	**FIELD BLANK MOD4**	EPA 9040	443847		
40261478001	**MW-309**	EPA 300.0	444529		
40261478002	**MW-310**	EPA 300.0	444529		
40261478003	**MW-311**	EPA 300.0	444529		
40261478004	**FIELD BLANK MOD4**	EPA 300.0	444529		

402614 78

Pace

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at https://info.pacelabs.com/hubfs/pas-standard-terms.pdf.

Page : 1 Of 1

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: SCS ENGINEERS	Report To: Meghan Blodgett	Attention:
Address: 2830 Dairy Drive	Copy To:	Company Name
Madison, WI 53718		Address
Email: mblodgett@scsengineers.com	Purchase Order #:	Pace Quote:
Phone: 608-216-7362 Fax:	Project Name: 25223067 Columbia CCR Mod 4-6	Pace Project Manager: dan.milewsky@pacelabs.com
Requested Due Date:	Project #: 25223067	Pace Profile #:

Regulatory Agency	State / Location
	WI

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analysis Filtered (Y/N): Y/N	Analyses Test: Metals (B/Ca)	Chloride/Fluoride/Sulfate	TDS and pH	Residual Chlorine (Y/N)	
	MATRIX CODES: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Other OT, Tissue TS																	N	N	N	N		
1		WT																					
2	MW-309	WT		4/26	1240				3	X		X							X	X	X		001
3	MW-310	WT		4/26	1130				3	X		X							X	X	X		002
4	MW-311	WT		4/26	1225				3	X		X							X	X	X		003
5	FIELD BLANK MOD4	WT		4/26	1300				3	X		X							X	X	X		004
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
ALL SAMPLES UNFILTERED	Bridget Russell	4/27	1600							
	[illegible]	4/28/23	0840	[illegible]	4/28/23	0840	2.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Bridget Russell

SIGNATURE of SAMPLER: [signature] DATE Signed: 4/27/2023

Sample Preservation Receipt Form

Client Name: SCS Engineers Project # 402614478

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

Lab Lot# of pH paper. 1200722 Lab Std #ID of preservation (if pH adjusted)

Pace Lab #	Glass: AG1U	BG1U	AG1H	AG4S	AG5U	AG2S	BG3U	Plastic: BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	Vials: VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	Jars: JGFU	JG9U	WGFU	WPFU	General: SP5T	ZPLC	GN 1	GN 2	VOA Vials (>6mm)*	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001									22		1																							2.5 / 5
002									22		1																						X		2.5 / 5
003									22		1																						X		2.5 / 5
004											1																						X		2.5 / 5
005																																			2.5 / 5
006																																			2.5 / 5
007																																			2.5 / 5
008																																			2.5 / 5
009											2/28/23																								2.5 / 5
010																																			2.5 / 5
011																																			2.5 / 5
012																																			2.5 / 5
013																																			2.5 / 5
014																																			2.5 / 5
015																																			2.5 / 5
016																																			2.5 / 5
017																																			2.5 / 5
018																																			2.5 / 5
019																																			2.5 / 5
020																																			2.5 / 5

Exceptions to preservation check VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other:_____ Headspace in VOA Vials (>6mm) · ☐Yes ☐No ☐N/A ***If yes look in headspace column**

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	VG9C	40 mL clear ascorbic w/ HCl	JGFU	4 oz amber jar unpres
BG1U	1 liter clear glass	BP3U	250 mL plastic unpres	DG9T	40 mL amber Na Thio	JG9U	9 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP3B	250 mL plastic NaOH	VG9U	40 mL clear vial unpres	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9H	40 mL clear vial HCL	WPFU	4 oz plastic jar unpres
AG5U	100 mL amber glass unpres	BP3S	250 mL plastic H2SO4	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH + Zn	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres					GN 1	
						GN 2	

Page 1 of 2

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40261478

40261478

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 - 9 **Type of Ice:** Wet Blue Dry None ☐ Meltwater Only

Cooler Temperature Uncorr 1.0 /Corr: 2.0

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: 4/28/23 /Initials: SG

Labeled By Initials: MH

Chain of Custody Present: 4/28/23 SG	☑Yes ☐No ☐N/A	1. PM pouded 4/28/23 SG
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
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.
- DI 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.
Correct Type: Pace Green Bay Pace IR, Non-Pace		
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 logi

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

May 26, 2023

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on April 28, 2023. 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

Revised Report: REDOX has been added to the field data list for MW-84A.

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
Natalie Burris, SCS ENGINEERS
Sherren Clark, SCS Engineers
Jenny Coughlin, Alliant Energy
Tom Karwoski, SCS ENGINEERS
Ryan Matzuk, SCS Engineers
Jeff Maxted, ALLIANT ENERGY

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

CERTIFICATIONS

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

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
South Carolina Certification #: 83006001
Texas Certification #: T104704529-21-8
Virginia VELAP Certification ID: 11873
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-21-00008
Federal Fish & Wildlife Permit #: 51774A

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40261460001	**MW-301**	Water	04/27/23 12:20	04/28/23 08:40
40261460002	**MW-84A**	Water	04/27/23 14:05	04/28/23 08:40

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40261460001	**MW-301**	EPA 6020B	TXW	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			LB	7	PASI-G
		EPA 903.1	JLJ	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	HNT	1	PASI-G
		EPA 9040	SRK	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40261460002	**MW-84A**	EPA 6020B	TXW	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			LB	7	PASI-G
		EPA 903.1	JLJ	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	HNT	1	PASI-G
		EPA 9040	SRK	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

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

ANALYTICAL RESULTS

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

Sample: MW-301 **Lab ID: 40261460001** Collected: 04/27/23 12:20 Received: 04/28/23 08:40 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	05/01/23 06:24	05/15/23 08:01	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	05/01/23 06:24	05/15/23 08:01	7440-38-2	
Barium	**9.8**	ug/L	2.3	0.70	1	05/01/23 06:24	05/15/23 08:01	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	05/01/23 06:24	05/15/23 08:01	7440-41-7	
Boron	**20.1**	ug/L	10.0	3.0	1	05/01/23 06:24	05/15/23 08:01	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	05/01/23 06:24	05/15/23 08:01	7440-43-9	
Calcium	**120000**	ug/L	254	76.2	1	05/01/23 06:24	05/15/23 08:01	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	05/01/23 06:24	05/15/23 08:01	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	05/01/23 06:24	05/15/23 08:01	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	05/01/23 06:24	05/15/23 08:01	7439-92-1	
Lithium	**0.62J**	ug/L	1.0	0.22	1	05/01/23 06:24	05/15/23 08:01	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	05/01/23 06:24	05/15/23 08:01	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	05/01/23 06:24	05/15/23 08:01	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	05/01/23 06:24	05/15/23 08:01	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	05/08/23 10:55	05/09/23 09:00	7439-97-6	M0
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**6.65**	Std. Units			1		04/27/23 12:20		
Field Specific Conductance	**857.0**	umhos/cm			1		04/27/23 12:20		
Oxygen, Dissolved	**6.50**	mg/L			1		04/27/23 12:20	7782-44-7	
REDOX	**95.3**	mV			1		04/27/23 12:20		
Turbidity	**0.00**	NTU			1		04/27/23 12:20		
Static Water Level	**787.57**	feet			1		04/27/23 12:20		
Temperature, Water (C)	**8.0**	deg C			1		04/27/23 12:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**526**	mg/L	20.0	8.7	1		05/01/23 10:51		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**6.9**	Std. Units	0.10	0.010	1		05/02/23 16:48		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**1.5J**	mg/L	2.0	0.43	1		05/12/23 16:00	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/12/23 16:00	16984-48-8	
Sulfate	**12.3**	mg/L	2.0	0.44	1		05/12/23 16:00	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: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

Sample: MW-84A **Lab ID: 40261460002** Collected: 04/27/23 14:05 Received: 04/28/23 08:40 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	05/01/23 06:24	05/15/23 08:08	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	05/01/23 06:24	05/15/23 08:08	7440-38-2	
Barium	**12.6**	ug/L	2.3	0.70	1	05/01/23 06:24	05/15/23 08:08	7440-39-3	
Beryllium	**<0.25**	ug/L	1.0	0.25	1	05/01/23 06:24	05/15/23 08:08	7440-41-7	
Boron	**10.3**	ug/L	10.0	3.0	1	05/01/23 06:24	05/15/23 08:08	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	05/01/23 06:24	05/15/23 08:08	7440-43-9	
Calcium	**68600**	ug/L	254	76.2	1	05/01/23 06:24	05/15/23 08:08	7440-70-2	
Chromium	**1.7J**	ug/L	3.4	1.0	1	05/01/23 06:24	05/15/23 08:08	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	05/01/23 06:24	05/15/23 08:08	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	05/01/23 06:24	05/15/23 08:08	7439-92-1	
Lithium	**0.71J**	ug/L	1.0	0.22	1	05/01/23 06:24	05/15/23 08:08	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	05/01/23 06:24	05/15/23 08:08	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	05/01/23 06:24	05/15/23 08:08	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	05/01/23 06:24	05/15/23 08:08	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	05/08/23 10:55	05/09/23 09:12	7439-97-6	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.01**	Std. Units			1		04/27/23 14:05		
Field Specific Conductance	**556.6**	umhos/cm			1		04/27/23 14:05		
Field Oxidation Potential	**103.4**	mV			1		04/27/23 14:05		
Oxygen, Dissolved	**9.37**	mg/L			1		04/27/23 14:05	7782-44-7	
Turbidity	**0.72**	NTU			1		04/27/23 14:05		
Static Water Level	**786.97**	feet			1		04/27/23 14:05		
Temperature, Water (C)	**10.7**	deg C			1		04/27/23 14:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**326**	mg/L	20.0	8.7	1		05/01/23 10:51		
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		05/02/23 16:52		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**3.0**	mg/L	2.0	0.43	1		05/12/23 16:59	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/12/23 16:59	16984-48-8	
Sulfate	**1.3J**	mg/L	2.0	0.44	1		05/12/23 16:59	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

QC Batch: 444256
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40261460001, 40261460002

METHOD BLANK: 2550653 Matrix: Water
Associated Lab Samples: 40261460001, 40261460002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.066	0.20	05/09/23 08:56	

LABORATORY CONTROL SAMPLE: 2550654

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.5	110	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2550655 2550656

Parameter	Units	40261460001 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	5.8	5.9	115	119	85-115	3	20	M0

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

QUALITY CONTROL DATA

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

QC Batch: 443628
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40261460001, 40261460002

METHOD BLANK: 2547530 Matrix: Water
Associated Lab Samples: 40261460001, 40261460002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	05/11/23 17:42	
Arsenic	ug/L	<0.28	1.0	05/11/23 17:42	
Barium	ug/L	<0.70	2.3	05/11/23 17:42	
Beryllium	ug/L	<0.25	1.0	05/11/23 17:42	
Boron	ug/L	<3.0	10.0	05/11/23 17:42	
Cadmium	ug/L	<0.15	1.0	05/11/23 17:42	
Calcium	ug/L	<76.2	254	05/11/23 17:42	
Chromium	ug/L	<1.0	3.4	05/11/23 17:42	
Cobalt	ug/L	<0.12	1.0	05/11/23 17:42	
Lead	ug/L	<0.24	1.0	05/11/23 17:42	
Lithium	ug/L	<0.22	1.0	05/11/23 17:42	
Molybdenum	ug/L	<0.44	1.5	05/11/23 17:42	
Selenium	ug/L	<0.32	1.1	05/11/23 17:42	
Thallium	ug/L	<0.14	1.0	05/11/23 17:42	

LABORATORY CONTROL SAMPLE: 2547531

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	250	250	100	80-120	
Arsenic	ug/L	250	255	102	80-120	
Barium	ug/L	250	234	94	80-120	
Beryllium	ug/L	250	233	93	80-120	
Boron	ug/L	250	220	88	80-120	
Cadmium	ug/L	250	254	102	80-120	
Calcium	ug/L	10000	10200	102	80-120	
Chromium	ug/L	250	241	96	80-120	
Cobalt	ug/L	250	241	96	80-120	
Lead	ug/L	250	241	96	80-120	
Lithium	ug/L	250	237	95	80-120	
Molybdenum	ug/L	250	245	98	80-120	
Selenium	ug/L	250	257	103	80-120	
Thallium	ug/L	250	227	91	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
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547532 2547533

Parameter	Units	40261434001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.52J	250	250	268	263	107	105	75-125	2	20	
Arsenic	ug/L	12.4	250	250	264	262	100	100	75-125	1	20	
Barium	ug/L	128	250	250	405	384	111	102	75-125	5	20	
Beryllium	ug/L	0.83J	250	250	261	259	104	103	75-125	1	20	
Boron	ug/L	43.8	250	250	309	302	106	103	75-125	2	20	
Cadmium	ug/L	0.56J	250	250	249	243	99	97	75-125	3	20	
Calcium	ug/L	147000	10000	10000	163000	156000	157	94	75-125	4	20	P6
Chromium	ug/L	30.1	250	250	279	274	100	98	75-125	2	20	
Cobalt	ug/L	19.2	250	250	257	254	95	94	75-125	1	20	
Lead	ug/L	26.6	250	250	280	274	102	99	75-125	2	20	
Lithium	ug/L	23.9	250	250	277	276	101	101	75-125	0	20	
Molybdenum	ug/L	1.3J	250	250	246	241	98	96	75-125	2	20	
Selenium	ug/L	1.9J	250	250	267	264	106	105	75-125	1	20	
Thallium	ug/L	0.44J	250	250	250	251	100	100	75-125	0	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

QUALITY CONTROL DATA

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

QC Batch: 443675
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40261460001, 40261460002

METHOD BLANK: 2547666 Matrix: Water
Associated Lab Samples: 40261460001, 40261460002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	05/01/23 10:47	

LABORATORY CONTROL SAMPLE: 2547667

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	582	552	95	80-120	

SAMPLE DUPLICATE: 2547668

Parameter	Units	40261457001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	448	464	4	10	

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

QUALITY CONTROL DATA

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

QC Batch: 443847
QC Batch Method: EPA 9040
Analysis Method: EPA 9040
Analysis Description: 9040 pH
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40261460001, 40261460002

SAMPLE DUPLICATE: 2548305

Parameter	Units	40261459003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.3	7.3	0	20	H6

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

QUALITY CONTROL DATA

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

QC Batch: 444310
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: 40261460001, 40261460002

METHOD BLANK: 2550800 Matrix: Water
Associated Lab Samples: 40261460001, 40261460002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	05/12/23 14:40	
Fluoride	mg/L	<0.095	0.32	05/12/23 14:40	
Sulfate	mg/L	<0.44	2.0	05/12/23 14:40	

LABORATORY CONTROL SAMPLE: 2550801

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.5	98	90-110	
Fluoride	mg/L	2	2.0	101	90-110	
Sulfate	mg/L	20	19.7	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2550802 2550803

Parameter	Units	40261459001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2.3	20	20	22.6	22.7	102	102	90-110	0	15	
Fluoride	mg/L	<0.095	2	2	2.1	2.1	105	104	90-110	0	15	
Sulfate	mg/L	11.0	20	20	31.5	31.5	103	103	90-110	0	15	

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

Sample: MW-301 **Lab ID: 40261460001** Collected: 04/27/23 12:20 Received: 04/28/23 08:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.387 (0.805) C:NA T:99%**	pCi/L	05/18/23 14:53	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.417 ± 0.322 (0.623) C:80% T:87%**	pCi/L	05/15/23 15:22	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.417 ± 0.709 (1.43)**	pCi/L	05/22/23 12:45	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

Sample: MW-84A **Lab ID: 40261460002** Collected: 04/27/23 14:05 Received: 04/28/23 08:40 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.365 (0.772) C:NA T:95%**	pCi/L	05/18/23 15:08	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.326 ± 0.316 (0.647) C:79% T:93%**	pCi/L	05/15/23 15:22	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.326 ± 0.681 (1.42)**	pCi/L	05/22/23 12:45	7440-14-4	

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

QC Batch: 585758
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: 40261460001, 40261460002

METHOD BLANK: 2845167 Matrix: Water
Associated Lab Samples: 40261460001, 40261460002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.356 ± 0.319 (0.642) C:76% T:89%	pCi/L	05/15/23 15:19	

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

QC Batch: 585757
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: 40261460001, 40261460002

METHOD BLANK: 2845166
Matrix: Water
Associated Lab Samples: 40261460001, 40261460002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.0428 ± 0.195 (0.397) C:NA T:94%	pCi/L	05/18/23 14:53	

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: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

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.
DL - Adjusted Method Detection Limit.
S - Surrogate
1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.
Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.
LCS(D) - Laboratory Control Sample (Duplicate)
MS(D) - Matrix Spike (Duplicate)
DUP - Sample Duplicate
RPD - Relative Percent Difference
NC - Not Calculable.
SG - Silica Gel - Clean-Up
U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.
N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.
Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.
TNI - The NELAC Institute.

ANALYTE QUALIFIERS

H6	Analysis initiated outside of the 15 minute EPA required holding time.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25223067 COLUMBIA CCR BCKGRND
Pace Project No.: 40261460

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40261460001	**MW-301**	EPA 3010A	443628	EPA 6020B	443733
40261460002	**MW-84A**	EPA 3010A	443628	EPA 6020B	443733
40261460001	**MW-301**	EPA 7470	444256	EPA 7470	444285
40261460002	**MW-84A**	EPA 7470	444256	EPA 7470	444285
40261460001	**MW-301**				
40261460002	**MW-84A**				
40261460001	**MW-301**	EPA 903.1	585757		
40261460002	**MW-84A**	EPA 903.1	585757		
40261460001	**MW-301**	EPA 904.0	585758		
40261460002	**MW-84A**	EPA 904.0	585758		
40261460001	**MW-301**	Total Radium Calculation	589747		
40261460002	**MW-84A**	Total Radium Calculation	589747		
40261460001	**MW-301**	SM 2540C	443675		
40261460002	**MW-84A**	SM 2540C	443675		
40261460001	**MW-301**	EPA 9040	443847		
40261460002	**MW-84A**	EPA 9040	443847		
40261460001	**MW-301**	EPA 300.0	444310		
40261460002	**MW-84A**	EPA 300.0	444310		

40261460

Pace

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company	SCS ENGINEERS	Report To.	Meghan Blodgett	Attention	
Address	2830 Dairy Drive	Copy To		Company Name	
Madison, WI 53718				Address.	
Email.	mblodgett@scsengineers.com	Purchase Order #		Pace Quote	
Phone	608-216-7362 Fax	Project Name	25223067 Columbia CCR Background	Pace Project Manager	dan.milewsky@pacelabs.com,
Requested Due Date		Project #	25223067	Pace Profile #:	

Regulatory Agency	
State / Location	WI

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	Radium 226	Radium 228	Metals	TDS and pH	Chloride,Fluoride,Sulfate	Residual Chlorine (Y/N)	
																		Requested Analysis Filtered (Y/N)	N	N	N	N	N		
1	MW-301	WT		4/27	1220				4		X	X							X	X	X	X	X		001
2	MW-84A	WT		4/27	1405				4		X	X							X	X	X	X	X		002
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Full List Metals = B, Ca, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li Hg, Mo, Se, Tl ALL SAMPLES UNFILTERED	Bridget Russell	4/27	1600							
	CS logistics	4/28/23	0840	[signature]	4/28/23	0840	2.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE					
PRINT Name of SAMPLER:	Bridget Russell				
SIGNATURE of SAMPLER:	[signature]	DATE Signed:	4/27/2023	TEMP in C	Received on Ice (Y/N) / Custody Sealed Cooler (Y/N) / Samples Intact (Y/N)

Client Name: SCS Engineers

Sample Preservation Receipt Form

Project # 402614460

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

Lab Lot# of pH paper: LOD0722 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: SG Date/ Time:

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	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN 1	GN 2							
001									2		1																						2.5 / 5
002									2																	2					X		2.5 / 5
003																										2					X		2.5 / 5
004																																	2.5 / 5
005																																	2.5 / 5
006																																	2.5 / 5
007																																	2.5 / 5
008																																	2.5 / 5
009																																	2.5 / 5
010																																	2.5 / 5
011																																	2.5 / 5
012																																	2.5 / 5
013																																	2.5 / 5
014																																	2.5 / 5
015																																	2.5 / 5
016																																	2.5 / 5
017																																	2.5 / 5
018																																	2.5 / 5
019																																	2.5 / 5
020																																	2.5 / 5

4/28/23 SG

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
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
BP2Z	500 mL plastic NaOH + Zn

VG9C	40 mL clear ascorbic w/ HCl
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 1	1L poly HNO3
GN 2	

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40261460

40261460

Client Name: SLS 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 - 9 **Type of Ice:** (Wet) Blue Dry None ☐ Meltwater Only

Cooler Temperature Uncorr: 1.0 /Corr: 2.0

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: 4/28/23 Initials: SG

Labeled By Initials: mt

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
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.
- DI 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.
Correct Type: (Pace Green Bay) Pace IR, Non-Pace		
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. 002 time "1045" 4/28/2356
-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: client used white out on bottle types 4/28/2356

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

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

July 18, 2023

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25223067 WPL-COLUMBIA
Pace Project No.: 40264572

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on July 01, 2023. 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
Natalie Burris, SCS ENGINEERS
Sherren Clark, SCS Engineers
Jenny Coughlin, Alliant Energy
Tom Karwoski, SCS ENGINEERS
Ryan Matzuk, SCS Engineers
Jeff Maxted, ALLIANT ENERGY

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

CERTIFICATIONS

Project: 25223067 WPL-COLUMBIA
Pace Project No.: 40264572

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
South Carolina Certification #: 83006001
Texas Certification #: T104704529-21-8
Virginia VELAP Certification ID: 11873
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-21-00008
Federal Fish & Wildlife Permit #: 51774A

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 25223067 WPL-COLUMBIA
Pace Project No.: 40264572

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40264572001	**MW-309**	Water	06/29/23 14:10	07/01/23 09:00

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: 25223067 WPL-COLUMBIA
Pace Project No.: 40264572

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40264572001	**MW-309**	EPA 6020B	TXW	1
			AG1	7
		EPA 300.0	HMB	1

PASI-G = Pace Analytical Services - Green Bay

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: 25223067 WPL-COLUMBIA
Pace Project No.: 40264572

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40264572001	**MW-309**					
EPA 6020B	Boron	59.4	ug/L	10.0	07/07/23 10:10	
	Field pH	7.72	Std. Units		06/29/23 14:10	
	Field Specific Conductance	3282	umhos/cm		06/29/23 14:10	
	Oxygen, Dissolved	9.22	mg/L		06/29/23 14:10	
	REDOX	217.1	mV		06/29/23 14:10	
	Turbidity	0.00	NTU		06/29/23 14:10	
	Static Water Level	784.12	feet		06/29/23 14:10	
	Temperature, Water (C)	13.9	deg C		06/29/23 14:10	
EPA 300.0	Sulfate	147	mg/L	10.0	07/13/23 11:49	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25223067 WPL-COLUMBIA
Pace Project No.: 40264572

Sample: MW-309 **Lab ID: 40264572001** Collected: 06/29/23 14:10 Received: 07/01/23 09:00 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								
Boron	**59.4**	ug/L	10.0	3.0	1	07/05/23 06:10	07/07/23 10:10	7440-42-8	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.72**	Std. Units			1		06/29/23 14:10		
Field Specific Conductance	**3282**	umhos/cm			1		06/29/23 14:10		
Oxygen, Dissolved	**9.22**	mg/L			1		06/29/23 14:10	7782-44-7	
REDOX	**217.1**	mV			1		06/29/23 14:10		
Turbidity	**0.00**	NTU			1		06/29/23 14:10		
Static Water Level	**784.12**	feet			1		06/29/23 14:10		
Temperature, Water (C)	**13.9**	deg C			1		06/29/23 14:10		
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Sulfate	**147**	mg/L	10.0	2.2	5		07/13/23 11:49	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25223067 WPL-COLUMBIA
Pace Project No.: 40264572

QC Batch: 448951
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40264572001

METHOD BLANK: 2578857 Matrix: Water
Associated Lab Samples: 40264572001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.0	10.0	07/07/23 08:32	

LABORATORY CONTROL SAMPLE: 2578858

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	250	269	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2578859 2578860

Parameter	Units	40264526004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	0.051 mg/L	250	250	328	337	111	114	75-125	3	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25223067 WPL-COLUMBIA
Pace Project No.: 40264572

QC Batch: 449570
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: 40264572001

METHOD BLANK: 2582475 Matrix: Water
Associated Lab Samples: 40264572001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	<0.44	2.0	07/13/23 11:04	

LABORATORY CONTROL SAMPLE: 2582476

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	20	20.3	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2582477 2582478

Parameter	Units	40264572001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	147	100	100	241	241	94	94	90-110	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2582479 2582480

Parameter	Units	40264768001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	138	400	400	517	541	95	101	90-110	5	15	

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: 25223067 WPL-COLUMBIA
Pace Project No.: 40264572

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.

DL - Adjusted Method Detection Limit.

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: 25223067 WPL-COLUMBIA
Pace Project No.: 40264572

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40264572001	**MW-309**	EPA 3010A	448951	EPA 6020B	449017
40264572001	**MW-309**				
40264572001	**MW-309**	EPA 300.0	449570		

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: 40264572

ALL SHADED AREAS are for LAB USE ONLY

Company: SCS Engineers	Billing Information: 25223067
Address: 2830 Dairy Dr, Madison WI, 53718	Container Preservative Type ** / Lab Project Manager:
Report To: Meghan Blodgett	Email To: mblodgett@scsengineers.com
Copy To:	Site Collection Info/Address: WPL - Columbia
Customer Project Name/Number:	State: WI County/City: Portage Time Zone Collected: [ ] PT [ ] MT [X] CT [ ] ET
Phone: 414-497-4253 Email: eschaefer@scsengineers.com	Site/Facility ID #: Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): Ethan Schaefer	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:

** 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: Boron	Analyses: Sulfate	Lab Profile/Line
MW-309	GW	G	6/29	1410				2	X	X	001

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: NC

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

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

Lab Tracking #: 2839170

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: _____oC
Cooler 1 Therm Corr. Factor: _____oC
Cooler 1 Corrected Temp: _____oC
Comments: 1

Relinquished by/Company: (Signature) SCS	Date/Time: 6/30/23 1430	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
Relinquished by/Company: (Signature) CS Logistics	Date/Time: 7-1-23 0900	Received by/Company: (Signature) Rodney Pace	Date/Time: 7-1-23 0900	Table #: 1 Acctnum: Template: Prelogin: PM: PB:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Sample Preservation Receipt Form

Client Name: SCS Engineers Project # 402604572

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

Lab Lot# of pH paper. 1008723 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	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN 1	GN 2							
001									1		1																				X		2.5 / 5
002																																	2.5 / 5
003																																	2.5 / 5
004																																	2.5 / 5
005																																	2.5 / 5
006																																	2.5 / 5
007																																	2.5 / 5
008																																	2.5 / 5
009																																	2.5 / 5
010																																	2.5 / 5
011																																	2.5 / 5
012																																	2.5 / 5
013																																	2.5 / 5
014																																	2.5 / 5
015																																	2.5 / 5
016																																	2.5 / 5
017																																	2.5 / 5
018																																	2.5 / 5
019																																	2.5 / 5
020																																	2.5 / 5

N/A 8-1-23

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

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

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	VG9C	40 mL clear ascorbic w/ HCl	JGFU	4 oz amber jar unpres
BG1U	1 liter clear glass	BP3U	250 mL plastic unpres	DG9T	40 mL amber Na Thio	JG9U	9 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP3B	250 mL plastic NaOH	VG9U	40 mL clear vial unpres	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9H	40 mL clear vial HCL	WPFU	4 oz plastic jar unpres
AG5U	100 mL amber glass unpres	BP3S	250 mL plastic H2SO4	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH + Zn	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres					GN 1	
						GN 2	

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40264572

40264572

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-121 **Type of Ice:** Wet Blue Dry None ☐ Meltwater Only

Cooler Temperature Uncorr: 3.0 /Corr: 2.5

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: 7-1-23 6-30-23 /Initials: R.A
R.A 7-1-23
Labeled By Initials: SC

Chain of Custody Present:	☒Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☒Yes ☐No ☐N/A	2.
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.
- DI 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.
Correct Type: Pace Green Bay, Pace IR, Non-Pace		
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.
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

Page 2 of 2

Appendix D

Historical Monitoring Results

Single Location

Name: WPL - Columbia

Location ID: MW-84A
Number of Sampling Dates: 24

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	10/27/2022	4/27/2023
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	12.2	10.3
Calcium	ug/L	74000	72200	67600	--	74000	76000	70800	73200	76100	74900	77500	76600	76000	74000	80100	73500	72700	77600	69200	69100	75300	75100	78400	68600
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	3.4	3
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	<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	7.31	7.01
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	1.1	1.3
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	302	326
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	<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	0.72	<0.28
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	13.7	12.6
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	<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	<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	2.2	1.7
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	<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	<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	0.41	0.71
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	<0.066	<0.066
Molybdenum	ug/L	<0.07	<0.07	0.073	--	0.12	<0.07	<0.07	<0.07	<0.44	<0.44	--	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	0.62	<0.44	<0.44	<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	<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	<0.14	<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	0.673	0.326
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	0.267	0
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	0.406	0.326
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	585.2	556.6
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	8.31	9.37
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	39.9	103.4
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	784.57	786.97
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	11.7	10.7
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	0	0.72
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	7.4	7.6

Single Location

Name: WPL - Columbia

Location ID: MW-301
Number of Sampling Dates: 23

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	10/27/2022	4/27/2023
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	37.5	20.1
Calcium	ug/L	126000	115000	108000	118000	129000	124000	120000	111000	108000	87200	112000	105000	101000	126000	114000	113000	112000	93000	117000	67800	97300	62800	120000
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	2.3	1.5
Fluoride	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.095	<0.095	<0.095	<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	6.8	6.65
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	11.6	12.3
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	282	526
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	<0.15	<0.15
Arsenic	ug/L	0.26	0.26	0.19	0.24	0.4	0.13	0.18	<0.28	<0.28	--	<0.28	0.45	<0.28	0.4	0.42	<0.28	0.33	0.62	<0.28	0.35	0.47	0.3	<0.28
Barium	ug/L	20.2	11.1	11.6	15.6	15	13.5	13.2	11.3	11.8	--	9.3	10.2	11.5	11.8	10	10.9	9.8	9.4	8.9	7.7	7.8	7.5	9.8
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	<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	<0.15	<0.15
Chromium	ug/L	2.1	0.58	0.59	<0.39	0.7	0.53	0.7	2.3	<1	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<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	0.52	<0.12
Lead	ug/L	0.9	0.077	0.48	<0.04	0.34	<0.04	<0.04	<0.2	<0.2	--	<0.2	--	<0.24	0.3	<0.24	--	<0.24	0.25	<0.24	<0.24	3.1	<0.24	<0.24
Lithium	ug/L	1.3	0.58	0.69	0.6	0.87	0.67	0.68	0.62	0.6	--	0.55	0.85	0.52	0.9	0.61	0.67	0.47	0.46	0.58	0.46	0.56	0.37	0.62
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	<0.066	<0.066
Molybdenum	ug/L	0.35	0.15	0.14	0.12	0.38	<0.07	<0.07	<0.44	<0.44	--	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<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	<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	<0.14	<0.14
Total Radium	pCi/L	1.31	1.11	0.89	0.631	1.01	2.42	1.35	1.3	1.74	--	0.882	0.0351	0.652	0.552	0.701	0.502	0.193	0.38	1.16	0.172	0.179	0.00292	0.417
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	-0.169	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	0.00292	0.417
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	507.5	857
Oxygen, Dissolved	mg/L	1.7	2.71	1.47	1.99	1.34	1.24	1.44	1.81	1.43	1.1	2.35	2.14	2.49	2.2	1.67	1.07	2	1.22	3.9	0.25	2.47	0.1	6.5
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	80.9	95.3
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	784.91	787.57
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	10.8	8
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	0	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	7.1	6.9

Single Location

Name: WPL - Columbia

Location ID: MW-309
Number of Sampling Dates: 25

Parameter Name	Units	2/21/2018	3/23/2018	4/23/2018	5/24/2018	6/23/2018	7/23/2018	8/22/2018	9/21/2018	10/22/2018	4/2/2019	10/8/2019	5/29/2020	6/30/2020	8/6/2020	10/8/2020	12/11/2020	4/13/2021	6/11/2021	10/14/2021	12/21/2021	4/12/2022	10/26/2022	11/30/2022	4/26/2023	6/29/2023
Boron	ug/L	31.4	31	30.4	28	26.6	35.5	40.5	30	--	37.4	33.4	54.6	50.7	55.3	57.7	65.9	48	49.9	42.9	36.4	32.5	46.6	49.3	50.8	59.4
Calcium	ug/L	42700	41800	39600	52700	67600	63800	93600	55200	--	45300	46900	51600	--	--	65300	--	62300	--	83100	--	80200	162000	153000	35500	--
Chloride	mg/L	147	157	157	141	203	557	811	329	--	145	43.2	350	--	--	575	--	390	--	519	--	319	796	--	372	--
Fluoride	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	--	<0.1	<0.1	<0.095	--	--	<0.095	--	<0.095	--	<0.095	--	<0.095	<0.095	--	<0.095	--
Field pH	Std. Units	7.84	8.08	7.71	7.59	7.5	7.55	7.53	7.83	7.56	7.49	7.75	7.35	7.33	7.72	7.33	7.42	7.68	7.71	7.64	7.45	7.64	7.23	7.3	7.61	7.72
Sulfate	mg/L	12.2	12.2	12	17.5	24.1	33.1	43.3	35.9	--	35.2	21.9	28.6	--	--	21.8	--	30.3	--	27.7	--	17.9	28.9	--	143	147
Total Dissolved Solids	mg/L	576	552	562	478	548	1210	1570	830	--	548	370	960	--	--	1160	--	916	--	1110	--	764	1670	--	1250	--
Antimony	ug/L	0.28	<0.15	0.36	0.24	0.76	0.31	0.57	<0.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	ug/L	<0.28	0.35	0.77	<0.28	0.56	0.55	0.46	<0.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	ug/L	24.1	22.2	21.3	15.3	18.3	31.2	46.2	22.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	ug/L	0.21	<0.18	0.2	<0.18	0.38	<0.18	<0.18	<0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	ug/L	0.11	<0.081	0.27	<0.081	0.58	0.23	0.3	<0.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	ug/L	2.3	1.9	2.3	1.9	2.2	<1	2.6	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	ug/L	0.5	0.18	0.39	0.11	0.54	0.29	0.35	<0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	ug/L	0.66	<0.2	0.39	<0.2	0.76	0.34	0.39	<0.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	ug/L	1.4	0.88	1.1	0.77	1.1	0.88	1.1	0.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.13	--	<0.13	<0.13	<0.13	<0.13	<0.13	<0.084	<0.084	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	ug/L	2.1	2.6	2	<0.44	0.7	0.47	<0.44	<0.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	ug/L	0.39	0.37	0.6	0.41	1.1	0.51	0.39	0.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	ug/L	0.16	<0.14	0.83	<0.14	0.57	0.42	0.38	<0.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Radium	pCi/L	0.516	1.25	1.13	0.895	0.673	1.74	0.754	0.569	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.486	0.815	0.539	0.0638	-0.208	0.334	0.232	0.569	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.03	0.431	0.595	0.831	0.673	1.41	0.522	-0.304	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	983	1094	985	921	1057	2290	2948	1423	1424	1041	687	1785	1726	1656	2222	2227	1804	3072	2079	1382	1420	2591	2746	2073	3282
Oxygen, Dissolved	mg/L	11.4	6.74	5.43	8.76	9.93	9.27	7.26	10.75	10.23	9.79	11.52	9.83	9.71	9.05	9.4	8.08	10.14	11.21	9.27	9.33	7.66	8.49	8.97	10.96	9.22
Field Oxidation Potential	mV	45.4	123	94.2	54.5	89.9	163.8	106.4	65.5	157.1	120.1	125.2	230.6	65.7	224.2	147.7	112.2	124.1	67.2	85.8	142.9	111.7	41	155.5	107	217.1
Groundwater Elevation	feet	783.2	783.11	783.07	785.45	786.03	786.27	785.54	787.08	787.99	786.3	787.26	785.98	786.18	785.93	785.47	785.26	784.29	784.2	783.65	782.93	783.14	781.5	781.62	785.05	784.12
Temperature	deg C	10.3	10.6	11	12.1	12	13.3	13.4	12.72	13.3	10.1	13	11	13.3	12.9	12.9	11.8	10.7	13.3	13.2	11.17	11.5	12.9	7.7	10.8	13.9
Turbidity	NTU	4.84	28.88	4.76	3.35	1.94	2.73	2.09	3.18	2.81	1.25	4.89	1.74	3.74	3.56	0	0	2.8	0.1	9.06	2.67	7.83	1.81	0.31	1.9	0
pH at 25 Degrees C	Std. Units	7.8	8	7.9	7.6	7.6	7.7	7.8	7.7	--	7.7	7.7	8	--	--	7.7	--	7.7	--	7.8	--	7.6	7.5	--	7.9	--

Single Location

Name: WPL - Columbia

Location ID: MW-310
Number of Sampling Dates: 24

Parameter Name	Units	2/21/2018	3/23/2018	4/23/2018	5/24/2018	6/23/2018	7/23/2018	8/22/2018	9/21/2018	10/22/2018	4/2/2019	6/12/2019	10/8/2019	12/23/2019	5/29/2020	10/8/2020	12/11/2020	4/13/2021	6/11/2021	10/14/2021	4/12/2022	10/26/2022	11/30/2022	4/26/2023	8/31/2023
Boron	ug/L	67.1	62.1	60.7	59.2	61.4	69.5	64.2	80.3	--	73	--	81.8	--	74.4	77.6	--	69.6	--	72	72	71.3	--	57.5	--
Calcium	ug/L	32400	33400	32100	32100	34300	39700	38800	54100	--	38800	--	57600	55400	41100	62000	56800	49300	--	38900	31900	68900	55500	36800	--
Chloride	mg/L	19.8	21.7	22.1	68.6	59.8	118	139	152	--	76	--	190	--	128	310	227	227	220	84.6	35.2	323	215	128	--
Fluoride	mg/L	<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	<0.095	--	<0.095	--
Field pH	Std. Units	7.85	8.06	7.75	7.74	7.82	7.81	7.77	7.98	7.7	9.79	7.82	7.82	7.7	7.54	7.52	7.62	7.73	7.73	7.7	7.74	7.61	7.67	7.27	7.75
Sulfate	mg/L	31.6	33.1	32	28	30.4	60.2	32.8	118	--	58.4	--	85.9	--	68.2	60	--	43.3	--	54.3	39.8	32.8	--	102	--
Total Dissolved Solids	mg/L	406	398	396	436	438	532	526	736	--	470	--	650	--	582	846	700	654	--	498	416	750	--	654	--
Antimony	ug/L	0.15	<0.15	0.3	0.21	0.97	0.42	0.17	0.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	ug/L	<0.28	0.42	0.82	0.45	1.2	0.66	0.43	0.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	ug/L	19.8	19.5	19	20.7	20.3	21.2	21	26.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	ug/L	<0.18	<0.18	0.72	<0.18	0.59	0.29	<0.18	<0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	ug/L	<0.081	<0.081	0.14	0.11	0.78	0.31	<0.15	0.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	ug/L	1.1	1.2	1.4	1.4	2.4	<1	1.3	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	ug/L	0.18	0.13	0.26	0.15	0.75	0.32	0.13	0.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	ug/L	<0.2	<0.2	0.21	<0.2	0.77	0.45	<0.24	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	ug/L	1	0.85	1.4	0.81	1.2	1.2	0.92	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.13	--	<0.13	<0.13	<0.13	<0.13	<0.13	<0.084	<0.084	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	ug/L	2.3	3.6	2.8	1.9	1.9	1.7	1.2	4.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	ug/L	<0.32	<0.32	0.55	<0.32	0.96	0.75	<0.32	1.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	ug/L	<0.14	<0.14	0.73	<0.14	0.9	0.44	<0.14	0.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Radium	pCi/L	0.114	0.709	0.969	0.346	0.12	0.257	0.308	0.475	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Radium-226	pCi/L	-0.053	0.423	-0.261	-0.115	0.12	0.0705	0.247	0.285	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.114	0.286	0.969	0.346	-0.00299	0.186	0.0614	0.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	684	765	688	840	791	998	1016	1114	1182	924	--	1226	1416	1035	1481	1212	1194	1192	884	711	1	1200	1040	1064
Oxygen, Dissolved	mg/L	11.02	5.83	2.87	8.85	10.09	8.32	3.43	10.49	10.27	7.86	--	11.57	9.65	10.07	9.63	8.3	9.93	11.21	9.29	10.03	8.66	9.46	11.38	11.24
Field Oxidation Potential	mV	25	64.2	68.2	63.5	74.5	165.7	137	51.5	145	119	--	139.4	40	207.8	150.4	111.5	106	55.6	85.2	200.5	31.3	146.5	112.6	184.6
Groundwater Elevation	feet	783.05	783.1	782.97	785.97	786.64	786.35	785.4	787.24	788.18	786.38	--	787.94	775.22	785.81	785.56	785.26	784.24	784.05	783.48	783.19	780.96	781.14	785.18	782.47
Temperature	deg C	11.04	11.2	11.2	11.7	12	13.2	13.4	13.52	13.6	10.5	--	13.4	12.4	11.5	13.2	12.5	10.8	12.8	13.4	10.6	13	10.8	10.8	13.4
Turbidity	NTU	0.94	1.7	1.35	0.04	1.12	0.41	0.32	3.99	5.53	1.13	--	2.66	2.06	1.96	0	0	0.57	0.67	3.16	1.17	1.58	0.51	2.25	0
pH at 25 Degrees C	Std. Units	7.8	7.8	7.9	7.8	7.8	7.8	7.9	7.6	--	7.8	--	7.8	--	8	7.8	--	7.8	--	8	7.9	7.7	--	7.8	--

Single Location

Name: WPL - Columbia

Location ID: MW-311
Number of Sampling Dates: 18

Parameter Name	Units	2/21/2018	3/23/2018	4/23/2018	5/24/2018	6/23/2018	7/23/2018	8/22/2018	9/21/2018	10/22/2018	4/2/2019	10/8/2019	5/29/2020	10/8/2020	4/14/2021	10/14/2021	4/12/2022	10/27/2022	4/26/2023
Boron	ug/L	43.7	42.7	40.1	31.7	33.6	30.1	32.4	27.5	--	35.7	33.5	25.7	26.2	33.6	31.7	32.7	34.2	23
Calcium	ug/L	58000	61000	56600	62500	70700	76800	65700	75400	--	65600	63900	62200	73400	59000	61000	61800	66300	52800
Chloride	mg/L	2.9	2.7	2.6	3.5	3	2	2	3.9	--	1.9	1.5	1.5	1.4	1.3	1.3	1	1.2	2.1
Fluoride	mg/L	<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	<0.095	<0.095
Field pH	Std. Units	7.72	7.93	7.62	7.54	7.65	7.59	7.6	7.95	7.5	7.51	7.69	7.37	7.66	7.46	7.45	8	7.5	7.48
Sulfate	mg/L	7.1	7.2	7.9	36.9	72.3	84.7	53.6	92.4	--	23.1	21.2	39.1	72.1	15.6	14.2	8.9	15.5	22.2
Total Dissolved Solids	mg/L	260	274	262	304	352	372	332	424	--	276	272	326	380	270	276	278	268	292
Antimony	ug/L	0.15	<0.15	<0.15	<0.15	0.18	<0.15	0.43	<0.15	--	--	--	--	--	--	--	--	--	--
Arsenic	ug/L	<0.28	0.56	0.42	0.32	0.31	0.46	0.56	0.56	--	--	--	--	--	--	--	--	--	--
Barium	ug/L	13.3	12.3	12.4	10.7	15.4	16.3	14.2	18.2	--	--	--	--	--	--	--	--	--	--
Beryllium	ug/L	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	0.19	<0.18	--	--	--	--	--	--	--	--	--	--
Cadmium	ug/L	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081	0.29	<0.15	--	--	--	--	--	--	--	--	--	--
Chromium	ug/L	2.1	2.2	2.2	2.2	2.3	1.3	2.3	1.5	--	--	--	--	--	--	--	--	--	--
Cobalt	ug/L	0.24	0.11	<0.085	0.11	0.11	0.12	0.35	<0.12	--	--	--	--	--	--	--	--	--	--
Lead	ug/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	<0.24	--	--	--	--	--	--	--	--	--	--
Lithium	ug/L	0.75	0.62	0.58	0.52	0.72	0.67	0.83	0.82	--	--	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.13	--	<0.13	<0.13	<0.13	<0.13	<0.13	<0.084	<0.084	--	--	--	--	--	--	--	--	--
Molybdenum	ug/L	2.1	1.9	2.1	0.55	0.93	0.56	0.74	2.5	--	--	--	--	--	--	--	--	--	--
Selenium	ug/L	0.83	0.78	0.6	0.9	0.86	0.62	0.93	1.2	--	--	--	--	--	--	--	--	--	--
Thallium	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	0.3	<0.14	--	--	--	--	--	--	--	--	--	--
Total Radium	pCi/L	0.608	1.14	0.898	0.162	0.0331	0.338	0.0614	0.773	--	--	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.205	0.569	0.502	0	-0.058	0.338	0.0614	0.424	--	--	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.403	0.571	0.396	0.162	0.0331	-0.0845	-0.253	0.349	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	455	508.1	459.1	539	596	606.8	573.2	600	699	337.8	495.6	547.2	606.1	500.2	493.5	482	487	484.7
Oxygen, Dissolved	mg/L	11.74	4.77	0.87	8.91	9.75	7.91	1.97	10.31	9.96	9.77	11.68	10.64	9.38	10.23	9.42	7.74	8.92	10.58
Field Oxidation Potential	mV	31	74	65.3	70.1	82.6	157	150.3	42.4	146	116.3	144.3	176.3	137.1	110.4	90.7	110.2	34.5	118.4
Groundwater Elevation	feet	783.02	783	781.83	786.11	786.47	786.55	785.46	787.66	788.64	786.38	787.64	785.85	785.83	784.15	783.48	783.04	781.23	785.69
Temperature	deg C	10.3	10.5	10.5	11	11	12.1	12.6	13.07	13.4	9.7	12.9	10.5	12.7	9.5	12.8	11.1	11.9	9.8
Turbidity	NTU	2.56	9.12	2.58	0.59	0.58	1.13	0.65	10.3	3.73	2.91	8.56	4.7	0.7	3.49	4.26	2.5	0	0.39
pH at 25 Degrees C	Std. Units	7.7	7.9	7.7	7.6	7.7	7.6	7.7	7.6	--	7.6	7.6	7.7	7.7	7.7	7.9	7.7	7.6	7.7

Appendix E

Alternative Source Demonstrations

E1 October 2022 Detection Monitoring Alternative Source Demonstration

Alternative Source Demonstration
October 2022 Detection Monitoring

Dry Ash Disposal Facility, Modules 4 - 6
Columbia Energy Center
Pardeeville, Wisconsin

Prepared for:

Alliant Energy

SCS ENGINEERS

25223067.00 | May 31, 2023

2830 Dairy Drive
Madison, WI 53718-6751
608-224-2830

Table of Contents

Tables

Figures

Appendices

I:\25223067.00\Deliverables\COL MOD 4 ASD - October 2022\230531_COL_4-6 LF_Oct22 ASD_Final.docx

PE CERTIFICATION

<table>
<tr>
<td rowspan="4"> 

5/31/2023</td>
<td>I, Sherren Clark, hereby certify that that the information in this alternate source demonstration is accurate and meets the requirements of 40 CFR 257.94(e)(2). This certification is based on my review of the groundwater data and related site information available for the Columbia Energy Center Dry Ash Disposal Facility. I am a duly licensed Professional Engineer under the laws of the State of Wisconsin.

5/31/2023</td>
</tr>
<tr>
<td>(signature) (date)</td>
</tr>
<tr>
<td>(printed or typed name)

License number E-29863

My license renewal date is July 31, 2024.

Pages or sheets covered by this seal:
Alternative Source Demonstration, October 2022 Detection</td>
</tr>
<tr>
<td>Monitoring, Dry Ash Disposal Facility, Modules 4-6</td>
</tr>
<tr>
<td></td>
<td>Columbia Energy Center, Pardeeville, Wisconsin (Entire Document)</td>
</tr>
</table>

[This page left blank intentionally]

1.0 INTRODUCTION

This Alternative Source Demonstration (ASD) was prepared to support compliance with the groundwater monitoring requirements of the "Coal Combustion Residuals (CCR) Final Rule" published by the U.S. Environmental Protection Agency (U.S. EPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule*, dated April 17, 2015 (U.S. EPA, 2015), and subsequent amendments. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.94(e)(2). The applicable sections of the Rule are provided below in *italics*.

This ASD also provides the results for the October 2022 sampling event and a supplemental resampling event completed in November 2022.

1.1 §257.94(E)(2) ALTERNATIVE SOURCE DEMONSTRATION REQUIREMENTS

The owner and operator may demonstrate that a source other than the CCR Unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels.

An ASD is completed when there are exceedances of one or more benchmarks established within the groundwater monitoring program. The ASD is completed to determine if any other sources are likely causes of the identified exceedance(s) of established benchmark(s) at the site. This ASD was performed in response to results indicating a statistically significant increase (SSI) over background levels during detection monitoring under the CCR Rule.

This ASD report is evaluating the SSIs observed in the statistical evaluation of the October 2022 detection monitoring event and the November 2022 resampling event at the Columbia Energy Center (COL) Dry Ash Disposal Facility, Modules 4-6 CCR Unit (Mod 4-6).

This ASD report is evaluating the SSIs for boron, chloride and calcium that were observed in the statistical evaluation of the October 2022 sampling and November 2022 resampling events.

1.2 SITE INFORMATION AND MAP

The COL site is located at W8375 Murray Road, Pardeeville, Columbia County, Wisconsin (**Figure 1**). The COL site is an active coal-burning generating station, which has been burning coal and disposing of CCR on site since the mid-1970s. The layout of the site is shown on **Figure 2**. The COL property includes two areas of CCR storage and disposal. These are the Dry Ash Disposal Facility (ADF) and the Ash Ponds Facility. This ASD evaluates the conditions at the site for Mod 4-6 of the ADF only. The Mod 4 CCR Unit became operational in 2018, following the construction of module 4 Modules 5 and 6 were constructed in 2021 and began receiving waste in 2022. The monitoring network certification was updated to include modules 5 and 6 on December 9, 2021, and the CCR Unit was subsequently referred to as Mod 4-6. The ADF is operated under the Wisconsin Department of Natural Resources (WDNR) License No. 3025.

The groundwater monitoring system at the COL Mod 4-6 facility monitors a single CCR Unit:

- COL Dry Ash Disposal Facility – Modules 4-6 (new landfill)

A map showing the CCR Unit and all background (or upgradient) and downgradient monitoring wells with identification numbers for the CCR groundwater monitoring program and the state monitoring program is provided on **Figure 2**. Separate monitoring systems have been established for the other CCR Units at COL, which include Modules 1-3 of the COL ADF, the primary ash pond, and the secondary ash pond.

1.3 STATISTICALLY SIGNIFICANT INCREASES IDENTIFIED

The statistical evaluation was completed in accordance with 40 CFR 257.93(f)(3) using a prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the Upper Prediction Limit (UPL) to evaluate whether an SSI has occurred. The evaluation was based on an intrawell UPL with 1-of-2 retesting, calculated using Sanitas software. The retesting approach results in a slightly lower UPL, but only 1 of 2 samples collected for the event (original and retest) must meet the UPL to demonstrate compliance. The intrawell UPLs, and the October 2022 sampling results and the November 2022 resampling results, are summarized in the attached **Table 1**.

The October 2022 SSIs include the following parameters and wells:

- Boron: MW-309
- Calcium: MW-309
- Chloride: MW-310

Concentration trends for the parameters with SSIs are shown in **Appendix A**.

1.4 OVERVIEW OF ALTERNATIVE SOURCE DEMONSTRATION

This ASD report includes:

- Background information (**Section 2.0**)
- Evaluation of potential that SSIs are due to methodology or analysis (**Section 3.0**)
- Evaluation of potential that SSIs are due to natural sources or man-made sources other than the CCR Units (**Section 4.0**)
- ASD conclusions (**Section 5.0**)
- Monitoring recommendations (**Section 6.0**)

Historical monitoring results from background and compliance sampling for the CCR Rule constituent results with SSIs are provided in **Table 2**. The laboratory reports for the October 2022 detection monitoring event will be included in the 2023 Annual Groundwater Monitoring and Corrective Action Report to be submitted in January 2024. Complete laboratory reports for the background monitoring events and the previous detection monitoring events were included in previous annual groundwater monitoring and corrective action reports.

2.0 BACKGROUND

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

- Geologic and hydrogeologic setting
- CCR Rule monitoring system
- Other monitoring wells

2.1 REGIONAL GEOLOGY AND HYDROGEOLOGY

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 ADF. Immediately underlying the surficial sand and gravel aquifer is the Cambrian-Ordovician sandstone aquifer.

Additional details on the regional geology and hydrogeology were provided in the May 2020 ASD (SCS Engineers [SCS], 2020).

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 ADF were described as generally sandy with interbedded silty clay lenses up to 20 feet thick (Warzyn Engineering, Inc. [Warzyn], 1978). During drilling of CCR well MW-301, the unconsolidated materials were identified as consisting primarily of silty sand. The boring log for previously installed monitoring well MW-84A shows silty sand and sand as the primary unconsolidated materials at these locations. CCR monitoring wells MW-84A and MW-301 are screened within the unconsolidated sand unit. The geology in the vicinity of wells MW-309, MW-310, and MW-311 is a poorly graded sand and gravel.

Shallow groundwater at the site generally flows to the northwest across the existing landfill area, then generally flows west toward the Wisconsin River. A groundwater flow map for October 2022 is shown on **Figure 3.** Historically, localized groundwater mounding was associated with the ash ponds. The October 2022 flow map shows temporary inward gradients in the vicinity of the Secondary Ash Pond due to groundwater dewatering activities. These temporary changes in flow do not affect groundwater flow directions in the vicinity of Mod 4-6. The groundwater elevation data for the state and CCR monitoring program wells are provided in **Table 3**.

2.2 CCR RULE MONITORING SYSTEM

The groundwater monitoring system established in accordance with the CCR Rule consists of two upgradient (background) monitoring wells and three downgradient monitoring wells. The background wells include MW-301 and MW-84A. The downgradient wells include MW-309, MW-310, and MW-311. The background wells are shared with the other COL CCR Units. The CCR Rule wells are installed within the sand and gravel aquifer. Well depths range from approximately 36 to 38 feet, measured from the top of the well casing.

2.3 OTHER MONITORING WELLS

Additional groundwater monitoring wells currently exist at COL as part of the monitoring systems developed for the state monitoring program and for the other CCR Units.

Monitoring wells for the state monitoring program are installed in the unconsolidated sand and gravel unit, which is the uppermost aquifer as defined under 40 CFR 257.53. This shallow monitoring system includes water table wells and mid-depth piezometers. Well depths range from approximately 14 to 76 feet, measured from the top of the well casing.

3.0 METHODOLOGY AND ANALYSIS REVIEW

To evaluate the potential that an SSI is due to a source other than the regulated CCR Unit, SCS used a two-step evaluation process. First, the sample collection, field and laboratory analysis, and statistical evaluation were reviewed to identify any potential error or analysis that led to exceedance of the benchmark. Second, potential alternative sources, including natural variation and man-made sources other than the CCR Unit, were evaluated. This section of the report provides the findings of the methodology and analysis review. Section 4.0 of the report addresses the potential alternative sources.

3.1 SAMPLING AND FIELD ANALYSIS

Field notes and sampling results were reviewed to determine if any sampling error may have caused or contributed to the observed SSIs. Potential field sampling errors or issues could include mislabeling of samples, improper sample handling, missed holding times, cross contamination during sampling, or other field error. Field blank sample results were also reviewed for any indication of potential contamination from sampling equipment or containers.

SCS collected samples on October 26 and 27, 2022. Retest samples were collected on November 30, 2022. Field parameter results were compiled by SCS and provided to the laboratory for inclusion in the laboratory report. SCS did not identify issues with the field analysis based on review of the data and field notes. Because boron, calcium, and chloride are laboratory parameters, there is little potential for a field analysis error to contribute to an SSI.

3.2 LABORATORY ANALYSIS REVIEW

The laboratory reports for the October 2022 detection monitoring event and the November 2022 resampling event were reviewed to determine if any laboratory analysis error or issue may have caused or contributed to an observed SSI for boron, chloride, or calcium. The laboratory report review included reviewing the laboratory quality control flags and narrative, verifying that correct methods were used and desired detection limits were achieved, and checking the field and laboratory blank sample results.

Following evaluation of the October 2022 sampling results, SCS resampled MW-309 and MW-310 for specific parameters on November 30, 2022. The resampling was performed on select parameters that exceeded UPLs in the October 2022 event, including boron and calcium for MW-309 and calcium and chloride for MW-310. Based on the review of the laboratory reports, SCS did not identify any additional issues due to a laboratory analysis error in the other laboratory reports. There were no laboratory quality control flags or issues identified in the laboratory reports that affect the usability of the data for detection monitoring.

Time series plots of the SSI constituent analytical data were also reviewed for any anomalous results that might indicate a possible sampling or laboratory error (e.g., dilution error or incorrect sample labeling). The time series plots are provided in Appendix A. The boron and chloride concentrations observed are within the range of historical concentrations. The calcium concentrations detected at MW-309 in October and November 2022 are higher than previous results but are similar to each other, indicating that these results are not due to a sampling or laboratory error.

3.3 STATISTICAL EVALUATION REVIEW

The review of the statistical results and methods included a quality control check of the following:

- Input analytical data vs. laboratory analytical reports
- Statistical method and process for each SSI

Based on the October 2022 sampling results and the November 2022 retest results, SSIs for boron and calcium occurred for MW-309, and an SSI occurred for chloride at MW-310 for the October 2022 semiannual event. The intrawell UPL at MW-310 was exceeded for calcium in October 2022, but the resample result in November 2022 was below the UPL. Therefore, according to the 1-of-2 retesting approach, there was no SSI for calcium at MW-310 in October 2022.

Based on the review of the statistical evaluation, SCS did not identify any errors in the statistical evaluation that caused or contributed to the determination of intrawell SSIs for boron, calcium, and/or chloride at wells MW-309 and MW-310. However, the small size of the intrawell background data set (eight samples per well) and the short timeframe over which they were collected (8 months) may have contributed to the identification of the October 2022 result as SSIs. The small background data set collected from February through September 2018 likely does not represent the full range of variability in background concentrations at the compliance monitoring wells. The Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (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, a UPL update is planned for 2023.

3.4 SUMMARY OF METHODOLOGY AND ANALYSIS REVIEW FINDINGS

In summary, there were no changes to the SSI determinations for the October 2022 monitoring event based on the methodology and analysis review, and no errors or issues caused or contributed to the reported SSIs.

4.0 ALTERNATIVE SOURCES

This section discusses the potential alternative sources for the boron, calcium, and chloride SSIs at the downgradient monitoring wells; identifies the most likely alternative source(s); and presents the lines of evidence indicating that an alternative source is the most likely cause of the observed SSIs.

4.1 POTENTIAL CAUSES OF SSI

4.1.1 Natural Variation

The statistical analysis was completed using an intrawell approach, comparing the October 2022 detection monitoring results to the UPLs calculated based on background sampling of the compliance wells (MW-309, MW-310, and MW-311). If concentrations of a constituent that is naturally present in the aquifer vary with time, then the potential exists that the compliance sampling concentrations may be higher than background concentrations due to natural temporal variation.

Temporal variation can occur seasonally or due to longer-term events such as changes in infiltration patterns and groundwater flow directions caused by wet or dry years.

Background sampling at the three MOD 4-6 compliance wells was performed prior to disposal of CCR in MOD 4-6. Because the background sampling at the three compliance wells was performed after other potential man-made sources of boron, calcium, and chloride had been in operation for many

years, it is difficult to determine how much of the variation in boron, calcium, and chloride concentrations is due to natural sources versus man-made alternative sources associated with the long-term use of the property, as discussed in Section 4.1.2. Based on comparison to the two upgradient wells, it appears likely that boron, calcium, and chloride may reflect man-made sources. Based on historical data showing calcium concentrations at many site monitoring wells that are comparable to the October and November 2022 concentrations at MW-309, it appears that the elevated calcium concentration may also be at least partially due to natural fluctuations. Regardless of the source, natural temporal variations in infiltration and groundwater flow direction may have contributed to the SSIs for boron and calcium at MW-309 and for chloride at MW-310.

4.1.2 Man-Made Alternative Sources

Man-made alternative sources that could potentially contribute to the boron, calcium, and chloride SSIs could include the closed ash pond landfill, the active and inactive ash ponds (currently in the closure process), the surface water/leachate collection pond for the ADF, the former ash pond effluent ditch, the coal storage area, railroad operations, road salt use, and/or other plant operations.

Based on the historic groundwater flow directions and on previous investigations at the site, the ash ponds and the former ash pond effluent ditch appear to be the most likely cause of the boron SSI for well MW-309.

Road salt use appears to be the most likely cause of the chloride SSI for MW-310. Road salt use also appears to be a likely cause for the calcium SSI for MW-309, as a result of sodium-calcium cation exchange.

4.2 LINES OF EVIDENCE

The lines of evidence indicating that the SSIs for boron, calcium, and chloride in compliance wells MW-309 and MW-310, relative to the intrawell background sampling, are due to one or more alternative sources include:

1. The detected concentrations of boron and chloride exceeding intrawell UPLs are below the background concentrations at other wells in the monitoring network. These results indicate that concentrations in these ranges were present in the groundwater in this area prior to initiation of CCR disposal in the Mod 4-6 CCR Unit. The background data for the intrawell statistical analysis represent pre-disposal conditions. Information about the historical boron and chloride concentrations is presented in Section 4.2.1.

2. The detected concentrations of calcium exceeding the intrawell UPL at MW-309 are within the range of concentrations detected at other on-site wells in the 1980s. These results indicate that concentrations in this range were present in the groundwater on site prior to the construction of the ADF. The background data for the intrawell statistical analysis represent pre-disposal conditions. Information about the historical calcium concentrations is presented in Section 4.2.2.

3. MW-309 and MW-310 are located adjacent to the plant entrance road, where elevated chloride concentrations due to road salt impacts are likely. Elevated calcium concentrations can also be caused by cation exchange following road salt application. More information about the effects of road salt on the chloride and calcium concentrations is presented in Section 4.2.3.

4. The Mod 4-6 CCR Unit was constructed with a composite liner system and leachate collection system. Module 4 has only been receiving CCR since late 2018 and Modules 5 and 6 started receiving CCR in 2022; therefore, it is very unlikely that a release from Mod 4-6 could have reached MW-309 and MW-310 by October 2022. More information about the composite liner is presented in **Section 4.2.4**.

Each of these lines of evidence and the supporting data are discussed in more detail in the following sections.

4.2.1 Background Concentrations – Boron and Chloride

Historical boron and chloride concentrations for all five Mod 4-6 wells are shown in **Table 2** and on the time series plots in **Appendix A**. As shown on the time series plots, the concentrations of boron in the May 2020 through June 2021 samples from MW-309 were higher than the background results at MW-309, but do not exceed the range of background sampling results for MW-310, located approximately 300 feet to the west along Murray Road.

As discussed in more detail in the ASD for the May 2020 monitoring event (SCS, 2020), the background concentrations of boron in the area of the Mod 4-6 compliance wells likely reflect historical ash management activities at the site under different groundwater flow conditions. The background data for the intrawell statistical analysis represent pre-disposal conditions at MOD 4-6.

For chloride, the October 2022 results at MW-310 exceeded the intrawell UPL based on the 2018 background sampling at this well, but the chloride concentrations were lower than those detected in current monitoring at MW-309 (**Appendix A**).

These results indicate that boron and chloride concentrations in the ranges detected at the Mod 4-6 compliance wells in October and November 2022 were present in the groundwater in this area prior to initiation of CCR disposal in the Mod 4-6 CCR Unit. Based on these results, it is likely that the boron and chloride concentrations from natural and/or man-made alternative sources have varied in concentration at MW-309 and MW-310 in response to changes in groundwater flow and infiltration.

4.2.2 Background Concentrations – Calcium

Historical calcium concentrations for non-CCR Rule wells at the ADF and select wells associated with the Ash Ponds site are included in **Appendix B**. Both tabulated data and a plot of calcium concentrations over time are included in **Appendix B**. This table and plot include historical data available in the WDNR Groundwater Environmental Monitoring System (GEMS) database for monitoring wells at the COL ADF.

The earliest calcium data available from the GEMS database for wells associated with the ADF are from September 1984. Initial placement of CCR in test plots in Module 1 of the ADF was approved in October 1984, and CCR disposal began sometime after that. Therefore, the initial groundwater monitoring results in the GEMS database represent pre-disposal conditions for the landfill. The historical results for the ADF wells are from 1984 through 1987, and the results for the Ash Ponds site wells are from 1981 through 1992. Data for two wells associated with the COL Ash Ponds site, and located approximately 850 feet and 1,400 feet from MW-309, are also included in **Appendix B**.

The historical data show fluctuating historical calcium concentrations. Of the landfill wells and two closest pond wells to MW-309, 15 wells have historic calcium concentrations above 100 mg/L and four wells have at least one concentration above 150 mg/L.

These results indicate that the calcium concentrations detected in October and November 2022 at MW-309 were present in the groundwater in this area prior to construction of the ADF and initiation of CCR disposal in Mod 4-6, and the calcium SSI at MW-309 may be at least partially attributed to background concentrations.

4.2.3 Location Adjacent to Entrance Road

Monitoring well MW-310 is located adjacent to the plant entrance road, where elevated chloride concentrations due to road salt impacts are likely. In order to be located as close as possible to the waste boundary of the CCR Unit (including the Mod 5/6 additions constructed in 2021), these wells are installed between the entrance road and the storm water ditch on the south side of the road. At this location, there is a high potential for road salt application to result in increased chloride concentrations in groundwater.

It appears that elevated calcium concentrations at MW-309 are also at least partially attributable to road salt application. Calcium concentrations at both MW-309 and MW-310 are strongly correlated with chloride concentrations, with R^2 values greater than 0.6 (**Appendix C**); this correlation would be expected if calcium is being mobilized through cation exchange with sodium following road salt application. If complete cation exchange were occurring between sodium (from road salt) and calcium, an increase of two moles of chloride per mole of calcium would be expected. The actual ratio is higher, as indicated by the trendline slopes in **Appendix C**, indicating that incomplete cation exchange is occurring. Calcium concentrations at MW-309 and MW-310 are not strongly correlated with sulfate concentrations (**Appendix C**), indicating that co-dissolution of calcium and sulfate from anhydrite or gypsum in CCR (specifically flue gas desulfurization waste) is not a likely source of the increase in calcium concentrations. The molar concentrations for sulfate are lower than for calcium, which is not consistent with a CCR/flue gas desulfurization (FGD) source. Sulfate is expected to be more mobile than calcium in groundwater and would be expected to be at a similar or higher concentration than calcium if the source was a release from Mod 4-6.

A temporary increase in both calcium and chloride concentrations was previously observed at MW-309 in August 2018, prior to CCR disposal in Mod 4-6 (**Appendix A**). These fluctuations indicate that the increased concentrations are at least partly attributable to a seasonal or impermanent source such as road salt application.

4.2.4 Mod 4-6 Composite Liner

The Mod 4-6 CCR Unit was constructed with a composite liner system and leachate collection system, and has only been receiving CCR since late 2018; therefore, it is very unlikely that a release from Mod 4-6 could have reached MW-309 and MW-310 by October 2022. The liner system includes the following:

- 2 feet of compacted clay
- Geosynthetic clay liner (GCL)
- 60-mil high density polyethylene (HDPE) geomembrane
- Leachate collection drainage layer
- Leachate collection piping

The liner was constructed in 2018, and CCR placement in Mod 4 began in November 2018. CCR placement in Mod 5-6 began in 2022.

Given the liner system in place, a release from Mod 4-6 would have to penetrate the HDPE liner at a flaw, flow vertically through the GCL and compacted clay liner, and travel with the groundwater approximately 600 feet north to MW-309 and MW-310 from Module 4 in less than four years, or travel to the wells from Modules 5 and 6 in less than one year. Based on the hydraulic conductivity of the liner clay (10^{-8} centimeters/second) and the very low estimated average groundwater velocity (0.2 to 4 feet per year [SCS, 2021b]), it is very unlikely that changes in boron, calcium, and chloride concentrations at MW-309 and MW-310 reflect a release from Mod 4-6. Extensive testing was performed as part of the WDNR-approved construction documentation (SCS, 2021b) to document the proper construction of the liner.

5.0 ALTERNATIVE SOURCE DEMONSTRATION CONCLUSIONS

The lines of evidence discussed above regarding the SSIs reported for boron and calcium at MW-309 and for chloride at MW-310 demonstrate that the SSIs are likely due to sources other than the Mod 4-6 CCR Unit. Similar boron and chloride concentrations were present in the area prior to disposal of CCR in Mod 4-6. Similar calcium concentrations were historically detected at other monitoring wells located around the landfill and to the southeast of the ponds. The SSIs likely reflect road salt impacts (chloride and calcium) and impacts associated with historical discharges from the ash ponds via the effluent ditch located west of the landfill (boron). Natural variation associated with changes in infiltration and groundwater flow may also have contributed to the SSI for calcium.

6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS

In accordance with section 257.94(e)(2) of the CCR Rule, the COL Mod 4-6 CCR Unit may continue with detection monitoring based on this ASD. The ASD report will be included in the 2023 Annual Report due January 31, 2024.

7.0 REFERENCES

RMT, 2003, Water Table Map (October 2002), Figure 3.

SCS Engineers, 2020, Alternative Source Demonstration, May 2020 Detection Monitoring, Dry Ash Disposal Facility, Module 4, Columbia Energy Center, Pardeeville, WI, November 12, 2020.

SCS Engineers, 2021a, 2020 Annual Groundwater Monitoring and Corrective Action Report, Columbia Energy Center, Dry Ash Disposal Facility, Module 4, Pardeeville, WI, January 29, 2021.

SCS Engineers, 2021b. Phase 1, Modules 5 and 6 Construction Documentation Report, Columbia Energy Center, Dry Ash Disposal Facility, Pardeeville, WI, December 2, 2021.

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

U.S. EPA, 2015, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, April 2015.

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.

Warzyn Engineering, Inc., 1981, Water Table Contour Map 2/4/81, Drawing No. C7134-94.

[This page left blank intentionally]

Tables

Table 1. Groundwater Analytical Results Summary
Columbia Dry Ash Disposal Facility - Modules 4-6 / SCS Engineers Project #25223067.00

Parameter Name	Background Wells		Compliance Wells							
	MW-84A	MW-301	MW-309			MW-310			MW-311	
	10/27/2022	10/27/2022	Intrawell UPL	10/26/2022	11/30/2022	Intrawell UPL	10/26/2022	11/30/2022	Intrawell UPL	10/27/2022
Boron, µg/L	12.2	37.5	42.2	46.6	49.3	81.9	71.3	--	49.8	34.2
Calcium, µg/L	78,400	62,800 P6	99,900	162,000	153,000	56,000	68,900	55,500	84,200	66,300
Chloride, mg/L	3.4	2.3	901	796	--	205	323	215	4.41	1.2 J
Fluoride, mg/L	<0.095	<0.095 M0	DQ	<0.095	--	DQ	<0.095	--	DQ	<0.095
Field pH, Std. Units	7.31	6.80	8.18	7.23	--	8.12	7.61	--	8.07	7.50
Sulfate, mg/L	1.1 J	11.6	53.1	28.9	--	118	32.8	--	131	15.5
Total Dissolved Solids, mg/L	302	282	1,730	1670	--	759	750	--	462	268

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

Abbreviations:
mg/L = milligrams per liter
µg/L = micrograms per liter
-- = Not Analyzed
SSI = Statistically Significar DQ= Double Quantification
LOD = Limit of Detection LOQ = Limit of Quantitation

Lab Notes:
J = Estimated concentration at or above the LOD and below the LOQ.
P6 = Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
M0 = Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

Note:
1. Intrawell UPLs based on 1-of-2 retesting approach; therefore, there is no SSI unless the original sample result and a retest result are above the UPL.
2. Intrawell UPL for fluoride is based on the double quantification rule, because fluoride was not detected above the LOQ in the background samples.

Created by:	NDK	Date:	9/19/2022
Last revision by:	NLB	Date:	4/26/2023
Checked by:	RM	Date:	5/3/2023
Scientist/PM QA/QC:	TK	Date:	5/15/2023

I:\25223067.00\Deliverables\COL MOD 4 ASD - October 2022\Tables\[Table 1 - COL LF MOD 4_Screening Summary - Oct 2022.xlsx]Table 1 - 2022 Analytical

Table 2. Historical Analytical Results for Parameters with SSIs
Columbia Dry ADF, Modules 4-6

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (µg/L)	Chloride (mg/L)
Background	MW-301	12/22/2015	26.5	126,000	3.70 J
		4/5/2016	25.2	115,000	4.00
		7/8/2016	23.6	108,000	3.50 J
		10/13/2016	30.6	118,000	2.20
		12/29/2016	32.8	129,000	2.00 J
		1/25/2017	32.6	124,000	1.50 J
		4/11/2017	28.8	120,000	2.00
		6/6/2017	21.3	111,000	3.50
		8/8/2017	30.6	108,000	5.50
		10/23/2017	34.3	87,200	4.00
		4/25/2018	24.3	112,000	2.30
		8/8/2018	22.8	105,000	5.20
		10/24/2018	27.8	101,000	3.20
		4/2/2019	26.9	126,000	0.79 J
		10/9/2019	35.9	114,000	1.70
		2/3/2020	27.9	113,000	1.30 J
		5/29/2020	21.3	112,000	2.00 J
		10/8/2020	28.8	93,000	3.40
		4/14/2021	22.2	117,000	1.50 J
		10/14/2021	31.4	67,800 P6	2.7
		4/13/2022	28.7	97,300	1.9 J
		10/27/2022	37.5	62,800 P6	2.30
	MW-84A	12/22/2015	11.9	74,000	4.90
		4/5/2016	14.0	72,200	4.70
		7/8/2016	14.7	67,600	5.10
		10/13/2016	11.1	74,000	4.30
		12/29/2016	14.7	76,000	4.70
		1/25/2017	16.1	70,800	4.60
		4/11/2017	12.9	73,200	4.90
		6/6/2017	14.8	76,100	5.50
		8/8/2017	22.9	74,900	5.50
		10/24/2017	13.8	77,500	5.10
		4/25/2018	25.0	76,600	4.80
		8/8/2018	12.8	76,000	4.90
		10/24/2018	10.1 J	74,000	4.20
		4/3/2019	13.6	80,100	3.60
		10/9/2019	12.0	73,500	3.90
		2/3/2020	15.7	72,700	3.70
		5/29/2020	10.0	77,600	3.70
		10/8/2020	9.7 J	69,200	4.30
		4/14/2021	14.3	69,100	4.40
		10/14/2021	11.1	75,300	3.5 M0
		4/13/2022	10.5	75,100	5.20
		10/27/2022	12.2	78,400	3.4

Table 2. Historical Analytical Results for Parameters with SSIs
Columbia Dry ADF, Modules 4-6

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (µg/L)	Chloride (mg/L)
Compliance	MW-309	2/21/2018	31.4	42,700	147
		3/23/2018	31.0	41,800	157
		4/23/2018	30.4	39,600	157
		5/24/2018	28.0	52,700	141
		6/23/2018	26.6	67,600	203
		7/23/2018	35.5	63,800	557
		8/22/2018	40.5	93,600	811
		9/21/2018	30.0	55,200	329
		4/2/2019	37.4	45,300	145
		10/8/2019	33.4	46,900	43.2
		5/29/2020	54.6	51,600	350
		6/30/2020	50.7	--	--
		8/6/2020	55.3	--	--
		10/8/2020	57.7	65,300	575
		12/11/2020	65.9	--	--
		4/13/2021	48.0	62,300	390
		6/11/2021	49.9	--	--
		10/14/2021**	36.4	83,100	519
		4/12/2022	32.5	80,200	319
		10/26/2022*	46.6	162,000	796
		11/30/2022	49.3	153,000	--
	MW-310	2/21/2018	67.1	32,400	19.8
		3/23/2018	62.1	33,400	21.7
		4/23/2018	60.7	32,100	22.1
		5/24/2018	59.2	32,100	68.6
		6/23/2018	61.4	34,300	59.8
		7/23/2018	69.5	39,700	118
		8/22/2018	64.2	38,800	139
		9/21/2018	80.3	54,100	152
		4/2/2019	73.0	38,800	76.0
		10/8/2019	81.8	57,600	190
		12/23/2019	--	55,400	--
		5/29/2020	74.4	41,100	128
		10/8/2020	77.6	62,000	310
		12/11/2020	--	56,800	227
		4/13/2021	69.6	49,300	227
		6/11/2021	--	--	220
		10/14/2021	72.0	38,900	84.5
		4/12/2022	72.0	31,900	35.2
		10/26/2022*	71.3	68,900	323
		11/30/2023	--	55,500	215
	MW-311	2/21/2018	43.7	58,000	2.90
		3/23/2018	42.7	61,000	2.70
		4/23/2018	40.1	56,600	2.60
		5/24/2018	31.7	62,500	3.50
		6/23/2018	33.6	70,700	3.00
		7/23/2018	30.1	76,800	2.00 J
		8/22/2018	32.4	65,700	2.00 J
		9/21/2018	27.5	75,400	3.90
		4/2/2019	35.7	65,600	1.90 J
		10/8/2019	33.5	63,900	1.50 J
		5/29/2020	25.7	62,200	1.50 J
		10/8/2020	26.2	73,400	1.40 J
		4/14/2021	33.6	59,000	1.30 J
		10/14/2021	31.7	61,000	1.3 J
		4/12/2022	32.7	61,800	1.0 J
		10/27/2022	34.2	66,300	1.2 J

Table 2. Historical Analytical Results for Parameters with SSIs
Columbia Dry ADF, Modules 4-6

Abbreviations:
µg/L = micrograms per liter or parts per billion (ppb)
mg/L = milligrams per liter or parts per million (ppm)
-- = Not sampled
J = Estimated value below the laboratory's limit of quantitation
* - re-sampled and analyzed for boron & calcium on 11/30/2022
** - re-sampled for boron on pH on 12/21/2021

Note:
(1) Complete laboratory reports included in the Annual Groundwater Monitoring and Corrective Action Reports.

Created by:	NDK	Date:	3/18/2021
Last revision by:	NLB	Date:	4/26/2023
Checked by:	RM	Date:	5/3/2023
PM QC Check:	TK	Date:	5/15/2023

I:\25223067.00\Deliverables\COL MOD 4 ASD - October 2022\Tables\[Table 2 - Historical Analytical Results

Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25223067.00

	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
Dry Ash Facility (Facility ID #03025)	**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	778.12	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

	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
Ash Pond Facility (Facility ID #02325)	**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
	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	--	--	--	--

Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25223067.00

	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	MW-312	MW-313	MW-314	MW-315
	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	826.786	820.30	821.57	819.78
	Screen Length (ft)	10	10	10	10	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	52.5			
	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	784.29			
	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	NI	NI	NI	NI
	April 4-5, 2016	786.78	785.81	785.48	788.08	789.61	789.09	785.29	785.63	786.37	--	--	--	--	--	--	NI	NI	NI	NI
	July 7-8, 2016	786.31	786.28	784.60	787.36	789.26	787.43	785.19	785.05	785.89	--	--	--	--	--	--	NI	NI	NI	NI
	July 28, 2016	NM	NM	784.35	NM	NM	NM	NM	784.86	785.61	--	--	--	--	--	--	NI	NI	NI	NI
	October 11-13, 2016	787.64	787.76	786.18	788.18	789.78	787.88	787.36	786.45	787.22	--	--	--	--	--	--	NI	NI	NI	NI
	December 29, 2016	787.37	787.05	NM	NM	NM	NM	785.66	785.72	786.63	--	--	--	--	--	--	NI	NI	NI	NI
	January 25-26, 2017	787.27	786.89	785.28	789.34	789.36	789.64	785.88	785.98	786.70	785.50	785.36	785.73	--	--	--	NI	NI	NI	NI
	April 10 & 11, 2017	787.89	787.55	786.00	788.22	789.57	787.95	786.39	786.30	787.16	786.22	785.64	786.51	--	--	--	NI	NI	NI	NI
	June 6, 2017	788.25	788.37	786.49	788.58	789.79	787.83	787.27	786.66	787.63	786.85	786.07	786.46	--	--	--	NI	NI	NI	NI
	August 7-9, 2017	787.34	787.55	785.42	789.52	789.30	788.54	786.11	785.81	786.68	785.69	785.19	785.37	--	--	--	NI	NI	NI	NI
	October 23-24, 2017	785.89	785.94	783.92	788.97	788.14	788.00	784.13	784.50	785.32	783.97	784.79	784.17	--	--	--	NI	NI	NI	NI
	February 21, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.19	783.05	783.02	NI	NI	NI	NI
	March 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.10	783.10	783.00	NI	NI	NI	NI
	April 23-25, 2018	785.29	784.37	783.27	789.69	787.67	790.43	783.09	781.77	785.88	783.24	783.65	782.65	783.07	782.97	781.83	NI	NI	NI	NI
	May 24, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.79	785.09	NM	785.45	785.97	786.11	NI	NI	NI	NI
	June 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.03	786.64	786.47	NI	NI	NI	NI
	July 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.27	786.35	786.55	NI	NI	NI	NI
	August 7, 2018	787.06	NM	785.20	788.25	788.56	787.63	NM	NM	786.55	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI
	August 22, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.54	785.40	785.46	NI	NI	NI	NI
	September 21, 2018	NM	788.37	786.50	NM	NM	NM	787.90	787.01	NM	NM	NM	NM	787.08	787.24	787.66	NI	NI	NI	NI
	October 22-24, 2018	788.98	789.16	787.51	789.05	790.04	788.47	788.77	787.88	788.32	787.66	786.57	787.81	787.99	788.18	788.64	NI	NI	NI	NI
	April 1-4, 2019	787.04	787.56	786.52	789.72	790.07	789.44	786.63	786.82	787.35	786.72	786.71	787.53	786.30	786.38	786.38	NI	NI	NI	NI
CCR Rule Wells	June 12, 2019	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	787.25	NM	NI	NI	NI	NI
	June 19, 2019	NM	NM	786.81	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI
	October 7-9, 2019	788.47	788.31	787.02	790.41	790.36	790.65	NM	NM	NM	787.47	786.99	787.18	787.26	787.94	787.64	NI	NI	NI	NI
	December 13, 2019	--	--	--	--	--	--	--	--	--	787.03	785.68	786.43	--	--	--	NI	NI	NI	NI
	December 23, 2019	--	--	--	--	--	--	--	--	--	--	--	--	--	775.22	--	NI	NI	NI	NI
	January 17, 2020	--	--	785.58	--	--	--	--	--	--	--	--	--	--	--	--	NI	NI	NI	NI
	February 3, 2020	787.24	NM	NM	NM	NM	NM	NM	NM	786.50	785.77	785.57	786.48	NM	NM	NM	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	NI	NI	NI	NI
	June 30, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.18	NM	NM	NI	NI	NI	NI
	August 6, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.93	NM	NM	NI	NI	NI	NI
	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	NI	NI	NI	NI
	December 11, 2020	NM	NM	NM	NM	788.19	NM	NM	NM	NM	NM	NM	NM	785.26	785.26	NM	NI	NI	NI	NI
	February 25, 2021	NM	NM	784.27	NM	788.36	NM	NM	784.75	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI
	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	NI	NI	NI	NI
	June 11, 2021	NM	NM	NM	NM	NM	NM	784.19	784.66	NM	NM	NM	NM	784.20	784.05	NM	NI	NI	NI	NI
	July 20, 2021	NM	NM	783.64	NM	788.39	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI
	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	NI	NI	NI	NI
	December 21, 2021	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	782.93	NM	NM	NI	NI	NI	NI
	February 24, 2022	NM	NM	782.34	NM	786.49	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI
	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	NI	NI	NI	NI
	July 27, 2022	NM	NM	783.07	NM	787.03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI
	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	NI	NI	NI	NI
	November 30, 2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	781.62	781.14	781.15	NI	NI	NI	NI
	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	NI	NI	NI	NI
	January 12-13, 2023	785.20	784.55	NM	NM	NM	NM	782.75	784.10	784.88	NM	NM	NM	782.57	782.45	782.32	NI	NI	NI	NI
	January 20, 2023	NM	NM	NM	788.08	NM	NM	NM	NM	NM	782.15	782.11	784.98	NM	NM	NM	NM	NM	NM	NM
	January 24, 2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.36	783.63	783.77
	February 20-23, 2023	785.56	784.98	NM	NM	NM	NM	NM	NM	NM	783.04	782.91	785.32	783.31	783.34	783.40	NM	783.59	783.82	783.96
	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	774.29	820.30	821.57	819.78

Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25223067.00

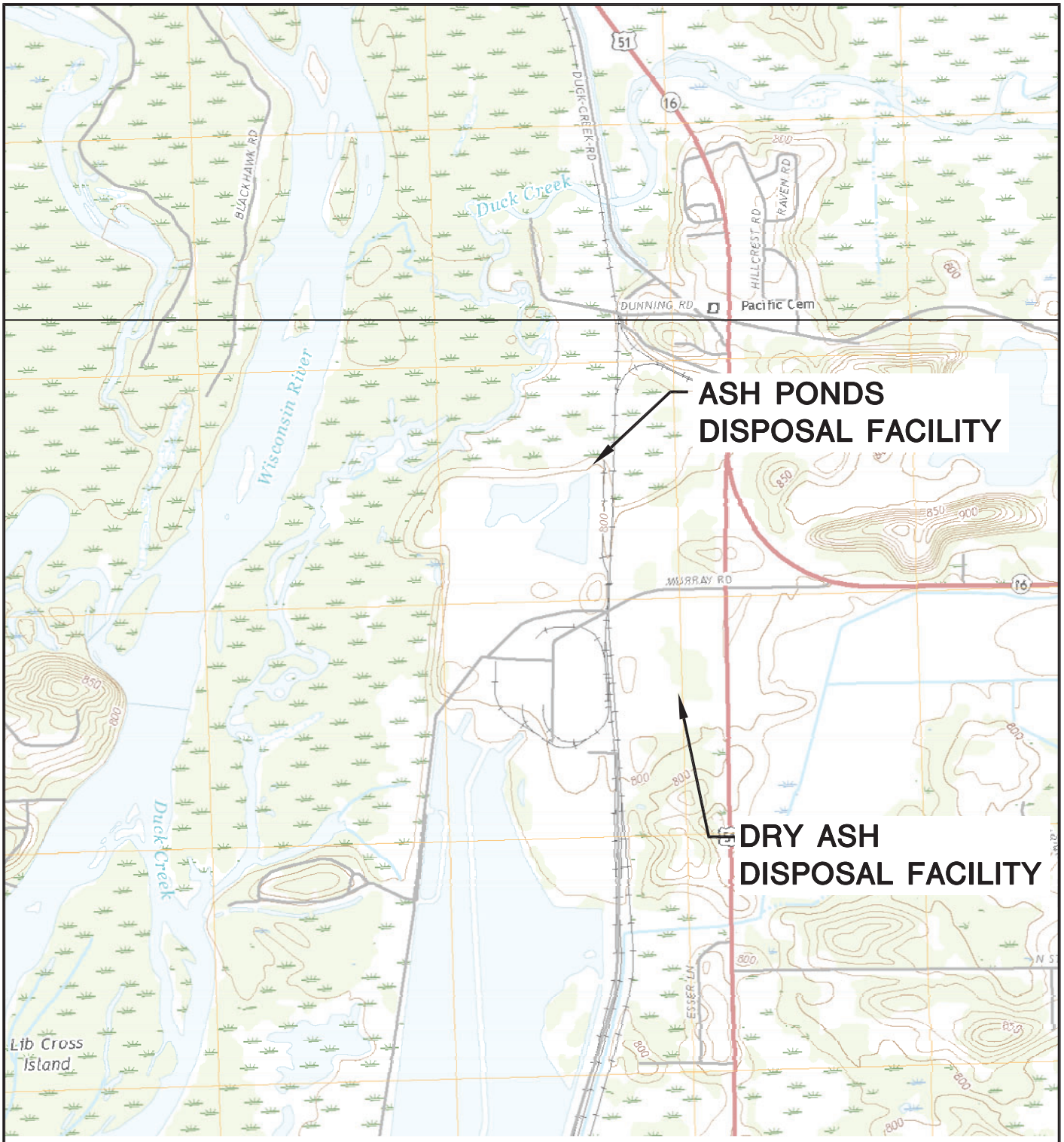
Notes:
NM = not measured

Created by: MDB Date: 5/6/2013
Last revision by: NLB Date: 4/25/2023
Checked by: RM Date: 5/1/2023

(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:\25223067.00\Deliverables\COL MOD 4 ASD - October 2022\Tables\[Table 3 - GW Elevations.xls]levels

Figures

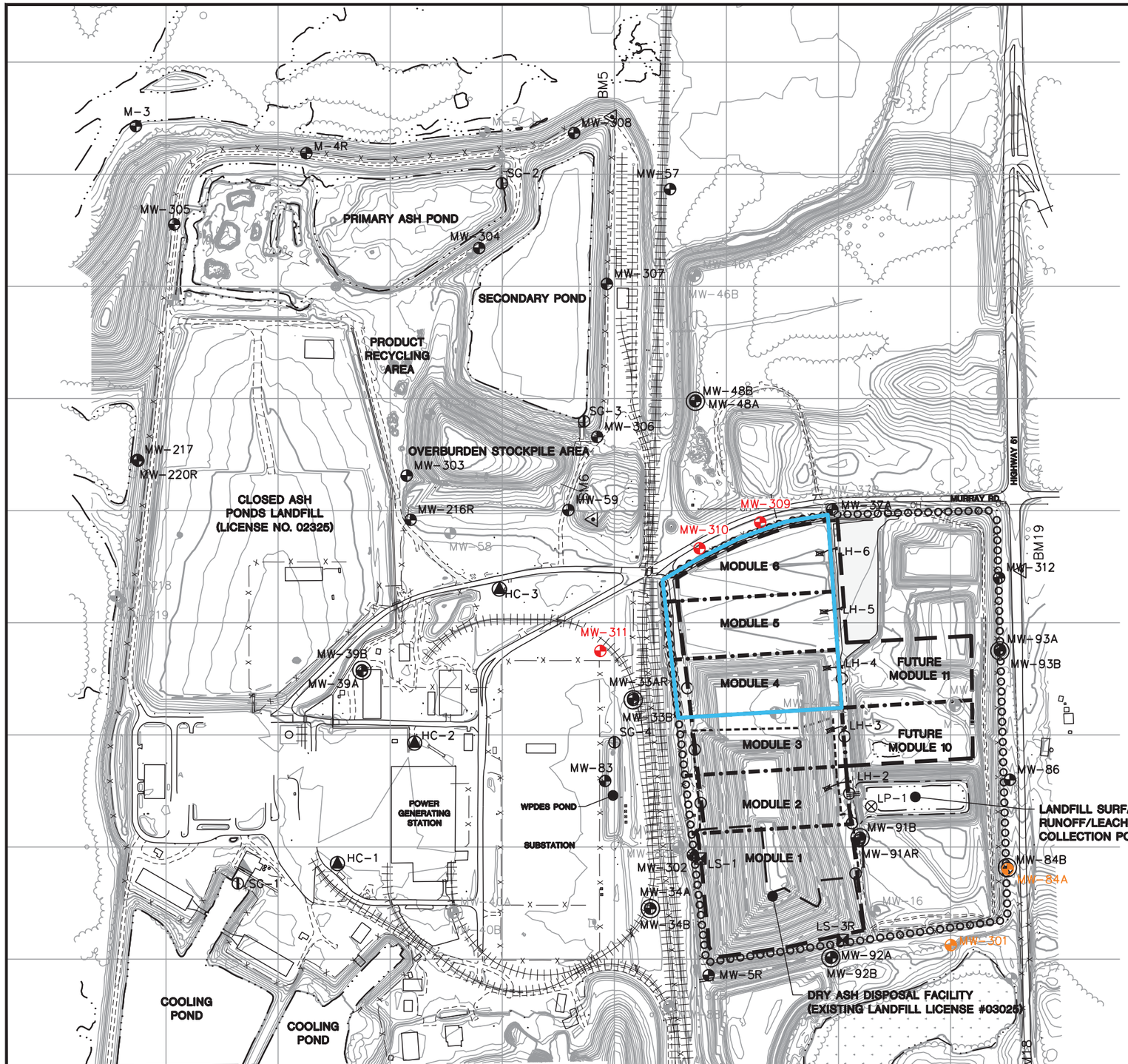


N

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. 25220067.00	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 04/10/2020		

I:\25220067.00\Drawings\ASD Mod 1-3 LF\Site Location Map.dwg, 4/12/2020 7:05:09 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 MODULE 4-6 DRY ASH DISPOSAL FACILITY 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:	MDB
REVISED:	01/16/2023	APPROVED BY:	TK 5/30/2023

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

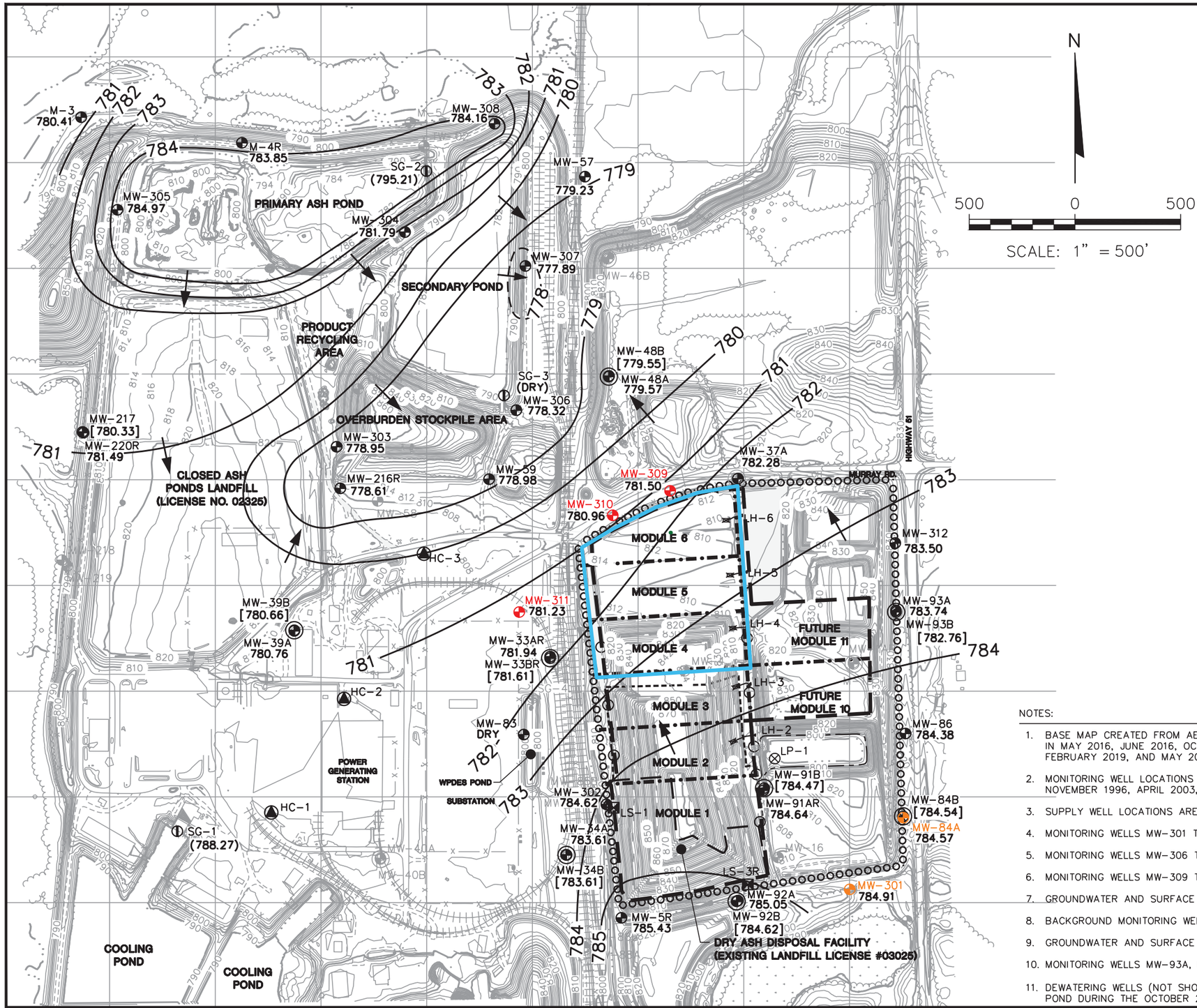
CLIENT: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WI 53954

SITE: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
MODULES 4-6 DRY ASH DISPOSAL FACILITY
PARDEEVILLE, WI

SITE PLAN AND MONITORING WELL LOCATIONS

FIGURE 2

I:\25222067.00\Drawings\Modules 4-6\Site Plan and Monitoring Well Locations Mod 4-6.dwg, 1/16/2023 3:06:53 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
- 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, AND MAY 2019.
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 MODULE 4-6 DRY ASH FACILITY 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:	12/30/2022	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, MODULES 4-6 DRY ASH DISPOSAL FACILITY, PARDEEVILLE, WI

WATER TABLE MAP, OCTOBER 2022

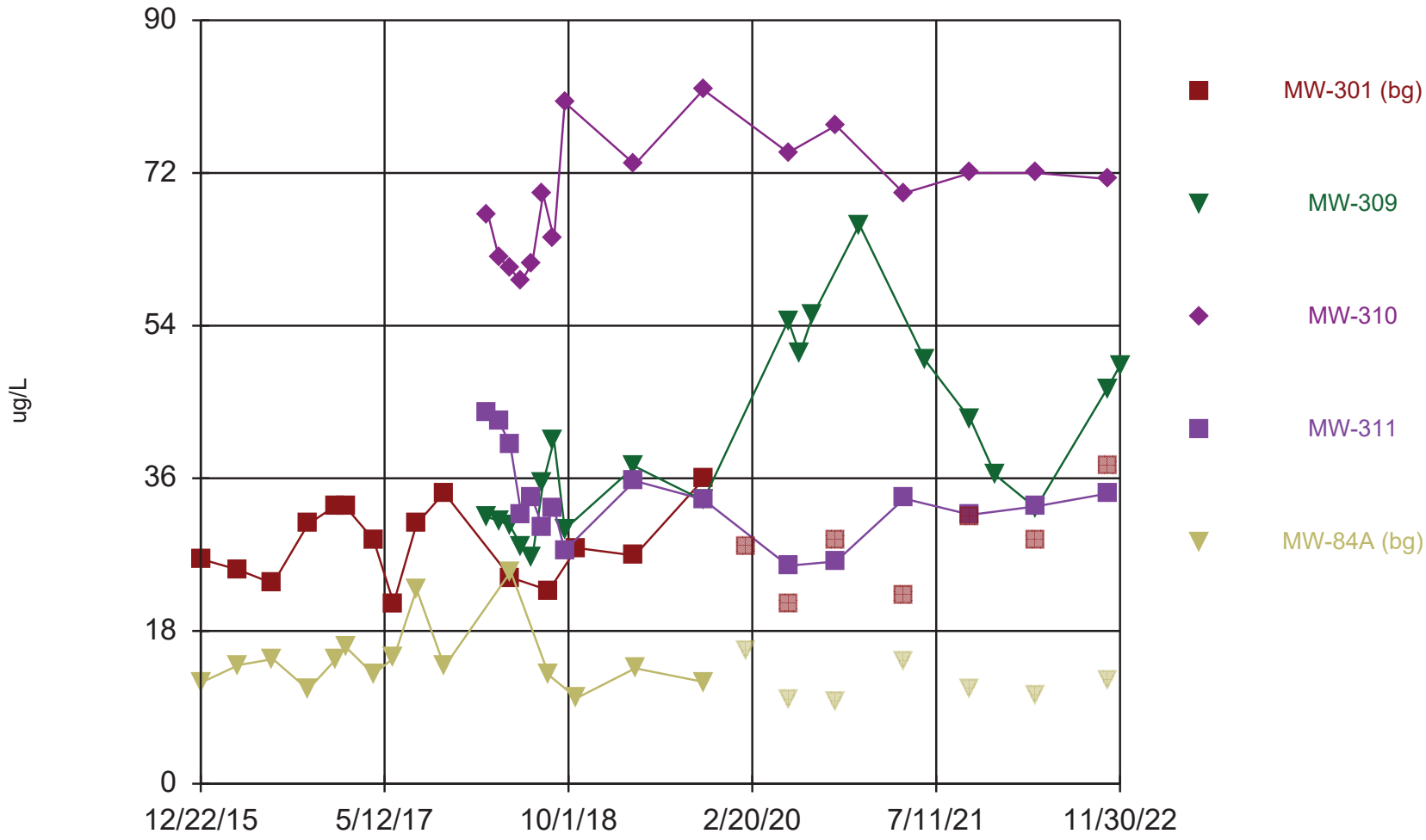
FIGURE 3

I:\25222067.00\Drawings\Modules 4-6\Water Table Map-October 2022.dwg, 1/16/2023 2:40:42 PM

Appendix A

Trend Plots for CCR Wells

Boron



Time Series Analysis Run 5/19/2023 3:18 PM View: COL MOD 4-6

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

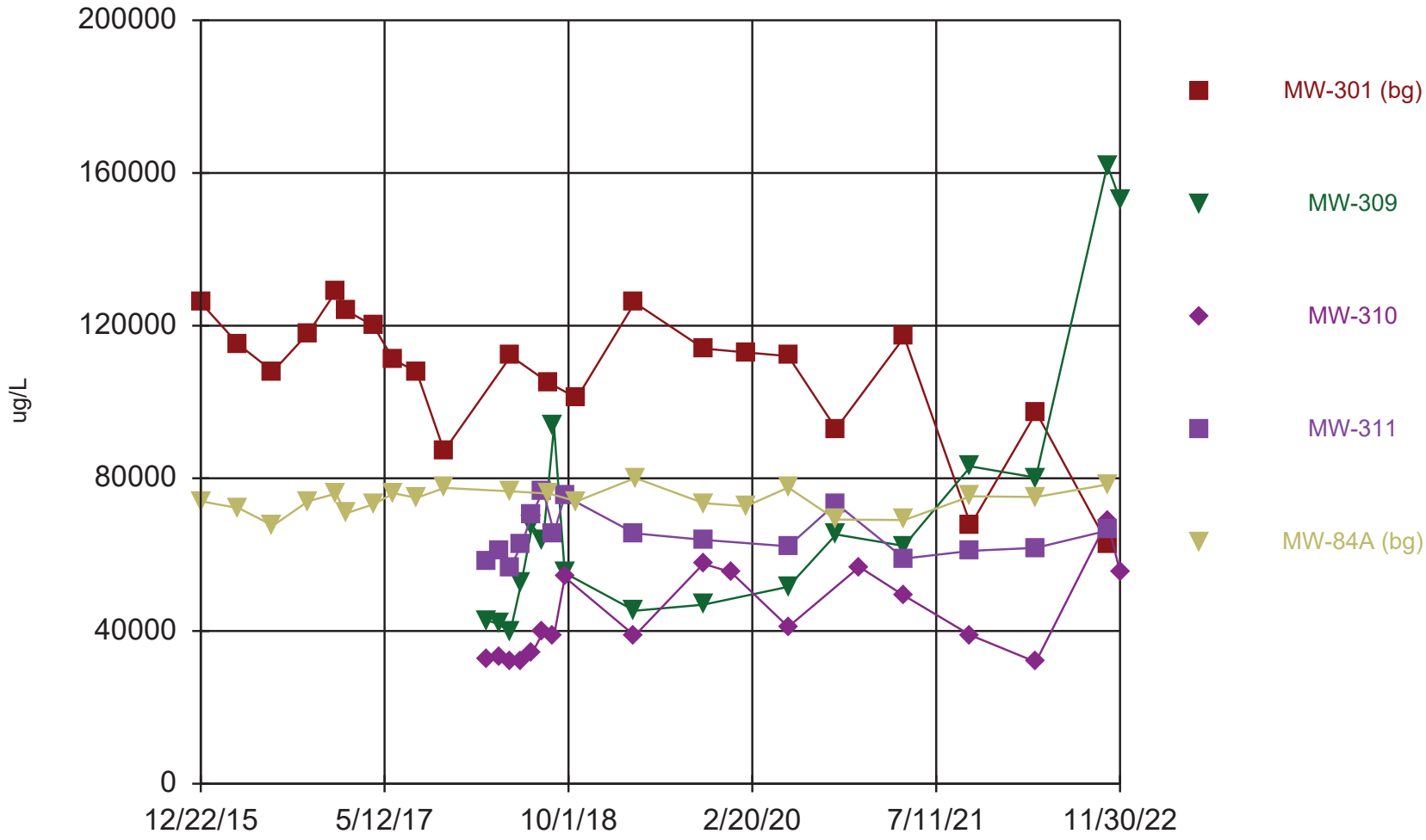
Time Series

Constituent: Boron (ug/L) Analysis Run 5/19/2023 3:27 PM View: COL MOD 4-6

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

	MW-301 (bg)	MW-309	MW-310	MW-311	MW-84A (bg)
12/22/2015	26.5				11.9
4/5/2016	25.2				14
7/8/2016	23.6				14.7
10/13/2016	30.6				11.1
12/29/2016	32.8				14.7
1/25/2017	32.6				16.1
4/11/2017	28.8				12.9
6/6/2017	21.3				14.8
8/8/2017	30.6				22.9
10/23/2017	34.3				
10/24/2017					13.8
2/21/2018		31.4	67.1	43.7	
3/23/2018		31	62.1	42.7	
4/23/2018		30.4	60.7	40.1	
4/25/2018	24.3				25
5/24/2018		28	59.2	31.7	
6/23/2018		26.6	61.4	33.6	
7/23/2018		35.5	69.5	30.1	
8/8/2018	22.8				12.8
8/22/2018		40.5	64.2	32.4	
9/21/2018		30	80.3	27.5	
10/24/2018	27.8				10.1 (J)
4/2/2019	26.9	37.4	73	35.7	
4/3/2019					13.6
10/8/2019		33.4	81.8	33.5	
10/9/2019	35.9				12
2/3/2020	27.9				15.7
5/29/2020	21.3	54.6	74.4	25.7	10
6/30/2020		50.7			
8/6/2020		55.3			
10/8/2020	28.8		77.6	26.2	9.7 (J)
12/11/2020		65.9 (R)			
4/13/2021			69.6		
4/14/2021	22.2			33.6	14.3
6/11/2021		49.9 (R)			
10/14/2021	31.4	42.9	72	31.7	11.1
12/21/2021		36.4			
4/12/2022		32.5	72	32.7	
4/13/2022	28.7				10.5
10/26/2022		46.6	71.3		
10/27/2022	37.5			34.2	12.2
11/30/2022		49.3			

Calcium



Time Series Analysis Run 5/19/2023 3:18 PM View: COL MOD 4-6

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

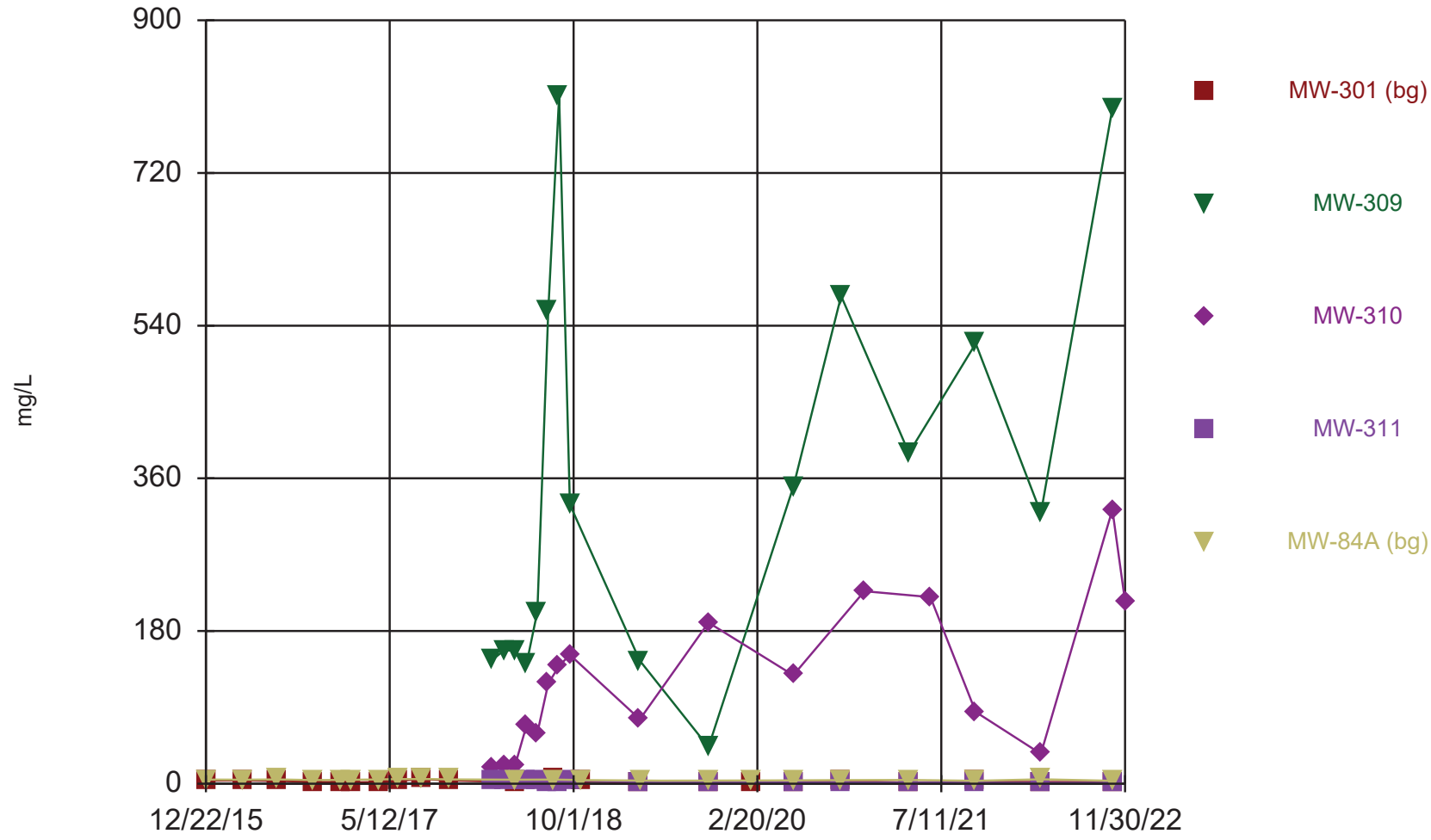
Time Series

Constituent: Calcium (ug/L) Analysis Run 5/19/2023 3:27 PM View: COL MOD 4-6

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

	MW-301 (bg)	MW-309	MW-310	MW-311	MW-84A (bg)
12/22/2015	126000				74000
4/5/2016	115000				72200
7/8/2016	108000				67600
10/13/2016	118000				74000
12/29/2016	129000				76000
1/25/2017	124000				70800
4/11/2017	120000				73200
6/6/2017	111000				76100
8/8/2017	108000				74900
10/23/2017	87200				
10/24/2017					77500
2/21/2018		42700	32400	58000	
3/23/2018		41800	33400	61000	
4/23/2018		39600	32100	56600	
4/25/2018	112000				76600
5/24/2018		52700	32100	62500	
6/23/2018		67600	34300	70700	
7/23/2018		63800	39700	76800	
8/8/2018	105000				76000
8/22/2018		93600	38800	65700	
9/21/2018		55200	54100	75400	
10/24/2018	101000				74000
4/2/2019	126000	45300	38800	65600	
4/3/2019					80100
10/8/2019		46900	57600	63900	
10/9/2019	114000				73500
12/23/2019			55400		
2/3/2020	113000				72700
5/29/2020	112000	51600	41100	62200	77600
10/8/2020	93000	65300		73400	69200
12/11/2020			56800 (R)		
4/13/2021		62300	49300		
4/14/2021	117000			59000	69100
10/14/2021	67800	83100	38900	61000	75300
4/12/2022		80200	31900	61800	
4/13/2022	97300				75100
10/26/2022		162000	68900		
10/27/2022	62800			66300	78400
11/30/2022		153000	55500		

Chloride



Time Series Analysis Run 5/19/2023 3:18 PM View: COL MOD 4-6

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

Time Series

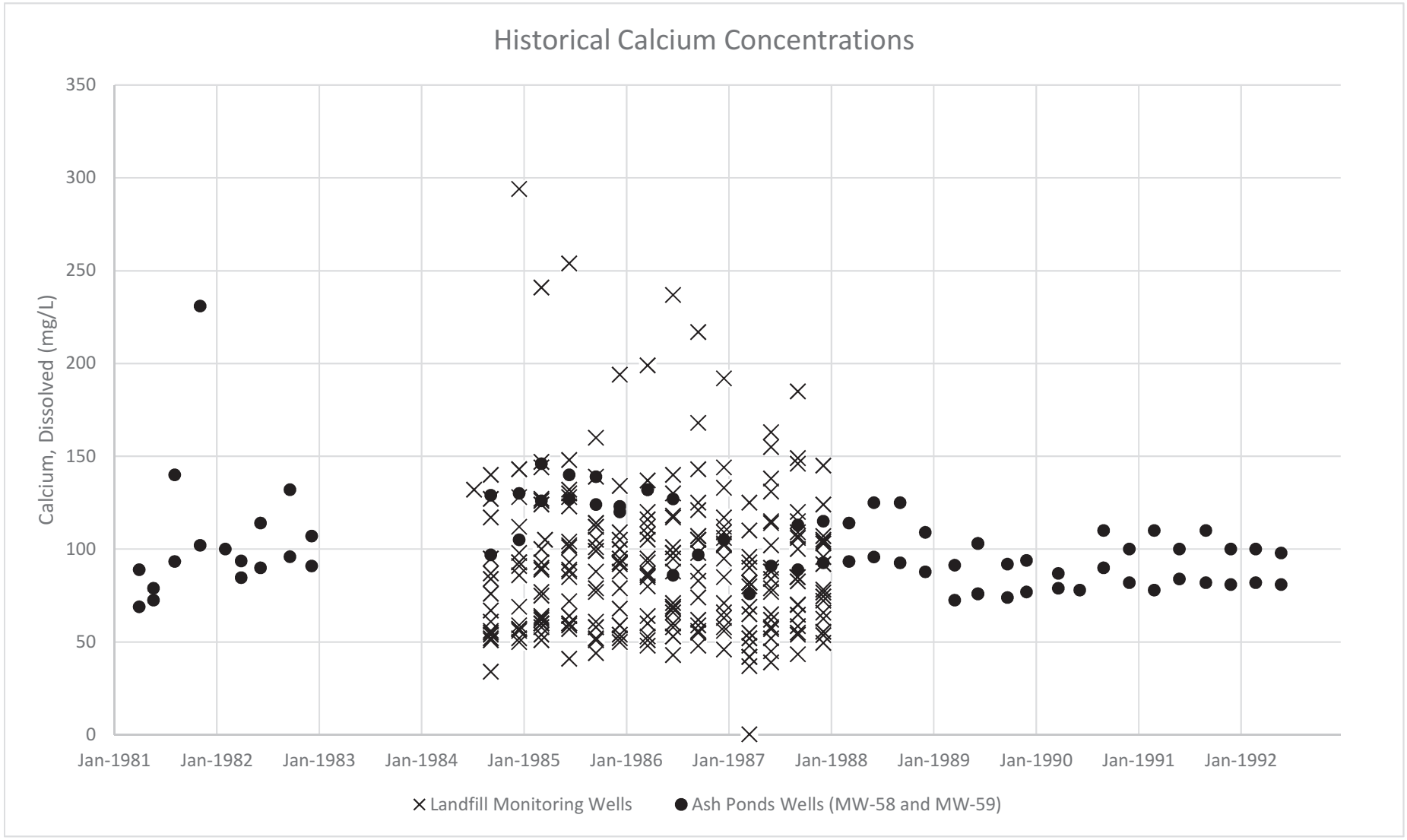
Constituent: Chloride (mg/L) Analysis Run 5/19/2023 3:27 PM View: COL MOD 4-6

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

	MW-301 (bg)	MW-309	MW-310	MW-311	MW-84A (bg)
12/22/2015	3.7 (J)				4.9
4/5/2016	4				4.7
7/8/2016	3.5 (J)				5.1
10/13/2016	2.2				4.3
12/29/2016	2 (J)				4.7
1/25/2017	1.5 (J)				4.6
4/11/2017	2				4.9
6/6/2017	3.5				5.5
8/8/2017	5.5				5.5
10/23/2017	4				
10/24/2017					5.1
2/21/2018		147	19.8	2.9	
3/23/2018		157	21.7	2.7	
4/23/2018		157	22.1	2.6	
4/25/2018	2.3				4.8
5/24/2018		141	68.6	3.5	
6/23/2018		203	59.8	3	
7/23/2018		557	118	2 (J)	
8/8/2018	5.2				4.9
8/22/2018		811	139	2 (J)	
9/21/2018		329	152	3.9	
10/24/2018	3.2				4.2
4/2/2019	0.79 (J)	145	76	1.9 (J)	
4/3/2019					3.6
10/8/2019		43.2	190	1.5 (J)	
10/9/2019	1.7 (J)				3.9
2/3/2020	1.3 (J)				3.7
5/29/2020	2 (J)	350	128	1.5 (J)	3.7
10/8/2020	3.4	575		1.4 (J)	4.3
12/11/2020			227 (R)		
4/13/2021		390			
4/14/2021	1.5 (J)			1.3 (J)	4.4
6/11/2021			220 (R)		
10/14/2021	2.7	519	84.6	1.3 (J)	3.5
4/12/2022		319	35.2	1 (J)	
4/13/2022	1.9 (J)				5.2
10/26/2022		796	323		
10/27/2022	2.3			1.2 (J)	3.4
11/30/2022			215		

Appendix B

Historical Calcium Data



Historical Calcium Results
License #3025 Wells and Select License #2325 Wells

Lic#	Point ID	Point Name	Parameter Description	Sample Date	Result Value	Result Unit
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	86	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	75	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	85	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	79	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	88	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	95	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	95	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	98	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	103	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	82	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	102	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	106	mg/L
3025	43	MW88B	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	124	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	294	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	241	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	254	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	160	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	194	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	199	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	140	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	168	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	133	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	110	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	131	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	149	mg/L
3025	42	MW88A	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	105	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	76	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	98	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	127	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	89	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	114	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	100	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	105	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	98	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	107	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	102	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	80	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	114	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	100	mg/L
3025	41	MW86	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	95.8	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	87	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	93	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	89	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	130	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	114	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	93	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	87	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	69	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	88	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	85	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	69	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	84	mg/L

Historical Calcium Results
License #3025 Wells and Select License #2325 Wells

Lic#	Point ID	Point Name	Parameter Description	Sample Date	Result Value	Result Unit
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	82.6	mg/L
3025	40	MW85	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	76.6	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	55	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	57	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	58	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	60	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	52	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	54	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	51	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	53	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	55	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	56	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	42	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	58	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	54	mg/L
3025	39	MW84B	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	55.6	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	54	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	56	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	60	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	59	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	58	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	68	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	60	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	53	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	56	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	58	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	42	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	57	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	58.6	mg/L
3025	38	MW84A	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	62.6	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	67	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	69	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	77	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	88	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	101	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	105	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	120	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	118	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	121	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	117	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	90	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	115	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	85	mg/L
3025	37	MW82B	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	92	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	7/9/1984	132	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	128	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	124	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	132	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	112	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	93	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	80	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	69	mg/L

Historical Calcium Results
License #3025 Wells and Select License #2325 Wells

Lic#	Point ID	Point Name	Parameter Description	Sample Date	Result Value	Result Unit
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	74	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	71	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	0.32	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	77	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	70.2	mg/L
3025	36	MW82A	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	74.5	mg/L
3025	35	MW81	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	91	mg/L
3025	35	MW81	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	90	mg/L
3025	35	MW81	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	93	mg/L
3025	35	MW81	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	88	mg/L
3025	35	MW81	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	88	mg/L
3025	35	MW81	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	88	mg/L
3025	35	MW81	CALCIUM, DISSOLVED (MG/L CA)	9/7/1987	85	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	56	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	57	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	60	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	60	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	58	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	59	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	53	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	58	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	59	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	63	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	48	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	62	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	70	mg/L
3025	34	MW80B	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	65.8	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	61	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	59	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	63	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	64	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	61	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	59	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	64	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	68	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	62	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	66	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	55	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	52	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	55	mg/L
3025	33	MW80A	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	53.7	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	84	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	93	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	93	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	104	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	105	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	95	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	116	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	117	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	125	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	112	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	82	mg/L

Historical Calcium Results
License #3025 Wells and Select License #2325 Wells

Lic#	Point ID	Point Name	Parameter Description	Sample Date	Result Value	Result Unit
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	88	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	115	mg/L
3025	10	MW5	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	104	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	140	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	143	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	144	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	148	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	139	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	134	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	137	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	130	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	143	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	144	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	125	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	138	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	146	mg/L
3025	9	MW4	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	145	mg/L
3025	23	MW37B	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	34	mg/L
3025	23	MW37B	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	50	mg/L
3025	23	MW37B	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	62	mg/L
3025	23	MW37B	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	72	mg/L
3025	23	MW37B	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	60	mg/L
3025	23	MW37B	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	39	mg/L
3025	22	MW37A	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	51	mg/L
3025	22	MW37A	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	57	mg/L
3025	22	MW37A	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	64	mg/L
3025	22	MW37A	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	64	mg/L
3025	22	MW37A	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	66	mg/L
3025	22	MW37A	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	65	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	112	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	51	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	41	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	44	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	79	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	85	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	71	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	83	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	65	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	155	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	64.7	mg/L
3025	21	MW34B	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	78.3	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	127	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	57	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	147	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	128	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	77	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	50	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	86	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	237	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	217	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	192	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	96	mg/L

Historical Calcium Results
License #3025 Wells and Select License #2325 Wells

Lic#	Point ID	Point Name	Parameter Description	Sample Date	Result Value	Result Unit
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	163	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	185	mg/L
3025	20	MW34A	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	72.3	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	3/20/1985	105	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	102	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	99	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	100	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	112	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	101	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	105	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	106	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	52	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	79	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	107	mg/L
3025	15	MW25	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	107	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	117	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	143	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	126	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	123	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	112	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	109	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	108	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	98	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	105	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	95	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	82	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	90	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	109	mg/L
3025	8	MW1B	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	103	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	95	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	93	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	100	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	101	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	99	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	92	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	93	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	98	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	107	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	109	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	93	mg/L
3025	7	MW1A	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	120	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	52	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	52	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	54	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	57	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	51	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	52	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	48	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	43	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	48	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	46	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	37	mg/L

Historical Calcium Results
License #3025 Wells and Select License #2325 Wells

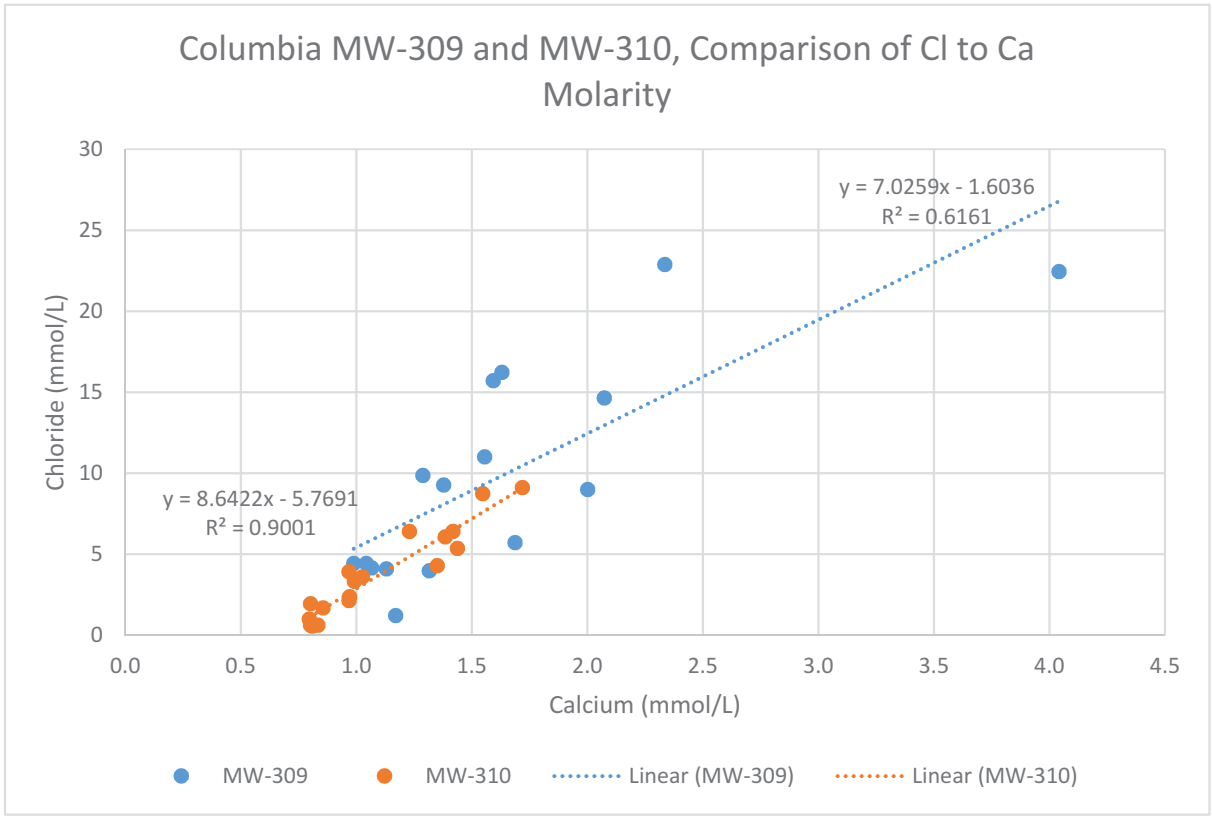
Lic#	Point ID	Point Name	Parameter Description	Sample Date	Result Value	Result Unit
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	45	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	43.4	mg/L
3025	11	MW16	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	49.5	mg/L
2325	108	W59 (W-2)	CALCIUM, TOTAL (MG/L CA)	3/30/1981	89	mg/L
2325	108	W59 (W-2)	CALCIUM, TOTAL (MG/L CA)	5/21/1981	72.5	mg/L
2325	108	W59 (W-2)	CALCIUM, TOTAL (MG/L CA)	8/4/1981	93.3	mg/L
2325	108	W59 (W-2)	CALCIUM, TOTAL (MG/L CA)	11/3/1981	102	mg/L
2325	108	W59 (W-2)	CALCIUM, TOTAL (MG/L CA)	2/1/1982	100	mg/L
2325	108	W59 (W-2)	CALCIUM, TOTAL (MG/L CA)	3/30/1982	84.6	mg/L
2325	108	W59 (W-2)	CALCIUM, TOTAL (MG/L CA)	6/7/1982	90	mg/L
2325	108	W59 (W-2)	CALCIUM, TOTAL (MG/L CA)	9/20/1982	96	mg/L
2325	108	W59 (W-2)	CALCIUM, TOTAL (MG/L CA)	12/7/1982	91	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	97	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	105	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	126	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	127	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	124	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	123	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	132	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	86	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	9/18/1986	97	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	12/19/1986	105	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	3/20/1987	76	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	6/5/1987	91	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	89	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	92.6	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	3/10/1988	93.4	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	6/7/1988	95.8	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	9/8/1988	92.7	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	12/7/1988	87.8	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	3/22/1989	91.4	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	6/13/1989	76	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	6/14/1989	76	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	9/27/1989	74	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	12/4/1989	77	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	3/28/1990	79	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	6/12/1990	78	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	9/5/1990	90	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	12/6/1990	82	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	3/5/1991	78	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	6/3/1991	84	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	9/6/1991	82	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	12/4/1991	81	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	3/2/1992	82	mg/L
2325	108	W59 (W-2)	CALCIUM, DISSOLVED (MG/L CA)	6/1/1992	81	mg/L
2325	107	W58 (W-1)	CALCIUM, TOTAL (MG/L CA)	3/30/1981	69	mg/L
2325	107	W58 (W-1)	CALCIUM, TOTAL (MG/L CA)	5/21/1981	79	mg/L
2325	107	W58 (W-1)	CALCIUM, TOTAL (MG/L CA)	8/4/1981	140	mg/L
2325	107	W58 (W-1)	CALCIUM, TOTAL (MG/L CA)	11/3/1981	231	mg/L
2325	107	W58 (W-1)	CALCIUM, TOTAL (MG/L CA)	3/30/1982	93.6	mg/L
2325	107	W58 (W-1)	CALCIUM, TOTAL (MG/L CA)	6/7/1982	114	mg/L
2325	107	W58 (W-1)	CALCIUM, TOTAL (MG/L CA)	9/20/1982	132	mg/L

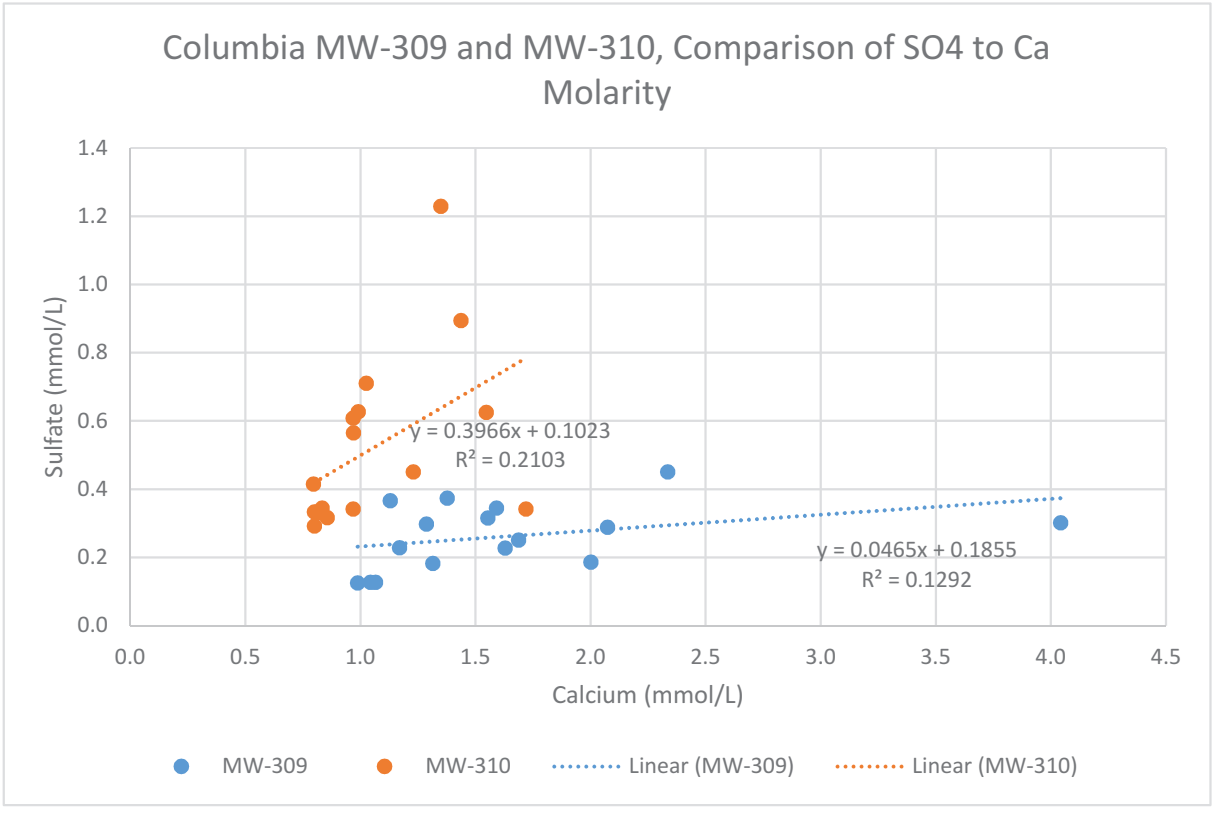
Historical Calcium Results
License #3025 Wells and Select License #2325 Wells

Lic#	Point ID	Point Name	Parameter Description	Sample Date	Result Value	Result Unit
2325	107	W58 (W-1)	CALCIUM, TOTAL (MG/L CA)	12/7/1982	107	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	9/7/1984	129	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	12/17/1984	130	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	3/7/1985	146	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	6/14/1985	140	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	9/18/1985	139	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	12/12/1985	120	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	3/21/1986	132	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	6/20/1986	127	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	9/9/1987	113	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	12/9/1987	115	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	3/10/1988	114	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	6/7/1988	125	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	9/8/1988	125	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	12/7/1988	109	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	3/22/1989	72.5	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	6/13/1989	103	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	6/14/1989	103	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	9/27/1989	92	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	12/4/1989	94	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	3/28/1990	87	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	9/5/1990	110	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	12/6/1990	100	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	3/5/1991	110	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	6/3/1991	100	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	9/6/1991	110	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	12/4/1991	100	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	3/2/1992	100	mg/L
2325	107	W58 (W-1)	CALCIUM, DISSOLVED (MG/L CA)	6/1/1992	98	mg/L

Appendix C

Calcium Correlation Plots


Columbia MW-309 and MW-310, Comparison of Cl to Ca Molarity
y = 7.0259x - 1.6036
R² = 0.6161
y = 8.6422x - 5.7691
R² = 0.9001
Chloride (mmol/L)
Calcium (mmol/L)
MW-309
MW-310
Linear (MW-309)
Linear (MW-310)


Columbia MW-309 and MW-310, Comparison of SO4 to Ca Molarity
y = 0.3966x + 0.1023
R² = 0.2103
y = 0.0465x + 0.1855
R² = 0.1292
Sulfate (mmol/L)
Calcium (mmol/L)
MW-309
MW-310
Linear (MW-309)
Linear (MW-310)

E2 April 2023 Detection Monitoring Alternative Source Demonstration

Alternative Source Demonstration
April 2023 Detection Monitoring

Dry Ash Disposal Facility, Modules 4 - 6
Columbia Energy Center
Pardeeville, Wisconsin

Prepared for:

Alliant Energy

SCS ENGINEERS

25223067.00 | November 22, 2023

2830 Dairy Drive
Madison, WI 53718-6751
608-224-2830

Table of Contents

Section Page

Tables

Figures

Appendices

I:\25223067.00\Deliverables\COL MOD4-6 ASD - April 2023\231122_COL_4-6 LF_Apr23 ASD_Final.docx

PE CERTIFICATION

11/22/2023

I, Sherren Clark, hereby certify that the information in this alternate source demonstration is accurate and meets the requirements of 40 CFR 257.94(e)(2). This certification is based on my review of the groundwater data and related site information available for the Columbia Energy Center Dry Ash Disposal Facility. I am a duly licensed Professional Engineer under the laws of the State of Wisconsin.

11/22/2023

(signature) (date)

Sherren Clark

(printed or typed name)

License number E-29863

My license renewal date is July 31, 2024.

Pages or sheets covered by this seal:
Alternative Source Demonstration, April 2023 Detection Monitoring, Dry Ash Disposal Facility, Modules 4-6
Columbia Energy Center, Pardeeville, Wisconsin (Entire Document)

[This page left blank intentionally]

1.0 INTRODUCTION

This Alternative Source Demonstration (ASD) was prepared to support compliance with the groundwater monitoring requirements of the "Coal Combustion Residuals (CCR) Final Rule" published by the U.S. Environmental Protection Agency (U.S. EPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule*, dated April 17, 2015 (U.S. EPA, 2015), and subsequent amendments. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.94(e)(2). The applicable sections of the Rule are provided below in *italics*.

This ASD also provides the results for the April 2023 sampling event and a supplemental resampling event completed in June 2023.

1.1 §257.94(E)(2) ALTERNATIVE SOURCE DEMONSTRATION REQUIREMENTS

The owner and operator may demonstrate that a source other than the CCR Unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels.

An ASD is completed when there are exceedances of one or more benchmarks established within the groundwater monitoring program. The ASD is completed to determine if any other sources are likely causes of the identified exceedance(s) of established benchmark(s) at the site. This ASD was performed in response to results indicating a statistically significant increase (SSI) over background levels during detection monitoring under the CCR Rule.

This ASD report is evaluating the SSIs for boron and sulfate that were observed in the statistical evaluation of the April 2023 detection monitoring event and the June 2023 resampling event at the Columbia Energy Center (COL) Dry Ash Disposal Facility, Modules 4-6 CCR Unit (Mod 4-6).

1.2 SITE INFORMATION AND MAP

The COL site is located at W8375 Murray Road, Pardeeville, Columbia County, Wisconsin (**Figure 1**). The COL site is an active coal-burning generating station, which has been burning coal and disposing of CCR on site since the mid-1970s. The layout of the site is shown on **Figure 2**. The COL property includes two areas of CCR storage and disposal. These are the Dry Ash Disposal Facility (ADF) and the Ash Ponds Facility. This ASD evaluates the conditions at the site for Mod 4-6 of the ADF only. The Mod 4 CCR Unit became operational in 2018. Modules 5 and 6 were constructed in 2021 and began receiving waste in 2022. The monitoring network certification was updated to include Modules 5 and 6 on December 9, 2021, and the CCR Unit was subsequently referred to as Mod 4-6. The ADF is operated under the Wisconsin Department of Natural Resources (WDNR) License No. 3025.

The groundwater monitoring system at the COL Mod 4-6 facility monitors a single CCR Unit:

- COL Dry Ash Disposal Facility – Modules 4-6 (new landfill)

A map showing the CCR Unit and all background (or upgradient) and downgradient monitoring wells with identification numbers for the CCR groundwater monitoring program and the state monitoring

program is provided on Figure 2. Separate monitoring systems have been established for the other CCR Units at COL, which include Modules 1-3 of the COL ADF, the primary ash pond, and the secondary ash pond.

1.3 STATISTICALLY SIGNIFICANT INCREASES IDENTIFIED

The statistical evaluation was completed in accordance with 40 CFR 257.93(f)(3) using a prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the Upper Prediction Limit (UPL) to evaluate whether an SSI has occurred. The evaluation was based on an intrawell UPL with 1-of-2 retesting, calculated using Sanitas software. The retesting approach results in a slightly lower UPL, but only 1 of 2 samples collected for the event (original and retest) must meet the UPL to demonstrate compliance. The intrawell UPLs, the April 2023 sampling results, and the June 2023 resampling results are summarized in the attached Table 1.

The April 2023 SSIs include the following parameters and wells:

- Boron: MW-309
- Sulfate: MW-309

Results for additional sampling of MW-309 in October and November are also included in Table 1.

Concentration trends for the parameters with SSIs are shown in Appendix A.

1.4 OVERVIEW OF ALTERNATIVE SOURCE DEMONSTRATION

This ASD report includes:

- Background information (Section 2.0)
- Evaluation of potential that SSIs are due to methodology or analysis (Section 3.0)
- Evaluation of potential that SSIs are due to natural sources or man-made sources other than the CCR Units (Section 4.0)
- ASD conclusions (Section 5.0)
- Monitoring recommendations (Section 6.0)

Historical monitoring results from background and compliance sampling for the CCR Rule constituent results with SSIs are provided in Table 2. The laboratory reports for the April 2023 detection monitoring event will be included in the 2023 Annual Groundwater Monitoring and Corrective Action Report to be submitted in January 2024. Complete laboratory reports for the background monitoring events and the previous detection monitoring events were included in previous annual groundwater monitoring and corrective action reports.

2.0 BACKGROUND

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

- Geologic and hydrogeologic setting
- CCR Rule monitoring system
- Other monitoring wells

2.1 REGIONAL GEOLOGY AND HYDROGEOLOGY

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 ADF. Immediately underlying the surficial sand and gravel aquifer is the Cambrian-Ordovician sandstone aquifer.

Additional details on the regional geology and hydrogeology were provided in the May 2020 ASD (SCS Engineers [SCS], 2020).

2.1.2 Site Information and Groundwater Flow

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 ADF were described as generally sandy with interbedded silty clay lenses up to 20 feet thick (Warzyn Engineering, Inc. [Warzyn], 1978). During drilling of CCR well MW-301, the unconsolidated materials were identified as consisting primarily of silty sand. The boring log for previously installed monitoring well MW-84A shows silty sand and sand as the primary unconsolidated materials at these locations. CCR monitoring wells MW-84A and MW-301 are screened within the unconsolidated sand unit. The geology in the vicinity of wells MW-309, MW-310, and MW-311 is a poorly graded sand and gravel.

Shallow groundwater at the site generally flows to the northwest across the existing landfill area, then generally flows west toward the Wisconsin River. A groundwater flow map for April 2023 is shown on **Figure 3.** The groundwater elevation data for the state and CCR monitoring program wells are provided in **Table 3** and a time series plot of groundwater elevations at the CCR wells is provided in **Appendix A**.

Historically, localized groundwater mounding was associated with the ash ponds; however, flow in the ash pond area changed in 2022 and 2023 as the ponds were closed and CCR was removed. In 2022, dewatering wells located around the Secondary Ash Pond lowered the water table near the Secondary Ash Pond and discharged groundwater to the Primary Ash Pond. Beginning in spring 2023, dewatering activities switched to the Primary Ash Pond area, and groundwater pumped from dewatering wells around the Primary Ash Pond was discharged to the large cooling pond south of the generating station. The April 2023 flow map shows temporary inward gradients in the vicinity of the Primary and Secondary Ash Ponds due to groundwater dewatering activities. For comparison, the April 2022 and October 2022 water table maps are provided in **Appendix B**.

Dewatering for ash pond closures affected water levels and groundwater flow directions in the Mod 4-6 area, as shown on the water table maps (**Figure 3** and **Appendix B**) and the time series plot of groundwater elevation (**Appendix A**).

2.2 CCR RULE MONITORING SYSTEM

The groundwater monitoring system established in accordance with the CCR Rule consists of two upgradient (background) monitoring wells and three downgradient monitoring wells. The background wells include MW-301 and MW-84A. The downgradient wells include MW-309, MW-310, and MW-311. The background wells are shared with the other COL CCR Units. The CCR Rule wells are installed within the sand and gravel aquifer. Well depths range from approximately 36 to 38 feet, measured from the top of the well casing.

2.3 OTHER MONITORING WELLS

Additional groundwater monitoring wells currently exist at COL as part of the monitoring systems developed for the state monitoring program and for the other CCR Units.

Monitoring wells for the state monitoring program are installed in the unconsolidated sand and gravel unit, which is the uppermost aquifer as defined under 40 CFR 257.53. This shallow monitoring system includes water table wells and mid-depth piezometers. Well depths range from approximately 14 to 76 feet, measured from the top of the well casing.

3.0 METHODOLOGY AND ANALYSIS REVIEW

To evaluate the potential that an SSI is due to a source other than the regulated CCR Unit, SCS used a two-step evaluation process. First, the sample collection, field and laboratory analysis, and statistical evaluation were reviewed to identify any potential error or analysis that led to exceedance of the benchmark. Second, potential alternative sources, including natural variation and man-made sources other than the CCR Unit, were evaluated. This section of the report provides the findings of the methodology and analysis review. Section 4.0 of the report addresses the potential alternative sources.

3.1 SAMPLING AND FIELD ANALYSIS

Field notes and sampling results were reviewed to determine if any sampling error may have caused or contributed to the observed SSIs. Potential field sampling errors or issues could include mislabeling of samples, improper sample handling, missed holding times, cross contamination during sampling, or other field error. Field blank sample results were also reviewed for any indication of potential contamination from sampling equipment or containers.

SCS collected samples on April 26 and 27, 2023. Retest samples were collected on June 29, 2023. Field parameter results were compiled by SCS and provided to the laboratory for inclusion in the laboratory report. SCS did not identify issues with the field analysis based on review of the data and field notes. Because boron and sulfate are laboratory parameters, there is little potential for a field analysis error to contribute to an SSI.

3.2 LABORATORY ANALYSIS REVIEW

The laboratory reports for the April 2023 detection monitoring event and the June 2023 resampling event were reviewed to determine if any laboratory analysis error or issue may have caused or contributed to an observed SSI for boron or sulfate. The laboratory report review included reviewing the laboratory quality control flags and narrative, verifying that correct methods were used and desired detection limits were achieved, and checking the field and laboratory blank sample results.

Following evaluation of the April 2023 sampling results, SCS resampled MW-309 for specific parameters on June 29, 2023. The resampling was performed on select parameters that exceeded UPLs in the April 2023 event, including boron and sulfate for MW-309. Based on the review of the laboratory reports, SCS did not identify any additional issues due to a laboratory analysis error in the other laboratory reports. There were no laboratory quality control flags or issues identified in the laboratory reports that affect the usability of the data for detection monitoring.

Time series plots of the SSI constituent analytical data were also reviewed for any anomalous results that might indicate a possible sampling or laboratory error (e.g., dilution error or incorrect sample

labeling). The time series plots are provided in Appendix A. The boron and sulfate concentrations observed are within the range of historical concentrations for the COL ADF as a whole.

3.3 STATISTICAL EVALUATION REVIEW

The review of the statistical results and methods included a quality control check of the following:

- Input analytical data vs. laboratory analytical reports
- Statistical method and process for each SSI

Based on the April 2023 sampling results and the June 2023 retest results, SSIs for boron and sulfate occurred for MW-309 for the April 2023 semiannual event.

Based on the review of the statistical evaluation, SCS did not identify any errors in the statistical evaluation that caused or contributed to the determination of intrawell SSIs for boron or sulfate at MW-309. However, the small size of the intrawell background data set (eight samples per well) and the short timeframe over which they were collected (8 months) may have contributed to the identification of the April 2023 result as SSIs. The small background data set collected from February through September 2018 likely does not represent the full range of variability in background concentrations at the compliance monitoring wells. The Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities (U.S. EPA, 2009; Section 5.3.1) recommends periodic updating of background for both intrawell and interwell analyses; however, newer data with SSIs cannot be added to the background data set unless and until the newer data has been confirmed to represent background variability and not a release from the CCR unit.

3.4 SUMMARY OF METHODOLOGY AND ANALYSIS REVIEW FINDINGS

In summary, there were no changes to the SSI determinations for the April 2023 monitoring event based on the methodology and analysis review, and no errors or issues caused or contributed to the reported SSIs.

4.0 ALTERNATIVE SOURCES

This section discusses the potential alternative sources for the boron and sulfate SSIs at the downgradient monitoring wells; identifies the most likely alternative source(s); and presents the lines of evidence indicating that an alternative source is the most likely cause of the observed SSIs.

4.1 POTENTIAL CAUSES OF SSI

4.1.1 Natural Variation

The statistical analysis was completed using an intrawell approach, comparing the April 2023 detection monitoring results to the UPLs calculated based on background sampling of the compliance wells (MW-309, MW-310, and MW-311). If concentrations of a constituent that is naturally present in the aquifer vary with time, then the potential exists that the compliance sampling concentrations may be higher than background concentrations due to natural temporal variation.

Temporal variation can occur seasonally or due to longer-term events such as changes in infiltration patterns and groundwater flow directions caused by wet or dry years.

Background sampling at the three MOD 4-6 compliance wells was performed prior to disposal of CCR in MOD 4-6. Because the background sampling at the three compliance wells was performed after other potential man-made sources of boron and sulfate had been in operation for many years, it is difficult to determine how much of the variation in boron and sulfate concentrations is due to natural sources versus man-made alternative sources associated with the long-term use of the property, as discussed in Section 4.1.2. Based on comparison to the two upgradient wells, it appears likely that boron and sulfate may reflect man-made sources. Regardless of the source, natural temporal variations in infiltration and groundwater flow direction may have contributed to the SSIs for boron and sulfate at MW-309.

4.1.2 Man-Made Alternative Sources

Man-made alternative sources that could potentially contribute to the boron and sulfate SSIs could include the closed ash pond landfill, the active and inactive ash ponds (currently in the closure process), the surface water/leachate collection pond for the ADF, the former ash pond effluent ditch, the coal storage area, railroad operations, road salt use, storm water runoff from the plant entrance road and/or other plant operations.

Historically, groundwater flow directions have varied significantly at the site due to changes in water and ash management, making it difficult to identify a specific source for low levels of boron and sulfate in the area of the Mod 4-6 compliance monitoring wells. Furthermore, recent dewatering activities around the Secondary Ash Pond (2022) and the Primary Ash Pond (2023) likely also affected groundwater flow, further complicating the evaluation of historic sources. Nevertheless, there are several lines of evidence indicating that the April 2023 SSIs for boron and sulfate are not due to a release from the Mod 4-6 CCR unit.

4.2 LINES OF EVIDENCE

The lines of evidence indicating that the SSIs for boron and sulfate in compliance well MW-309 relative to the intrawell background sampling, are due to one or more alternative sources including:

1. The Mod 4-6 CCR Unit was constructed with a composite liner system and leachate collection system. Module 4 has only been receiving CCR since late 2018 and Modules 5 and 6 started receiving CCR in 2022; therefore, it is very unlikely that a release from Mod 4-6 could have reached MW-309 by April 2023. More information about the composite liner is presented in Section 4.2.5.

2. The detected concentrations of boron exceeding the intrawell UPL for MW-309 are below the background UPL for nearby compliance well MW-310. These results indicate that concentrations in this range were present in the groundwater in this area prior to initiation of CCR disposal in the Mod 4-6 CCR Unit. The background data for the intrawell statistical analysis represent pre-disposal conditions. Information about the historical boron concentrations is presented in Section 4.2.1.

3. The concentrations of boron and sulfate dropped significantly in the results from the recent October 2023 sampling event, following the increases in April 2023. This short-term increase and decrease are not an expected behavior in response to a release through the composite liner. More information about the concentration changes with time is presented in Section 4.2.2.

4. Higher temporal variability in 2022 and 2023 is expected in these wells because active groundwater pumping for dewatering in the ash pond area likely induced changes in groundwater levels and flow patterns. The influence of dewatering is discussed in Section 4.2.3.

5. Because of their shallow depth and location near the plant entrance road, influences from surface water infiltration, precipitation, or dissolution of sulfate impurities in rock salt (a deicing material) may be accentuated in these wells. These factors contribute to temporal variability. For sulfate impurities in rock salt, the expected manifestation would be as a sharp increase in sulfate in the spring followed by a decrease in the fall, as discussed in Section 4.2.4.

6. As discussed in Section 3.3, the small background data set was collected over a short period of time from February through September 2018, and likely does not represent the full range of temporal variability in background concentrations at the compliance monitoring wells.

These lines of evidence and the supporting data are discussed in more detail in the following sections.

4.2.1 Mod 4-6 Composite Liner

The Mod 4-6 CCR Unit was constructed with a composite liner system and a leachate collection system, and has only been receiving CCR since late 2018 in MOD 4 and since 2022 in MODs 5 and 6. Given the short active time frame, it is very unlikely that a release from Mod 4-6 could have reached MW-309 by April 2023. The liner system includes the following:

- 2 feet of compacted clay
- Geosynthetic clay liner (GCL)
- 60-mil high density polyethylene (HDPE) geomembrane
- Leachate collection drainage layer
- Leachate collection piping

The MOD 4 liner was constructed in 2018, and CCR placement in Mod 4 began in November 2018. CCR placement in Mod 5-6 began in 2022.

Given the liner system in place, a release from Mod 4-6 would have to penetrate the HDPE liner at a flaw, flow vertically through the GCL and compacted clay liner, and travel with the groundwater approximately 600 feet north to MW-309 from Module 4 in less than five years, or travel to the wells from Modules 5 and 6 in less than one year. Based on the hydraulic conductivity of the liner clay (10^{-8} centimeters/second), the lack of any evidence of a flaw in the HDPE liner, and the very low estimated average groundwater velocity (0.2 to 4 feet per year [SCS, 2021a]), it is very unlikely that changes in sulfate concentrations at MW-309 reflect a release from Mod 4-6. Extensive testing was performed as part of the WDNR-approved construction documentation (SCS, 2021b) to document the proper construction of the liner.

4.2.2 Area Background Concentrations for Boron and Sulfate

The detected concentrations of boron exceeding the intrawell UPL for MW-309 are below the background UPL for nearby compliance well MW-310. These results indicate that concentrations in this range were present in the groundwater in this area prior to initiation of CCR disposal in the Mod 4-6 CCR Unit. The background data for the intrawell statistical analysis represent pre-disposal conditions.

Historical boron concentrations for all five Mod 4-6 wells are shown in **Table 2** and on the time series plots in **Appendix A**. As shown on the time series plots, the concentrations of boron in the May 2020 through the April 2023 samples from MW-309 were generally higher than the background results at MW-309, but do not exceed the range of background sampling results for MW-310, located approximately 300 feet to the west along Murray Road.

As discussed in more detail in the ASD for the May 2020 monitoring event (SCS, 2020), the background concentrations of boron in the area of the Mod 4-6 compliance wells likely reflect historical ash management activities at the site under different groundwater flow conditions. The background data for the intrawell statistical analysis represent pre-disposal conditions at MOD 4-6.

These results indicate that boron concentrations in the ranges detected at the Mod 4-6 compliance wells in April and June 2023 were present in the groundwater in this area prior to initiation of CCR disposal in the Mod 4-6 CCR Unit. Based on these results, it is likely that the boron concentrations from natural and/or man-made alternative sources have varied in concentration at MW-309 in response to changes in groundwater flow and infiltration.

For sulfate, the April and June 2023 concentrations at MW-309 exceeded the intrawell UPLs for all three compliance wells, but the recent October 2023 result for sulfate at MW-309 was within the range of background concentrations for nearby well MW-310. The October result indicates that the sulfate concentration has returned to the range observed for wells along the entrance road prior to CCR disposal in MOD 4-6 after a short-term increase above that range.

4.2.3 Boron and Sulfate Concentration Changes with Time

The concentrations of boron and sulfate dropped significantly in the results of the recent October 2023 sampling event, following the increases in April 2023. This short-term increase and decrease are not an expected behavior in response to a release through the composite liner.

The historical boron and sulfate concentrations from all five MOD 4-6 wells are shown in **Table 2** and on the time series plots in **Appendix A.** These concentrations were then followed by a sharp decline in the October 2023 sampling event.

4.2.4 Influence of Dewatering Well Pumping

Higher temporal variability in 2022 and 2023 is expected in these wells because active groundwater pumping for dewatering in the ash pond area likely induced changes in groundwater levels and flow patterns. In 2022, dewatering wells were installed around the Secondary Pond and groundwater was pumped to lower the water table below the pond to facilitate CCR removal and pond closure. Pumped groundwater was discharged to the Primary Ash Pond. In 2023, groundwater was pumped from dewatering wells installed around the Primary Ash Pond to lower the water table below the pond to facilitate CCR removal and pond closure. The pumped groundwater was discharged to the large cooling pond south of the generating station.

The April 2023 flow map (**Figure 3**) shows temporary inward gradients in the vicinity of the Primary Ash Pond and Secondary Pond due to groundwater dewatering activities. For comparison, the April 2022 and October 2022 water table maps are provided in **Appendix B**.

The April 2022 water table map shows radial flow away from the Primary Ash Pond and flow to the northwest in the MOD 4-6 area. The October 2022 water table map shows the influence of dewatering around the Secondary Pond. The April 2023 water table map shows the influence of

initial dewatering around the Primary Ash Pond, and potentially some residual effects of the 2022 dewatering around the Secondary Pond. All three maps continue to show flow being generally to the north and/or northwest in the MOD 4-6, but hydraulic gradients and flow paths likely varied locally as dewatering was started and stopped at different locations.

The time series plot of groundwater elevations (**Appendix A**) also shows the influence of dewatering activities. The plot shows water levels at the two upgradient background wells, located further from the pond closure area, and the three compliance wells, located closer to the pond closure area. From the time MOD 4 began accepting CCR in late 2018, water levels at all five wells followed a generally decreasing trend through 2022, with a much steeper decrease between April 2022 and October 2022, when the Secondary Pond dewatering wells were active. Water levels at the compliance wells increased after dewatering at the Secondary Pond ended in late 2022, and all wells showed increased water levels in spring 2023 due to precipitation and infiltration.

The variability in water levels and flow directions associated with the dewatering activities likely contributed to temporal variability in boron and sulfate concentrations at MW-309. Conditions during 2022 and 2023 were variable and were not the same as those during the short background monitoring period used to develop the intrawell UPLs.

4.2.5 Surface Water Infiltration Effects

Because of their shallow depth and location near the plant entrance road, influences from surface water infiltration, precipitation, or dissolution of sulfate impurities in rock salt (a deicing material) may be accentuated in the MOD 4-6 compliance wells. These factors contribute to temporal variability.

The influence of surface water infiltration and road salt impacts is apparent in the chloride monitoring results for MW-309 and MW-310. During background monitoring, prior to CCR disposal in MOD 4-6, MW-309 had chloride concentrations ranging from 141 to 811 mg/L, and concentrations since then have been highly variable but below the intrawell UPL.

Wells MW-309, MW-310, and MW-311 are shallow wells that are also located close to an access road. Due to this location, influence from atmospheric deposition, precipitation, or the dissolution of sulfate from rock salt during deicing of roads, it may be likely a sharp increase in sulfate will be seen in the spring followed by a sharp decrease in the fall.

While chloride provides the strongest indication of impacts from surface water infiltration, concentrations of other parameters can also vary to the surface water impacts. Sulfate can be present as an impurity in rock salt used for deicing. Surface water infiltration can also affect seasonal water levels and local flow directions.

5.0 ALTERNATIVE SOURCE DEMONSTRATION CONCLUSIONS

The lines of evidence discussed above regarding the SSIs reported for boron and sulfate at MW-309 demonstrate that the SSIs are likely due to sources other than the Mod 4-6 CCR Unit.

6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS

In accordance with section 257.94(e)(2) of the CCR Rule, the COL Mod 4-6 CCR Unit may continue with detection monitoring based on this ASD. The ASD report will be included in the 2023 Annual Report due January 31, 2024.

7.0 REFERENCES

RMT, 2003, Water Table Map (April 2023), Figure 3.

SCS Engineers, 2023, Alternative Source Demonstration, October 2022 Detection Monitoring, Dry Ash Disposal Facility, Modules 4-6, Columbia Energy Center, Pardeeville, WI, May 31, 2023.

SCS Engineers, 2020, Alternative Source Demonstration, May 2020 Detection Monitoring, Dry Ash Disposal Facility, Module 4, Columbia Energy Center, Pardeeville, WI, November 12, 2020.

SCS Engineers, 2021a, 2020 Annual Groundwater Monitoring and Corrective Action Report, Columbia Energy Center, Dry Ash Disposal Facility, Module 4, Pardeeville, WI, January 29, 2021.

SCS Engineers, 2021b. Phase 1, Modules 5 and 6 Construction Documentation Report, Columbia Energy Center, Dry Ash Disposal Facility, Pardeeville, WI, December 2, 2021.

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

U.S. EPA, 2015, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, April 2015.

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.

Warzyn Engineering, Inc., 1981, Water Table Contour Map 2/4/81, Drawing No. C7134-94.

Tables

Table 1. Groundwater Analytical Results Summary
Columbia Dry Ash Disposal Facility - Module 4-6 / SCS Engineers Project #25222067.00

Parameter Name	Background Wells		Compliance Wells								
	MW-84A	MW-301	MW-309					MW-310		MW-311	
	4/27/2023	4/27/2023	Intrawell UPL	4/26/2023	6/29/2023	10/9/2023	11/9/2023	Intrawell UPL	4/26/2023	Intrawell UPL	4/26/2023
Groundwater Elevation, ft amsl	786.97	787.57		785.05	784.12	782.58	782.76		785.18		785.69
Appendix III											
Boron, µg/L	10.3	20.1	42.2	50.8	59.4	41.5	--	81.9	57.5	49.8	23.0
Calcium, µg/L	68,600	120,000	99,900	35,500	--	66,800	--	56,000	36,800	84,200	52,800
Chloride, mg/L	3.0	1.5 J	901	372	--	259	--	205	128	4.41	2.1
Fluoride, mg/L	<0.095	<0.095	DQ	<0.095	--	<0.095	--	DQ	<0.095	DQ	<0.095
Field pH, Std. Units	7.01	6.65	8.18	7.61	7.72	7.43	7.25	8.12	7.27	8.07	7.48
Sulfate, mg/L	1.3 J	12.3	53.1	143	147	80.6	89.0	118	102	131	22.2
Total Dissolved Solids, mg/L	326	526	1,730	1,250	--	858	--	759	654	462	292

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

Abbreviations:
UPL = Upper Prediction Limit
DQ = Double Quantification
-- = Not Analyzed
LOQ = Limit of Quantitation
LOD = Limit of Detection
mg/L = milligrams per liter
µg/L = micrograms per liter
SSI = Statistically Significant Increase

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

Notes:
1. Intrawell UPLs are based on 1-of-2 retesting approach; therefore, there is no SSI if either the original sample result or the resample are below the UPL.

2. Intrawell UPL for fluoride is based on the double quantification rule, because fluoride was not detected above the LOQ in the background samples.

3. Intrawell UPLs were calculated from background sampling results for the compliance wells from February 2018 through September 2018.

Created by: NDK Date: 12/2/2022
Last revision by: RM Date: 11/14/2023
Checked by: NLB Date: 11/14/2023
Scientist/PM QA/QC: TK Date: 11/14/2023

Table 2. Historical Analytical Results for Parameters with SSIs
Columbia Dry ADF, Modules 4-6

Well Group	Well	Collection Date	Boron (µg/L)	Sulfate (mg/L)
Background	MW-301	12/22/2015	26.5	9.3
		4/5/2016	25.2	15.3
		7/8/2016	23.6	15
		10/13/2016	30.6	13.9
		12/29/2016	32.8	12.3 J
		1/25/2017	32.6	6.5
		4/11/2017	28.8	10.3
		6/6/2017	21.3	17.1
		8/8/2017	30.6	31.6
		10/23/2017	34.3	27.5
		4/25/2018	24.3	8.6
		8/8/2018	22.8	21.6
		10/24/2018	27.8	19.2
		4/2/2019	26.9	4.4
		10/9/2019	35.9	8.4
		2/3/2020	27.9	7.2
		5/29/2020	21.3	11.5
		10/8/2020	28.8	25.1
		4/14/2021	22.2	8.5
		10/14/2021	31.4	17.4
		4/13/2022	28.7	12.7
		10/27/2022	37.5	11.6
		4/27/2023	20.1	12.3
		10/11/2023	36.2	11.8
	MW-84A	12/22/2015	11.9	4.9
		4/5/2016	14.0	4.3
		7/8/2016	14.7	3.7 J
		10/13/2016	11.1	2.6 J
		12/29/2016	14.7	2.7 J
		1/25/2017	16.1	3
		4/11/2017	12.9	2.8 J
		6/6/2017	14.8	2.7 J
		8/8/2017	22.9	2 J
		10/24/2017	13.8	2.2 J
		4/25/2018	25.0	2.8 J
		8/8/2018	12.8	1.9 J
		10/24/2018	10.1 J	1.6 J
		4/3/2019	13.6	1.4 J
		10/9/2019	12.0	1.3 J
		2/3/2020	15.7	<2.2
		5/29/2020	10.0	1.5 J
		10/8/2020	9.7 J	1.3 J
		4/14/2021	14.3	1.4 J
		10/14/2021	11.1	1.3 J
		4/13/2022	10.5	1.4 J
		10/27/2022	12.2	1.1 J
		4/27/2023	10.3	1.3 J
		10/11/2023	14.0	1.4 J

Table 2. Historical Analytical Results for Parameters with SSIs
Columbia Dry ADF, Modules 4-6

Well Group	Well	Collection Date	Boron (µg/L)	Sulfate (mg/L)
Compliance	MW-309	2/21/2018	31.4	12.2
		3/23/2018	31.0	12.2
		4/23/2018	30.4	12
		5/24/2018	28.0	17.5
		6/23/2018	26.6	24.1
		7/23/2018	35.5	33.1
		8/22/2018	40.5	43.3
		9/21/2018	30.0	35.9
		4/2/2019	37.4	35.2
		10/8/2019	33.4	21.9
		5/29/2020	54.6	28.6
		6/30/2020	50.7	--
		8/6/2020	55.3	--
		10/8/2020	57.7	21.8
		12/11/2020	65.9	--
		4/13/2021	48.0	30.3
		6/11/2021	49.9	--
		10/14/2021	42.9	27.7
		12/21/2021	36.4	--
		4/12/2022	32.5	17.9
		10/26/2022	46.6	28.9
		11/30/2022	49.3	--
		4/26/2023	50.8	143
		6/29/2023	59.4	147
		10/9/2023	41.5	80.6
		11/9/2023	--	89.0
	MW-310	2/21/2018	67.1	31.6
		3/23/2018	62.1	33.1
		4/23/2018	60.7	32
		5/24/2018	59.2	28
		6/23/2018	61.4	30.4
		7/23/2018	69.5	60.2
		8/22/2018	64.2	32.8
		9/21/2018	80.3	118
		4/2/2019	73	58.4
		10/8/2019	82	85.9
		5/29/2020	74	68.2
		10/8/2020	77.6	60
		4/13/2021	69.6	43.3
		10/14/2021	72.0	54.3
		4/12/2022	72.0	39.8
		10/26/2022	71.3	32.8
		4/26/2023	57.5	102
		10/9/2023	65.6	90.7

Table 2. Historical Analytical Results for Parameters with SSIs
Columbia Dry ADF, Modules 4-6

Well Group	Well	Collection Date	Boron (µg/L)	Sulfate (mg/L)
Compliance	MW-311	2/21/2018	43.7	7.1
		3/23/2018	42.7	7.2
		4/23/2018	40.1	7.9
		5/24/2018	31.7	36.9
		6/23/2018	33.6	72.3
		7/23/2018	30.1	84.7
		8/22/2018	32.4	53.6
		9/21/2018	27.5	92.4
		4/2/2019	35.7	23.1
		10/8/2019	33.5	21.2
		5/29/2020	25.7	39.1
		10/8/2020	26.2	72.1
		4/14/2021	33.6	15.6
		10/14/2021	31.7	14.2
		4/12/2022	32.7	8.9
		10/27/2022	34.2	15.5
		4/26/2023	23.0	22.2
		10/9/2023	31.0	10.8

Abbreviations:
µg/L = micrograms per liter or parts per billion (ppb)
mg/L = milligrams per liter or parts per million (ppm)
-- = Not sampled
J = Estimated value below the laboratory's limit of quantitation

Note:
(1) Complete laboratory reports included in the Annual Groundwater Monitoring and Corrective Action Reports.

Created by:	SCC	Date:	11/8/2023
Checked by:	NLB	Date:	11/21/2023
PM QC Check:	TK	Date:	11/21/2023

I:\25223067.00\Deliverables\COL MOD4-6 ASD - April 2023\Tables\[Table 2 - Historical Analytical Results with SSIs.xlsx]Table 2. Analy. Rslts- CCR

Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25223067.00

	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	LS-1	LS-3R	LH-2	LH-3	LH-4
	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	17.42	17.10	19.90		
	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	NM	NM	NM		
	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			dry	--	
	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	NM	dry	dry	--	
	October 8, 2013													785.66	785.42	785.97	785.52	NI	NI	NI	NM	NM	NM	--	
	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	NM	dry	leachate depth = 0.2 in.	--	
	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	NM	dry	leachate depth = 0.3 in.	--	
	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	dry	--	dry	--	
	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	broken	dry	leachate depth = 14.8 in.	--	
	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	broken	dry	15.9"	--	
	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	liquid depth = 3.5'	dry	0.8"	1.4"	
	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	liquid depth = 3.0'	dry	-0.3	1.4"	
	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	liquid depth = 2.7'	dry	NM	NM	
Dry Ash Facility (Facility ID #03025)	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	NM	NM	1.4" [5]	1.6" [5]	
	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	NM	NM	NM	NM	
	April 23-25, 2018	783.99	aband	785.36	783.09	786.36	781.77	780.79	783.28	783.32	785.88	784.91	782.54	784.71	784.53	785.23	784.81	NI	NI	NI	liquid depth = 2.7'	NM	NM	NM	
	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	dry	liquid depth = 2.4'	4.6	4	--
	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	liquid depth = 3.9'	dry	--	--	
	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	liquid depth = 3.8'	dry	-0.1"	11.7"	13.1"
	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	liquid depth = 3.8'	dry	-0.1	2.4	2.4
	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	liquid depth = 3.8'	dry	-0.1	2.7	2.4
	February 25, 2021	NM	aband	NM	NM	NM	784.75	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NM	NM	-0.1	2.7	2.6
	April 14, 2021	778.12	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	liquid depth = 3.7'		--	0.233	0.21666667
	June 11, 2021	NM	aband	NM	784.19	NM	784.66	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NM	NM	NM	NM	NM
	October 11-12, 14, 2021	784.47	aband	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	liquid depth = 3.7'	--			
	October 17, 2021	NM	aband	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NM	NM	-0.01	0.26	0.23
	April 1, 2022	aband	aband	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	"0.1"	3.1"	2.9"
	April 11-13, 2022	aband	aband	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	liquid depth = 3.8'	dry	NM	NM	NM
	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	liquid depth = 3.6'	dry	NM	NM	NM
	February 20-23, 2023	aband	aband	NM	783.57	NM	784.48	NM	NM	NM	785.25	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	March 27-28, 2023	aband	aband	NM	784.52	NM	785.23	NM	NM	NM	786.21	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	April 24-27, 2023	aband	aband	787.76	785.79	785.35	786.22	786.12	784.99	786.05	786.97	786.86	786.67	786.76	786.59	787.53	787.11	785.87	785.85	785.55	liquid depth = 3.5'	dry	NM	NM	NM
	May 16, 2023	aband	aband	787.79	785.64	785.25	786.06	786.05	785.39	785.77	786.88	786.79	786.74	786.95	786.75	787.47	787.05	786.23	786.21	785.97	NM	NM	NM	NM	NM
	May 30-31, 2023	aband	aband	NM	785.23	NM	785.70	NM	NM	NM	786.57	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	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	NM	NM	NM	NM	

	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
Ash Pond Facility (Facility ID #02325)	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
	March 27-28, 2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	April 24-27, 2023	785.18	dry	785.38	785.19	784.55	784.51	NM	784.83	784.46	783.78	785.30	787.8	NM	NM	NM
	May 16, 2023	782.79	781.64	784.70	784.58	784.60	784.49	782.80	784.68	783.94	782.07	784.03	NM	NM	NM	NM
	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	--	--	--	--

Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25223067.00

	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	MW-312	MW-313	MW-314	MW-315	MW-316
	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	826.786	820.3	821.57	819.78	808.49
	Screen Length (ft)	10	10	10	10	10	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	52.5				43.7
	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	784.29				774.79
	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	NI	NI	NI	NI	NI
	April 4-5, 2016	786.78	785.81	785.48	788.08	789.61	789.09	785.29	785.63	786.37	--	--	--	--	--	--	NI	NI	NI	NI	NI
	July 7-8, 2016	786.31	786.28	784.60	787.36	789.26	787.43	785.19	785.05	785.89	--	--	--	--	--	--	NI	NI	NI	NI	NI
	July 28, 2016	NM	NM	784.35	NM	NM	NM	NM	784.86	785.61	--	--	--	--	--	--	NI	NI	NI	NI	NI
	October 11-13, 2016	787.64	787.76	786.18	788.18	789.78	787.88	787.36	786.45	787.22	--	--	--	--	--	--	NI	NI	NI	NI	NI
	December 29, 2016	787.37	787.05	NM	NM	NM	NM	785.66	785.72	786.63	--	--	--	--	--	--	NI	NI	NI	NI	NI
	January 25-26, 2017	787.27	786.89	785.28	789.34	789.36	789.64	785.88	785.98	786.70	785.50	785.36	785.73	--	--	--	NI	NI	NI	NI	NI
	April 10 & 11, 2017	787.89	787.55	786.00	788.22	789.57	787.95	786.39	786.30	787.16	786.22	785.64	786.51	--	--	--	NI	NI	NI	NI	NI
	June 6, 2017	788.25	788.37	786.49	788.58	789.79	787.83	787.27	786.66	787.63	786.85	786.07	786.46	--	--	--	NI	NI	NI	NI	NI
	August 7-9, 2017	787.34	787.55	785.42	789.52	789.30	788.54	786.11	785.81	786.68	785.69	785.19	785.37	--	--	--	NI	NI	NI	NI	NI
	October 23-24, 2017	785.89	785.94	783.92	788.97	788.14	788.00	784.13	784.50	785.32	783.97	784.79	784.17	--	--	--	NI	NI	NI	NI	NI
	February 21, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.19	783.05	783.02	NI	NI	NI	NI	NI
	March 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.10	783.10	783.00	NI	NI	NI	NI	NI
	April 23-25, 2018	785.29	784.37	783.27	789.69	787.67	790.43	783.09	781.77	785.88	783.24	783.65	782.65	783.07	782.97	781.83	NI	NI	NI	NI	NI
	May 24, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.79	785.09	NM	785.45	785.97	786.11	NI	NI	NI	NI	NI
	June 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.03	786.64	786.47	NI	NI	NI	NI	NI
	July 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.27	786.35	786.55	NI	NI	NI	NI	NI
	August 7, 2018	787.06	NM	785.20	788.25	788.56	787.63	NM	NM	786.55	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	August 22, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.54	785.40	785.46	NI	NI	NI	NI	NI
	September 21, 2018	NM	788.37	786.50	NM	NM	NM	787.90	787.01	NM	NM	NM	NM	787.08	787.24	787.66	NI	NI	NI	NI	NI
	October 22-24, 2018	788.98	789.16	787.51	789.05	790.04	788.47	788.77	787.88	788.32	787.66	786.57	787.81	787.99	788.18	788.64	NI	NI	NI	NI	NI
	April 1-4, 2019	787.04	787.56	786.52	789.72	790.07	789.44	786.63	786.82	787.35	786.72	786.71	787.53	786.30	786.38	786.38	NI	NI	NI	NI	NI
	June 12, 2019	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	787.25	NM	NI	NI	NI	NI	NI
	June 19, 2019	NM	NM	786.81	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	October 7-9, 2019	788.47	788.31	787.02	790.41	790.36	790.65	NM	NM	NM	787.47	786.99	787.18	787.26	787.94	787.64	NI	NI	NI	NI	NI
CCR Rule Wells	December 13, 2019	--	--	--	--	--	--	--	--	--	787.03	785.68	786.43	--	--	--	NI	NI	NI	NI	NI
	December 23, 2019	--	--	--	--	--	--	--	--	--	--	--	--	--	775.22	--	NI	NI	NI	NI	NI
	January 17, 2020	--	--	785.58	--	--	--	--	--	--	--	--	--	--	--	--	NI	NI	NI	NI	NI
	February 3, 2020	787.24	NM	NM	NM	NM	NM	NM	NM	786.50	785.77	785.57	786.48	NM	NM	NM	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	NI	NI	NI	NI	NI
	June 30, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.18	NM	NM	NI	NI	NI	NI	NI
	August 6, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.93	NM	NM	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	December 11, 2020	NM	NM	NM	NM	788.19	NM	NM	NM	NM	NM	NM	NM	785.26	785.26	NM	NI	NI	NI	NI	NI
	February 25, 2021	NM	NM	784.27	NM	788.36	NM	NM	784.75	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	June 11, 2021	NM	NM	NM	NM	NM	NM	784.19	784.66	NM	NM	NM	NM	784.20	784.05	NM	NI	NI	NI	NI	NI
	July 20, 2021	NM	NM	783.64	NM	788.39	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	December 21, 2021	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	782.93	NM	NM	NI	NI	NI	NI	NI
	February 24, 2022	NM	NM	782.34	NM	786.49	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	July 27, 2022	NM	NM	783.07	NM	787.03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	November 30, 2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	781.62	781.14	781.15	NI	NI	NI	NI	NI
	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	NI	NI	NI	NI	NI
	January 12-13, 2023	785.20	784.55	NM	NM	NM	NM	782.75	784.10	784.88	NM	NM	NM	782.57	782.45	782.32	NI	NI	NI	NI	NI
	January 20, 2023	NM	NM	NM	788.08	NM	NM	NM	NM	NM	782.15	782.11	784.98	NM	NM	NM	NM	NM	NM	NM	NI
	January 24, 2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.73	783.36	783.63	783.77	NI
	February 20-23, 2023	785.56	784.98	NM	NM	NM	NM	NM	NM	NM	783.04	782.91	785.32	783.31	783.34	783.40	783.50	783.59	783.82	783.96	NI
	March 27-28, 2023	786.83	785.87	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.84	783.98	784.43	NM	784.12	784.41	784.57	NI
	April 24-27, 2023	787.57	786.87	784.38	784.03	NM	NM	785.79	786.22	786.97	784.82	784.25	787.75	785.05	785.18	785.69	NM	785.21	785.43	785.59	NI
	May 5, 2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.55	NM	NM	NM	780.49
	May 16, 2023	787.43	787.07	783.88	784.12	dry	781.64	785.64	786.06	786.88	784.65	783.89	786.88	785.15	785.11	785.39	785.97	785.46	785.68	785.88	780.48
	May 30-31, 2023	787.04	786.89	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	784.90	784.69	784.97	NM	785.24	785.55	785.77	NM
	June 29-30, 2023	786.32	786.39	NM	NM	NM	NM	784.32	785.04	785.92	NM	NM	NM	784.12	783.84	783.97	NM	784.67	784.95	785.17	NM
	July 31, 2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.96	784.26	784.49	NM
	August 31, 2023	NM	785.30	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	782.47	NM	NM	783.55	783.83	783.97	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	774.29	820.30	821.57	819.78	764.79

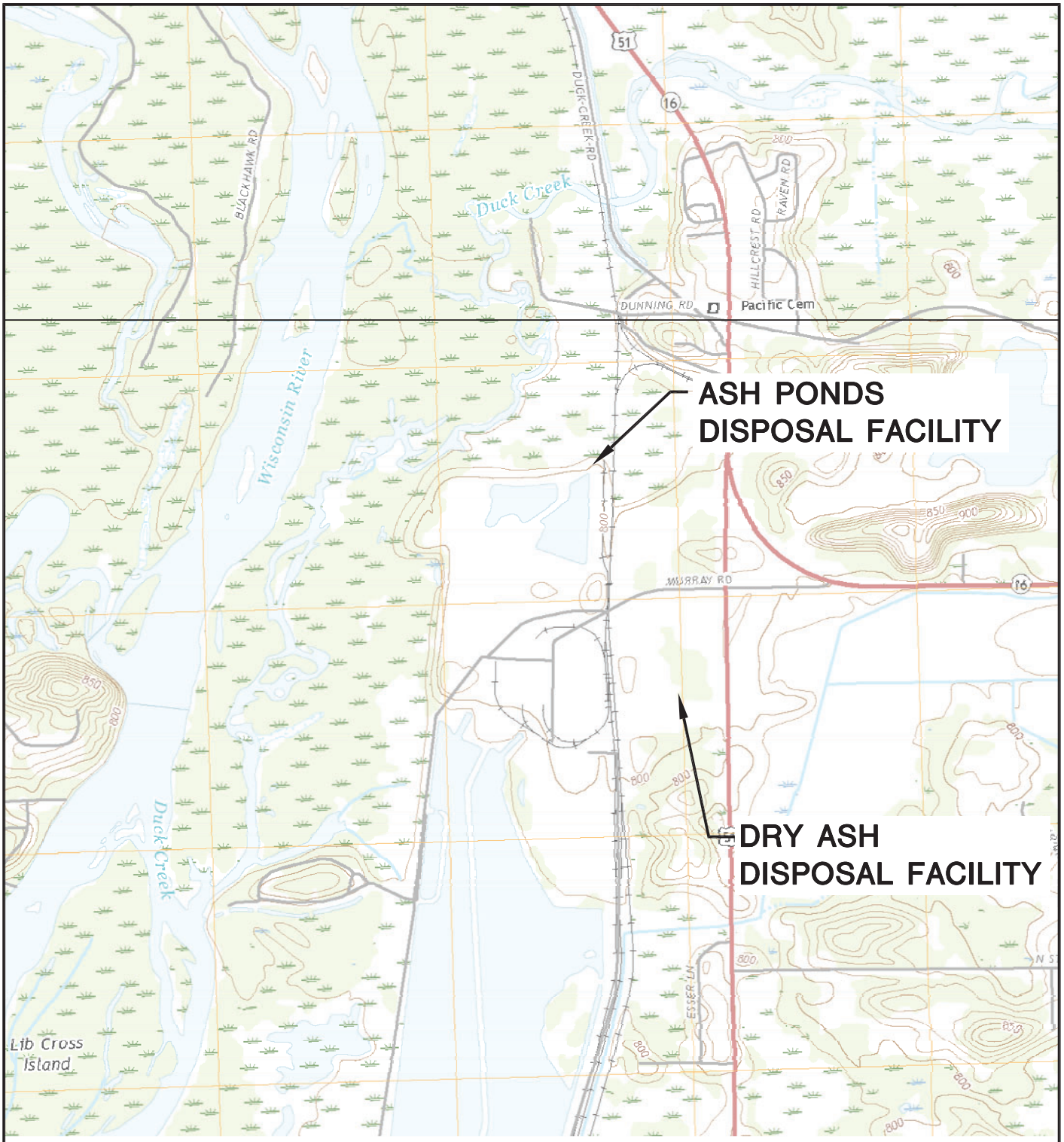
Notes:
NM = not measured

Created by: MDB Date: 5/6/2013
Last revision by: EMS Date: 8/31/2023
Checked by: JSN Date: 9/1/2023
Proj Mgr QA/QC: TK Date: 11/11/2023

(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:\25223067.00\Deliverables\COL 1-3 ASD - April 2023\Tables\[Table 3 - wlstat_Columbia.xls]levels

Figures

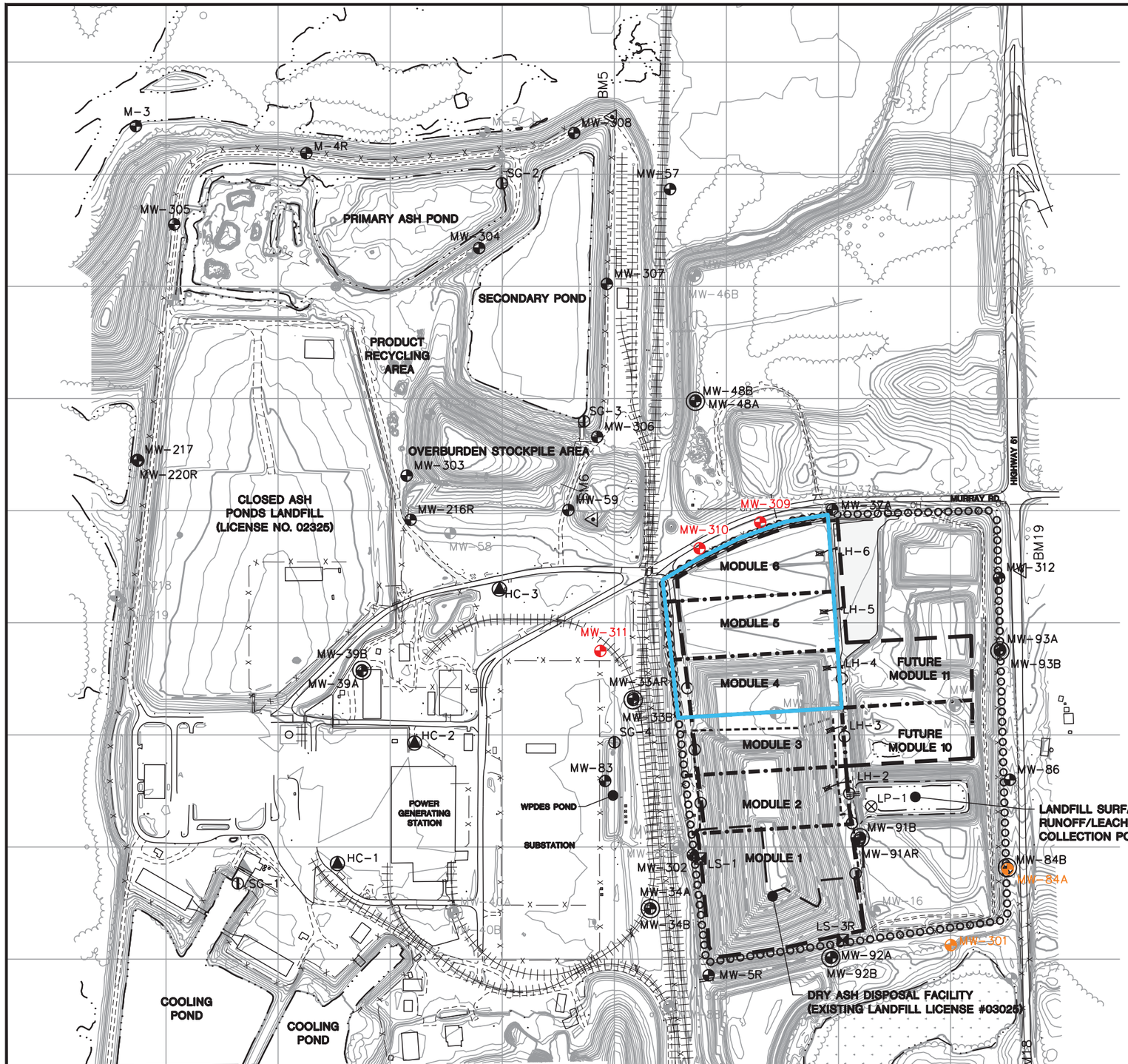


N

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. 25220067.00	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 04/10/2020		

I:\25220067.00\Drawings\ASD Mod 1-3 LF\Site Location Map.dwg, 4/12/2020 7:05:09 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 MODULE 4-6 DRY ASH DISPOSAL FACILITY 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:	MDB
REVISED:	01/16/2023	APPROVED BY:	TK 5/30/2023

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

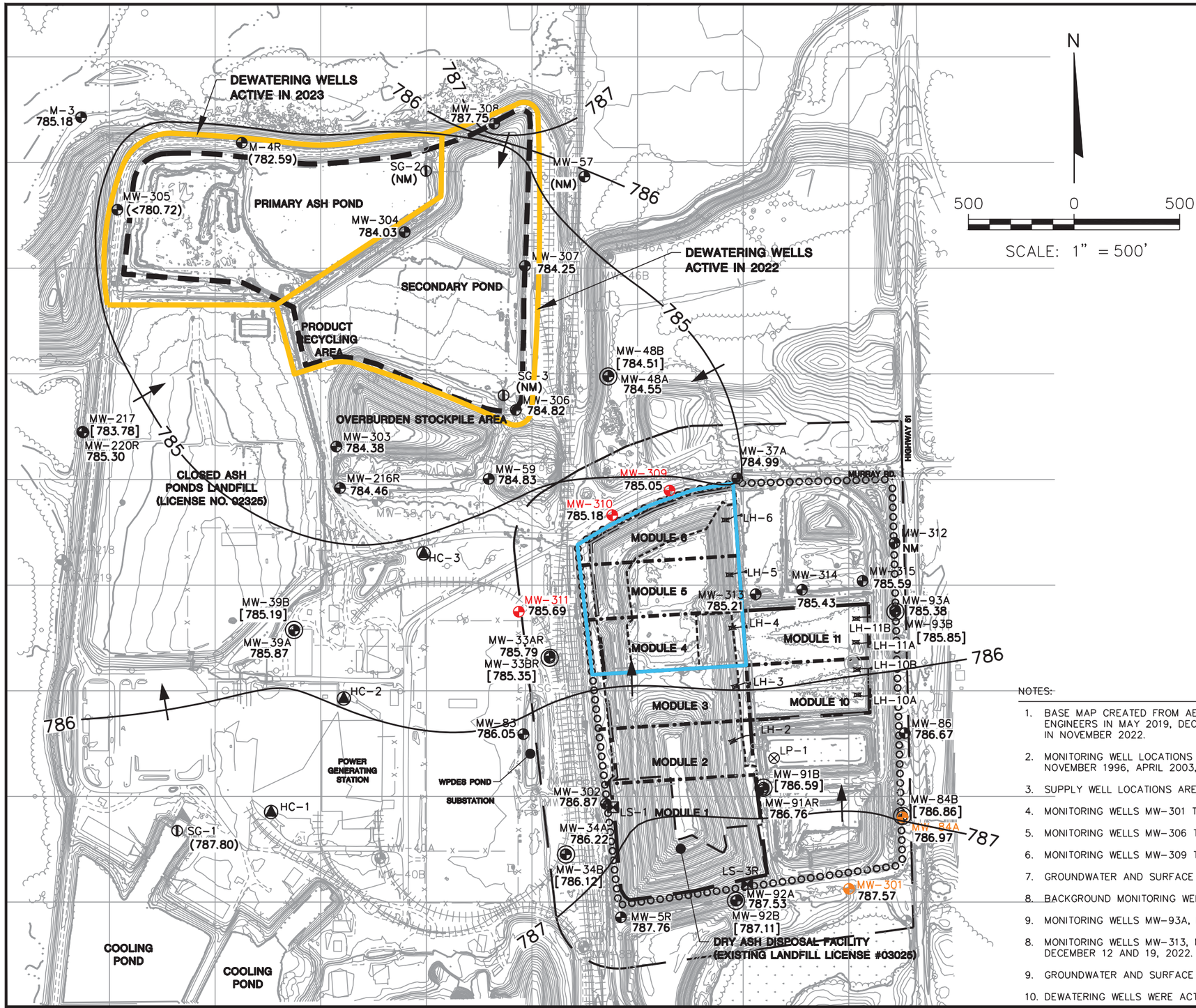
CLIENT: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WI 53954

SITE: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
MODULES 4-6 DRY ASH DISPOSAL FACILITY
PARDEEVILLE, WI

SITE PLAN AND MONITORING WELL LOCATIONS

FIGURE 2

I:\25222067.00\Drawings\Modules 4-6\Site Plan and Monitoring Well Locations Mod 4-6.dwg, 1/16/2023 3:06:53 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
- APPROXIMATE LOCATION OF DEWATERING WELLS
- CCR UNIT
- CCR MONITORING WELL
- CCR BACKGROUND MONITORING WELL
- 787.62 WATER TABLE ELEVATION
- [788.87] POTENTIOMETRIC SURFACE ELEVATION (NOT CONTOURED)
- (795.20) SURFACE WATER ELEVATION (NOT CONTOURED)
- WATER TABLE CONTOUR
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014, AND GROUND SURVEYS BY SCS ENGINEERS IN MAY 2019, DECEMBER 2020, NOVEMBER 2021, AND DECEMBER 2021, AND BY DRONE SURVEY BY AMES IN NOVEMBER 2022.
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 MODULE 4-6 DRY ASH FACILITY ARE: MW-301 AND MW-84A.
9. MONITORING WELLS MW-93A, MW-93B, AND MW-312 INSTALLED BY CASCADE ENVIRONMENTAL ON MARCH 25-28, 2022.
8. MONITORING WELLS MW-313, MW-314, AND MW-315 WERE INSTALLED BY HORIZON CONSTRUCTION & EXPLORATION ON DECEMBER 12 AND 19, 2022.
9. GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED ON APRIL 24-27, 2023.
10. DEWATERING WELLS WERE ACTIVE AROUND THE PRIMARY POND DURING THE APRIL 2023 SAMPLING EVENT.

PROJECT NO.	25223067.00	DRAWN BY:	KP
DRAWN:	10/12/2023	CHECKED BY:	RM
REVISED:	11/10/2023	APPROVED BY:	TK 11/10/2023

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
MODULES 4-6 DRY ASH DISPOSAL FACILITY
PARDEEVILLE, WI

WATER TABLE MAP
APRIL 2023

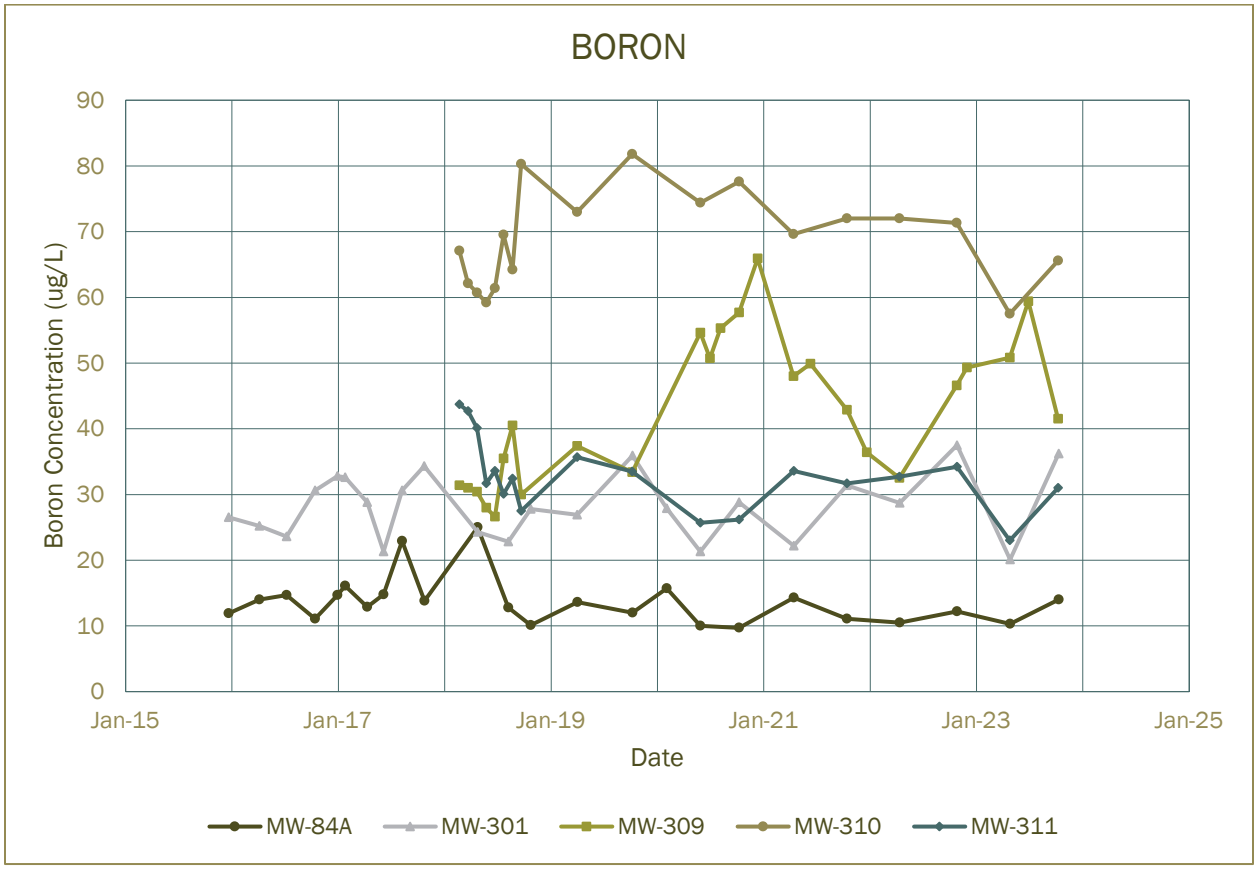
FIGURE 3

I:\25223067.00\Drawings\Module 4\Water Table Map-April 2023.dwg, 11/10/2023 3:30:31 PM

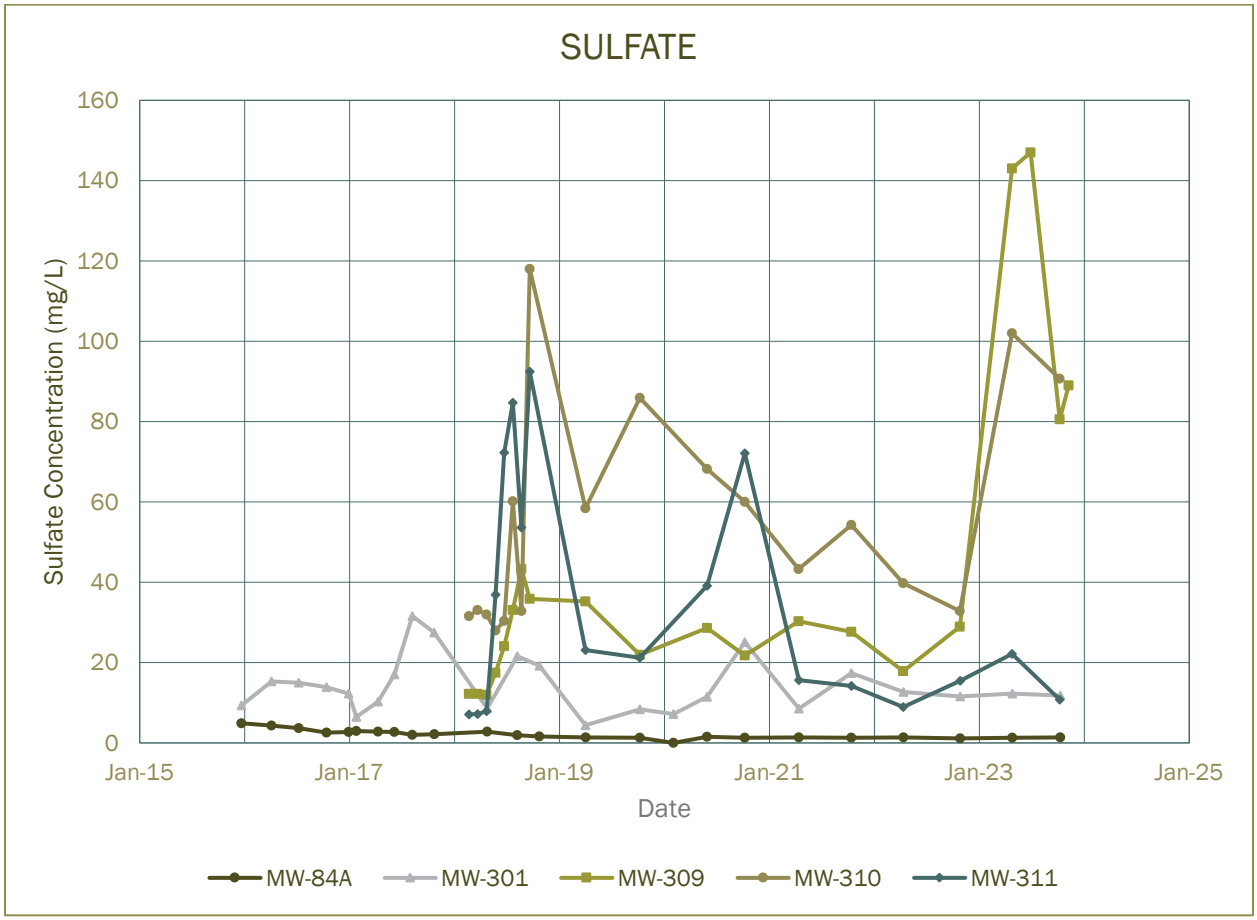
Appendix A

Trend Plots for CCR Wells

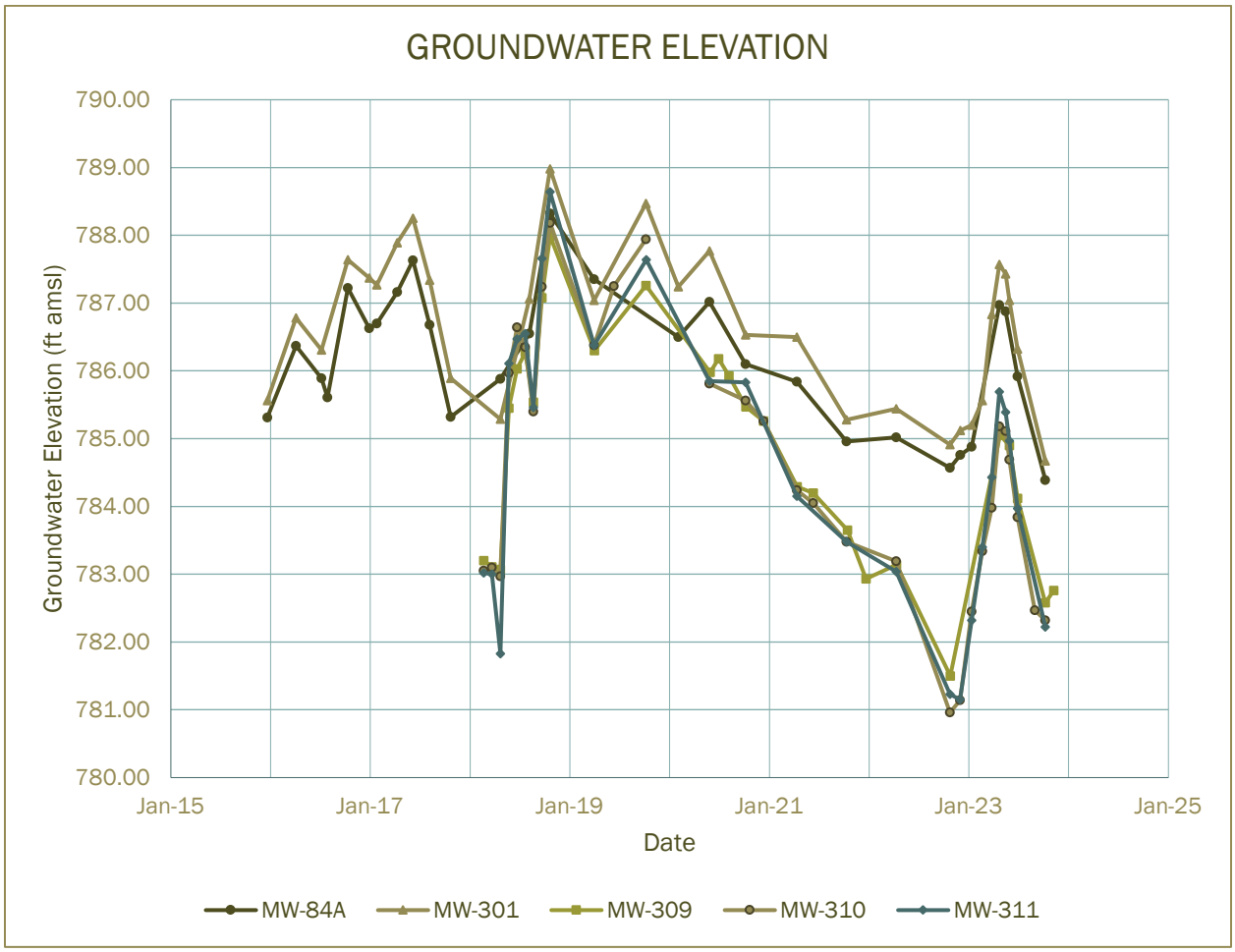
Trend Plots: Boron



Trend Plots: Sulfate

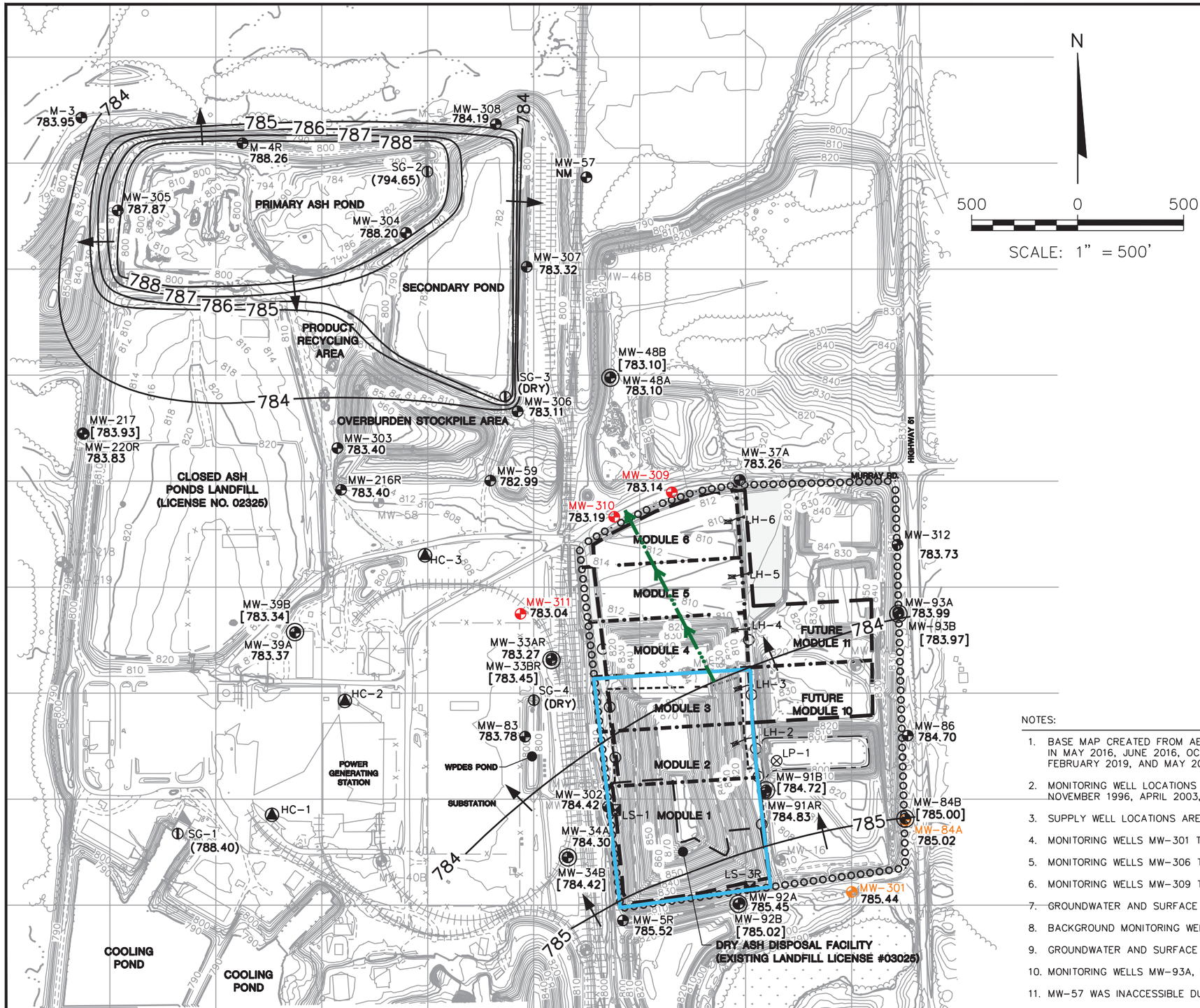


Trend Plots: Groundwater Elevation



Appendix B

2022 Water Table Maps



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, AND MAY 2019.
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 MODULE 4-6 DRY ASH FACILITY 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

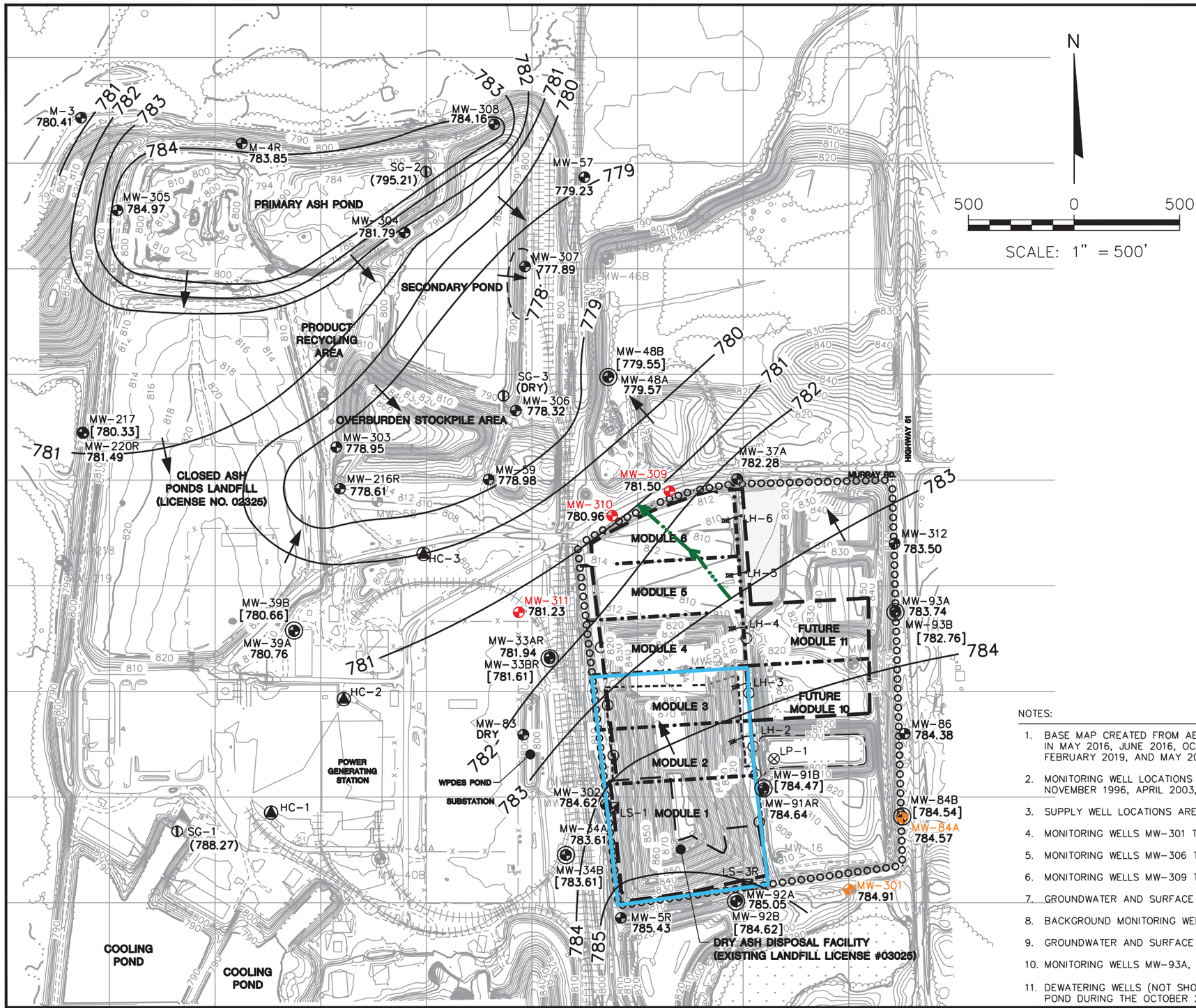
CLIENT: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
W8375 MURRAY ROAD
PARDEEVILLE, WI 53954

SITE: ALLIANT ENERGY
COLUMBIA ENERGY CENTER
MODULES 4-6 DRY ASH DISPOSAL FACILITY
PARDEEVILLE, WI

WATER TABLE MAP
APRIL 2022

FIGURE 3

I:\25222067.00\Drawings\Modules 4-6\Water Table Map-April 2022.dwg, 1/16/2023 2:43:07 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, AND MAY 2019.
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 MODULE 4-6 DRY ASH FACILITY 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:	12/30/2022	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, MODULES 4-6 DRY ASH DISPOSAL FACILITY, PARDEEVILLE, WI

WATER TABLE MAP
OCTOBER 2022

FIGURE 4

I:\25222067.00\Drawings\Modules 4-6\Water Table Map-October 2022.dwg, 1/16/2023 2:40:42 PM