2021 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

25221067.00 | January 31, 2022

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OVERVIEW OF CURRENT STATUS

Columbia Energy Center, Dry Ash Disposal Facility, Modules 4, 5, and 6 2021 Annual Report

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

Category	Rule Requirement	Site Status
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	April/June 2021 Boron: MW-309 Chloride: MW-310 <u>October/December 2021</u> none
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	Alternative Source Demonstration prepared for the October 2020 and April 2021 events during 2021. Assessment monitoring not required.

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Category	Rule Requirement	Site Status
Statistically Significant Levels (SSL) Above Groundwater	(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
Protection Standard (GPS)	(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

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1.0 INTRODUCTION

This 2021 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the Coal Combustion Residuals (CCR) Rule [40 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 2021 Annual Groundwater Monitoring and Corrective Action Report for the CCR Unit.

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

The Columbia Energy Center (COL) Dry Disposal Ash Facility is an active CCR landfill and includes an existing CCR unit and one new CCR landfill unit. 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 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**). A separate groundwater monitoring system evaluates groundwater conditions for Modules 1-3 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 water table elevations and groundwater flow directions for the April 2021 monitoring event are shown on **Figure 3**, and the water table elevations and groundwater flow directions for the October 2021 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 2021.

The monitoring system, which was originally established to monitor Module 4, was updated to include Modules 5 and 6 following construction of these Modules in 2021. The groundwater monitoring system for COL Mod 4-6 was certified on December 9, 2021. The addition of Modules 5 and 6 was anticipated in the original design of the monitoring system, so no new wells were needed.

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 December 2021 at COL Dry Ash Disposal Module 4 as part of ongoing detection monitoring. As part of the April 2021 semiannual event, retest samples were collected in June 2021. As part of the October 2021 semiannual event, a retest sample was collected at one monitoring well in December 2021.

Groundwater samples collected during the semiannual events, in April and October 2021, were analyzed for the Appendix III constituents. The retest sampling events, in June and December 2021, were limited to a subset of the Appendix III constituent list. 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 sampling results for Appendix III parameters in 2021 are summarized in **Table 5.** Field parameter results for the 2021 sampling events are provided in **Table 6**. The analytical laboratory reports for 2021 are provided in **Appendix C**. Historical results for each monitoring well are summarized in **Appendix D**.

3.4 § 257.90(e)(4) MONITORING TRANSITION NARRATIVE

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

There were no transitions between monitoring programs during 2021. The COL Dry Ash Disposal Facility, Mod 4-6 remained in the detection monitoring program.

In 2021, the monitoring results for the October 2020 and April 2021 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 upper prediction limits (UPLs) based on background monitoring results from the compliance wells. The intrawell UPLs were calculated in January 2020 using background data collected through September 2018, prior to CCR placement in Mod 4. The Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (U.S. EPA, 2009; Section 5.3.1) recommends periodic updating of background for both intrawell and interwell analyses. For semiannual monitoring, an update interval of 2 to 3 years is recommended; therefore, a UPL update is planned for 2022. The UPL calculations are included in **Appendix E**. The UPLs calculated in January 2020 and April 2021 monitoring results.

For the October 2020 event, SSIs for boron at MW-309 and chloride at MW-310 were identified. For the April 2021 event, SSIs for boron at MW-309 and for calcium and chloride at MW-310 were identified. However, alternative source demonstrations (ASDs) were completed, demonstrating that sources other than the Module 4 CCR unit were the likely cause of the observed concentrations. The ASD reports are provided in **Appendix F**.

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 2021 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 2021.

Summary of Key Actions Completed.

- Statistical evaluation and determination of SSIs for the October 2020 and April 2021 monitoring events.
- ASD report for the SSIs identified from the October 2020 and April 2021 monitoring events.
- Two semiannual groundwater sampling and analysis events (April and October 2021).
- Resampling events at MW-309 and MW-310 in June 2021 and at MW-309 in December 2021.

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

Discussion of Actions to Resolve the Problems. Not applicable.

Projection of Key Activities for the Upcoming Year (2022):

- Statistical evaluation and determination of any SSIs for the October 2021 and April 2022 monitoring 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 2022).

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 October 2020 and April 2021 sampling events are provided in **Appendix F**. 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 $\S257.90(e)(6)$ are listed and the information is provided at the beginning of this report, before the Table of Contents.

4.0 **REFERENCES**

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

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

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

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

Table 1. Groundwater Monitoring Well Network Columbia Energy Center - Dry Ash Disposal Facility MOD 4-6 SCS Engineers Project #25221067.00

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:	RM	Date:	12/14/2020
Last revision by:	RM	Date:	1/7/2021
Checked by:	NDK	Date:	1/8/2021

Table 2. Groundwater Samples Summary

Columbia Energy Center-Dry Ash Disposal Facility MOD 4 / SCS Engineers Project #25221067.00

Sample Dates	Do	wngradient W	Background Wells				
	MW-309	MW-310	MW-311	MW-84A	MW-301		
April 13-14, 2021	D	D	D	D	D		
June 11, 2021	D-R	D-R					
October 14, 2021	D	D	D	D	D		
December 21, 2021	D-R						
Total Samples	4	3	2	2	2		

Abbreviations:

D = Detection Monitoring

D-R = Detection Monitoring Retest Sample

-- = Not Sampled

Created by:	MDB	Date: 12/16/2021
Last revision by:	MDB	Date: 12/22/2021
Checked by:	JAO	Date: 12/22/2021

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

	Well Number	MW-1AR	MW-4	MW-5R	MW-33AR	MW-33BR	MW-34A	MW-34B	MW-37A	MW-83	MW-84A	MW-84B	MW-86	MW-91AR	MW-91B	MW-92A	MW-92B
	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
	Total Depth (ft from top of casina)	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
	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
	April 15, 2013	785.44	784.02	786.09	784.16	784.14	784.74	784.79	783.87	784.49	785.83	785.76	785.22	785.14	785.01	785.75	785.34
	October 8, 2013													785.66	785.42	785.97	785.52
	October 15, 2013	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.66	785.42	785.97	785.52
	April 14, 2014	784.95	784.09	785.63	783.74	783.91	784.63	784.70	783.45	783.73	785.58	785.52	784.96	785.04	784.96	785.99	785.54
	October 2-3, 2014	785.03	785.39	786.08	784.37	784.28	784.57	784.54	784.56	dry	785.24	785.18	785.19	785.47	785.28	785.75	785.33
	April 13-14, 2015	783.96	783.63	785.25	783.01	782.74	783.65	783.95	782.87	dry	784.43	784.51	784.17	784.48	784.37	785.07	784.66
	October 6-7, 2015	784.28	784.44	785.72	783.68	783.33	784.05	784.02	783.66	dry	784.80	784.76	784.66	784.89	784.70	785.20	784.76
Davidale	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
Dry Ash	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
Facility	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
(Facility ID	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
#03025)	October 9-10, 2017	NM	aband	NM	NM	NM	NM	NM	NM	NM	785.56 ⁽⁶⁾	NM	NM	NM	NM	NM	NM
	February 21, 2018	783.97	aband	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	784.68	784.46	NM	NM
	April 23-25, 2018	783.99	aband	785.36	783.09	786.36	781.77	780.79	783.28	783.32	785.88	784.91	782.54	784.71	784.53	785.23	784.81
	October 23-25, 2018	788.25	aband	789.71	788.77	787.96	787.88	787.73	787.62	788.26	788.32	788.19	788.21	788.59	788.31	789.32	788.87
	April 1-4, 2019	787.05	aband	788.64	786.63	786.54	786.82	786.92	786.47	786.78	787.35	787.34	787.16	787.45	787.18	788.04	787.63
	October 7-9, 2019	787.26	aband	789.23	788.26	787.64	787.92	787.74	786.77	788.90	787.79	787.73	787.44	787.78	787.62	788.63	788.17
	May 27-28, 2020	786.92	aband	788.34	786.01	785.75	785.98	785.99	786.22	786.03	787.02	786.99	786.94	787.26	787.05	787.86	787.47
	October 7-8, 2020	785.95	aband	787.76	785.91	785.45	785.70	785.68	785.52	785.72	786.10	786.06	786.10	786.55	786.33	786.85	786.38
	February 25, 2021	NM	aband	NM	NM	NM	784.75	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	April 14, 2021	785.11	aband	787.29	784.27	784.05	784.77	784.77	784.46	С	785.84	785.81	785.60	785.86	785.69	786.47	786.06
	June 11, 2021	NM	aband	NM	784.19	NM	784.66	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	October 11-12, 14, 2021	784.47	adand	786.78	783.73	783.60	784.42	784.41	783.88	783.87	784.96	784.88	784.79	785.14	784.94	785.55	785.11
	October 17, 2021	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	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

	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
	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				
	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
Ash Pond	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
Facility	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
(Facility ID	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
#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
	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 NetworkColumbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25221067.00

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

Notes:	Created by:	MDB	Date: 5/6/20	13
NM = not measured	Last revision by:	JAO	Date: 12/22/20	021
	Checked by:	RM	Date: 12/22/20	021

(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, 2017 sampling event. The level was allowed to return to static and was measured on 10/10/2017.

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

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

[Northwest							
Sampling Dates	h1 (ft)	h2 (ft)	∆l (ft)	∆h/∆l (ft/ft)	V (ft/d)			
4/12-14/2021	785.00	784.29	251.04	0.0028	0.006			
10/11-14/2021	784.00	783.65	327.05	0.0011	0.0022			

	West								
Sampling Dates	h1 (ff)	h2 (ft)	∆l (ft)	∆h/∆l (ft/ft)	V (ft/d)				
4/12-14/2021	785.00	784.27	144.60	0.0050	0.010				

Wells	K Values (cm/sec)	K Values (ft/d)	Assumed Porosity, n
MW-309	2.12E-04	0.60	Forosity, n
MW-310	1.91E-04	0.54	0.40
MW-311	6.12E-04	1.73	
Geometric	2.92E-04	0.83	

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

ft = feet

ft/d = feet per day

K = hydraulic conductivity n = effective porosity

n = enective porosity

V = groundwater flow velocity

Created by:	RM
Last revision by:	RM
Checked by:	MDB

h1, h2 = point interpreted groundwater elevation at locations 1 and 2 ΔI = distance between location 1 and 2 $\Delta h/\Delta I$ = hydraulic gradient

Date:	12/29/2020
Date:	1/3/2022
Date:	1/4/2022

Table 5. 2021 Groundwater Analytical Results SummaryColumbia Dry Ash Disposal Facility - MOD 4 / SCS Engineers Project #25221067.00

	Background Wells				Compliance Wells											
	MW-	84A	MW	-301			MV	/-309				MW-310			MM	/-311
Parameter Name	4/14/2021	10/14/2021	4/14/2021	10/14/2021	Intrawell UPL	4/13/2021	6/11/2021	10/14/2021	12/21/2021	Intrawell UPL	4/13/2021	6/11/2021	10/14/2021	Intrawell UPL	4/14/2021	10/14/2021
Boron, µg/L	14.3	11.1	22.2	31.4	42.2	48.0	49.9	42.9	36.4	81.9	69.6		72	49.8	33.6	31.7
Calcium, µg/L	69,100	75,300	117,000 P6	67,800 P6	99,900	62,300		83100		56,000	49,300		38,900	84,200	59,000	61,000
Chloride, mg/L	4.40	3.5	1.50 J	2.7	901	390		519		205	227	220	84.6	4.41	1.3 J	1.3 J
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	7.34	7.42	6.66	7.01	8.18	7.68	7.71	7.64	7.45	8.12	7.73	7.70	8.00	8.07	7.46	7.45
Sulfate, mg/L	1.40 J	1.3 J	8.5	17.4	53.1	30.3		27.7		118	43.3		54.3	131	15.6	14.2
Total Dissolved Solids, mg/L	328	326	472	334	1,730	916		1110		759	654		498	462	270	276

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

 μ g/L = micrograms per liter

UPL = Upper Prediction Limit DQ = Double Quantification SSI = Statistically Significant Increase -- = Not Analyzed LOQ = Limit of Quantitation LOD = Limit of Detection

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.

Notes:

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:	LMH	Date:	1/7/2021
Last revision by:	MDB	Date:	12/30/2021
Checked by:	RM	Date:	1/3/2022
Scientist/PM QA/QC:	ΤK	Date:	1/7/2022

I:\25221067.00\Deliverables\2021 Fed Annual Report - COL Mod 4\Tables\[Table 5 - 2021 MOD4LF Annual Analytical Results Summary.xlsx]Table 5 - 2021 Analytical

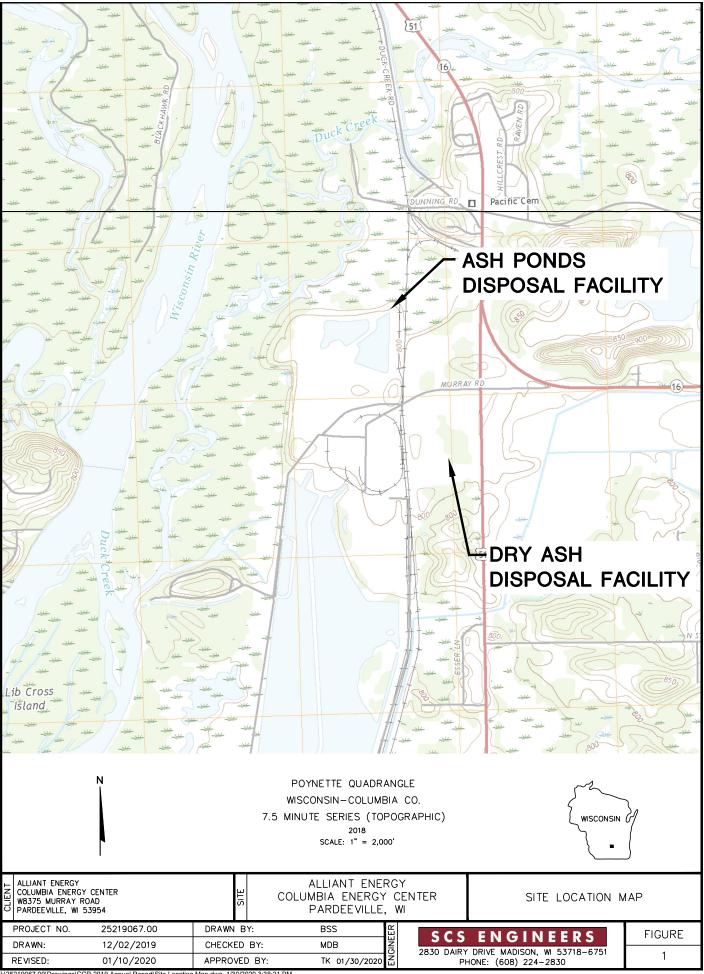
Table 6. Groundwater Field Data SummaryColumbia Energy Center - Dry Ash Disposal Facility - MOD 4 / SCS Engineers Project #25221067.00

Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Oxygen, Dissolved (mg/L)	Field Specific Conductance (umhos/cm)	Field Oxidation Potential (mV)	Turbidity (NTU)
MW-84A	4/14/2021	785.84	10.2	7.34	9.80	610.9	95.6	2.45
	10/14/2021	784.96	12.5	7.42	9.25	598.9	89.7	3.41
MW-301	4/14/2021	786.50	7.4	6.66	3.90	857.0	102.9	2.41
	10/14/2021	785.28	11.1	7.01	0.25	597.2	57.8	3.21
MW-309	4/13/2021	784.29	10.7	7.68	10.14	1,804	124.1	2.80
	6/11/2021	784.20	13.3	7.71	11.21	3,072	67.2	0.10
	10/14/2021	783.65	13.2	7.64	9.27	2,079	85.8	9.06
	12/21/2021	782.93	11.2	7.45	9.33	1,382	142.9	2.67
MW-310	4/13/2021	784.24	10.8	7.73	9.93	1,194	106.0	0.57
	6/11/2021	784.05	12.8	7.73	11.21	1,192	55.6	0.67
	10/14/2021	783.48	13.4	7.7	9.29	884	85.2	3.16
MW-311	4/14/2021	784.15	9.5	7.46	10.23	500.2	110.4	3.49
	10/14/2021	783.48	12.8	7.45	9.42	493.5	90.7	4.26

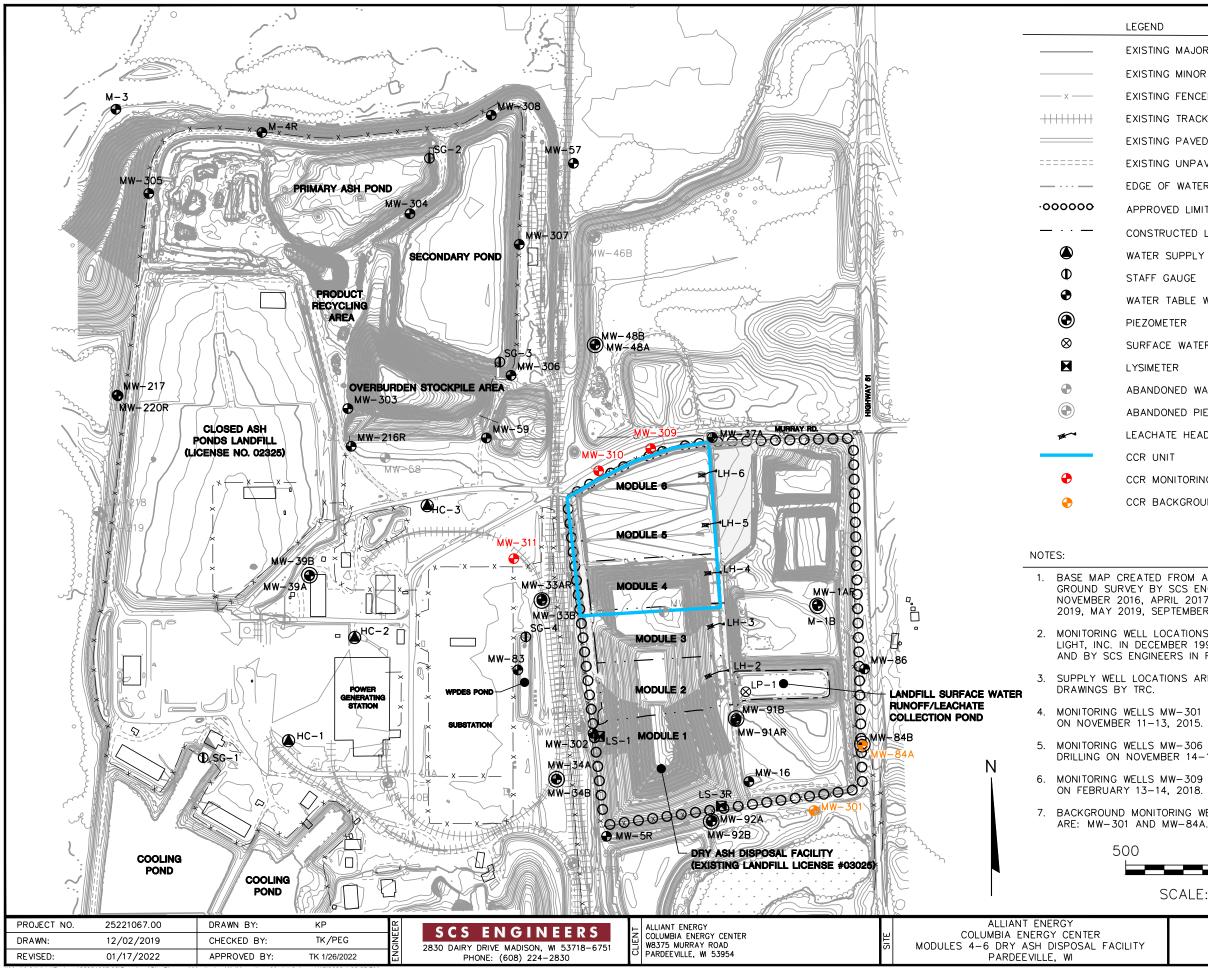
Created by: NDK Last revision by: JAO Checked by: RM Date: 4/21/2021 Date: 12/22/2021 Date: 12/22/2021

Figures

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



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

CCR BACKGROUND MONITORING WELL

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.

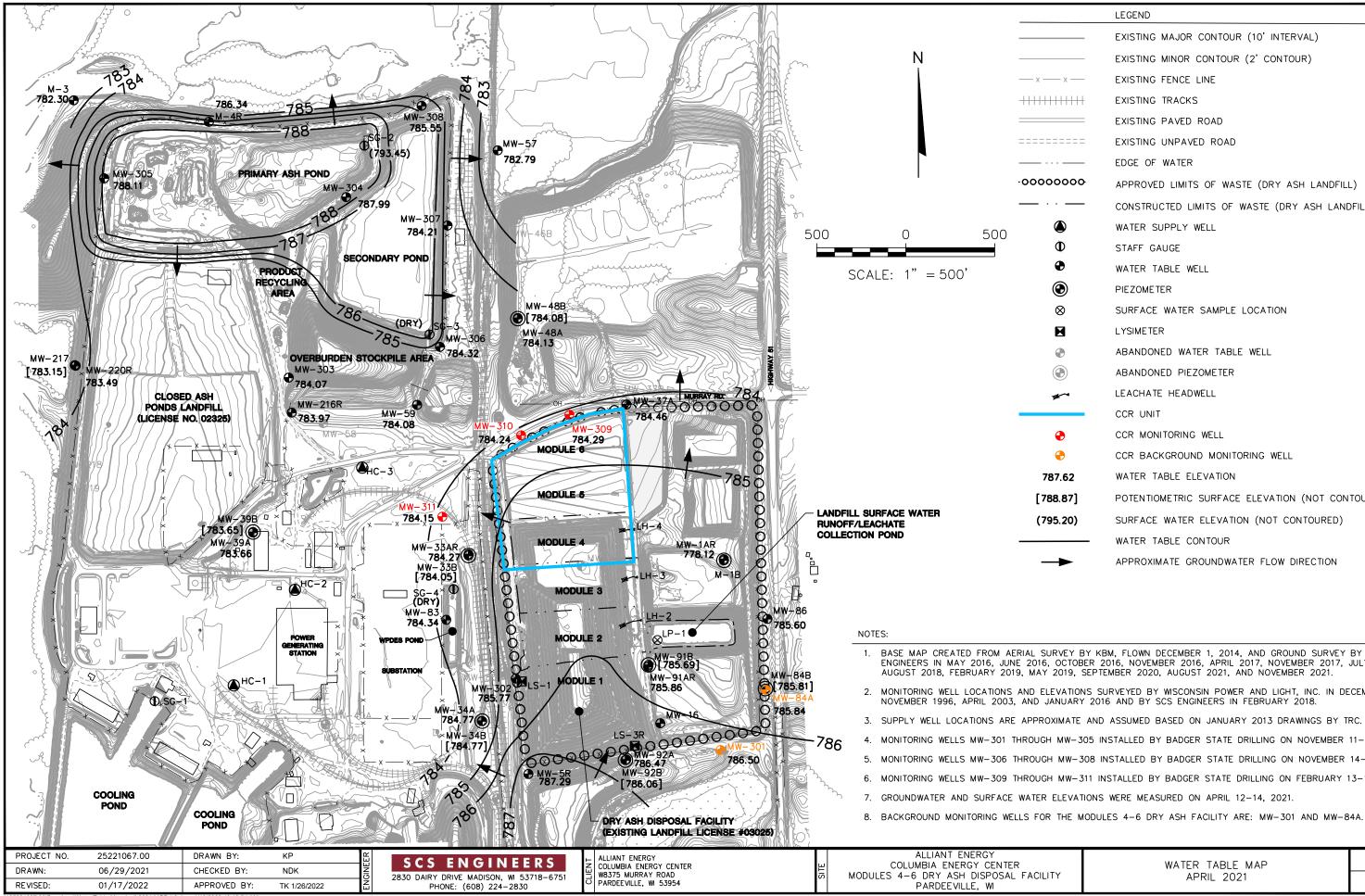
5. MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15, 2016.

6. MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING ON FEBRUARY 13-14, 2018.

7. BACKGROUND MONITORING WELLS FOR THE MODULES 4–6 DRY ASH DISPOSAL FACILITY ARE: MW–301 AND MW–84A.

500 SCALE: 1" = 500'

FIGURE SITE PLAN AND MONITORING WELL LOCATIONS 2



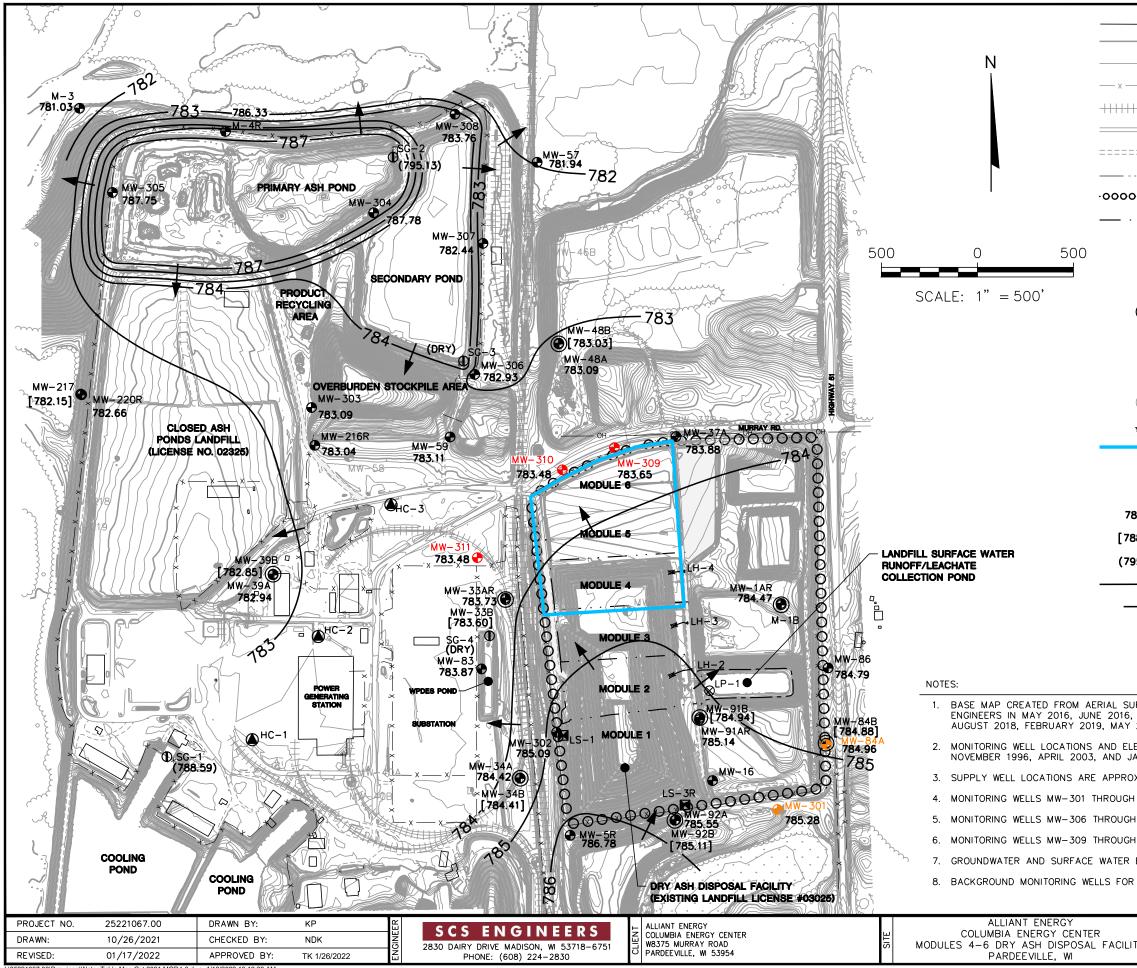
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	LEGEND
	EXISTING MAJOR CONTOUR (10' INTERVAL)
	EXISTING MINOR CONTOUR (2' CONTOUR)
x	EXISTING FENCE LINE
+++++++	EXISTING TRACKS
	EXISTING PAVED ROAD
=====	EXISTING UNPAVED ROAD
	EDGE OF WATER
00000	APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
· · <u> </u>	CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL)
	WATER SUPPLY WELL
Φ	STAFF GAUGE
•	WATER TABLE WELL
۲	PIEZOMETER
\otimes	SURFACE WATER SAMPLE LOCATION
	LYSIMETER
•	ABANDONED WATER TABLE WELL
	ABANDONED PIEZOMETER
***	LEACHATE HEADWELL
	CCR UNIT
•	CCR MONITORING WELL
e	CCR BACKGROUND MONITORING WELL
87.62	WATER TABLE ELEVATION
88.87]	POTENTIOMETRIC SURFACE ELEVATION (NOT CONTOURED)
95.20)	SURFACE WATER ELEVATION (NOT CONTOURED)
	WATER TABLE CONTOUR
-	APPROXIMATE GROUNDWATER FLOW DIRECTION

1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014, AND GROUND SURVEY BY SCS ENGINEERS IN MAY 2016, JUNE 2016, OCTOBER 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, JULY 2018, AUGUST 2018, FEBRUARY 2019, MAY 2019, SEPTEMBER 2020, AUGUST 2021, AND NOVEMBER 2021. 2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND JANUARY 2016 AND BY SCS ENGINEERS IN FEBRUARY 2018.

3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY TRC. 4. MONITORING WELLS MW-301 THROUGH MW-305 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 11-13, 2015. 5. MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15, 2016. 6. MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING ON FEBRUARY 13-14, 2018. 7. GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED ON APRIL 12-14, 2021.

	WATER TABLE MAP	FIGURE
ΤY	APRIL 2021	3



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	LEGEND
	EXISTING MAJOR CONTOUR (10' INTERVAL)
	EXISTING MINOR CONTOUR (2' CONTOUR)
x	EXISTING FENCE LINE
+++++++	EXISTING TRACKS
	EXISTING PAVED ROAD
=====	EXISTING UNPAVED ROAD
• •	EDGE OF WATER
00000	APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
	CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL)
٢	WATER SUPPLY WELL
Φ	STAFF GAUGE
•	WATER TABLE WELL
۲	PIEZOMETER
\otimes	SURFACE WATER SAMPLE LOCATION
	LYSIMETER
•	ABANDONED WATER TABLE WELL
	ABANDONED PIEZOMETER
*	LEACHATE HEADWELL
	CCR UNIT
•	CCR MONITORING WELL
e	CCR BACKGROUND MONITORING WELL
87.62	WATER TABLE ELEVATION
88.87]	POTENTIOMETRIC SURFACE ELEVATION (NOT CONTOURED)
95.20)	SURFACE WATER ELEVATION (NOT CONTOURED)
	WATER TABLE CONTOUR
-	APPROXIMATE GROUNDWATER FLOW DIRECTION

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.

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.
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 MONITORING WELLS MW-301 THROUGH MW-305 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 11–13, 2015.
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 MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING ON FEBRUARY 13–14, 2018.
 GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED ON OCTOBER 11–14, 2021.
 BACKGROUND MONITORING WELLS FOR THE MODULES 4–6 DRY ASH FACILITY ARE: MW-301 AND MW-84A.

	WATER TABLE MAP	FIGURE
ΤY	OCTOBER 2021	4

Appendix A

Summary of Regional Hydrogeologic Stratigraphy

Table COL-3. Regional Hydrogeologic StratigraphyColumbia 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.

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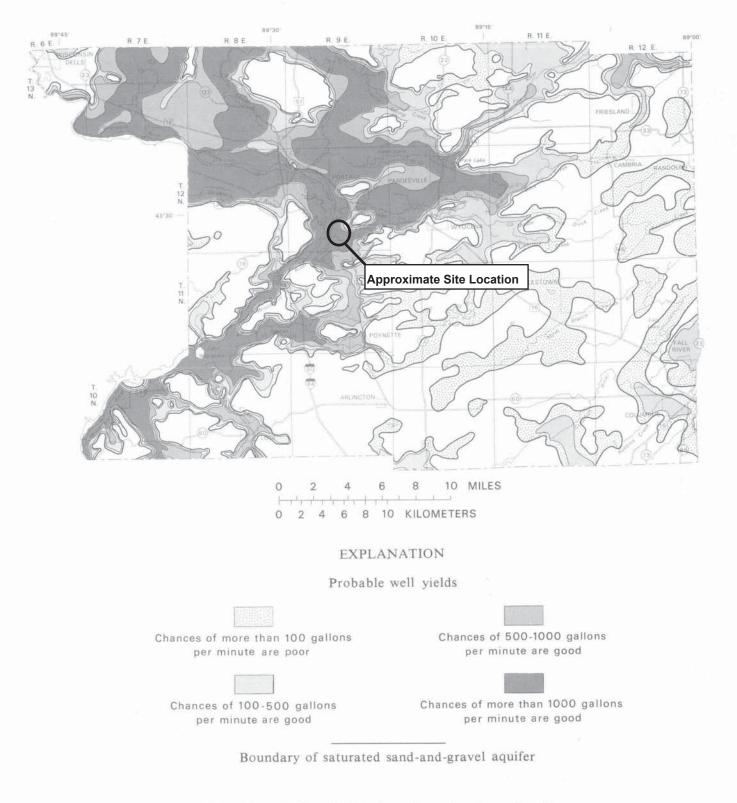
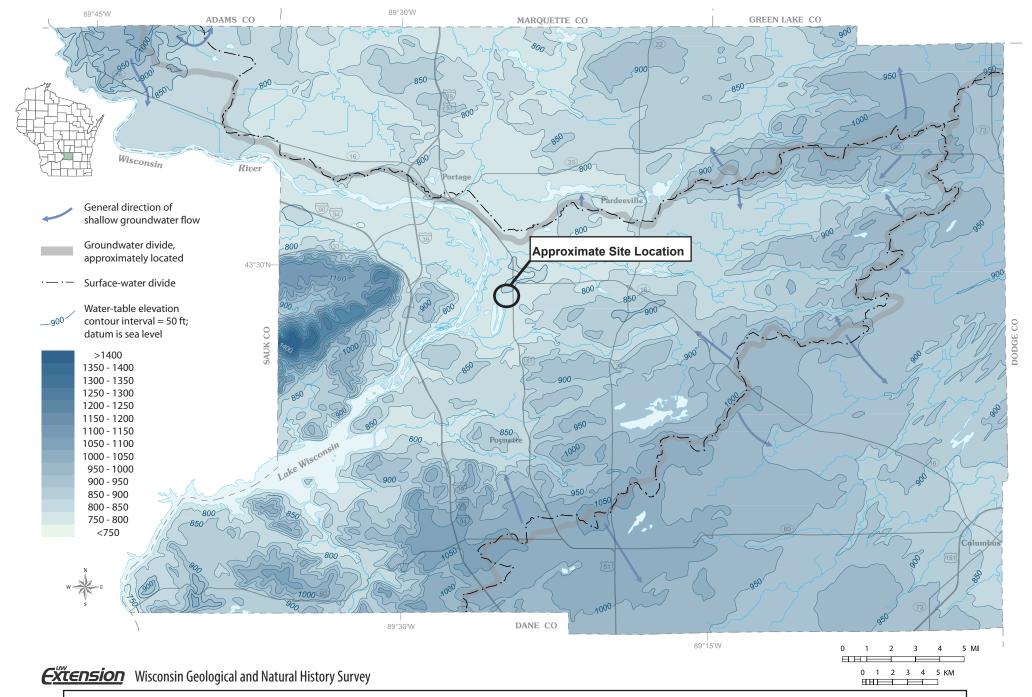


Figure 9. Probably well yields from the sand-and-gravel aquifer.

14

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



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

Appendix B

Boring Logs and Well Construction Documentation



LOG OF TEST BORING

Project ____Wisconsin Power & Light

ENGINEERING INC LocationCalur

LocationColumbia..Generating.Station....

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

		AN		. C.			SOIL PROPER					
	Reco	ivery	Mois	sture		VISUAL CLASSIFICATION	ļ	50			ERI	TIES
No.	Type	+	ł	N	Depth	and Remarks		Qu	w	u	PL	
					E I	Dark Brown Silty SAND (SM)				1		<u> </u>
	<u> </u>			ļ	ΕI							
					EI							
					<u>-</u> 5_							
Τ					EI	Brown Fine to Mali cours						
					F	Brown Fine to Medium SAND, Little Silt, Trace to Little						
						Gravel and Boulders (SM)						
						· ,					[
					-							
					-							
					- 15-							<u> </u>
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					- 30	all the second						
				E								
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				-E						·		
				_E	35-			1				
				F								
				E		Ful p	4					
						End Boring at 37'	ļ					
			+	1	40-	Well Installed at 37'						
		<u> </u>	NA'	TE	R LE	VEL OBSERVATIONS						
nile (Drillin	g						1117	5783		175	1111
on C	Comp	letio	n of	Drilli	ng		Star	t	Co	molet	0757 e	
ne A	fter l	Drilli	ng				Crew	/ Ch	ief UVS	Ria .	B-40	<u>}</u>
	to Wa						Orillir	ng N	/lethod	ED O-	57	
pth 1	to Ca	ve Ir	, וו							•••••		

ter en la companya de la companya d	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 All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.	
	2 LENGTH OF WELL POINT, WELL SCREEN, OR SLOTTED PIPE 10 FEET	
	(3) TOTAL LENGTH OF SOLID PIPE 29 FEET 02 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	۰.
	7 DEPTH OF UPPER OR TOP SEAL 0 FEET	
	(8) TYPE OF BACKFILL Spoils (Sand)	
	9 PROTECTIVE CASING (YES) NO	
	HEIGHT ABOVE GROUND	
	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.	
в	ORING # DATE TIME DEPTH TO WATER REMARKS	
	84A 10/7/83 3 days 21' 84B 10/7/83 3 days 19'6"	

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State of Wisconsin Department of Natural Resources

SOIL BORING LOG INFORMATION

Rev. 7-98

Form 4400-122

Route To:

Watershed/Wastewater

Waste Management
Other

						1									Pag		of	2	
Facility		ct Nan lumbi			5.05# 25215125 AD	Lice	ense/Pe	ermit/	Mot	nito	ring N	umber		Boring	Numbe		W 20	1	
				crew chief (first, last) a	SCS#: 25215135.00	Date	e Drill	ing St	arte	d		D	te Drilli	ng Cor	nnleted		W-30	ing Method	
	in Du	-				Duit	U DIM		arte	u			de Dinn	ing con	npieteu		hollow stem		
Bad	ger S	tate I	Drilling					1/11					1	1/11/	2015		auger		
WI Uni	-			DNR Well ID No.	Common Well Name	Fina	l Stati			leve	ł		e Elevat			В	Borehole Diameter		
Local C		701		timated: 🗌) or Bor	ing Logation V			Fee	et			803		Feet			8	.5 in.	
State P				2 N, 2025001.0 E	S/C/N		Lat		•		'	"	Local C	ma Lo		r			
	1/4			4 of Section 27,	T 12 N, R 9 E		Long		0		1	"		Feet				□ E Feet □ W	
Facility	' ID			County			y Cod		Civ	il To	own/C	ity/ or	Village						
-				Columbia	1	11			Po	orta	ge								
Sam	ple													Soil	Prope	erties			
	& (in)	ts	set	Soil/R	ock Description								(tsf						
r pe	Att.	oun	n Fe	And Ge	ologic Origin For			S			ц		tion	e		ty		ents	
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Eac	h Major Unit			SCS	Graphic	- b0	Well Diagram	PID/FID	iket letra	Moisture Content	Liquid Limit	Plasticity Index	200	RQD/ Comments	
and	Lei Rei	Bld	De		8			n S	Gra	Log	Well Diagr	PIL	Pocket Penetration (tsf)	Mo Coi	Liquid Limit	Plastic Index	P 2	RQ Coi	
				SILTY SAND, yellowi medium grained.	sh brown (10YR 5/6), fi	ine to													
n			-1	inediani Brainedi															
			E																
S 1	21	76 910	$\begin{bmatrix} -2 \\ \end{bmatrix}$								-			Μ					
Ш																			
			El																
S2	20	67	-4	Same as above except, $3/6$ (bottom section), tr	10YR 5/4 (top section), ace gravel.	10YF	2							м					
		9 10	E	(,,,	g														
- 4			-5																
			-6	Same as above except,	10YR 3/4 (bottom), 10Y	YR 5/4	4												
			E	(top), trace little roots a	ind sticks, trace gravel.														
S3	22	76	-7											м					
		96	E					SM											
			-8																
П			-9	Same as above except,															
S4	21	45		(bottom), trace clay at h	oottom.									м					
54	21	65	-10											M					
U			Ē																
П			-11	Same as above except.	fine to coarse grained sa	und.													
		2.2	E	little gravel, trace clay i	n top half, 10ŸR 3/6.	,													
S5	18	2 2 4 5	-12											М					
Ц			-13									-							
п			E	Same as above except,	10VD 6/8														
			-14	same as above except,	10 I K U/0.														
S6	20	23 33												М					
1	L cortif	u that t	-15	mation on this form is tru	and compate to the head														

Signature	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
0		

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.

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A

Sample. Soil Properties y = 0.0000000000000000000000000000000000	Borin	g Numl	oer	MW	V-301 Use only as an attachment to Form 4400-1	22.						Pag	ge 2	of	2
$\begin{bmatrix} 37\\ 20\\ 57\\ 43\\ 57\\ 20\\ 20\\ 43\\ 57\\ 20\\ 20\\ 43\\ 57\\ 20\\ 20\\ 23\\ 43\\ 6\\ 20\\ 21\\ 23\\ 43\\ 6\\ 222\\ 23\\ 59\\ 23\\ 23\\ 59\\ 23\\ 23\\ 44\\ 36\\ 222\\ 23\\ 23\\ 50\\ 21\\ 23\\ 44\\ 36\\ 222\\ 23\\ 23\\ 50\\ 21\\ 23\\ 36\\ 224\\ 25\\ 25\\ 26\\ 27\\ 28\\ End of boring at 28 ft bgs. \end{bmatrix}$	Contractor in contractor in contract	nple										Prope	erties		-
$\begin{bmatrix} 37\\ 20\\ 57\\ 43\\ 57\\ 20\\ 20\\ 43\\ 57\\ 20\\ 20\\ 43\\ 57\\ 20\\ 20\\ 23\\ 43\\ 6\\ 20\\ 21\\ 23\\ 43\\ 6\\ 222\\ 23\\ 59\\ 23\\ 23\\ 59\\ 23\\ 23\\ 44\\ 36\\ 222\\ 23\\ 23\\ 50\\ 21\\ 23\\ 44\\ 36\\ 222\\ 23\\ 23\\ 50\\ 21\\ 23\\ 36\\ 224\\ 25\\ 25\\ 26\\ 27\\ 28\\ End of boring at 28 ft bgs. \end{bmatrix}$		& (in)	ts	tet	Soil/Rock Description					(tsf)	1				
$\begin{bmatrix} 37\\ 20\\ 57\\ 43\\ 57\\ 20\\ 20\\ 43\\ 57\\ 20\\ 20\\ 43\\ 57\\ 20\\ 20\\ 23\\ 43\\ 6\\ 20\\ 21\\ 23\\ 43\\ 6\\ 222\\ 23\\ 59\\ 23\\ 23\\ 59\\ 23\\ 23\\ 44\\ 36\\ 222\\ 23\\ 23\\ 50\\ 21\\ 23\\ 44\\ 36\\ 222\\ 23\\ 23\\ 50\\ 21\\ 23\\ 36\\ 224\\ 25\\ 25\\ 26\\ 27\\ 28\\ End of boring at 28 ft bgs. \end{bmatrix}$	Je L	Att. red (oun	n Fe	And Geologic Origin For	10		6		tion	t te		ty		ents
$\begin{bmatrix} 37\\ 20\\ 57\\ 43\\ 57\\ 20\\ 20\\ 43\\ 57\\ 20\\ 20\\ 43\\ 57\\ 20\\ 20\\ 23\\ 43\\ 6\\ 20\\ 21\\ 23\\ 43\\ 6\\ 222\\ 23\\ 59\\ 23\\ 23\\ 59\\ 23\\ 23\\ 44\\ 36\\ 222\\ 23\\ 23\\ 50\\ 21\\ 23\\ 44\\ 36\\ 222\\ 23\\ 23\\ 50\\ 21\\ 23\\ 36\\ 224\\ 25\\ 25\\ 26\\ 27\\ 28\\ End of boring at 28 ft bgs. \end{bmatrix}$	mbe I Tyj	ngth cove	W C	pth I	Each Major Unit	C	aphic	oll apran)/FII	cket netra	nten	luid	stici lex	00	D/
57 20 54 17 medium grained. 18 58 20 24 19 20 21 32 23 44 24 22 23 44 24 22 23 44 24 22 23 44 24 22 23 44 24 22 25 23 21 32 22 23 24 25 25 26 26 27 28 26 27 28 End of boring at 28 ft bgs.	Nur and	Ler Rec	Blo	Dej		n	Gr	W	IId	Pod	Mc	Lir	Pla Ind	P 2	RQ Co
S7 20 5.4 1.7 M $S8$ 20 2.4 1.9 W $S8$ 20 2.4 2.4 0 $S9$ 23 4.4 22 SM W $S10$ 21 3.6 223 24 $Same$ as above except, $10YR 6/4$. W $S10$ 21 3.2 2.5 $Same$ as above except, $10YR 6/4$. W				-											
S7 20 54 -17 medium grained. M $S8$ 20 24 -19 W $S9$ 23 44 -22 SM W $S10$ 21 32 24 -24 Same as above except, 10YR 6/4. W $S10$ 21 410 -26 End of boring at 28 ft bgs. W	П			-16	SILTY SAND, yellowish brown (10YR 5/6), fine to										
$\begin{bmatrix} 1 \\ 38 \end{bmatrix} \begin{bmatrix} 20 \\ 45 \\ -21 \\ -23 \\ -23 \\ -24 \\ -23 \\ -23 \\ -24 \\ -23 \\ -23 \\ -24 \\ -25 \\ -26 \\ -27 \\ -28 \\ -28 \\$			5 4	- 17	medium grained.										
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	S7	20	43	E'I							M				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				-18						2					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Π			E											
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			24	= 19											
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	S8	20	45	E_20							W				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				Ē											
S9 23 $4 \cdot 4 = 22$ $3 \cdot 6 = 22$ $4 \cdot 10 = 23$ Same as above except, 10YR 6/4. W S10 21 $3 \cdot 2 = 25$ $4 \cdot 10 = 26$ 27 = 28 Same as above except, 10YR 6/4. W End of boring at 28 ft bgs. End of boring at 28 ft bgs. Image: Constraint of the constrain	Π			-21											
S10 $\begin{bmatrix} 21 \\ 3 \\ 4 \\ 10 \\ -25 \\ -26 \\ -27 \\ -28 $			4.4	- 22		SM				i.					
S10 $\begin{bmatrix} 21 & 32 \\ 4 & 10 \\ -25 \\ -26 \\ -27 \\ -28 \\ End of boring at 28 ft bgs. \end{bmatrix}$ Same as above except, 10YR 6/4. W	S9	23	36	E 22							W				
S10 21 $\begin{pmatrix} 3 & 2 \\ 4 & 10 \\ -25 \\ -26 \\ -27 \\ -28 \\ -2$				-23									3		
S10 21 $\begin{pmatrix} 3 & 2 \\ 4 & 10 \\ -25 \\ -26 \\ -27 \\ -28 \\ -2$				E											
-26 -27 -28 End of boring at 28 ft bgs.			32	24	Same as above except, 10YR 6/4.						**7				
-26 -27 -28 End of boring at 28 ft bgs.	S10	21	4 10	-25							w		с 4		
-27 -27 -28 End of boring at 28 ft bgs.				Ē									-		
End of boring at 28 ft bgs.				-26									-		
End of boring at 28 ft bgs.				- 27											
End of boring at 28 it bgs.															
				-28	End of horing at 28 ft has			-							
			7												
										-	2	-			-
												1	2.		
		-									-	a - 1			

State of Wisconsin Department of Natural Resources

SOIL BORING LOG INFORMATION

Rev. 7-98

Form 4400-122

Route To:

Watershed/Wastewater

Waste Management 🛛 Other 🗌

													Pag		of	2	
	A. 10	ect Nam				License/	Permit/	Monito	ring N	umber		Boring					
				a Generating Station f crew chief (first, last) a		Data Dri	lling St	orted		D	to Deilli		MW-	309	I'D.ill	ing Method	
1. C.		ampto		ciew chier (inst, iast) a	naram	Date Di	Date Drilling Started Date Drilling Con					ipieteu			llow stem		
			rilling	, Co.		2/13/2018						2/14/2018			auger		
WI UI	nique V	Vell No.		DNR Well ID No.	Common Well Name	Final Sta				Surfa	e Eleva					chole Diameter	
		R111			MW-309	26.	7 Fee	t MS	Ĺ	1	309.88				8.5 in.		
	Grid O Plane	rigin		timated: 🗌) or Boi 448 N, 2,124,151		La	t	•	ų.		Local C						
NW		of SI	-	/4 of Section 27,	T 12 N, R 9 E			0				Feet				Feet 🗌 E	
Facilit		101 01		County		Long County Co		Civil T	own/C	lity/ or	Village						
				Columbia		11				Pacifi							
Sar	nple								1			Soil	Prope	rties			
	s (ii	~	5	Soil/R	lock Description												
U U	Att. ed ()	ount	L Fee		ologic Origin For						_ 5			~		Its	
Typ	gth /	Ŭ	Depth In Feet	Eac	ch Major Unit		CS	ohic	Tam	Ē	dard	sture	it d	ticity	0	mer	
Number and Type	Length Att. & Recovered (in)	Blow Counts	Dep				U S	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments	
					8.5 below ground surface	e; open				4							
			E ₁	hole.				1	的	Č,		l, i					
			1						CHCHCHCH	な文							
			-2							ž.							
			E														
			-3														
			-5														
			111														
			-6														
			E_7														
			ΈΙ														
			-8								1 3						
n	Ĩ			POORLY GRADED S	SAND, fine to coarse, ye	llow		1.17									
- 11			-9	(10YR 7/6), rounded g	grains.	,											
S1	20	11 14 18	-10					1.1			N/A	M					
			-10					18.3									
	i.		-11							1							
			Ξ	Same but with trace gr	avel			2									
S2	20	12 15 20 28	-12	Sume out with duce B			SP	2.24			N/A	М					
			-13					-									
П			-14					1									
S3	24	16 20		Same as above but with	h no gravel.			<- 2			N/A	м					
		26	-15		6			711	148 - E			141					
I hereb	v certif	v that the	he infor	mation on this form is tr	ue and correct to the best	t of my kn	owledg	e									

 Signature
 Firm
 SCS Engineers
 Tel: (608) 224-2830

 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.

	g Numt	ber	MW	V-309 Use only as an attachment to Form 4400-	-122.					0.11		ge 2	of	2
San										Soil	Prope	erties		
	Length Att. & Recovered (in)	nts	eet	Soil/Rock Description										
be	h Att ered	Cour	In F	And Geologic Origin For	S	.9	5		ation	at te		ity		ents
Number and Type	ngth cov	Blow Counts	Depth In Feet	Each Major Unit	USC	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Nu	Le	Ble	Ď	1	D	្រី ភ្ន	Well	PI	Pe	žΰ	ĒĒ	Pla Inc	Ч	2 K S K S
U			16			1999								
0			-16	POORLY GRADED SAND, fine to coarse, yellow, (10YR 7/6), rounded grains, trace silt.		1.1								
- 11			E	(10YR 7/6), rounded grains, trace silt.										
S4	22	11 17 32 41	-17			11			N/A	M				
			-											
			-18 -			1.00								
			E-19											
S5		22 29	E						N/A	м				
		36	-20			\$ 21								
			E			1.12								
П			E ²¹			3.5								
		18 20	En			1								
S6	24	18 20 28 36	F			201			N/A	M				
L			E-23											
Г			-			 								
			-24											
S7		18 24 32	E				E		N/A	M				
			E-25			1	18							
]		E-26		SP									
			E			1.1								
S8	22	14 18 30 40	-27						N/A	w				Depth to water a
50		30 40	E											Depth to water a ~ 26 feet.
L	1		-28											
Г	1		Ē				ΙE							
		22 32	E-29				E							
S9	22	34	E-30						N/A	W				
L	I I		E			1.1								
			-31											
			E				IE							
			-32				-==							
			F											
	1.1		=33				E							
			E-34				IE							
			E											1
			-35				1							
			E											
			= 36					_						
			ſ	End of Boring at 36.5 feet bgs.										
		1												
		1												
		1	1								1		R.	12

State of Wisconsin Department of Natural Resources

SOIL BORING LOG INFORMATION Rcv. 7-98

Form 4400-122

Route To:

Watershed/Wastewater Remediation/Redevelopment Waste Management Other

						1				•			Pag		of	2		
	-	ct Nan		in Canadian Station	SCI2# 2521715(01	License/	Permit/	Monito	ring N	umber		Boring	Numbe MW-					
				ia Generating Station f crew chief (first, last) a		Date Dri	Iling St	arted		D	te Drilli				Drill	ing Method		
	ve Cri	-								100						hollow stem		
Bac	lger S	tate I	Drilling			2/13/2018					2/13/2018					auger		
WI Ur		Vell No		DNR Well ID No.	Common Well Name	Final Sta										Borehole Diameter		
T 1		R110	D		MW-310	27	.9 Fee	t MSI		8	310.96				8	.5 in.		
	Grid O Plane	rigin		timated:) or Bor ,332 N, 2,123,880		La	ıt	0	•		Local C							
NW		of S				Lon		o	8			reet	□ N □ S			Feet 🗌 E		
Facilit		or b.		County		County Co		Civil T	own/C	ity/ or	Village			_				
				Columbia		11		Town	n of F	Pacific	>							
San	nple											Soil	Prope	erties				
	% (i	s l	ы т	Soil/R	ock Description													
. Q	Att. ed (ount	1 Fe	And Ge	ologic Origin For						L io	0		~		uts		
Typ	Length Att. & Recovered (in)	Blow Counts	Depth In Fcct	Eac	h Major Unit		CS	phic	1 Tan		dard	sture	it d	ticit.	0)/		
Number and Type	Length Att. Recovered (Blov	Dep				U S	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments		
-			F	Hydrovaced boring to	8 feet below ground surf	face;				4								
			1 2 3 4 5 6 7	open hole.					AXXXXX AXXXXX	ł.								
			E															
			-2															
			E^3															
			E_4															
			Ē															
			-5															
			E ⁻⁶															
			2,															
			E'															
			-8															
n				POORLY GRADED S	AND AND GRAVEL,	fine to		0.2										
			-9	medium sand, coarse g	ravel, brownish yellow,	(10YR		193										
S1	18	46	E I	6/6), angular gravel, ro	und sand.			2.81			N/A	M						
			-10					41.5										
			-11															
- 11			E i i	Same as above but trac	e gravel.			10										
S2	24	18 27 38 40	-12				SP	12			N/A	м						
		38 40						19										
			-13															
П			-14					31										
S3	24	26 32 40 38	14					- 3 8			N/A	м						
II	27	40 38	-15					3.1				141						

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

Signature Firm SCS Engineers	Tel: (608) 224-2830
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.

Borin	g Numl	ber	MW	V-310 Use only as an attachment to Form 4400-1	22.							ge 2	of	2
San	nple									Soil	Prope	erties		
er vpe	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For	s	ic	Ę	A	ation	ure nt	_	ity		lents
Number and Type	Lengt	Blow	Depth	Each Major Unit	U S C	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S4	10	25 50/5	16	POORLY GRADED SAND AND GRAVEL, fine to medium sand, coarse gravel, brownish yellow, (10YR 6/6), angular gravel, round sand.					N/A	М				Tough drilling.
			18											
S5	24	38 60 50/4	20						N/A	M				
S6	12	38 50/5	22						N/A	м				
S7	24	32 46 50/4	24						N/A	м				
S8	16	25 40 50/5	E		SP				N/A	w				Depth to water at ~26 feet.
S9		32 25 50/5	-28 -29 -30	8					N/A	w				
L			-31 -32 -33											
			-34					-						
			-36	End of Boring at 36.5 feet bgs.		23								
													*	

State of Wisconsin Department of Natural Resources

Form 4400-122 Rev. 7-98

Route To: Wa

Watershed/Wastewater

Waste Management 🖾 Other 🗌

													Pag		of	2
Facilit				is Concenting Station	000# 25217156 01	License/Permit/Monitoring Number MW-311										
	WPL - Alliant Columbia Generating Station SCS#: 25217156.01 Boring Drilled By: Name of crew chief (first, last) and Firm				Date Dri					ing Method						
		ampto					0 -			1922.0		0				llow stem
Bad	lger S	tate L	Drilling		10. A 10.			/2018				2/14/2	2018		au	ger
WI Ur		Vell No	s.	DNR Well ID No.	Common Well Name	Final Sta					e Eleva		VICT	Bo		Diameter
Local		R112	□ (es	stimated: 🗌) or Bori	MW-311		5 Fee	t MSI				Feet I		_	8	.5 in.
State				,874 N, 2,123,437		La	t	°			Local			r		Feet 🗌 E
NE		of S	W 1		t 12 n, r 9 e	Long		°	<u> </u>							ŪŴ
Facilit	уD			County		County Co	de				Village					
Can				Columbia		11	l	Town	1 of P	acific		0	Duran			
San	nple	1		d 1100								501	Prope	erties	i i	
	ft. & 1 (jn)	ints	Feet		ock Description						6					6
ber ype	h At /erec	Cou	[H]		ologic Origin For		~	ic.	u u	A	ard	nre	-	city		aent
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Eac	h Major Unit		SC	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
	1 K	<u>m</u>		Hydrovaced boring to 8	B feet below ground surf	ace:	D				NA	N N	ЦЦЦ	E E	4	×0
			E,	open hole.	U				NONONON NONONON							
			Ē						認知							
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Π			-9	POORLY GRADED S	AND AND GRAVEL,	fine to										
S 1	24	12 16	= 9	coarse sand, coarse gra rounded sand, angular	vel, yellow, (10YR 7/6). pravel.	,										
51	24	20 24	-10		<u> </u>						N/A	M				
L								1.								
п			-11													
		17.27	E	Same as above but with	tenen ailt		SP	n 2.								
S2	24	17 27 30 38	-12	Same as above but with	I Trace SHI.			2			N/A	M				
U			-13					i di la								
п			-													
		10.75	-14					i - 1								
S3	24	18 26 31	= 								N/A	M				
			-13							L						

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

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

This term 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.

Sample Soil/Rock Description Soil/Rock Descripion Soil/Rock D	Borin	g Num	ber	MW	V-311 Use only as an attachment to Form 4400-	122.						Pa		of	2
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SCS #25215135

	Watershed/Wastewater	Waste Managemen	MONITORING WELL CONSTRUCTION Form 4400-113A Rev. 7-98
Facility/Project Name	Remediation/Redevelopment	Other	Well Name
WPL-Columbia	ft.		MW-301
Facility License, Permit or Monitoring No.		SIt. W. ated:) or Well Location	Wis, Unique Well No. DNR Well ID No.
I winty Excense, I child of Montolling 140.			1/1/701
Facility ID			
L WALLEY SAF	St. Plane 541562.2 ft. N		Date well installed $11 / 11 / 2015$ m m d d v v v v
Type of Well	Section Location of Waste/Sou		Well Installed By: Name (first, last) and Firm
Well Code 11 / MW			Kevin Duerst
Distance from Waste/ Enf. Stds.	Location of Well Relative to M		
Sourceft. Apply	u Upgradient s d Downgradient n	Sidegradient Not Known	Badger State Drilling
A. Protective pipe, top elevation $- \frac{80}{2}$	7 16 ft. MSL	1. Cap and lock?	
B . Well casing, top elevation $-\frac{80}{-2}$	06 89 ft. MSL	2. Protective cover	6
		a. Inside diamete	
C. Land surface elevation	03 69 ft. MSL	b. Length:	-5 ft
D. Surface seal, bottom79169 ft. MS	Lor 12 ft.	c. Material:	Steel 🔀 04
12. USCS classification of soil near screen		d. Additional pro	
	sw sp	If yes, descrit	
			Bentonite X 30
Bedrock		3. Surface scal:	$\begin{array}{c} \text{Bentomic } \searrow 50\\ \text{Concrete } \square 01 \end{array}$
13. Sieve analysis performed?	Yes No		Other
14. Drilling method used: Rot	tary. 50	4 Material between	n well casing and protective pipe:
Hollow Stem Au			Bentonite \times 30
	ther	Bentonite to	grade, sand above Other
		5. Annular space se	
15. Drilling fiuid used: Water 0 2	Air 01		mud weight Bentonite-sand slurry 35
Drilling Mud 0.3 N	None 🛛 99 🛛 🗱		mud weight \ldots Bentonite slurry \square 31
			nite Bentonite-cement grout 50
16. Drilling additives used?	Yes 🗙 No	eFt	³ volume added for any of the above
		f. How installed	
Describe		×	Tremie pumped 🗍 02
17. Source of water (attach analysis, if requ	area):	- 8 89	Gravity 🔲 08
	8	6. Bentonite seal:	a. Bentonite granules 33
		b /4 in. 🗙	$3/8$ in. $1/2$ in. Bentonite chips \checkmark 3 2
E. Bentonite seal, top 803.69 ft. MS	$L \text{ or } _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ $	🕅 / с	4 ft3 Other
791 69	L or $_$ $_$ $_$ $]$ ¹² ft.	7 Fine sand materi	al: Manufacturer, product name & mesh size
F. Fine sand, topft. MS	L or		RW Sidley Inc. #7
G. Filter pack, top 789.69 ft. MS		a	
G. Filter pack, top69.69 ft. MS	L or 14 ft.	b. Volume adde	
11 Server isist ton 787 696 145	L or16 ft.	8. Filter pack mater	rial: Manufacturer, product name & mesh size
H. Screen joint, top $-\frac{787.69}{10}$ ft. MS.	L or1.	a	RW Sidley #5
I. Well bottom 777.69 ft. MS	L or26ft.	b. Volume adde 9. Well casing:	
		9. Well casing:	
J. Filter pack, bottom776.69 ft. MS	L or27 ft.		
J. Phier pack, bottom re into		10. Screen material:	Other 🔲 🚚
K. Borehole, bottom ft. MS	$L \text{ or } _ _ _ _ _ _ _ ^{28} \text{ft.}$	a. Screen type:	
		a. screen type:	
L. Borehole, diameter $-\frac{8.5}{-1}$ in.			
		b. Manufacturer	linear at a state
M. O.D. well casing -2.4 in.		c. Slot size:	$0_{-} \underline{01} \text{ in.}$
		d. Slotted length	
N. I.D. well casing $-\frac{2.0}{2.0}$ in.		11. Backfill material	
			Native Other
I hereby certify that the information on this	form is true and correct to the h	best of my knowledge.	
Signature of m	Firm		
Mah ill		GINEERS, 2830 Dairy Drive,	Madison, WI 53718-6751
	I		

	Watershed/Wastewater	Other	agemenX	MONITORING WELL CONSTRUC Form 4400-113A Rev. 7-98	CTION
Facility/Project Name WPL-Columbia Generating Station	Local Grid Location of Wel 543447.673 ft.		51.113 n. XE.	Well Name MW-309	
Facility License, Permit or Monitoring No.	Local Grid Origin (est	imated: []) or _"Long	Well Location	Wis. Unique Well No. DNR Well ID VR111	No.
Facility ID	· · · · · · · · · · · · · · · · · · ·	. N,	ft. E. S/C/N	Date Well Installed $\frac{02}{m}$, $\frac{14}{d}$, $\frac{2}{y}$	2018
Type of Well Well Code <u>11</u> / MW	NW1/4 of SE 1/4 of Section of Well Relative to	ec. <u>27</u> .T. <u>12</u>	N, R. 09 W	Well Installed By: Name (first, last) an Mark Crampton	nd Firm
Distance from Waste/ Enf. Stds. Sourceft. Apply	u Upgradient s d X Downgradient n	Not Known		Badger State Drilling Co., Inc	<u>. </u>
	813.59 ft. MSL		 Cap and lock? Protective cover 	Yes	No
B. Well casing, top elevation	813.28 ft. MSL	A	a. Inside diamete		6 in.
C. Land surface elevation	809.88 ft. MSL		b. Length:		5 ft.
D. Surface seal, bottom807.61 ft. MS	SL or _ 2.27 ft.		c. Material:	Steel 🔀 Other	04
12. USCS classification of soil near screen	n:		d. Additional pro] No
	sw□ sp ⊠ \	$ \land \land$	If yes, describ		-
SM SC ML MH C Bedrock	сг 🗆 сн 🗆 🔰 🕺		3. Surface scal:	Bentonite 🗵	
13. Sieve analysis performed?	Yes No			Concrete Concrete] 01
14. Drilling method used: Ro	tary 🔲 5 0		4. Material between	well casing and protective pipe:	
Hollow Stem Au	uger 🔀 4 1 hther 🗌 🛲		Filter Sand (#5) Bentonite Other	30
			5. Annular space se		<]33
15. Drilling fluid used: Water 0 2 Drilling Mud 0 3	Air 01 None 99			nud weight Bentonite-sand slurry	
		× ×		nud weight Bentonite slurry	31
16. Drilling additives used?	Yes XNo		e0.342 Ft	³ volume added for any of the above	1
Describe		8 8	f. How installed		01
17. Source of water (attach analysis, if requ	uired):	8 Ø		Tremie pumped Gravity	02
	[6. Bentonite seal:	a. Bentonite granules	33
E. Bentonite seal, top807.61 ft. MS	L or 2.27 fl.		b/4 in. 🗙 c	3/8 in. 1/2 in. Bentonite chips	
F. Fine sand, top 788.61 ft. MS	SL or $_{-}21.27$ ft.		7. Fine sand materi a. RW Sidley #	al: Manufacturer, product name & mes 7 (1 bag)	sh size
G. Filter pack, top 786.61 ft. MS	SL or23.27 ft.		b. Volume addee	1ft ³	67-102A
H. Screen joint, top785.61 ft. MS	SL or 24.27 ft.		8	ial: Manufacturer, product name & me RW Sidley #5 (6 bags) d ft ³	sh size
	SL or34.27 ft.		 b. Volume adde 9. Well casing: 	Flush threaded PVC schedule 40 Flush threaded PVC schedule 80	23
	SL or $\{-}^{36.5}$ ft.		0. Screen material:	PVC Other	
K. Borehole, bottom 773.38 ft. MS	SL or36.5ft.		a. Screen type:	Factory cut X Continuous slot	
L. Borehole, diameter $-\frac{8.5}{}$ in.			b. Manufacturer	Other	
M. O.D. well casing -2.38 in.		\setminus	c. Slot size: d. Slotted length	0.0	10 in. 10 ft.
N. I.D. well casing 2.01 in.		1		(below filter pack): None Other	14
I hereby certify that the information on this	form is true and correct to the	he best of my kno	wledge.		
Signature 1	Firm				
Invil	SCS	ENGINEERS,	2830 Dairy Drive	Madison, WI 53718	

Dam	ershed/Wastewater	Waste Managemen X	MONITORING WELL CONSTRUCTION Form 4400-113A Rev. 7-98
Facility/Project Name Loc WPL-Columbia Generating Station	cal Grid Location of Well × 543331.971 ft.	N. 2123879.85 ft. XE	Well Name MW-310
Facility License, Permit or Monitoring No. Loc	cal Grid Origin (estima	ted: []) or Well Location	Wis, Unique Well No. DNR Well ID No.
Facility ID St.	Plane ft. N	ft. E. S/C	Data Wall Installed
Type of Well Nell Code 11 / MW	ction Location of Waste/Sou ₩1/4 ofSE 1/4 of Sec	<u>27</u> , T . <u>12</u> N, R . <u>09</u>	E Well Installed By: Name (first, last) and Firm
Distance from Waste/ Enf. Stds. u	cation of Well Relative to W Upgradient s X Downgradient n	Sidegradient Nor Known	Badger State Drilling Co., Inc.
	3.93 ft. MSL	1. Cap and lock?	Yes No
	3.62 ft. MSL	2. Protective cov	6
		a. Inside diam	eter: $-\frac{5}{6}$ in.
	0.96 ft. MSL	b. Length: c. Material:	Steel \mathbf{X} 0 4
D. Surface seal, bottom 809.21 ft. MSL o	<u>,r _ 1.75</u> fL	-	
12. USCS classification of soil near screen:	- 10 m	d. Additional	
		If yes, deso	cribe:
SM SC ML MH CL	Сн 🗌 🖌	3. Surface scal:	Bentonite 🔀 30
13. Sieve analysis performed? Xes			
14. Drilling method used: Rotary		4. Material betw	Con well casing and protective pipe:
Hollow Stem Auger			Bentonite 30
Other		Filter Sand (#5) Other 🔀 🏬
		5. Annular space	
15. Drilling fiuid used: Water 0 2 Air Drilling Mud 0 3 None	r 01 c 899		al mud weight Bentonite-sand slurry 35
		cLbs/g	al mud weight Bentonite slurry 231
16. Drilling additives used?	X No 🔛	d % Ber	tonite Bentonite-cement grout 50 Ft ³ volume added for any of the above
_		f. How instal	
Describe			Tremie pumped 0 2
17. Source of water (attach analysis, if required	i):	88 ·	Gravity 🔀 08
	👹	6. Bentonite sea	
E. Bentonite seal, top809.21 ft. MSL or	r <u>1.75</u> ft.	b/4 in.	X3/8 in. 1/2 in. Bentonite chips X 3 2 Other ↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓
F. Fine sand, top789.21 ft. MSL of	r21.75 ft.	7. Fine sand main a. RW Sidley	terial: Manufacturer, product name & mesh size (#7 (1 bag)
G. Filter pack, top 787.21 ft. MSL or	r23.75 ft.	b. Volume ad	lded ft ³
H. Screen joint, top785.21 ft. MSL or	r25.75 ft.	- [] / a	aterial: Manufacturer, product name & mesh size RW Sidley #5 (7 bags)
I. Well bottom 775.21 ft. MSL or	r35.75 ft.	b. Volume ac 9. Well casing:	Flush threaded PVC schedule 40 2 3 Flush threaded PVC schedule 80 2 4
J. Filter pack, bottom774.46 ft. MSL or	r36.5 ft.	10. Screen materi	
K. Borcholc, bottom 774.46 ft. MSL or	r36.5ft.	a. Screen typ	Factory cut X 11
L. Borehole, diameter $-\frac{8.5}{-1}$ in.		b. Manufactu	Other 🗌 🏥
M. O.D. well casing -2.38 in.		c. Slot size: d. Slotted len	0_010 in.
N. I.D. well casing 2.01 in.			rial (below filter pack): None 14 Other
I hereby certify that the information on this for	m is true and correct to the h	best of my knowledge.	
Signature 1	Firm		
- Manya	SCS EN	GINEERS, 2830 Dairy Dri	ve, Madison, WI 53718

	Watershed/Wastewater	Waste Managemen X	MONITORING WELL CONSTRUCTION Form 4400-113A Rev. 7-98
Facility/Project Name WPL-Columbia Generating Station	Local Grid Location of Well 542874.39 ft	S. 2123437.50 n. XE.	Well Name MW-311
Facility License, Permit or Monitoring No.	Local Grid Origin (estima	ted: [_]) or Well Location [vR112
Facility ID	St. Plane ft. N. Section Location of Waste/Sour	ft. E. S/C/N	Date Well Installed m m d d y y y y
Type of Well Well Code 11 / MW	NE1/4 of SW 1/4 of Sec.	<u>27</u> , T. <u>12</u> N, R. <u>09</u>	Well Installed By: Name (first, last) and Firm Mark Crampton
Distance from Waste/ Enf. Stds. Sourceft. Apply	Location of Well Relative to W u Upgradient s d X Downgradient n	Sidegradient Not Known	Badger State Drilling Co., Inc.
	810.05 ft. MSL	1. Cap and lock?	X Yes No
B. Well casing, top elevation	809.74 ft. MSL	2. Protective cover a. Inside diamet	
C. Land surface elevation	806.53 ft. MSL	b. Length:	
D. Surface seal, bottom 803.55 ft. M.		c. Material:	Steel 🔀 04
	Re-Solary		
12. USCS classification of soil near screee	sw sp 🛛	d. Additional pu If yes, descri	
			Bentonite X 30
Bedrock	N	3. Surface scal:	Concrete 01
		×	Other
	stary 50	4. Material betwee	en well casing and protective pipe: Bentonite 2 30
Hollow Stem A	Uger A 41 Other	Filter Sand (#	
		5. Annular space s	000000
15. Drilling fluid used: Water 0 2	Air 0 1		mud weight Bentonite-sand slurry 35
Drilling Mud 0 3	None × 99		mud weight Bentonite slurry 21
16. Drilling additives used?	Yes 🗙 No		nite Bentonite-cement grout 50
		f. How installe	
Describe			Tremie pumped 🔲 02
17. Source of water (attach analysis, if req	uirea):		Gravity 🔀 08
		6. Bentonite seal:	a. Bentonite granules 3 3 3/8 in. 1/2 in. Bentonite chips X 3 2
E. Bentonite seal, top803.55 ft, MS		/ c	Other
F. Fine sand, top 787.55 ft. MS	SL or18.98 ft.	7. Fine sand mater	rial: Manufacturer, product name & mesh size #7 (1 bag)
G. Filter pack, top 785.55 ft. MS	SL or20.98 ft.		edft ³
H. Screen joint, top783.55 ft. MS	SL or 22.98 ft.	- [] / a	RW Sidley #5 (6 bags)
I. Well bottom 773.55 ft. MS	SL or 32.98 ft.	b. Volume add 9. Well casing:	Flush threaded PVC schedule 40 🔀 23 Flush threaded PVC schedule 80 🗌 24
J. Filter pack, bottom773.53 ft. MS	SL or33 ft.	10. Screen material	Other DVC
K. Borehole, bottom773.53 ft. MS	SL or33ft.	a. Screen type:	" @w
L. Borehole, diameter $-\frac{8.5}{}$ in.			Other 🗌 🔛
M. O.D. well casing -2.38 in.		b. Manufacture c. Slot size: d. Slotted leng	0. <u>010</u> in.
N. I.D. well casing 2.01 in.		a 0	al (below filter pack): None 🔀 1 4 Other 🗖 📰
I hereby certify that the information on this	s form is true and correct to the l	pest of my knowledge.	
Signature	Firm		
- JANU	SCS EN	GINEERS, 2830 Dairy Drive	e, Madison, WI 53718

State of Wisconsin Department of Natural Resources

MONITORING	WELL DEVELOPMENT
Form 4400-113B	Rev. 7-98

Route to: Watershed/Wast	ewater	Waste Management	\mathbf{X}		
Remediation/Rec	levelopment	Other			
Facility/Project Name	County Name		Well Name		
WPL - Alliant Columbia Generating Station	C	olumbia		1	MW-309
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Nu VR111		DNR Wel	ll ID Number
surged with bailer and pumped X surged with block and bailed X surged with block and pumped X surged with block, bailed and pumped X Depth only Y Pumped slowly Y Other Y S. Time spent developing well		 11. Depth to Water (from top of well casing) Date Time 12. Sediment in well bottom 13. Water clarity 	Before Dev a30 a30 b. $\frac{02}{m} / \frac{1}{d}$ c12 : $\frac{47}{d}$ Clear [1] Turbid [X] 1 (Describe) Brown Silty s were used an		·
8. Volume of water added (if any)	<u></u> gal.	solids		• — ^{mg/1}	mg/l
9. Source of water added		15. COD		• mg/l	mg/l
		16. Well developed b	y: Name (first, 1	ast) and Firm	1
10. Analysis performed on water added?	es 🗌 No	First Name: Kyle	5.	Last Name	
		Firm: SCS ENGIN	IEERS, 2830	Dairy Driv	ve, 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 Last Name: Nate	I hereby certify that the above information is true and correct to the best of my knowledge.
Facility/Finn:	Signature: Myle Mun
Street:W8375 Murray Road	Print Name: Kyle Kramer
City/State/Zip: Pardeeville, Wisconsin 53954	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.

State of Wisconsin Department of Natural Resources

MONITORING	WELL DEVELOPMENT
Form 4400-113B	Rev. 7-98

Route to: Watershed/Waster	water	Waste Management	X		
Remediation/Red	evelopment	Other			
Facility/Project Name WPL - Alliant Columbia Generating Station	County Name County Code	olumbia Wis. Unique Well Nu	Well Name		MW-310 II ID Number
Facility License, Permit or Monitoring Number		VR110		DNK Wei	
surged with bailer and pumped Image: Constraint of the surged with block and bailed Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block, bailed and pumped Image: Constraint of the surged with block,	4 1 6 1 4 2 5 2 7 0	well casing) Date 1	$\frac{30}{m m} = \frac{30}{2}$	55 ft.	After Development <u>32</u> <u>30</u> ft. $\frac{2018}{y} = \frac{2}{m} \frac{16}{d} \frac{201}{y} \frac{201}{y}$ $\frac{12}{y} = 36 \qquad \text{[x] p.m.}$
bailed only 1 pumped only 5 pumped slowly 5 Other 1	2 0 5 1 5 0 <u>171 min.</u>	Time 12. Sediment in well bottom 13. Water clarity		inches 0 5	inches inches Clear X 20 Turbid 25 (Describe)
5. Inside diameter of well $-\frac{2}{2}$) in.		silty		
7. Volume of water removed from well60	28 gal.				mg/l
 8. Volume of water added (if any)	BR. CTTED	solids		mg/l	mg/l
10. Analysis performed on water added? Ye (If yes, attach results)	es 🗌 No	16. Well developed by First Name: Kyle Firm: SCS ENGIN		Last Name	

17. Additional comments on development:

Four cycles of well purging dry and recharging.

Name and Address of Facility Contact /Owner/Responsible Party First Last Name: Nate	I hereby certify that the above information is true and correct to the best of my knowledge.
Facility/Firm: Wisconsin Power and Light	Signature: 14 le 11 hours
Street: W8375 Murray Road	Print Name: Kyle Kramer
City/State/Zip: Pardeeville, Wisconsin 53954	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.

State of Wisconsin Department of Natural Resources

MONITORING WELL DEVELOPMENT Form 4400-113B Rev. 7-98

Route to: Watershed/Wast	ewater	Waste Management	X		
Remediation/Re	levelopment	Other			
Facility/Project Name	County Name		Well Name		
WPL - Alliant Columbia Generating Station	C	olumbia		M	W-311
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Nu VR112		DNR Well	ID Number
 2. Well development method surged with bailer and bailed surged with bailer and pumped surged with block and pumped surged with block, bailed and pumped compressed air bailed only pumped only pumped slowly Other 3. Time spent developing well 4. Depth of well (from top of well casisng) 	$ \begin{array}{c c} $	11. Depth to Water (from top of well casing) Date	Before Deviation $\frac{26}{m m} = \frac{26}{m m}$	$-\frac{75}{y} ft.$ $\frac{20}{y} \frac{20}{y} \frac{20}{y}$ $\frac{1}{y} a.m.$ $x p.m.$ inches $0 \qquad C$ 5 T	After Development
	in.				
7. Volume of water removed from well	$\frac{3}{2} \cdot \frac{74}{2} \text{gal.}$				solid waste facility: mg/l
8. Volume of water added (if any)	<u></u> gal.	solids			
9. Source of water added		15. COD		mg/l	mg/l
		16. Well developed by	: Name (first, la	ast) and Firm	
10. Analysis performed on water added?	'es 🗌 No	First Name: Kyle	C 03 52	Last Name:	Kramer
(11 y 00, million 100(110)		Firm: SCS ENGIN	EERS, 2830	Dairy Drive	e, Madison, WI 53718

17. Additional comments on development:

Name and Address of Facility Contact /Owner/Responsible Party First Last Name: Name:	I hereby certify that the above information is true and correct to the best of my knowledge.
Facility/Firm: Columbia Dry Ash & Ash Pond Disposal Facilities	Signature: Nyle 11
Street:W8375 Murray Road	Print Name: Kyle Kramer
City/State/Zip: Pardeeville, Wisconsin 53954	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

- C1 April 2021 Detection Monitoring
- C2 June 2021 Resample
- C3 October 2021 Detection Monitoring
- C4 December 2021 Resample

C1 April 2021 Detection Monitoring



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

May 03, 2021

Meghan Blodgett SCS ENGINEERS 2830 Dairy Drive Madison, WI 53718

RE: Project: 25219067 COLUMBIA CCR MOD 4 Pace Project No.: 40225270

Dear Meghan Blodgett:

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

The test results provided in this final report were generated by each of the following laboratories within the Pace Network: • Pace Analytical Services - Green Bay

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

Sincerely,

Day Milery

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

Enclosures

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





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

CERTIFICATIONS

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40225270

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302 Florida/NELAP Certification #: E87948 Illinois Certification #: 200050 Kentucky UST Certification #: 82 Louisiana Certification #: 04168 Minnesota Certification #: 055-999-334 New York Certification #: 12064 North Dakota Certification #: R-150 Virginia VELAP ID: 460263 South Carolina Certification #: 83006001 Texas Certification #: T104704529-14-1 Wisconsin Certification #: 405132750 Wisconsin DATCP Certification #: 105-444 USDA Soil Permit #: P330-16-00157 Federal Fish & Wildlife Permit #: LE51774A-0



SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40225270

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40225270001	MW-309	Water	04/13/21 16:35	04/16/21 07:45
40225270002	MW-310	Water	04/13/21 17:10	04/16/21 07:45
40225270003	MW-311	Water	04/14/21 09:45	04/16/21 07:45
40225270004	FIELD BLANK MOD4	Water	04/13/21 17:10	04/16/21 07:45



SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40225270

ab ID	Sample ID	Method	Analysts	Analytes Reported
0225270001		EPA 6020	DS1	2
			VGC	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
225270002	MW-310	EPA 6020	DS1	2
			VGC	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
25270003	MW-311	EPA 6020	DS1	2
			VGC	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
225270004	FIELD BLANK MOD4	EPA 6020	DS1, KXS	2
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3

PASI-G = Pace Analytical Services - Green Bay



Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40225270

Sample: MW-309	Lab ID:	40225270001	Collected	l: 04/13/2 ⁻	1 16:35	Received: 04/	(16/21 07:45 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	-	l Method: EPA 6 Ilytical Services			od: EP/	A 3010			
Boron Calcium	48.0 62300	ug/L ug/L	10.0 254	3.0 76.2	1 1	04/20/21 06:41 04/20/21 06:41			
Field Data	Analytica Pace Ana	l Method: Ilytical Services	- Green Bay	/					
Field pH Field Specific Conductance Oxygen, Dissolved REDOX Turbidity Static Water Level Temperature, Water (C)	7.68 1804.0 10.14 124.1 2.80 784.29 10.7	Std. Units umhos/cm mg/L mV NTU feet deg C			1 1 1 1 1 1		04/13/21 16:35 04/13/21 16:35 04/13/21 16:35 04/13/21 16:35 04/13/21 16:35 04/13/21 16:35 04/13/21 16:35	7782-44-7	
2540C Total Dissolved Solids		l Method: SM 2 Ilytical Services		/					
Total Dissolved Solids	916	mg/L	20.0	8.7	1		04/20/21 12:35		
9040 pH		I Method: EPA S		1					
pH at 25 Degrees C	7.7	Std. Units	0.10	0.010	1		04/19/21 10:03		H6
300.0 IC Anions		I Method: EPA 3		/					
Chloride Fluoride Sulfate	390 <0.095 30.3	mg/L mg/L mg/L	40.0 0.32 2.0	8.6 0.095 0.44	20 1 1		04/30/21 10:09 04/30/21 01:46 04/30/21 01:46	16984-48-8	



Project: 25219067 COLUMBIA CCR MOD 4

Chloride

Fluoride

Sulfate

Pace Project No.: 40225270

Sample: MW-310	Lab ID:	40225270002	Collected	: 04/13/2	1 17:10	Received: 04	/16/21 07:45 M	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytica	l Method: EPA 6	020 Prepara	ation Meth	od: EP	A 3010			
	Pace Ana	alytical Services	- Green Bay						
Boron	69.6	ug/L	10.0	3.0	1	04/20/21 06:41	04/22/21 21:41	7440-42-8	
Calcium	49300	ug/L	254	76.2	1	04/20/21 06:41	04/22/21 21:41	7440-70-2	
Field Data	Analytica	I Method:							
	Pace Ana	alytical Services	- Green Bay						
Field pH	7.73	Std. Units			1		04/13/21 17:10		
Field Specific Conductance	1194.0	umhos/cm			1		04/13/21 17:10		
Oxygen, Dissolved	9.93	mg/L			1		04/13/21 17:10	7782-44-7	
REDOX	106.0	mV			1		04/13/21 17:10		
Turbidity	0.57	NTU			1		04/13/21 17:10		
Static Water Level	784.24	feet			1		04/13/21 17:10		
Temperature, Water (C)	10.8	deg C			1		04/13/21 17:10		
2540C Total Dissolved Solids	Analytica	I Method: SM 25	540C						
	Pace Ana	alytical Services	- Green Bay						
Total Dissolved Solids	654	mg/L	20.0	8.7	1		04/20/21 12:36		
9040 pH	Analytica	l Method: EPA 9	040						
	Pace Ana	alytical Services	- Green Bay						
pH at 25 Degrees C	7.8	Std. Units	0.10	0.010	1		04/19/21 10:09		H6
300.0 IC Anions	Analytica	I Method: EPA 3	00.0						
	Pace Ana	alytical Services	- Green Bay						

Pace Anal	ylical Service	s - Green bay			
227	mg/L	20.0	4.3	10	04/30/21 17:06 16887-00-6
<0.095	mg/L	0.32	0.095	1	04/30/21 10:52 16984-48-8
43.3	mg/L	2.0	0.44	1	04/30/21 10:52 14808-79-8



Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40225270

Sample: MW-311	Lab ID:	40225270003	Collected	: 04/14/2	1 09.45	Received: 04/	(16/21 07·45 M	atrix: Water	
		10220210000	Concered		1 00.10		10/21 01:10		
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	-	Method: EPA 6 lytical Services			od: EP/	A 3010			
Boron Calcium	33.6 59000	ug/L ug/L	10.0 254	3.0 76.2	1 1	04/20/21 06:41 04/20/21 06:41	04/22/21 21:48 04/22/21 21:48		
Field Data	Analytical Pace Ana	Method: lytical Services	- Green Bay	,					
Field pH Field Specific Conductance Oxygen, Dissolved REDOX Turbidity Static Water Level Temperature, Water (C)	7.46 500.2 10.23 110.4 3.49 784.15 9.5	Std. Units umhos/cm mg/L mV NTU feet deg C			1 1 1 1 1 1		04/14/21 09:45 04/14/21 09:45 04/14/21 09:45 04/14/21 09:45 04/14/21 09:45 04/14/21 09:45 04/14/21 09:45	7782-44-7	
2540C Total Dissolved Solids		Method: SM 25 lytical Services		,					
Total Dissolved Solids	270	mg/L	20.0	8.7	1		04/20/21 12:36		
9040 pH		Method: EPA 9 lytical Services		,					
pH at 25 Degrees C	7.7	Std. Units	0.10	0.010	1		04/19/21 10:10		H6
300.0 IC Anions		Method: EPA 3 lytical Services		,					
Chloride Fluoride Sulfate	1.3J <0.095 15.6	mg/L mg/L mg/L	2.0 0.32 2.0	0.43 0.095 0.44	1 1 1		04/30/21 15:54 04/30/21 15:54 04/30/21 15:54	16984-48-8	



Project: 25219067 COLUMBIA CCR MOD 4

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Pace Project No.: 40225270

Sample: FIELD BLANK MOD4	Lab ID:	40225270004	Collected:	04/13/2	1 17:10	Received: 04/	/16/21 07:45 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical	Method: EPA 6	020 Prepara	ation Meth	od: EPA	3010			
	Pace Anal	lytical Services	- Green Bay						
Boron	<3.0	ug/L	10.0	3.0	1	04/20/21 06:41	04/22/21 18:38	7440-42-8	
Calcium	<76.2	ug/L	254	76.2	1	04/20/21 06:41	04/24/21 02:22	7440-70-2	
2540C Total Dissolved Solids	Analytical	Method: SM 25	540C						
	Pace Anal	lytical Services	- Green Bay						
Total Dissolved Solids	<8.7	mg/L	20.0	8.7	1		04/20/21 12:36		
9040 pH	Analytical	Method: EPA 9	040						
	Pace Anal	lytical Services	- Green Bay						
pH at 25 Degrees C	6.3	Std. Units	0.10	0.010	1		04/19/21 10:12		H6
300.0 IC Anions	Analytical	Method: EPA 3	0.00						
	Pace Anal	lytical Services	- Green Bay						
Chloride	<0.43	mg/L	2.0	0.43	1		04/30/21 16:09	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		04/30/21 16:09	16984-48-8	
Sulfate	<0.44	mg/L	2.0	0.44	1		04/30/21 16:09	14808-79-8	



Project:	25219067 COLUM	BIA CCR MOD 4										
Pace Project No.:	40225270											
QC Batch:	382878		Analy	sis Method	d: E	EPA 6020						
QC Batch Method:	EPA 3010		Analy	sis Descrip	ption: 6	6020 MET						
			Labo	ratory:	F	Pace Analyt	ical Service	es - Green	Bay			
Associated Lab San	nples: 402252700	001, 4022527000	2, 4022527	0003, 4022	25270004							
METHOD BLANK:	2208607			Matrix: Wa	ater							
Associated Lab San	nples: 402252700	001, 4022527000	2, 4022527	0003, 4022	25270004							
			Blan	ık l	Reporting							
Paran	neter	Units	Resu	ult	Limit	Analy	/zed	Qualifiers	s			
i ului						0 04/22/2	1 40.47					
Boron		ug/L		<3.0	10.0	J U4/ZZ/Z	1 18:17					
		ug/L ug/L		<3.0 <76.2	10.0 254		-					
Boron Calcium LABORATORY COM Paran		ug/L 2208608 Units	Spike Conc.	<76.2 LC Res	254 S S Sult	4 04/24/2 LCS % Rec	1 01:55 % Re Limi	ts (Qualifiers			
Boron Calcium LABORATORY COM Paran Boron		ug/L 2208608 Units ug/L	Conc50	<76.2 LC 	254 SS Sult 460	4 04/24/24 LCS % Rec 92	1 01:55 % Re Limi 2 8	ts (30-120	Qualifiers			
Boron Calcium LABORATORY COM Paran		ug/L 2208608 Units	Conc.	<76.2 LC 	254 S S Sult	4 04/24/2 LCS % Rec	1 01:55 % Re Limi 2 8	ts (Qualifiers			
Boron Calcium LABORATORY COM Paran Boron	neter	ug/L 2208608 Units ug/L ug/L	Conc. 50 500	<76.2 LC 	254 SS Sult 460	4 04/24/2 LCS % Rec 92 98	1 01:55 % Re Limi 2 8	ts (30-120	Qualifiers	_		
Boron Calcium LABORATORY COM Paran Boron Calcium	neter	ug/L 2208608 Units ug/L ug/L	Conc. 50 500	<76.2 LC 	254 Soult 460 4890	4 04/24/2 LCS % Rec 92 98	1 01:55 % Re Limi 2 8	ts (30-120	Qualifiers			
Boron Calcium LABORATORY COM Paran Boron Calcium	neter	ug/L 2208608 Units ug/L ug/L	Conc. 50 500	<76.2 LC Res 0 0	254 Soult 460 4890	4 04/24/2 LCS % Rec 92 98	1 01:55 % Re Limi 2 8	ts (30-120	Qualifiers % Rec		Мах	
Boron Calcium LABORATORY COM Paran Boron Calcium	neter IATRIX SPIKE DUP	ug/L 2208608 Units ug/L ug/L LICATE: 22086	Conc. 500 500 609 MS	<76.2 LC Res 0 0 MSD	254 Soult 460 4890 2208610	4 04/24/2 LCS % Rec 92 98	1 01:55 % Re 	ts (30-120 30-120		RPD	Max RPD	Qual
Boron Calcium LABORATORY CON Paran Boron Calcium MATRIX SPIKE & M	neter IATRIX SPIKE DUP	ug/L 2208608 Units ug/L ug/L LICATE: 22086 40225233001	609 Spike	<76.2 LC Res 0 0 MSD Spike	254 Soult 460 4890 2208610 MS	4 04/24/2 LCS % Rec 92 98 MSD	1 01:55 % Re Limi 2 & E 3 & E MS	ts (30-120 30-120 MSD	% Rec Limits		RPD	

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.



Pace Project No.: 40225270 QC Batch: 382941 Analysis Method: SM 2540C QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids Associated Lab Samples: 40225270001, 40225270002, 40225270003, 40225270004 Pace Analytical Services - Green Bay METHOD BLANK: 2208850 Matrix: Water Associated Lab Samples: 40225270001, 40225270002, 40225270003, 40225270004 Blank Parameter Units Result Limit Analyzed Qualifiers	y
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids Laboratory: Pace Analytical Services - Green Bay Associated Lab Samples: 40225270001, 40225270002, 40225270003, 40225270004 METHOD BLANK: 2208850 Matrix: Water Associated Lab Samples: 40225270001, 40225270002, 40225270003, 40225270004 Blank Reporting	y
Laboratory: Pace Analytical Services - Green Bay Associated Lab Samples: 40225270001, 40225270002, 40225270003, 40225270004 METHOD BLANK: 2208850 Matrix: Water Associated Lab Samples: 40225270001, 40225270002, 40225270003, 40225270004 Blank Reporting	y
Associated Lab Samples: 40225270001, 40225270002, 40225270003, 40225270004 METHOD BLANK: 2208850 Matrix: Water Associated Lab Samples: 40225270001, 40225270002, 40225270003, 40225270004 Blank Reporting	у
METHOD BLANK: 2208850 Matrix: Water Associated Lab Samples: 40225270001, 40225270002, 40225270003, 40225270004 Blank Reporting	
Associated Lab Samples: 40225270001, 40225270002, 40225270003, 40225270004 Blank Reporting	
Blank Reporting	
1 5	
Parameter Units Result Limit Analyzed Qualifiers	
	_
Total Dissolved Solids mg/L <8.7 20.0 04/20/21 12:31	-
LABORATORY CONTROL SAMPLE: 2208851	
Spike LCS LCS % Rec	
Parameter Units Conc. Result % Rec Limits Qua	alifiers
Total Dissolved Solids mg/L 564 542 96 80-120	
SAMPLE DUPLICATE: 2208852	
40225218004 Dup Max Parameter Units Result Rep RPD	Qualifiers
Total Dissolved Solidsmg/L140140010	
SAMPLE DUPLICATE: 2208853	
40225218010 Dup Max	
Parameter Units Result Result RPD RPD	Qualifiers
Total Dissolved Solids mg/L 530 556 5 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.



Project:	25219067 COLUME	BIA CCR MOD 4					
Pace Project No.:	40225270						
QC Batch:	382734		Analysis Meth	od:	EPA 9040		
QC Batch Method:	EPA 9040		Analysis Desc	ription:	9040 pH		
			Laboratory:		Pace Analytica	I Services - G	Freen Bay
Associated Lab Sar	mples: 402252700	01, 40225270002	2, 40225270003		-		-
SAMPLE DUPLICA	TE: 2207891						
SAIVIFLE DUPLICA	AIE. 220/091		40225153001	Dup		Max	<i>(</i>
Para	meter	Units	Result	Result	RPD	RPI	
pH at 25 Degrees (2	Std. Units	7.1	7.	2	0	20 H6
SAMPLE DUPLICA	TE: 2207905		40005470004	Dur		Ma	
			40225178001	Dup	RPD	Max RPI	
Para	motor	l Inite	Recult				
Para	meter	Units Std. Units	_ <u>Result</u>	Result 7.		0	Quaimers

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.



Project:	25219067 COLUM	BIA CCR MOD 4							
Pace Project No.:	40225270								
QC Batch:	382737		Analysis Meth	iod:	EPA 9040				
QC Batch Method:	EPA 9040		Analysis Desc	cription:	9040 pH				
			Laboratory:		Pace Analytic	al Serv	rices - Gre	en Bay	
Associated Lab Sa	mples: 402252700	04							
SAMPLE DUPLICA	ATE: 2207896								
			40225270004	Dup			Max		
Para	meter	Units	Result	Result	RPD		RPD	Qualifiers	
pH at 25 Degrees (0	Std. Units	6.3		6.4	1		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.



Project: 2521900 Pace Project No.: 402252	70											
Pace Project No.: 402252 QC Batch: 38370	-		Arrah	aia Math	a du T	DA 200 0						
			-	sis Meth		PA 300.0						
QC Batch Method: EPA 3	00.0		-	sis Desc	•	00.0 IC An			_			
	4000507000	4 4000507000		ratory:		ace Analyt	ical Service	es - Green	Вау			
Associated Lab Samples:	4022527000	1, 4022527000	2, 40225270	0003, 40)225270004							
METHOD BLANK: 221328	7			Matrix: \	Water							
Associated Lab Samples:	4022527000	1, 4022527000	2, 4022527	0003, 40	225270004							
			Blan	ık	Reporting							
Parameter		Units	Resu	ult	Limit	Analy	/zed	Qualifiers	5			
Chloride		mg/L		<0.43	2.0	04/30/2	1 01:17					
Fluoride		mg/L	<	<0.095	0.32	2 04/30/22	1 01:17					
0.11.1.1												
Suitate		mg/L		<0.44	2.0	04/30/21	1 01:17					
Suitate		mg/L		<0.44	2.0	04/30/21	1 01:17					
	AMPLE: 2	mg/L 213288					1 01:17					
LABORATORY CONTROL S	SAMPLE: 2	213288	Spike	L	_CS	LCS	% Re					
	SAMPLE: 2	0		L					Qualifiers			
LABORATORY CONTROL S Parameter	SAMPLE: 2	213288	Spike	L Re	_CS	LCS	% Re Limi		Qualifiers			
LABORATORY CONTROL S Parameter Chloride Fluoride	GAMPLE: 2	213288 Units mg/L mg/L	Spike Conc. 20	L R(0 2	LCS esult 21.5 2.1	LCS % Rec 108 107	% Re 	ts (90-110 90-110	Qualifiers			
Sulfate LABORATORY CONTROL S Parameter Chloride Fluoride Sulfate	GAMPLE: 2	213288 Units mg/L	Spike Conc.	L R(0 2	LCS esult 21.5	LCS % Rec 108	% Re 	ts (90-110	Qualifiers	_		
LABORATORY CONTROL S Parameter Chloride Fluoride Sulfate		213288 Units mg/L mg/L mg/L	Spike Conc. 20 20	L R(0 2	CS esult 21.5 2.1 21.6	LCS % Rec 108 107	% Re 	ts (90-110 90-110	Qualifiers	_		
LABORATORY CONTROL S Parameter Chloride Fluoride		213288 Units mg/L mg/L mg/L	Spike Conc. 20 21 21	L R(0 2 0	LCS esult 21.5 2.1	LCS % Rec 108 107	% Re 	ts (90-110 90-110	Qualifiers	_		
LABORATORY CONTROL S Parameter Chloride Fluoride Sulfate	PIKE DUPLI	213288 Units mg/L mg/L mg/L	Spike Conc. 20 20	L R(0 2 0 MSD	CS esult 21.5 2.1 21.6	LCS % Rec 108 107	% Re 	ts (90-110 90-110	Qualifiers % Rec	_	Мах	
LABORATORY CONTROL S Parameter Chloride Fluoride Sulfate	PIKE DUPLI	213288 Units mg/L mg/L mg/L CATE: 2213:	Spike Conc. 20 21 289 MS	L R(0 2 0	CS esult 21.5 2.1 21.6 2213290	LCS % Rec 108 107 108	% Re Limi 3 7 3 3 5	ts (90-110 90-110 90-110		RPD	Max RPD	Qual
LABORATORY CONTROL S Parameter Chloride Fluoride Sulfate MATRIX SPIKE & MATRIX S Parameter	PIKE DUPLI	213288 Units mg/L mg/L mg/L CATE: 22132	Spike Conc. 20 20 289 MS Spike	L Rr 0 2 0 MSD Spike	CS esult 21.5 2.1 21.6 2213290 MS Result	LCS % Rec 108 107 108 MSD	% Re Limi 3 9 7 9 3 9 8 8	ts (90-110 90-110 90-110 90-110 MSD	% Rec			Qual
LABORATORY CONTROL S Parameter Chloride Fluoride Sulfate MATRIX SPIKE & MATRIX S	SPIKE DUPLI	213288 Units mg/L mg/L CATE: 22132 40225270001 Result	Spike Conc. 20 20 289 MS Spike Conc.	L Ri 0 2 0 MSD Spike Conc. 400	CS esult 21.5 2.1 21.6 2213290 MS Result	LCS % Rec 107 108 MSD Result	MS % Rec	ts (90-110 90-110 90-110 90-110 MSD % Rec	% Rec Limits		RPD	Qual

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40225270

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



QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40225270

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40225270001	MW-309	EPA 3010	382878	EPA 6020	382964
40225270002	MW-310	EPA 3010	382878	EPA 6020	382964
40225270003	MW-311	EPA 3010	382878	EPA 6020	382964
40225270004	FIELD BLANK MOD4	EPA 3010	382878	EPA 6020	382964
40225270001	MW-309				
40225270002	MW-310				
40225270003	MW-311				
40225270001	MW-309	SM 2540C	382941		
40225270002	MW-310	SM 2540C	382941		
40225270003	MW-311	SM 2540C	382941		
40225270004	FIELD BLANK MOD4	SM 2540C	382941		
40225270001	MW-309	EPA 9040	382734		
40225270002	MW-310	EPA 9040	382734		
40225270003	MW-311	EPA 9040	382734		
40225270004	FIELD BLANK MOD4	EPA 9040	382737		
40225270001	MW-309	EPA 300.0	383702		
40225270002	MW-310	EPA 300.0	383702		
10225270003	MW-311	EPA 300.0	383702		
40225270004	FIELD BLANK MOD4	EPA 300.0	383702		

CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.



ection A		Section B								Sect	ion C	;																			
	Client Information:	Required P	roject	Inform	nation:					Invo	ice In	forma	ation:	:												Pag	ge :	1	Of	1	
mpany:	SCS ENGINEERS	Report To:	Megl	han Bl	lodgett						ntion:				<u> </u>																
dress:	2830 Dairy Drive	Copy To:										Name	:		\rightarrow		\sim	Ľ													
	VI 53718	Durations								Addr				e									3			See R	Regulat	ory Agen	cy	이 고려했	1000
ione:	blodgett@scsengineers.com 608-216-7362 Fax:	Purchase O Project Nam			0007.0		00.14			_	Quo													Ret and		2532629	e server er er	angestan a sa		Contrast State	deres.
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	MATRIX Dinking Water Waste W Product SAMPLE ID Oil	WT ater WW P	(see valid codes to left)	(G=GRAB C=COMP) I	STA		ECTED	1D	T COLLECTION	ß		P	Prese	ervat	ives				VV	N N							re (Y/N)		SSex :		
ITEM #	One Character per box. Wipe (A-Z, 0-9 /, -) Air Sample Ids must be unique Tissue	WP AR OT TS		AMPLE TYPE	DATE	ТІМЕ	DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H2SO4 HNO3	HUG	NaOH	Na2S203	Methanol		BornolColoium	Boron/Calcium	TDS, CI, F, SO4							Residual Chlorine (Y/N)				
1 2 м	1W-309		WT	ţ	112/20		4/13/21	K 35	5	3	X	7	<					×	(x	×					+		-		C	DI	-
8 м	IW-310		wτ		113/21		4/13/21	1710		3	X)						×	< x	x									C	νŻ	_
<u>4 M</u>	IW-311		wī	_4	14/21			945		3			X					×	<u> </u>	×									<u> </u>	<u>83</u>	
5 F	IELD BLANK MOD4		wī		V13/a		4/ <i>13/</i> 2	1710		3	X	_ >	(+				×	<u> </u>	×		_	$\left \right $	+	+	+	-		0	04	-
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Order	dresses — By :		Ship [*]	Го :			Retur	n To:
Company	SCS ENGIN	EERS	Company	SCS ENGINEERS (F	ace Analyti	cal Green	Company	Pace Analytical Green Bay
Contact	Blodgett, Me	eghan	Contact	Paul Grover			Contact	Milewsky, Dan
Email	mblodgett@	scsengineers.com	Email	pgrover@scsengir	eers.com		Email	dan.milewsky@pacelabs.com
Address	2830 Dairy [Drive	Address	2830 Dairy Drive			Address	1241 Bellevue Street
Address 2			Address 2				Address 2	Suite 9
City	Madison		City	Madison			City	Green Bay
State	<u>wi</u> :	Zip <u>53718</u>	State	WI Zip <u>53</u>	718		State	WI Zip 54302
Phone	608-216-736	62	Phone	608-216-7362			Phone	(920)469-2436
Info	0							
		219067 Columbia CCR Mod 4	Due Date	04/09/2021	Profil	e 3946		Quote
Project N	Manager _{Mil}	ewsky, Dan Re	eturn Date		Carrie	r Most	Economical	Location
Trip Bl	clude Trip Bla	anks		Bottle Label Blank Pre-Printed X Pre-Printed	No Sampl			ttles Boxed Cases Individually Wrapped Grouped By Sample ID/Matrix
	n Shipping o Shipper ith Shipper Options — umber of Blau re-Printed			Misc — Misc — Sampling Ir Custody Se Temp. Blar X Coolers Syringes	al			Extra Bubble Wrap Short Hold/Rush Stickers X DI Water 1 Liter(s) USDA Regulated Soils
# of Sample:	s Matrix	Test	Containe	r	Total	# of	Lot #	Notes
5	WT	Boron/Calcium	250mL plas	tic w/HNO3	5	0	M-0-290-03BB	
5	WT	рН	250mL plas	tic unpres	5	0	M-0-290-04BB	
5	WT	TDS, CI, F, SO4	250mL plas	tic unpres	5	0	M-0-290-04BB	

Hazard Shipping Placard In Place : NA Sample receiving hours are typically 8am-5pm, but may differ by location. Please check with your Pace Project Vanager. Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you. Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage/disposal. Payment term are net 30 days. Please include the proposal number on the chain of custody to insure proper billing.	B USE: Ship Date : Prepared By: Verified By:	Mai Yer Her
Sample CLIEN	USE (Optional):	
	Date Rec'd:	
ALL SAMPLES UNFILTERED	Received By:	

F-ALL-C-009-rev.00.	19Dec2016
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Page 17 of 19

Verified By:

Clie	Sample Preservation Receipt Form Pace Analytical Services, LLC Client Name: Source of the preservation Receipt Form Project # 100000000000000000000000000000000000																																
	All o	ontai	ners r	needin	g pres	ervati	on ha	ive be	en ch									b Std :	#ID of	prese	ervatio	n (if pł	1 adju	sted):					Initial comp		N	Date/ Time:	
				Gl	ass						Plast	ic				Via	als			[J	ars		G	enera	1	(>6mm) *	≤2	Act pH ≥9	212	5	justed	Volume
Pace Lab #	AG1U	BG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	VG9A	DG9T	VG9U	VG9H	NG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN	VOA Vials	H2SO4 pH	NaOH+Zn Act	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	(mL)
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019																1		1							1		\mathbb{Z}		1				2.5/5/10
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Exce	otions	to pre	eserva	ation o	check:	VOA	. Colif	form. [•]	TOC.	тох.	тон.	0&G.	WID	RO. P	henol	ics. Of	her:			Неа	dspac	e in V	DA Via	ais (>f	3mm) :	□Yes	□No	⊳N/A	*If ve	s look	in head	_ dspace	column
AG1U					·		,			_	er plas							40 n	nL cle									<u> </u>	unpre				1
BG1U	1 lite	er cle	ar gla	ass					30		mL p								nL an										unpre				
AG1H									3B	250	mL p	lastic	NaO	н		vo	39U		nL cle					1	GFU	4 oz	clea	r jar u	inpres	;			
AG4S									23N		mL p								nL cle									-	unpre		6-6-		4
AG4U AG5U								BP	°3S	250	mL p	astic	H2S	J4					nL cle nL cle			UH			P5T PLC	120 ziplo			na I	hiosu	iate		
AG2S				-														40 11							GN	Zipiu	u ua	9					
BG3U																								L									1 , ,)

F-GB-C-046-Rev.03 (11Feb2020) Sample Preservation Receipt Form

	T	Doc	ument Name:	1	
Pace Analytical [®]	Sample	Conditi	on Upon Receipt (SCUR)	Documer	nt Revised: 26Mar2020
1241 Bellevue Street, Green Bay, WI 54302	ENV		cument No.: GBAY-0014-Rev.00	Deed Or	Author:
					een Bay Quality Office
		n Upo	on Receipt Form (Se	CUR)	
Client Name: SCS ENGINEERS			Project #:		
Courier: SCS Logistics E Ford Fu					0225270
Courier: CS Logistics Fed Ex Speeder		s F v	Valtco		
Tracking #:	· · · · · · · · · · · · · · · · · · ·		4022	11 1 11 11 5270	
Custody Seal on Cooler/Box Present: Fyes	Cno Sea	ls intact			
Custody Seal on Samples Present: Γ yes K n	o Sea	is intact:			
Packing Material: T Bubble Wrap T Bubble	e Bags 🗍	Non	e T Other		
Thermometer Used <u>SR - 90</u> Cooler Temperature Uncorr: / /Corr:	Type of Ice		Blue Dry None	Samples on	ice, cooling process has begun
				_	Person examining contents:
Temp should be above freezing to 6°C.		ogical I	issue is Frozen: 🔽 yes		Date: 4162 /Initials: 1 >>
Biota Samples may be received at ≤ 0°C if shipped on Dry	Ice.				Labeled By Initials:
Chain of Custody Present:	Kes □No	□n/a	1.		
Chain of Custody Filled Out:	Ø√es □No		2.		
Chain of Custody Relinquished:	B≪es □No		3.		
Sampler-Name & Signature on COC:	□Yes DA	□n/a	4.	·····	
Samples Arrived within Hold Time:	Kes □No		5.		
- VOA Samples frozen upon receipt	∃Yes □No		Date/Time:		
Short Hold Time Analysis (<72hr):	∃Yes Ø₩		6.	· · · · · · · · · · · · · · · · · · ·	
Rush Turn Around Time Requested:	∃Yes Dinfo		7.		
Sufficient Volume:			8.		
For Analysis: Deves DNo MS/MSD: D	JYes Bud				
	Sves □No				
Base Original III -	Kes □No				
]Yes □No	S MTA			
Containers Intact:	Thes INO		10.		
]Yes []No			· · ·	
	¥es □No		·······		
,	\sim				
]Yes 🗌 No	- 1251/A 1	3.		
]Yes □No				
Pace Trip Blank Lot # (if purchased):					
Client Notification/ Resolution: Person Contacted:		Dat- /7"		ee attached	form for additional comments
Comments/ Resolution:		Date/Ti	me:		
			······································		
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PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample logir

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Page_____ of _____ Page 19 of 19



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

May 11, 2021

Meghan Blodgett SCS ENGINEERS 2830 Dairy Drive Madison, WI 53718

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

Dear Meghan Blodgett:

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

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

- Pace Analytical Services Green Bay
- Pace Analytical Services Greensburg

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

Sincerely,

Day Milent

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

Enclosures

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





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

CERTIFICATIONS

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

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

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

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



SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

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



SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

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

PASI-G = Pace Analytical Services - Green Bay

PASI-PA = Pace Analytical Services - Greensburg



Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

Sample: MW-301	Lab ID:	40225276001	Collected	d: 04/14/2	1 14:55	Received: 04/	16/21 07:40 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytica	Method: EPA 6	6020 Prepai	ration Meth	od: EP	A 3010			
	Pace Ana	lytical Services	- Green Ba	у					
Antimony	<0.15	ug/L	1.0	0.15	1	04/21/21 06:55	04/21/21 21:48	7440-36-0	
Arsenic	<0.28	ug/L	1.0	0.28	1	04/21/21 06:55	04/21/21 21:48	7440-38-2	
Barium	8.9	ug/L	2.3	0.70	1	04/21/21 06:55	04/21/21 21:48	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	04/21/21 06:55	04/21/21 21:48	7440-41-7	
Boron	22.2	ug/L	10.0	3.0	1	04/21/21 06:55	04/21/21 21:48	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	04/21/21 06:55	04/21/21 21:48	7440-43-9	
Calcium	117000	ug/L	2540	762	10	04/21/21 06:55	04/21/21 19:30	7440-70-2	P6
Chromium	<1.0	ug/L	3.4	1.0	1	04/21/21 06:55	04/21/21 21:48	7440-47-3	
Cobalt	<0.12	ug/L	1.0	0.12	1	04/21/21 06:55	04/21/21 21:48	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	04/21/21 06:55	04/21/21 21:48	7439-92-1	
Lithium	0.58J	ug/L	1.0	0.22	1	04/21/21 06:55	04/21/21 21:48	7439-93-2	
Molybdenum	<0.44	ug/L	1.5	0.44	1	04/21/21 06:55	04/21/21 21:48	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	04/21/21 06:55	04/22/21 10:16	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	04/21/21 06:55	04/21/21 21:48	7440-28-0	
7470 Mercury	-	Method: EPA			od: EP	A 7470			
	Pace Ana	lytical Services	- Green Ba	y					
Mercury	<0.066	ug/L	0.20	0.066	1	04/22/21 11:00	04/23/21 09:30	7439-97-6	
Field Data	Analytica	Method:							
	Pace Ana	lytical Services	- Green Ba	y					
Field pH	6.66	Std. Units			1		04/14/21 14:55		
Field Specific Conductance	857.0	umhos/cm			1		04/14/21 14:55		
Oxygen, Dissolved	3.90	mg/L			1		04/14/21 14:55	7782-44-7	
REDOX	102.9	mV			1		04/14/21 14:55		
Turbidity	2.41	NTU			1		04/14/21 14:55		
Static Water Level	786.50	feet			1		04/14/21 14:55		
Temperature, Water (C)	7.4	deg C			1		04/14/21 14:55		
2540C Total Dissolved Solids	Analytica	Method: SM 2	540C						
	Pace Ana	lytical Services	- Green Ba	у					
Total Dissolved Solids	472	mg/L	20.0	8.7	1		04/20/21 15:00		
9040 pH	Analytica	Method: EPA	9040						
•		lytical Services		у					
pH at 25 Degrees C	6.9	Std. Units	0.10	0.010	1		04/19/21 10:15		H6
300.0 IC Anions	Analytica	Method: EPA 3	300.0						
	-	lytical Services		у					
Chloride	1.5J	mg/L	2.0	0.43	1		04/30/21 16:37	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		04/30/21 16:37		
Sulfate	8.5	mg/L	2.0	0.44	1		04/30/21 16:37		



Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

Sample: MW-84A	Lab ID:	40225276002	Collecte	d: 04/14/2′	1 13:40	Received: 04/	16/21 07:40 M	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical	Method: EPA 6	6020 Prepa	ration Meth	od: EPA	3010			
	Pace Anal	ytical Services	- Green Ba	у					
Antimony	0.55J	ug/L	1.0	0.15	1	04/21/21 06:55	04/21/21 22:15	7440-36-0	
Arsenic	0.91J	ug/L	1.0	0.28	1	04/21/21 06:55			
Barium	13.4	ug/L	2.3	0.70	1		04/21/21 22:15		
Beryllium	0.47J	ug/L	1.0	0.25	1	04/21/21 06:55	04/21/21 22:15	7440-41-7	
Boron	14.3	ug/L	10.0	3.0	1	04/21/21 06:55	04/21/21 22:15	7440-42-8	
Cadmium	0.53J	ug/L	1.0	0.15	1	04/21/21 06:55	04/21/21 22:15	7440-43-9	
Calcium	69100	ug/L	254	76.2	1	04/21/21 06:55			
Chromium	2.6J	ug/L	3.4	1.0	1		04/21/21 22:15		
Cobalt	0.52J	ug/L	1.0	0.12	1	04/21/21 06:55	04/21/21 22:15	7440-48-4	
Lead	0.55J	ug/L	1.0	0.24	1		04/21/21 22:15		
Lithium	1.0	ug/L	1.0	0.22	1		04/21/21 22:15		
Molybdenum	0.62J	ug/L	1.5	0.44	1	04/21/21 06:55			
Selenium	0.48J	ug/L	1.1	0.32	1		04/22/21 10:44		
Thallium	0.66J	ug/L	1.0	0.14	1		04/21/21 22:15		
7470 Mercury	Analytical	Method: EPA	7470 Prepa	ration Meth	od: FPA	7470			
, no morodry	-	ytical Services							
Mercury	<0.066	ug/L	0.20	0.066	1	04/22/21 11:00	04/23/21 09:32	7439-97-6	
Field Data	Analytical	Method:							
	Pace Anal	ytical Services	- Green Ba	у					
Field pH	7.34	Std. Units			1		04/14/21 13:40		
Field Specific Conductance	610.9	umhos/cm			1		04/14/21 13:40		
Oxygen, Dissolved	9.80	mg/L			1		04/14/21 13:40	7782-11-7	
REDOX	95.6	mV			1		04/14/21 13:40	1102-44-1	
Turbidity	2.45	NTU			1		04/14/21 13:40		
Static Water Level	785.84	feet			1		04/14/21 13:40		
Temperature, Water (C)	10.2	deg C			1		04/14/21 13:40		
2540C Total Dissolved Solids	Analytical	Method: SM 2	540C						
	•	ytical Services		у					
Total Dissolved Solids	328	mg/L	20.0	8.7	1		04/20/21 15:01		
9040 pH	Analytical	Method: EPA	9040						
	Pace Anal	ytical Services	- Green Ba	у					
pH at 25 Degrees C	7.6	Std. Units	0.10	0.010	1		04/19/21 10:17		H6
300.0 IC Anions	Analytical	Method: EPA	300.0						
	Pace Anal	ytical Services	- Green Ba	у					
Chloride	4.4	mg/L	2.0	0.43	1		04/30/21 16:52	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		04/30/21 16:52	16984-48-8	
Sulfate	1.4J	mg/L	2.0	0.44	1		04/30/21 16:52	14808-79-8	



Project: Pace Project No.:	25219067 COLU 40225276	MBIA CCR BACKGI	RND									
QC Batch:	383173		Analy	sis Meth	od: I	EPA 7470						
QC Batch Method:	EPA 7470		-	sis Desc		7470 Mercur	у					
			Labor	atory:	·	Pace Analyti	cal Servic	es - Green	Bay			
Associated Lab San	nples: 4022527	6001, 40225276002										
METHOD BLANK:	2210149			Matrix: \	Water							
Associated Lab San	nples: 4022527	6001, 40225276002										
			Blan	k	Reporting							
Paran	neter	Units	Resu	ılt	Limit	Analy	zed	Qualifier	rs			
Mercury		ug/L	<	0.066	0.2	0 04/23/21	08:32					
LABORATORY CON	NTROL SAMPLE:	2210150	Cailca		CS	LCS	0/ D					
Paran	neter	Units	Spike Conc.		esult	% Rec	% R Limi		Qualifiers			
Mercury		ug/L		5	4.7	93						
morodry		49, E	·				·					
MATRIX SPIKE & M		PLICATE: 22101	51		2210152							
MATRIX SFIRE & IV	ATRIA SPIKE DU	LIGHTE. LEIGH										
	IATRIA SPIKE DU		MS	MSD								
		40225233001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter		40225233001	-	-	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual

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.



Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.:	40225276
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QC Batch:	383007	Analysis Method:	EPA 6020
QC Batch Method:	EPA 3010	Analysis Description:	6020 MET
Associated Lab Sam	ples: 40225276001, 40225276002	Laboratory:	Pace Analytical Services - Green Bay
	·····		
METHOD BLANK:	2209295	Matrix: Water	

Associated Lab Samples: 40225276001, 40225276002

	10220210001; 10220210002				
		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	04/21/21 18:28	
Arsenic	ug/L	<0.28	1.0	04/21/21 18:28	
Barium	ug/L	<0.70	2.3	04/21/21 18:28	
Beryllium	ug/L	<0.25	1.0	04/21/21 18:28	
Boron	ug/L	<3.0	10.0	04/21/21 18:28	
Cadmium	ug/L	<0.15	1.0	04/21/21 18:28	
Calcium	ug/L	<76.2	254	04/21/21 18:28	
Chromium	ug/L	<1.0	3.4	04/21/21 18:28	
Cobalt	ug/L	<0.12	1.0	04/21/21 18:28	
Lead	ug/L	<0.24	1.0	04/21/21 18:28	
Lithium	ug/L	<0.22	1.0	04/21/21 18:28	
Molybdenum	ug/L	<0.44	1.5	04/21/21 18:28	
Selenium	ug/L	<0.32	1.1	04/21/21 18:28	
Thallium	ug/L	<0.14	1.0	04/21/21 18:28	
	•				

LABORATORY CONTROL SAMPLE: 2209296

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

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

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC.



Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

MATRIX SPIKE & MATRIX	SPIKE DUPL	ICATE: 2209	-		2209298							
		40225276001	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	ug/L	<0.15	500	500	531	529	106	106	75-125	0	20	
Arsenic	ug/L	<0.28	500	500	495	490	99	98	75-125	1	20	
Barium	ug/L	8.9	500	500	504	503	99	99	75-125	0	20	
Beryllium	ug/L	<0.25	500	500	475	472	95	94	75-125	1	20	
Boron	ug/L	22.2	500	500	519	512	99	98	75-125	1	20	
Cadmium	ug/L	<0.15	500	500	510	509	102	102	75-125	0	20	
Calcium	ug/L	117000	5000	5000	122000	120000	104	64	75-125	2	20	P6
Chromium	ug/L	<1.0	500	500	511	511	102	102	75-125	0	20	
Cobalt	ug/L	<0.12	500	500	493	494	99	99	75-125	0	20	
Lead	ug/L	<0.24	500	500	512	504	102	101	75-125	2	20	
Lithium	ug/L	0.58J	500	500	487	482	97	96	75-125	1	20	
Molybdenum	ug/L	<0.44	500	500	514	518	103	103	75-125	1	20	
Selenium	ug/L	<0.32	500	500	483	484	97	97	75-125	0	20	
Thallium	ug/L	<0.14	500	500	526	523	105	105	75-125	0	20	

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.



Project: 2	5219067 COLUI	MBIA CCR BACKGR	ND					
Pace Project No.: 4	0225276							
QC Batch:	382972		Analysis M	ethod:	SM 2540C			
QC Batch Method:	SM 2540C		Analysis De	escription:	2540C Total Di	ssolved Solids		
			Laboratory		Pace Analytica	I Services - Gre	een Ba	у
Associated Lab Samp	les: 40225276	6001, 40225276002						
METHOD BLANK: 2	209087		Matrix	k: Water				
Associated Lab Samp	les: 40225276	6001, 40225276002						
			Blank	Reporting				
Parame	ter	Units	Result	Limit	Analyze	d Quali	ifiers	
Total Dissolved Solids		mg/L	<8.7	20	0.0 04/20/21 1	4:59		-
LABORATORY CONT	ROL SAMPLE:	2209088						
			Spike	LCS	LCS	% Rec		
Parame	ter	Units	Conc.	Result	% Rec	Limits	Qua	alifiers
Total Dissolved Solids		mg/L	564	554	98	80-120		
SAMPLE DUPLICATE	2209089							
_			40225276001	Dup		Max		
Parame	ter	Units	Result	Result	RPD	RPD		Qualifiers
Total Dissolved Solids		mg/L	472	2 4	86	3	10	
SAMPLE DUPLICATE	: 2209090							
			40225343004			Max		
Parame	ter	Units	Result	Result	RPD	RPD		Qualifiers
Total Dissolved Solids		mg/L	850) 8	08	5	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.



Project:	25219067 COLUN	IBIA CCR BACKG	RND						
Pace Project No.:	40225276								
QC Batch:	382737		Analysis Meth	iod:	EPA 9040				
QC Batch Method:	C Batch Method: EPA 9040			cription:	9040 pH				
					Pace Analytic	al Serv	vices - Gre	en Bay	
Associated Lab Sa	mples: 40225276	001, 40225276002	2						
SAMPLE DUPLICA	TE: 2207896								
			40225270004	Dup			Max		
Para	meter	Units	Result	Result	RPD		RPD	Qualifiers	
pH at 25 Degrees (C	Std. Units	6.3		6.4	1		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

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC.



-1		DLUMBIA	CCR BACKO	GRND										
Pace Project No.: 4	40225276													
QC Batch:	383702			Analy	sis Meth	od:	EPA	A 300.0						
QC Batch Method:	EPA 300.0			Analy	sis Desc	ription:	300	.0 IC Ani	ons					
				Labo	ratory:		Pac	e Analyti	cal Service	es - Green	Bay			
Associated Lab Samp	ples: 4022	5276001,	4022527600	2										
METHOD BLANK: 2	2213287				Matrix: N	Water								
Associated Lab Samp	ples: 4022	5276001,	4022527600	2										
				Blar	nk	Reporting								
Parame	eter		Units	Res	ult	Limit		Analy	zed	Qualifier	S			
Chloride			mg/L		<0.43	2	.0	04/30/21	01:17					
Fluoride			mg/L	~	<0.095	0.3	32	04/30/21	01:17					
Sulfate			mg/L		<0.44	2	.0	04/30/21	01:17					
Cunate														
	TROL SAMPI	F: 221	-											
	TROL SAMPI	_E: 221	3288	Spike		CS		CS	% R	ec				
		LE: 221	-	Spike Conc.	L	.CS esult		_CS	% Ri Limi		Qualifiers			
LABORATORY CON ^{**} Parame		_E: 221:	3288	Conc.	L				Limi		Qualifiers			
LABORATORY CON Parame Chloride		_E: 221:	3288 Units	Conc2	L Re	esult		Rec	Limi	ts	Qualifiers			
LABORATORY CON		_E: 221	3288 Units mg/L	Conc.	L 0	21.5		Rec 108	Limi	ts	Qualifiers			
LABORATORY CON Parame Chloride Fluoride	eter		3288 Units mg/L mg/L mg/L	2	L Re 0 2	21.5 2.1	%	5 Rec 108 107	Limi	ts 90-110 90-110	Qualifiers	_		
LABORATORY CON Parame Chloride Fluoride Sulfate	eter		3288 Units mg/L mg/L mg/L	2	L Re 0 2	21.5 2.1 21.6	%	5 Rec 108 107	Limi	ts 90-110 90-110	Qualifiers	_		
LABORATORY CON Parame Chloride Fluoride Sulfate	eter	DUPLICA	3288 Units mg/L mg/L mg/L	Conc. 2 2 289	L Re 0 2 0	21.5 2.1 21.6	% 0	5 Rec 108 107	Limi	ts 90-110 90-110	Qualifiers % Rec	_	Max	
LABORATORY CON Parame Chloride Fluoride Sulfate	eter ATRIX SPIKE	DUPLICA	3288 Units mg/L mg/L mg/L	289 MS	L Re 0 2 0 MSD	21.5 2.1 21.6 221329	% 0 N	9 Rec 108 107 108	Limi	ts 90-110 90-110 90-110		RPD	Max RPD	Qua
LABORATORY CON Parame Chloride Fluoride Sulfate MATRIX SPIKE & MA Parameter	eter ATRIX SPIKE	DUPLICA 402 Units	3288 Units mg/L mg/L mg/L ATE: 2213	Conc. 2 2 289 MS Spike	L Re 2 0 MSD Spike	21.5 2.1 21.6 221329 MS Result	% 0 R	5 Rec 108 107 108 MSD	A Limi	ts 90-110 90-110 90-110 90-110 MSD	% Rec Limits			Qua
LABORATORY CON Parame Chloride Fluoride Sulfate MATRIX SPIKE & MA	eter ATRIX SPIKE	DUPLICA 402	3288 Units mg/L mg/L mg/L ATE: 2213 225270001 Result	Conc. 2 289 MS Spike Conc.	L Re 0 2 0 MSD Spike Conc.	21.5 2.1 21.6 221329 MS Result 0 816	% 0 R	A Rec 108 107 108 MSD Result	MS % Rec	ts 90-110 90-110 90-110 90-110 MSD % Rec	% Rec Limits 90-110		RPD	Qua

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.



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

Sample: MW-301	Lab ID: 402252	276001 Collected: 04/14/21 14:55	Received:	04/16/21 07:40 M	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical S	ervices - Greensburg				
Radium-226	EPA 903.1	0.418 ± 0.563 (0.946) C:NA T:91%	pCi/L	05/10/21 16:44	13982-63-3	
	Pace Analytical S	ervices - Greensburg				
Radium-228	EPA 904.0	0.739 ± 0.509 (0.983) C:66% T:83%	pCi/L	05/07/21 15:44	15262-20-1	
	Pace Analytical S	ervices - Greensburg				
Total Radium	Total Radium Calculation	1.16 ± 1.07 (1.93)	pCi/L	05/11/21 15:49	7440-14-4	



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

Sample: MW-84A	Lab ID: 4022		Received:	04/16/21 07:40 I	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	-0.289 ± 0.530 (1.20) C:NA T:92%	pCi/L	05/10/21 17:00	13982-63-3	
	Pace Analytical	Services - Greensburg				
Radium-228	EPA 904.0	0.285 ± 0.346 (0.732) C:73% T:95%	pCi/L	05/11/21 11:28	15262-20-1	
	Pace Analytical	Services - Greensburg				
Total Radium	Total Radium Calculation	0.285 ± 0.876 (1.93)	pCi/L	05/11/21 15:49	7440-14-4	



QUALITY CONTROL - RADIOCHEMISTRY

Project:	25219067 COLUMBIA	CCR BACKGRND				
Pace Project No.:	40225276					
QC Batch:	445315	Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 2	28		
		Laboratory:	Pace Analytical	Services - Greensbur	g	
Associated Lab Sa	mples: 40225276002					
METHOD BLANK:	2149683	Matrix: Water				
Associated Lab Sa	mples: 40225276002					
Para	meter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228	0.37	73 ± 0.381 (0.787) C:76% T:77%	pCi/L	05/11/21 11:27		

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.



QUALITY CONTROL - RADIOCHEMISTRY

Project:	25219067 COLUI	MBIA CCR BACKG	RND				
Pace Project No.:	40225276						
QC Batch:	445314		Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 2	28		
			Laboratory:	Pace Analytical	Services - Greensbur	g	
Associated Lab Sa	mples: 40225276	6001					
METHOD BLANK:	2149682		Matrix: Water				
Associated Lab Sa	mples: 40225276	6001					
Para	meter	Act ± U	nc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.621 ± 0.331 (0	.589) C:74% T:104%	pCi/L	05/07/21 12:16		

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.



QUALITY CONTROL - RADIOCHEMISTRY

Project:	25219067 COLUM	BIA CCR BACKGRND					
Pace Project No .:	40225276						
QC Batch:	445313	Analysis M	lethod:	EPA 903.1			
QC Batch Method:	EPA 903.1	Analysis D	escription:	903.1 Radium-2	26		
		Laboratory	/: I	Pace Analytical	Services - Greensbu	g	
Associated Lab Sa	mples: 402252760	001, 40225276002					
METHOD BLANK:	2149681	Matr	ix: Water				
Associated Lab Sa	mples: 402252760	001, 40225276002					
Para	meter	Act ± Unc (MDC) Carr	Trac	Units	Analyzed	Qualifiers	
Radium-226		0.301 ± 0.462 (0.795) C:NA T:96	i%	pCi/L	05/10/21 16:18		

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.



QUALIFIERS

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

DEFINITIONS

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval) (MDC) - Minimum Detectable Concentration Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

ND - Not Detected at or above LOD.

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

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

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

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



QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40225276

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

		Full List Metals = B, Ca, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li Hg, Mo, Se, Ti ALL SAMPLES UNFILTERED	ADDITIONAL COMMENTS	12	2	10	0	8. 8. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	7	6	5	3	2 MW-84A	1 MW-301	TTEM #	M		Requested Due Date:	scsengineers.co	Madison, WI 53718	Address: 2830 Dairy Drive		Section A	Pace Analytical	7
SAMPLER NAME AND SIGNATURE PRINT Name of SAMPLER: SIGNATURE of SAMPLER:		Ada- Withen / SUS Engi	RELINQUISHED BY / AFFILIATION										4	4/14/21	Wate Water WW Wate Water WW Product PW Ol OL OL (\$ 500 START END OL OTHER TS MATRIX CODE (\$ 60 GGRAB MATRIX CODE (\$ 60 GGRAB MATRIX CODE (\$ 60 GGRAB MATRIX CODE (\$ 60 GGRAB MATRIX CODE (\$ 60 GGRAB SAMPLE TYPE (\$ 60 GGRAB TIME DATE 1	es to left)		Project Name: 25219067 Columbia CCR Background	er#:		Copy To: Meghan Blodgett	Required Project Information:	Section B	CHAIN The Chair	
	AND I WIND WALL INDUCA	4/15/21 1000	DATE TIME ACCEPTED BY / AFFILIATION										5 2 3 × ×	H22 2 2 1 × ×	SAMPLE TEMP AT COLLECTION # OF CONTAINERS Unpreserved H2SO4 HNO3 HCI NaOH Na2S2O3 Methanol Other Analyses Test Radium 226 Radium 228		r doo r romo n. A		Pace Quote:	Address:	Attention: Company Name:	Invoice Information:	Section C	CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.	
TEMP in C Received on Ice (Y/N) Sealed Cooler (Y/N) Samples Intact (Y/N)	be Horal OTHICO X N X		TIME SAMPLE CONDITIONS										x x x 002		Metals pH TDS, CI, F, SO4 Residual Chlorine (Y/N)	NMN IIII	equested Analysis Filtered (Y/N)	m,		Regulatory Agency		Page: 1 Of 1		st Document	

Page 20 of 23

Pace Container Order #800030	40225276
------------------------------	----------

Add	dresses —							$\Delta \alpha \Delta \beta \alpha I Q$
Order			Ship ⁻	То :			Retur	n To:
Company	SCS ENGIN	IEERS	Company	SCS ENGINEERS (P	ace Analy	tical Greer	Company	Pace Analytical Green Bay
Contact	Blodgett, Me	eghan	Contact	Paul Grover			Contact	Milewsky, Dan
Email	mblodgett@	scsengineers.com	Email	pgrover@scsengin	eers.com	I	Email	dan.milewsky@pacelabs.com
Address	2830 Dairy I	Drive	Address	2830 Dairy Drive			Address	1241 Bellevue Street
Address 2			Address 2				Address 2	Suite 9
City	Madison		City	Madison			City	Green Bay
State	<u>wi</u>	Zip <u>53718</u>	State	WI Zip 537	718		State	WI Zip <u>54302</u>
Phone	608-216-736	62	Phone	608-216-7362			Phone	(920)469-2436
	0							
		219067 Columbia CCR ickground	Due Date	04/09/2021	Profi	le_3946		Quote
Project I	Manager _{Mi}	lewsky, Dan R	eturn Date		Carri	er Most	Economical	Location
	lanks	anks		Bottle Labels	No Samp			ttles Boxed Cases Individually Wrapped Grouped By Sample ID/Matrix
	n Shipping o Shipper ith Shipper Options — umber of Blau re-Printed	<u></u>		Misc Sampling In Custody Se Temp. Blant X Coolers Syringes	al	5		Extra Bubble Wrap Short Hold/Rush Stickers DI Water Liter(s) USDA Regulated Soils
# of Sample	s Matrix	Test	Containe	r	Total	# of	Lot #	Notes
2	WT	Radium 226	1L Plastic H	HNO3 pres	2	0		
2	WT	Radium 228	1L Plastic H	HNO3 pres	2	0		
2	WΤ	Metals	250mL plas	stic w/HNO3	2	0	M-0-290-03BB	
2	WT	рН	250mL plas	stic unpres	2	0	M-0-290-04BB	
2	WT	TDS, CI, F, SO4	250mL plas	stic unpres	2	0	M-0-290-04BB	

Hazard Shipping Placard In Place : NA

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

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

Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage/disposal. 'Payment term are net 30 days.

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

Sample

Full List Metals = B, Ca, Sb, As, Ba, Be, Cd, Cr, Co ALL SAMPLES UNFILTERED

LAB USE:

Ship Date : 04/07/2021 Prepared By: Mai Yer Her Verified By:

	CLIENT USE (Optional):
o, Pb, Li Hg, Mo, Se, Tl	Date Rec'd:
	Received By:
	Verified By:
Page 1 of 1	Page 21 of 23

Clie	Sample Preservation Receipt Form Pace Analytical Services, LLC 1241 Bellevue Street, Suite S 1241 Bellevue Street, Suite S Green Bay, WI 54302 976														Street, Suite 9																		
	All containers needing preservation have been checked and noted below: setes DNO DN/A Lab Lot# of pH paper: 00360 Lab Std #ID of preservation (if pH adjusted): Initial when Date/ completed: MU Time:																																
	AG1U AG1U AG1U AG1U AG2S AG4U AG5U AG5U AG5U AG5U AG5U AG5U BP3B BP3U BP3U AG5U BP3U BP3U BP3U BP3U BP3U BP3U BP3U BP3															Volume																	
Pace Lab #																(mL)																	
001										12																2					\Diamond		2.5/5/10
002										2	120															2					N/V		2.5/5/10
003	5																														,		2.5 / 5 / 10
004		X				1000			B arr											1601 A. 1													2.5/5/10
005				\geq																													2.5/5/10
006							S-AR Digital		a an	1. A. A. A.										e sie											Colorado C		2.5/5/10
007	100-011									\geq																							2.5 / 5 / 10
008										Distant of the			and south						an sa														2.5/5/10
009																	/																2.5/5/10
010					225 data Manage				影响			9880 gan 1994 - 199	agas (n. 19) 19 ser 19 ser 19 ser 19 ser					₫4s.n.e.			1. Alexandre												2.5/5/10
011															<u> </u>					$\langle $	\geq												2.5 / 5 / 10
012			影响			940400 NG 484	n antina Managana Managana							٨	[]			権なら											osni fire				2.5/5/10
013										The second second			ľ	\sim	1									\geq	/								2.5 / 5 / 10
014															Í	Constant of	21	States States	255038 01000							Χ		ALC: N					2.5/5/10
015		1410-00-01-01											<u> </u>	M	\sim	\mathcal{O}^{\cdot}	2	l.										/					2.5 / 5 / 10
016	A CONTRACTOR			1.2									N/S														· · · · · · · · · · · · · · · · · · ·		199	/			2.5/5/10
017																															\geq		2.5 / 5 / 10
018			树麻					12.50						1997 - 1997 1997 - 1997 - 1997 1997 - 1997 - 1997				lod's a	Sectors.				and the second s									4 45	25/5/10
019	730501992																				N.C.S. SPORT			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				1170/H (1190-11					2.5/5/40
020					Site and														16 Q.														2.5/5/10
Excep	otions	to pre	eserva	ation o	heck:	VOA	, Colii	form, ⁻	тос,	тох,	тон, о	0&G,	WID	RO, PI	henoli	cs, Ot	herh	022k	1224	(Head	JU-1 space		DA Via	ıls (>6	mm) :	□Yes	□No '		*lf ye	s look	in head	Ispace	column
AG1U											r plas								nL cle								ambe						1
BG1U											mL pl								nL am								ambe	-					
AG1H	1 lite	er am	ber g	lass	HCL						mL pl					VG	9U	40 m	nL cle	ar via	l unp	res		wo	GFU		clear						
AG4S											mL pl								IL cle								plast				_		
AG4U									°3S	250	mL pl	astic	H2S	4ر					L cle			ЭН			25T		-		Na T	hiosul	fate		
	5U 100 mL amber glass unpres VG9D 40 mL clear vial DI ZPLC ziploc bag																																
BG3U	500	mL a	impei	r qias	SHZE	504																		С.	SN	IVI.	1001	1 1	41/11	12	onec	ר	

F-GB-C-046-Rev.03 (11Feb2020) Sample Preservation Receipt Form

Page 1 of Page 22 of 23

	Document Name: Sample Condition Upon Receipt (SCUR)	
Pace Analytical"	Document No.: Author:	
1241 Bellevue Street, Green Bay, WI 5430	2 ENV-FRM-GBAY-0014-Rev.00 Pace Green Bay Quality Office	
Sample	Condition Upon Receipt Form (SCUR)	
•	Project #:	٦
Client Name: <u>SCS Engineer</u>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
Courier: CS Logistics Fed Ex		
Client Pace Other:		
Tracking #:		
Custody Seal on Cooler/Box Present: 🗖 yes		
Custody Seal on Samples Present: Lyes	-	
Packing Material: ∇ Bubble Wrap \Box Bub Thermometer Used SR - QQ	ble Bags D None Other Type of Ice: Wet Blue Dry None Samples on ice, cooling process has begun	—
Cooler Temperature Uncorr: 1,0 /Corr: 1	A Borson examining contents:	2
Temp Blank Present: Yes no	Biological Tissue is Frozen: Dyes no Date: 4-16-21 /Initials: MA	1
Temp should be above freezing to 6°C.		
Biota Samples may be received at $\leq 0^{\circ}$ C if shipped on D		_
Chain of Custody Present:	Des DNA 1. Sample HUL416: UYes DARO DNA 2. COPY TO INFO, PROJ. STATE, SAME TYPE M	4
Chain of Custody Filled Out:	Pres DNO DN/A 3. 4	14-7
Chain of Custody Relinquished:	$\Box Yes \ \Box No \ \Box N/A \ 4.$	40
Sampler Name & Signature on COC:	-	-
Samples Arrived within Hold Time:	ØYres □No 5.	
- VOA Samples frozen upon receipt	□Yes □No Date/Time: ℃ 6.	-
Short Hold Time Analysis (<72hr):	⊠Yes No 6. □Yes Ĵ #6 7.	-
Rush Turn Around Time Requested:	-	\neg
Sufficient Volume:	D: □Yes \$\$\$\$\$ □N/A	
	$\chi_{\rm Yes} \Box_{\rm No}$ 9.	-
Correct Containers Used:	$\begin{array}{c} \mathbf{A}_{\mathbf{Y}} \mathbf{e}_{\mathbf{S}} \\ \mathbf{M}_{\mathbf{Y}} \mathbf{e}_{\mathbf{S}} \\ \mathbf{M}_{\mathbf{N}} \mathbf{o} \\ \mathbf{D}_{\mathbf{N}} \mathbf{A} \end{array}$	
-Pace Containers Used:		
-Pace IR Containers Used:	Yes □No \$\$\$\$1/A \$	\neg
Containers Intact:	□Yes □No \$\$\$\$A 11.	\neg
Filtered volume received for Dissolved tests	$\mathcal{M}_{\text{res}} \square \text{No} \square \text{N/A} 12.$	\neg
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix:	N LINE LINE LE	
Trip Blank Present:		1
Trip Blank Custody Seals Present		
Pace Trip Blank Lot # (if purchased):		
Client Notification/ Resolution:	If checked, see attached form for additional comments	
Person Contacted: Comments/ Resolution:	Date/Time:	
	/	

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

Page _____of ____ Page 23 of 23

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C2 June 2021 Resample



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

June 21, 2021

Meghan Blodgett SCS ENGINEERS 2830 Dairy Drive Madison, WI 53718

RE: Project: 25221067 ALLIANT-COLUMBIA Pace Project No.: 40228358

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on June 12, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network: • Pace Analytical Services - Green Bay

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

Sincerely,

Day Milery

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

Enclosures

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





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

CERTIFICATIONS

Project: 25221067 ALLIANT-COLUMBIA

Pace Project No.: 40228358

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302 Florida/NELAP Certification #: E87948 Illinois Certification #: 200050 Kentucky UST Certification #: 82 Louisiana Certification #: 04168 Minnesota Certification #: 055-999-334 New York Certification #: 12064 North Dakota Certification #: R-150 Virginia VELAP ID: 460263 South Carolina Certification #: 83006001 Texas Certification #: T104704529-14-1 Wisconsin Certification #: 405132750 Wisconsin DATCP Certification #: 105-444 USDA Soil Permit #: P330-16-00157 Federal Fish & Wildlife Permit #: LE51774A-0



SAMPLE SUMMARY

Project: 25221067 ALLIANT-COLUMBIA

Pace Project No.: 40228358

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Lab ID	Sample ID	Matrix	Date Collected	Date Received
40228358001	MW 309	Water	06/11/21 10:10	06/12/21 08:15
40228358002	FIELD BLANK	Water	06/11/21 10:20	06/12/21 08:15
40228358003	MW 310	Water	06/11/21 10:30	06/12/21 08:15
40228358004	FIELD BLANK	Water	06/11/21 10:30	06/12/21 08:15



SAMPLE ANALYTE COUNT

Project:25221067 ALLIANT-COLUMBIAPace Project No.:40228358

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40228358001		EPA 6020	KXS	1
			VGC	7
40228358002	FIELD BLANK	EPA 6020	KXS	1
40228358003	MW 310		VGC	7
		EPA 300.0	HMB	1
40228358004	FIELD BLANK	EPA 300.0	HMB	1

PASI-G = Pace Analytical Services - Green Bay



Project: 25221067 ALLIANT-COLUMBIA

Pace Project No.: 40228358

Sample: MW 309	Lab ID:	40228358001	Collected	: 06/11/21	10:10	Received: 06/	(12/21 08:15 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytica	Method: EPA 6	020 Prepar	ation Metho	od: EPA	3010			
	Pace Ana	lytical Services	- Green Bay	,					
Boron	49.9	ug/L	10.0	3.0	1	06/15/21 05:31	06/16/21 02:30	7440-42-8	
Field Data	Analytica	Method:							
	Pace Ana	lytical Services	- Green Bay	,					
Field pH	7.71	Std. Units			1		06/11/21 10:10		
Field Specific Conductance	3072	umhos/cm			1		06/11/21 10:10		
Oxygen, Dissolved	11.21	mg/L			1		06/11/21 10:10	7782-44-7	
REDOX	67.2	mV			1		06/11/21 10:10		
Turbidity	0.10	NTU			1		06/11/21 10:10		
Static Water Level	784.20	feet			1		06/11/21 10:10		
Temperature, Water (C)	13.3	deg C			1		06/11/21 10:10		



Project: 25221067 ALLIANT-COLUMBIA

Pace Project No.: 40228358

Sample: FIELD BLANK	Lab ID:	40228358002	Collecte	d: 06/11/2 ⁻	1 10:20	Received: 06/	12/21 08:15 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical	Method: EPA 6	020 Prepa	ration Meth	od: EPA	A 3010			
	Pace Ana	lytical Services	- Green Ba	у					
Boron	<3.0	ug/L	10.0	3.0	1	06/15/21 05:31	06/16/21 02:16	7440-42-8	



Project: 25221067 ALLIANT-COLUMBIA

Pace Project No.:

40228358

Sample: MW 310	Lab ID:	40228358003	Collecte	d: 06/11/2	21 10:30	Received: 06	/12/21 08:15 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytica	Method:							
	Pace Ana	lytical Services	- Green Ba	y					
Field pH	7.73	Std. Units			1		06/11/21 10:30		
Field Specific Conductance	1192	umhos/cm			1		06/11/21 10:30		
Oxygen, Dissolved	11.21	mg/L			1		06/11/21 10:30	7782-44-7	
REDOX	55.6	mV			1		06/11/21 10:30		
Turbidity	0.67	NTU			1		06/11/21 10:30		
Static Water Level	784.05	feet			1		06/11/21 10:30		
Temperature, Water (C)	12.8	deg C			1		06/11/21 10:30		
300.0 IC Anions	Analytica	I Method: EPA 3	00.0						
	Pace Ana	lytical Services	- Green Ba	у					
Chloride	220	mg/L	20.0	4.3	10		06/18/21 17:50	16887-00-6	



Project: 25221067 ALLIANT-COLUMBIA

Pace Project No.: 40228358

Sample: FIELD BLANK	Lab ID:	40228358004	Collected	d: 06/11/21	1 10:30	Received: 06/	(12/21 08:15 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions		Method: EPA 3 ytical Services		у					
Chloride	<0.43	mg/L	2.0	0.43	1		06/17/21 14:36	16887-00-6	



-)	1067 ALLIANT	-COLUMBIA										
Pace Project No.: 4022	8358											
QC Batch: 387	893		Analy	sis Metho	d: E	EPA 6020						
QC Batch Method: EPA	A 3010		Analy	sis Descri	ption: 6	6020 MET						
			Labo	ratory:	F	Pace Analyt	ical Servic	es - Green	n Bay			
Associated Lab Samples:	402283580	01, 4022835800	2									
METHOD BLANK: 2237	867			Matrix: W	ater							
Associated Lab Samples:	402283580	01, 4022835800	2									
			Blar	nk	Reporting							
Parameter		Units	Res	ult	Limit	Analy	/zed	Qualifie	rs			
Boron		ug/L		<3.0	10.0	0 06/16/2	1 02:09					
LABORATORY CONTROL	L SAMPLE:	2237868										
LABORATORY CONTROL	L SAMPLE: 2	2237868	Spike	LC	s	LCS	% R	ec				
LABORATORY CONTROL	L SAMPLE: 2	2237868 Units	Spike Conc.	LC Res	-	LCS % Rec	% R Limi		Qualifiers			
	L SAMPLE: 2		•	Res	-		Limi		Qualifiers	_		
Parameter	L SAMPLE: :	Units	Conc.	Res	sult	% Rec	Limi	ts	Qualifiers	_		
Parameter		Units ug/L	Conc50		sult	% Rec 89	Limi	ts	Qualifiers	_		
Parameter Boron		Units ug/L .ICATE: 2237	- Conc. 50 869 MS	0 Res	443 2237870	% Rec 89	- Limi 9 &	ts		_		
Parameter Boron MATRIX SPIKE & MATRIX	X SPIKE DUPL	Units ug/L .ICATE: 2237 40228358001	Conc. 50 369 MS Spike	MSD Spike	443 2237870 MS	% Rec 89 MSD	Limi MS	ts 30-120 MSD	% Rec	_	Max	
Parameter Boron		Units ug/L .ICATE: 2237	- Conc. 50 869 MS	0 Res	443 2237870	% Rec 89	- Limi 9 &	ts		RPD	Max RPD	Qual

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.



Project: 252	21067 ALLIANT	-COLUMBIA										
Pace Project No.: 402	28358											
QC Batch: 38	37994		Anal	sis Metho	d:	EPA 300.0						
QC Batch Method: El	PA 300.0		Analy	ysis Descri	ption:	300.0 IC An	ions					
			Labo	ratory:		Pace Analy	tical Service	es - Green	Bay			
Associated Lab Samples	402283580	03, 4022835800	4									
METHOD BLANK: 223	8231			Matrix: W	ater							
Associated Lab Samples	402283580	03, 4022835800	4									
			Blai	nk	Reporting							
Parameter		Units	Res	ult	Limit	Anal	yzed	Qualifiers	3			
Chloride		mg/L		<0.43	2	0 06/17/2	1 10:38					
LABORATORY CONTRO	DL SAMPLE:	2238232	Spike	LC	· c	LCS	% R	~~				
Parameter		Units	Conc.	Res		% Rec	Limi		Qualifiers			
Chloride		mg/L	2	20	20.2	10	1 9	90-110		_		
MATRIX SPIKE & MATR	IX SPIKE DUPL	-ICATE: 2238	233		2238234	1						
			MS	MSD								
Demonst	11.2	40228358003	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	0
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	220	200	200	435	435	107	107	90-110	0	15	
MATRIX SPIKE & MATR		_ICATE: 2238	235		2238236	6						
			MS	MSD		-						
		40228315008	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	39.8J	1000	1000	1090	1100	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.



QUALIFIERS

Project: 25221067 ALLIANT-COLUMBIA

Pace Project No.: 40228358

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.



QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25221067 ALLIANT-COLUMBIA

Pace Project No.: 40228358

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40228358001	MW 309	EPA 3010	387893	EPA 6020	387967
40228358002	FIELD BLANK	EPA 3010	387893	EPA 6020	387967
40228358001	MW 309				
40228358003	MW 310				
40228358003	MW 310	EPA 300.0	387994		
40228358004	FIELD BLANK	EPA 300.0	387994		

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Company Name:	SCS		_				@		I	MN: 61	2-607-17	00 0	/1: 920-469-2436		50300	1
Branch/Location:	Madison, WI		14	ace	Ana	lytic	al					_		40	18358	<u> </u>
Project Contact:	Maja Blodgett		1		•	celabs.c							Quote #:			
Phone:	1608 216 - 136.	1	Ċ	HA:	MN	OF	: Cl	JS ⁻	ΓΟΙ	YC			Mail To Contact:			
Project Number:						Preserva D=HNO3	tion Code	<u>)S</u>	=Methano		он		Mail To Company:			
Project Name:	25221061		None B=+ Sodium Bisul	ICL C= fate Soluti			Thiosulfa		Other			F	Mail To Address:			
	Allion - Coluv	FIL	TERED?	VIN	17	1/	<u> </u>									
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Pace Lab #	AG1U	BG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	VG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN	VOA Vials	H2SO4 pH ≤2	NaOH+Zn	NaOH pH ≥12	HNO3 pH ≤2	pH after a	(mL)
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F-GB-C-046-Rev.03 (11Feb2020) Sample Preservation Receipt Form

Page (mali tigal [®]	Sample Co		ment Name: n Upon Receipt (SCUR)	Document Revised: 26Mar2020
Pace Analytical [®] 1241 Bellevue Street, Green Bay, WI 54302	ENV-F		ument No.: BAY-0014-Rev.00	Author: Pace Green Bay Quality Office
Sample (Condition	Upoi	n Receipt Form (S	CUR)
Client Name: SCS			Project #:	0#:40228358
Courier: CS Logistics Fed Ex Speede	ee 🗖 UPS		/altco	
Tracking #:			40	228358
Custody Seal on Cooler/Box Present: Kyes Custody Seal on Samples Present: Lyes K	no Seals	intact:	🗖 yes 🗖 no	
Packing Material: 🗖 Bubble Wrap 🗖 Bubb Thermometer Used 🛛 SR - 102		- Y ' \		
	Type of Ice	Wet	Blue Dry None	Samples on ice, cooling process has begun Person examining contents:
Cooler Temperature Uncorr: () /Corr: Temp Blank Present: - T/yes [] no	Biolo	- ogical T	issue is Frozen: 🔲 yes	
Temp should be above freezing to 6°C. Biota Samples may be received at ≤ 0°C if shipped on Dr		J		Labeled By Initials:
Chain of Custody Present:		□n/A	1.	
Chain of Custody Filled Out:	□Yes XNo	□n/a	2. NO POHL, NO M	will into or Invoice into
Chain of Custody Relinquished:	Dyles INO	□n/a	3. EL	6-12.21
Sampler Name & Signature on COC:	Thes INO	□n/a	4.	
Samples Arrived within Hold Time:			5.	
- VOA Samples frozen upon receipt	□Yes □No		Date/Time:	
Short Hold Time Analysis (<72hr):	UYes The		6.	
Rush Turn Around Time Requested:	□Yes 📈		7.	
Sufficient Volume:			8.	
For Analysis: 📈es □No MS/MSD	: 🗆 Yes 🆄 No	□n/A		
Correct Containers Used:	¥Yes □No		9.	
-Pace Containers Used:	★ Kes □No	□n/a		
-Pace IR Containers Used:	□Yes □No			
Containers Intact:	Xes □No		10.	
Filtered volume received for Dissolved tests	□Yes □No		11.	
Sample Labels match COC:			12.	
-Includes date/time/ID/Analysis Matrix:	<u>i</u> l.			
Trip Blank Present:	□Yes □No	YANA	13.	
Trip Blank Custody Seals Present	□Yes □No	INA		
Pace Trip Blank Lot # (if purchased):			16 _L _ 1	d and attached form for additional and a form
Client Notification/ Resolution: Person Contacted: Comments/ Resolution:		_Date/		d, see attached form for additional comments

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

Page of Page 15 of 15

C3 October 2021 Detection Monitoring



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

November 02, 2021

Meghan Blodgett SCS ENGINEERS 2830 Dairy Drive Madison, WI 53718

RE: Project: 25219067 COLUMBIA CCR MOD 4 Pace Project No.: 40235318

Dear Meghan Blodgett:

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

The test results provided in this final report were generated by each of the following laboratories within the Pace Network: • Pace Analytical Services - Green Bay

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

Sincerely,

Day Milery

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

Enclosures

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





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

CERTIFICATIONS

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40235318

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302 Florida/NELAP Certification #: E87948 Illinois Certification #: 200050 Kentucky UST Certification #: 82 Louisiana Certification #: 04168 Minnesota Certification #: 055-999-334 New York Certification #: 12064 North Dakota Certification #: R-150 Virginia VELAP ID: 460263 South Carolina Certification #: 83006001 Texas Certification #: T104704529-14-1 Wisconsin Certification #: 405132750 Wisconsin DATCP Certification #: 105-444 USDA Soil Permit #: P330-16-00157 Federal Fish & Wildlife Permit #: LE51774A-0



SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40235318

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40235318001	MW-309	Water	10/14/21 14:15	10/16/21 08:35
40235318002	MW-310	Water	10/14/21 12:45	10/16/21 08:35
40235318003	MW-311	Water	10/14/21 11:40	10/16/21 08:35
40235318004	FIELD BLANK MOD4	Water	10/14/21 12:45	10/16/21 08:35



SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40235318

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40235318001		EPA 6020B	кхs	2
			MEA	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40235318002	MW-310	EPA 6020B	KXS	2
			MEA	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40235318003	MW-311	EPA 6020B	KXS	2
			MEA	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40235318004	FIELD BLANK MOD4	EPA 6020B	KXS	2
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3

PASI-G = Pace Analytical Services - Green Bay



Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40235318

Sample: MW-309	Lab ID:	40235318001	Collected	: 10/14/2 ⁻	1 14:15	Received: 10/	16/21 08:35 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	-	Method: EPA			hod: Ef	PA 3010A			
Boron	42.9	ug/L	10.0	3.0	1	10/20/21 06:24	10/26/21 16:34	7440-42-8	
Calcium	83100	ug/L	254	76.2	1	10/20/21 06:24	10/26/21 16:34	7440-70-2	
Field Data	Analytical Pace Ana	Method: lytical Services	- Green Bay	,					
Field pH	7.64	Std. Units			1		10/14/21 14:15		
Field Specific Conductance	2079	umhos/cm			1		10/14/21 14:15		
Oxygen, Dissolved	9.27	mg/L			1		10/14/21 14:15	7782-44-7	
REDOX	85.8	mV			1		10/14/21 14:15		
Turbidity Static Water Level	9.06 783.65	NTU feet			1		10/14/21 14:15 10/14/21 14:15		
Temperature, Water (C)	13.2	deg C			1		10/14/21 14:15		
2540C Total Dissolved Solids		Method: SM 2 lytical Services		,					
Total Dissolved Solids	1110	mg/L	20.0	8.7	1		10/19/21 13:33		
9040 pH		Method: EPA		,					
pH at 25 Degrees C	7.8	Std. Units	0.10	0.010	1		10/21/21 11:16		H6
300.0 IC Anions		Method: EPA		,					
Chloride	519	mg/L	20.0	4.3	10		10/25/21 18:59	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		10/25/21 17:47	16984-48-8	
Sulfate	27.7	mg/L	2.0	0.44	1		10/25/21 17:47	14808-79-8	



Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40235318

Sample: MW-310	Lab ID:	40235318002	Collected	1: 10/14/2	1 12:45	Received: 10/	16/21 08:35 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS		Method: EPA 6	•		thod: El	PA 3010A			
Boron	72.0	ug/L	10.0	3.0	1		10/26/21 16:41		
Calcium	38900	ug/L	254	76.2	1	10/20/21 06:24	10/26/21 16:41	7440-70-2	
Field Data	Analytical	Method:							
	Pace Ana	lytical Services	- Green Bay	/					
Field pH	7.70	Std. Units			1		10/14/21 12:45		
Field Specific Conductance	884	umhos/cm			1		10/14/21 12:45		
Oxygen, Dissolved	9.29	mg/L			1		10/14/21 12:45	7782-44-7	
REDOX	85.2	mV			1		10/14/21 12:45		
Turbidity	3.16	NTU			1		10/14/21 12:45		
Static Water Level	783.48	feet			1		10/14/21 12:45		
Temperature, Water (C)	13.4	deg C			1		10/14/21 12:45		
2540C Total Dissolved Solids	Analytical	Method: SM 2	540C						
	Pace Ana	lytical Services	- Green Bay	/					
Total Dissolved Solids	498	mg/L	20.0	8.7	1		10/19/21 13:33		
9040 pH	Analytical	Method: EPA	9040						
-	Pace Ana	lytical Services	- Green Bay	/					
pH at 25 Degrees C	8.0	Std. Units	0.10	0.010	1		10/21/21 11:18		H6
300.0 IC Anions		Method: EPA 3		1					
Chloride	84.6	mg/L	20.0	4.3	10		10/25/21 19:14	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		10/25/21 18:02	16984-48-8	
Sulfate	54.3	mg/L	2.0	0.44	1		10/25/21 18:02	14808-79-8	



Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40235318

Sample: MW-311	Lab ID:	40235318003	Collected	d: 10/14/2 ⁻	11:40	Received: 10/	16/21 08:35 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	-	Method: EPA 6			hod: El	PA 3010A			
Boron Calcium	31.7 61000	ug/L ug/L	10.0 254	3.0 76.2	1 1		10/26/21 16:48 10/26/21 16:48		
Field Data	Analytical Pace Ana	Method:	- Green Bay	/					
Field pH Field Specific Conductance Oxygen, Dissolved REDOX Turbidity Static Water Level Temperature, Water (C)	7.45 493.5 9.42 90.7 4.26 783.48 12.8	Std. Units umhos/cm mg/L mV NTU feet deg C			1 1 1 1 1 1		10/14/21 11:40 10/14/21 11:40 10/14/21 11:40 10/14/21 11:40 10/14/21 11:40 10/14/21 11:40 10/14/21 11:40	7782-44-7	
2540C Total Dissolved Solids		Method: SM 28		/					
Total Dissolved Solids	276	mg/L	20.0	8.7	1		10/19/21 13:34		
9040 pH		Method: EPA 9		/					
pH at 25 Degrees C	7.9	Std. Units	0.10	0.010	1		10/21/21 11:19		H6
300.0 IC Anions		Method: EPA 3		/					
Chloride Fluoride Sulfate	1.3J <0.095 14.2	mg/L mg/L mg/L	2.0 0.32 2.0	0.43 0.095 0.44	1 1 1		10/25/21 18:16 10/25/21 18:16 10/25/21 18:16	16984-48-8	



Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40235318

Sample: FIELD BLANK MOD4	Lab ID:	40235318004	Collected	10/14/21	12:45	Received: 10/	16/21 08:35 M	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical	Method: EPA 6	020B Prepa	ration Met	hod: EF	PA 3010A			
	Pace Anal	lytical Services	- Green Bay						
Boron	<3.0	ug/L	10.0	3.0	1	10/20/21 06:24	10/26/21 13:52	7440-42-8	
Calcium	<76.2	ug/L	254	76.2	1	10/20/21 06:24	10/26/21 13:52	7440-70-2	
2540C Total Dissolved Solids	Analytical	Method: SM 25	540C						
	Pace Anal	lytical Services	- Green Bay						
Total Dissolved Solids	<8.7	mg/L	20.0	8.7	1		10/19/21 13:34		
9040 pH	Analytical	Method: EPA 9	040						
	Pace Anal	lytical Services	- Green Bay						
pH at 25 Degrees C	8.8	Std. Units	0.10	0.010	1		10/21/21 11:20		H6
300.0 IC Anions	Analytical	Method: EPA 3	00.0						
	Pace Anal	lytical Services	- Green Bay						
Chloride	<0.43	mg/L	2.0	0.43	1		11/01/21 13:51	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		11/01/21 13:51	16984-48-8	
Sulfate	<0.44	mg/L	2.0	0.44	1		11/01/21 13:51	14808-79-8	



Project: Pace Project No.:	25219067 COLUN 40235318	BIA CCR MOD 4										
QC Batch:	399050		Analy	sis Metho	d: E	EPA 6020B						
QC Batch Method:	EPA 3010A			sis Descri		6020B MET						
			Labo	ratory:	F	Pace Analyti	cal Service	es - Green	Bay			
Associated Lab San	nples: 40235318	001, 4023531800	2, 4023531	8003, 4023	35318004	-						
METHOD BLANK:	2304130			Matrix: W	/ater							
Associated Lab San	nples: 40235318	001, 4023531800	2, 4023531	8003, 402;	35318004							
			Blar	ık l	Reporting							
Paran	neter	Units	Resu	ult	Limit	Analy	zed	Qualifier	S			
		ug/L		<3.0	10.0	0 10/26/21	13:37					
Boron												
Boron Calcium		ug/L		<76.2	254	4 10/26/21	13:37					
Calcium LABORATORY CON Paran		0	Spike Conc.	LC Res	CS sult	LCS % Rec	% Re Limit	ts (Qualifiers			
Calcium LABORATORY COM Paran Boron		ug/L 2304131 Units ug/L	Conc. 25	LC Res	S sult	LCS % Rec 97	% Re Limit	ts (30-120	Qualifiers			
Calcium LABORATORY CON Paran		ug/L 2304131 Units	Conc.	LC Res	CS sult	LCS % Rec	% Re Limit	ts (Qualifiers			
Calcium LABORATORY COM Paran Boron Calcium	neter	ug/L 2304131 Units ug/L ug/L	Conc. 25 1000	LC Res	243 10000	LCS % Rec 97 100	% Re Limit	ts (30-120	Qualifiers	_		
Calcium LABORATORY COM Paran Boron	neter	ug/L 2304131 Units ug/L ug/L	Conc. 25 1000	LC Res	S sult	LCS % Rec 97 100	% Re Limit	ts (30-120	Qualifiers			
Calcium LABORATORY COM Paran Boron Calcium	neter	ug/L 2304131 Units ug/L ug/L	Conc. 25 1000	LC Res 0 0	243 10000	LCS % Rec 97 100	% Re Limit	ts (30-120	Qualifiers % Rec	_	Max	
Calcium LABORATORY COM Paran Boron Calcium	IATRIX SPIKE DUP	ug/L 2304131 Units ug/L ug/L LICATE: 2304	Conc. 25 1000 132 MS	LC Res 0 0 MSD	243 10000 2304133	LCS % Rec 97 100	% Re Limit ,8)8	ts (30-120 30-120		RPD	Max RPD	Qual
Calcium LABORATORY COM Paran Boron Calcium MATRIX SPIKE & M	IATRIX SPIKE DUP	ug/L 2304131 Units ug/L ug/L LICATE: 2304 40235317001	Conc. 25 1000 132 MS Spike	LC Res 0 0 0 MSD Spike	2304133 MS	LCS % Rec 97 100	% Re Limit , 8 0 8 MS	ts (30-120 30-120 MSD	% Rec			Qual

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.



Project:	25219067 COLUM	IBIA CCR MOD 4							
Pace Project No.:	40235318								
QC Batch:	398939		Analysis Me	ethod:	SM 25	40C			
QC Batch Method:	SM 2540C		Analysis De	escription:	2540C	Total Dis	solved Solids		
			Laboratory:		Pace A	nalytical	Services - Gr	een Ba	ау
Associated Lab San	nples: 40235318	001, 40235318002,	40235318003,	40235318004					
METHOD BLANK:	2303507		Matrix	: Water					
Associated Lab San	nples: 40235318	001, 40235318002,	40235318003,	40235318004					
			Blank	Reporting					
Paran	neter	Units	Result	Limit		Analyzed	Qual	ifiers	
Total Dissolved Solid	ds	mg/L	<8.7	20	0.0 10/	/19/21 13	:29		
LABORATORY CON	NTROL SAMPLE:	2303508							
_			Spike	LCS	LCS		% Rec	_	
Paran	neter	Units	Conc.	Result	% Re	ec	Limits	Qı	ualifiers
Total Dissolved Solid	ds	mg/L	575	566		98	80-120		
SAMPLE DUPLICAT	TE: 2303509		4000500004	-					
Param	actor	Units	40235220001 Result	Dup Result		RPD	Max RPD		Qualifiers
						RED			
Total Dissolved Solid	ds	mg/L	248	5 2	72		9	10	
SAMPLE DUPLICA	TE: 2303510								
			40235316003	Dup			Max		
Paran	neter	Units	Result	Result		RPD	RPD		Qualifiers
Total Dissolved Solid	ds	mg/L	374	3	90		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.



Project:	25219067 COLUM	BIA CCR MOD 4					
Pace Project No.:	40235318						
QC Batch:	399227		Analysis Meth	od: E	PA 9040		
QC Batch Method:	EPA 9040		Analysis Desc	ription: 9	040 pH		
			Laboratory:	F	Pace Analytical	Services - Gr	een Bay
Associated Lab Sa	mples: 402353180	001, 4023531800	2, 40235318003, 40	235318004	-		-
	TE. 0004074						
SAMPLE DUPLICA	ATE: 2304971		40235095010	Dup		Мах	
Para	meter	Units	Result	Result	RPD	RPD	Qualifiers
nll at 25 Degrade (<u>.</u>	Std. Units	7.8	7.8	 3	0	20 H6
ph at 25 Degrees (6					0	
pH at 25 Degrees (SAMPLE DUPLICA							
SAMPLE DUPLICA	ATE: 2304972		40235316004	Dup		Мах	0
SAMPLE DUPLICA		Units	40235316004 Result	Dup Result	RPD		Qualifiers

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.



Project: 25219 Pace Project No.: 40235		3IA CCR MOD 4										
QC Batch: 3994	129		Analy	sis Metho	d: E	PA 300.0						
QC Batch Method: EPA	300.0		Analy	sis Descri	ption: 3	00.0 IC Ani	ons					
			Laboi	ratory:	F	ace Analyti	cal Service	es - Green	Bay			
Associated Lab Samples:	402353180	01, 4023531800	2, 4023531	8003		-						
METHOD BLANK: 23064	.33			Matrix: W	/ater							
Associated Lab Samples:	402353180	01, 4023531800	2, 4023531	8003								
			Blan	ık	Reporting							
Parameter		Units	Resu	ult	Limit	Analy	zed	Qualifiers	5			
Chloride		mg/L	_	<0.43	2.0) 10/25/21	14:26					
Fluoride		mg/L	<	<0.095	0.32	2 10/25/21	14:26					
0.14		4		~	2.0) 10/25/21	14.26					
Sulfate		mg/L		<0.44	2.0	10/23/21	14.20					
Sulfate		mg/L		<0.44	2.0	10/23/21	14.20					
LABORATORY CONTROL	SAMPLE:	mg/L 2306434		<0.44	2.0	10/23/21	14.20					
	SAMPLE:	2306434	Spike	<0.44 	· · · · · · · · · · · · · · · · · · ·	LCS	% R					
	SAMPLE:		Spike Conc.		S				Qualifiers			
LABORATORY CONTROL	SAMPLE:	2306434	•	LC Res	S	LCS	% Ro Limi		Qualifiers	_		
LABORATORY CONTROL Parameter Chloride Fluoride	SAMPLE:	2306434 Units	Conc.	LC Res	2S sult 18.3 2.1	LCS % Rec 92 104	% R(Limi	ts (Qualifiers	_		
LABORATORY CONTROL Parameter Chloride	SAMPLE:	2306434 Units mg/L	Conc.	LC Res 0 2	S sult	LCS % Rec 92	% R(Limi	ts ()0-110	Qualifiers	_		
LABORATORY CONTROL Parameter Chloride Fluoride Sulfate		2306434 Units mg/L mg/L mg/L	2	LC Res 0 2	Ssult 18.3 2.1 18.2	LCS % Rec 92 104	% R(Limi	ts (90-110 90-110	Qualifiers	_		
LABORATORY CONTROL Parameter Chloride Fluoride		2306434 Units mg/L mg/L mg/L	2	LC Res 0 2	2S sult 18.3 2.1	LCS % Rec 92 104	% R(Limi	ts (90-110 90-110	Qualifiers	_		
LABORATORY CONTROL Parameter Chloride Fluoride Sulfate		2306434 Units mg/L mg/L mg/L	Conc. 2 2 2 435	LC Res 0 2 0	Ssult 18.3 2.1 18.2	LCS % Rec 92 104	% R(Limi	ts (90-110 90-110	Qualifiers	_	Max	
LABORATORY CONTROL Parameter Chloride Fluoride Sulfate		2306434 Units mg/L mg/L mg/L	Conc. 2 2 2 435 MS	LC Res 0 2 0 MSD	2S sult 18.3 2.1 18.2 2306436	LCS % Rec 92 104 91	% Ri Limi 2 (9) 4 (9) 5	ts (00-110 00-110 00-110		- RPD	Max RPD	Qual
LABORATORY CONTROL Parameter Chloride Fluoride Sulfate MATRIX SPIKE & MATRIX Parameter	SPIKE DUPL	2306434 Units mg/L mg/L mg/L .ICATE: 2306 10582635003	Conc. 2 2 2 435 MS Spike	LC Res 0 2 0 MSD Spike	2S sult 18.3 2.1 18.2 2306436 MS	LCS % Rec 92 104 91 MSD	% Ri Limi 2 S	ts (00-110 00-110 00-110 00-110 MSD	% Rec		RPD	Qual
LABORATORY CONTROL Parameter Chloride Fluoride Sulfate MATRIX SPIKE & MATRIX	SPIKE DUPL	2306434 Units mg/L mg/L mg/L ICATE: 2306 10582635003 Result	Conc. 2 2 435 MS Spike Conc.	LC Res 0 2 0 MSD Spike Conc.	2S sult 18.3 2.1 18.2 2306436 MS Result	LCS % Rec 92 104 91 MSD Result	MS % Rec	ts (90-110 90-110 90-110 90-110 MSD % Rec	% Rec Limits		RPD 15	Qual

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.



-)	25219067 COLU 40235318	MBIA CCR MOD 4	ŀ									
QC Batch:	399901		Analy	ysis Metho	od: E	PA 300.0						
QC Batch Method:	EPA 300.0			, vsis Descr		00.0 IC Ani	ions					
			Labo	ratory:	F	Pace Analyt	ical Service	es - Green	Bay			
Associated Lab Sam	ples: 4023531	8004		-		·			-			
METHOD BLANK:	2309132			Matrix: V	Vater							
Associated Lab Sam	ples: 4023531	8004										
			Blar	nk	Reporting							
Param	neter	Units	Res	ult	Limit	Analy	/zed	Qualifiers	3			
Chloride		mg/L		<0.43	2.0							
Fluoride		mg/L	·	<0.095	0.32							
Sulfate		mg/L		<0.44	2.0) 10/30/2 ⁻	10:42					
LABORATORY CON	ITROL SAMPLE:	2309133										
			Spike	LC	CS	LCS	% R	ec				
Param	eter	Units	Conc.	Re	sult	% Rec	Limi	ts (Qualifiers			
Chloride		mg/L	2	20	21.3	107	7 9	90-110		_		
Fluoride		mg/L		2	2.0	102	2 9	90-110				
Sulfate		mg/L	2	20	21.2	106	6 9	90-110				
MATRIX SPIKE & M	ATRIX SPIKE DU	PLICATE: 2309	134		2309135							
			MS	MSD								
_		40235316004	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Unit	s Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/		20	20		24.0	111	110	90-110	0		MO
Fluoride	mg/		2	2		2.2	111	111	90-110	0	-	MO
Sulfate	mg/	L 56.1	100	100	164	163	108	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.



QUALIFIERS

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40235318

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.



QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40235318

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40235318001	MW-309	EPA 3010A	399050	EPA 6020B	399167
40235318002	MW-310	EPA 3010A	399050	EPA 6020B	399167
40235318003	MW-311	EPA 3010A	399050	EPA 6020B	399167
40235318004	FIELD BLANK MOD4	EPA 3010A	399050	EPA 6020B	399167
40235318001	MW-309				
40235318002	MW-310				
40235318003	MW-311				
40235318001	MW-309	SM 2540C	398939		
40235318002	MW-310	SM 2540C	398939		
40235318003	MW-311	SM 2540C	398939		
40235318004	FIELD BLANK MOD4	SM 2540C	398939		
40235318001	MW-309	EPA 9040	399227		
40235318002	MW-310	EPA 9040	399227		
40235318003	MW-311	EPA 9040	399227		
40235318004	FIELD BLANK MOD4	EPA 9040	399227		
40235318001	MW-309	EPA 300.0	399429		
40235318002	MW-310	EPA 300.0	399429		
40235318003	MW-311	EPA 300.0	399429		
40235318004	FIELD BLANK MOD4	EPA 300.0	399901		

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document U - C

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Compan		Report To:	Meg	han E	Blodgett					Attent		Name	Mę	<u>ser</u>		is/	2100	9			e	7~										
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Madison Email:	, WI 53718	Purchase O	rder #			· · · · ·				Pace	_	te:										_		Ť								
Phone:	mblodgett@scsengineers.com 608-216-7362 Fax:	Project Nam			19067 Co	lumbia C	CR Mod 4					ect Ma	nager	:	dan.n	nilewsk	v@pa	cel	abs.o	com,					. S. 1.	142	79263	Sta	te / L	ocation		1. A. A.
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Page 16 of 19

		ł	Pace Co	ontainer Or	der #	#86	5031 Y	1025318
Addree Order B	esses — y:		Ship 1	То :			(Returi	n To:
Company S	CS ENGIN	IEERS	Company	SCS ENGINEERS (Pa	ce Analytic	al Gree	n Company	Pace Analytical Green Bay
Contact Bl	odgett, Me	eghan	Contact	Adam Watson			Contact	Milewsky, Dan
Email m	blodgett@	scsengineers.com	Email	awatson@scsengine	eers.com		Email	dan.milewsky@pacelabs.com
Address 28	330 Dairy I	Drive	Address	2830 Dairy Drive			Address	1241 Bellevue Street
Address 2			Address 2				Address 2	Suite 9
City M	adison	~	City	Madison			City	Green Bay
State W	1	Zip 53718	State	WI Zip 537	18		State	WI Zip 54302
Phone 60)8-216-73	62	Phone	608-216-7362			Phone	(920)469-2436
Info					· · · ·			
Project	Name Ba	219067 Columbia CCR ckground	Due Date	10/08/2021	Profile	9 <u>3946</u>	5-12	Quote
Project Ma	nager _{Mi}	lewsky, Dan	_ Return Date		Carrie	r Mos	t Economical	Location
Trip Blan	nks ——	anks		Bottle Labels Blank Bre-Printed N X Pre-Printed V	No Sample			ttles Boxed Cases Individually Wrapped Grouped By Sample ID/Matrix
COC Op	Shipper Shipper	nks		Misc Sampling Ins Custody Sea X Temp. Blank X Coolers Syringes	1			 Extra Bubble Wrap Short Hold/Rush Stickers DI Water Liter(s) USDA Regulated Soils
# of Samples	Matrix	Test	Containe	er and the second se	Total	# of	Lot #	Notes
2	WT	Radium 226	1L Plastic H	HNO3 pres	2	0		
2	WT	Radium 228	1L Plastic H	HNO3 pres	2	0	M 1 106 0200	
2	WT	Metals	250mL plas	stic w/HNO3	2	0	M-1-106-03BB	
2	WT	рН	250mL plas	stic unpres	2	0	M-1-203-03BB	
2	WT	TDS, CI, F, SO4	250mL plas	stic unpres	2	0	M-1-203-03BB	

Hazard Shipping Placard In Place : NA Sample receiving hours are typically 8am-5pm, but may differ by location. Please check with your Pac	LAB USE:	10/07/2021
Sample receiving nours are typically sam spin, but may differ by location. Please check with your rate Manager. 'Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you. 'Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sampl 'Payment term are net 30 days. 'Please include the proposal number on the chain of custody to insure proper billing.	Prepared By:	Mai Yer Her
Sample	CLIENT USE (Optional):	
Full List Metals = B, Ca, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li Hg, Mo, Se, Tl ALL SAMPLES UNFILTERED	Date Rec'd: Received By: Verified By:	
F-ALL-C-009-rev.00. 19Dec2016 Page 1 of 1		Dogo 17 of 10

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	~	conta	iners	needi	ng pre	serval	tion h	avebo	en ci	necked Lab			below: paper:				•	b Std	#ID of	prese	ervatio	n (if pl	H adju	sted):					Initial comp	when leted;	22	Date/ Time:	
				G	lass]				Plas	tic				Vi	als]		J	ars		G	enera	al	(>6mm) *	s2	Act pH ≥9	12	2	usted	Volume
Pace Lab #	AG1U	BG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	VG9A	DG9T	VG9U	NG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	ßN	VOA Vials (>6mm)	H2SO4 pH	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	(mL)
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F-GB-C-046-Rev.03 (11Feb2020) Sample Preservation Receipt Form

Page 1 of Page 18 of 19

		ument Name:	Danua	
Pace Analytical [®]		on Upon Receipt (SCUR)	ent Revised: 26Mar2020
1241 Bellevue Street, Green Bay, WI 54302		cument No.: GBAY-0014-Rev.		Author:
		3BA1-0014-Rev.	00 Pace G	reen Bay Quality Office
Sample C	ondition Upc	on Receipt Fo		
Client Name: SCS Engineer	2	Project #	A	0005040
Courier: KCS Logistics Fed Ex Speedee	<u>></u>		WO#:4	0235318
Client Client Pace Other:		Valtco		
Tracking #:				
	~	<u> </u>	40235318	
Custody Seal on Cooler/Box Present: 🔽 yes 🗙 Custody Seal on Samples Present: 🗖 yes 🛣 no			L	
Packing Material: E Bubble Wrap E Bubble		Fyes Fno		
	ype of Ice: Wet	e C Other		
Cooler Temperature Uncorr: 5 /Corr: 5	The of ice. Wel	Jue Diy None	Samples o	n ice, cooling process has begun Person examining contents:
Temp Blank Present: yes Xno	Biological	lissue is Frozen:	vesEno	IN/AI AD (
Temp should be above freezing to 6°C.			,	Date: UID/1/Initials:
Biota Samples may be received at $\leq 0^{\circ}$ C if shipped on Dry I	ce.			Labeled By Initials:/W/
Chain of Custody Present:		1.		
Chain of Custody Filled Out:		2. f. 17.		0/16/21 AZ /
Chain of Custody Relinquished:		3 does ho	vo dato	Aime WIGDI 191
	Yes INo	5.	· · · · · · · · · · · · · · · · · · ·	
		Date/Time:		
	IYes XNo			
		6.		
Sufficient Volume:	JYes XNo	7		
		8.		
]Yes XNo []N/A			
		9.		
-Pace Containers Used:	Yes 🗆 No 🗆 N/A			
-Pace IR Containers Used:]Yes □No 📌 🖾 A	·		
Containers Intact:	Yes 🗆 No	10.		
Filtered volume received for Dissolved tests		11.		
Sample Labels match COC:	Yes □No □N/A	12.		
-Includes date/time/ID/Analysis Matrix:				
		13.		
Pace Trip Blank Lot # (if purchased):			•	
Client Notification/ Resolution:	I		hecked, see attach	ed form for additional comments
Person Contacted:	Date/T	ime:		
Comments/ Resolution:			1	

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

Page 2 of 2



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

December 08, 2021

Meghan Blodgett SCS ENGINEERS 2830 Dairy Drive Madison, WI 53718

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

Dear Meghan Blodgett:

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

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

- Pace Analytical Services Green Bay
- Pace Analytical Services Greensburg

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

Sincerely,

Day Milent

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

Enclosures

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





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

CERTIFICATIONS

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

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

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

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



SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

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



SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

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

PASI-G = Pace Analytical Services - Green Bay

PASI-PA = Pace Analytical Services - Greensburg



Project: 25219067 COLUMBIA CCR BACKGRND

40235317 oct No

Pace Project No .:	402353
r acc r reject re.	102000

Sample: MW-301	Lab ID:	40235317001	Collecte	d: 10/14/2	17:05	Received: 10/	16/21 08:35 M	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytica	I Method: EPA 6	020B Prep	aration Met	hod: EF	PA 3010A			
	Pace Ana	alytical Services	- Green Ba	у					
Lithium	0.46J	ug/L	1.0	0.22	1	10/20/21 06:24	10/26/21 14:44	7439-93-2	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/20/21 06:24	10/26/21 14:44		
Boron	31.4	ug/L	10.0	3.0	1		10/26/21 14:44		
Calcium	67800	ug/L	254	76.2	1	10/20/21 06:24	10/26/21 14:44	7440-70-2	P6
Chromium	<1.0	ug/L	3.4	1.0	1	10/20/21 06:24	10/26/21 14:44	7440-47-3	
Cobalt	0.34J	ug/L	1.0	0.12	1	10/20/21 06:24	10/26/21 14:44	7440-48-4	
Arsenic	0.35J	ug/L	1.0	0.28	1	10/20/21 06:24	10/26/21 14:44	7440-38-2	
Selenium	<0.32	ug/L	1.1	0.32	1	10/20/21 06:24	10/26/21 14:44	7782-49-2	
Molybdenum	<0.44	ug/L	1.5	0.44	1	10/20/21 06:24	10/26/21 14:44	7439-98-7	
Cadmium	<0.15	ug/L	1.0	0.15	1	10/20/21 06:24	10/26/21 14:44	7440-43-9	
Antimony	<0.15	ug/L	1.0	0.15	1	10/20/21 06:24	10/26/21 14:44	7440-36-0	
Barium	7.7	ug/L	2.3	0.70	1		10/26/21 14:44		
Mercury	<0.093	ug/L	0.31	0.093	1		10/26/21 14:44		
Thallium	0.17J	ug/L	1.0	0.14	1		10/26/21 14:44		
Lead	<0.24	ug/L	1.0	0.24	1	10/20/21 06:24	10/26/21 14:44	7439-92-1	
7470 Mercury	Analytica	I Method: EPA 7	470 Prepa	ration Meth	od: EPA	7470			
·····	•	alytical Services	•			-			
Mercury	<0.066	ug/L	0.20	0.066	1	11/11/21 10:35	11/12/21 13:03	7439-97-6	H1,M0
Field Data	Analytica	I Method:							
		alytical Services	- Green Ba	у					
Field pH	7.01	Std. Units			1		10/14/21 17:05		
Field Specific Conductance	597.2	umhos/cm			1		10/14/21 17:05		
Oxygen, Dissolved	0.25	mg/L			1		10/14/21 17:05	7782-44-7	
REDOX	57.8	mV			1		10/14/21 17:05	1102 44 1	
Turbidity	3.21	NTU			1		10/14/21 17:05		
Static Water Level	785.28	feet			1		10/14/21 17:05		
Temperature, Water (C)	11.1	deg C			1		10/14/21 17:05		
2540C Total Dissolved Solids	Analvtica	I Method: SM 2	540C						
		alytical Services		у					
Total Dissolved Solids	334	mg/L	20.0	8.7	1		10/19/21 13:33		
9040 pH	Analytica	I Method: EPA 9	040						
	Pace Ana	alytical Services	- Green Ba	у					
pH at 25 Degrees C	7.3	Std. Units	0.10	0.010	1		10/21/21 11:12		H6
300.0 IC Anions	Analytica	I Method: EPA 3	0.00						
	-	alytical Services		у					
Chloride	2.7	mg/L	2.0	0.43	1		11/09/21 02:59	16887-00-6	
		J =			•				
Fluoride	<0.095	mg/L	0.32	0.095	1		11/09/21 02:59	16984-48-8	



Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

Sample: MW-84A	Lab ID:	40235317002	Collected	d: 10/14/2	1 15:20	Received: 10/	(16/21 08:35 M	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytica	I Method: EPA 6	020B Prepa	aration Met	hod: El	PA 3010A			
	Pace Ana	alytical Services	- Green Bay	/					
Antimony	<0.15	ug/L	1.0	0.15	1	10/20/21 06:24	10/26/21 15:28	7440-36-0	
Arsenic	0.41J	ug/L	1.0	0.28	1	10/20/21 06:24	10/26/21 15:28	7440-38-2	
Barium	12.9	ug/L	2.3	0.70	1	10/20/21 06:24	10/26/21 15:28	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/20/21 06:24	10/26/21 15:28	7440-41-7	
Boron	11.1	ug/L	10.0	3.0	1	10/20/21 06:24	10/26/21 15:28	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	10/20/21 06:24	10/26/21 15:28	7440-43-9	
Calcium	75300	ug/L	254	76.2	1	10/20/21 06:24	10/26/21 15:28		
Chromium	1.9J	ug/L	3.4	1.0	1	10/20/21 06:24	10/26/21 15:28		
Cobalt	0.12J	ug/L	1.0	0.12	1	10/20/21 06:24			
Lead	<0.24	ug/L	1.0	0.24	1	10/20/21 06:24			
Lithium	0.28J	ug/L	1.0	0.22	1	10/20/21 06:24			
Mercury	<0.093	ug/L	0.31	0.093	1	10/20/21 06:24			
Molybdenum	<0.44	ug/L	1.5	0.44	1	10/20/21 06:24			
Selenium	<0.32	ug/L	1.1	0.32	1	10/20/21 06:24	10/26/21 15:28		
Thallium	0.19J	ug/L	1.0	0.14	1	10/20/21 06:24	10/26/21 15:28	7440-28-0	
7470 Mercury	Analytica	I Method: EPA 7	470 Prepar	ation Meth	od: EP/	A 7470			
· · · · · · ·	-	alytical Services							
Mercury	<0.066	ug/L	0.20	0.066	1	11/11/21 10:35	11/12/21 13:10	7439-97-6	H1
Field Data	Analytica	I Method:							
	Pace Ana	alytical Services	- Green Bay	/					
Field pH	7.42	Std. Units			1		10/14/21 15:20		
Field Specific Conductance	598.9	umhos/cm			1		10/14/21 15:20		
Oxygen, Dissolved	9.25	mg/L			1		10/14/21 15:20	7782-44-7	
REDOX	89.7	mV			1		10/14/21 15:20	1102 44 1	
Turbidity	3.41	NTU			1		10/14/21 15:20		
Static Water Level	784.96	feet			1		10/14/21 15:20		
Temperature, Water (C)	12.5	deg C			1		10/14/21 15:20		
2540C Total Dissolved Solids	Analytica	I Method: SM 2	540C						
	Pace Ana	alytical Services	- Green Bay	/					
Total Dissolved Solids	326	mg/L	20.0	8.7	1		10/19/21 13:33		
9040 pH	Analytica	I Method: EPA 9	040						
	Pace Ana	alytical Services	- Green Bay	/					
pH at 25 Degrees C	7.8	Std. Units	0.10	0.010	1		10/21/21 11:15		H6
300.0 IC Anions	-	l Method: EPA 3 alytical Services		/					
Chloride	3.5	mg/L	2.0	0.43	1		11/09/21 03:56	16887-00-6	MO
Fluoride	<0.095	mg/L	0.32	0.095	1		11/09/21 03:56		MO
Sulfate	1.3J	mg/L	2.0	0.033	1		11/09/21 03:56		MO
	1.00		2.0	0.77			. 1, 00, 21 00.00	. 1000 / 0 0	



Project: 252190 Pace Project No.: 402353	67 COLUMBIA 17	CCR BACKO	BRND									
QC Batch: 40143	37		Anal	ysis Meth	nod:	EPA 7470						
QC Batch Method: EPA 7	470		Anal	ysis Dese	cription:	7470 Mercu	ry					
			Labo	oratory:		Pace Analyt	ical Servic	es - Green	Вау			
Associated Lab Samples:	40235317001,	4023531700	2									
METHOD BLANK: 231775	4			Matrix:	Water							
Associated Lab Samples:	40235317001,	4023531700	2									
			Bla	ink	Reporting							
Parameter		Units	Res	sult	Limit	Analy	zed	Qualifier	S			
Mercury		ug/L		<0.066	0.2	0 11/12/2	12:58					
LABORATORY CONTROL S	SAMPLE: 231	7755										
			Spike	- I	LCS	LCS	% R	ec				
Parameter		Units	Conc.	R	esult	% Rec	Lim	its	Qualifiers			
Mercury		ug/L		5	5.6	11 [.]		85-115		_		
MATRIX SPIKE & MATRIX S		ATE: 2317	756		2317757	,						
			MS	MSD								
_		235317001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	_
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Mercury	ug/L	<0.066	5		5 6.2	6.2	123	123	85-115	0	20	MO

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.



Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.:	40235317
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QC Batch:	399050	Analysis Met	hod:	EPA 6020B		
QC Batch Method:	EPA 3010A	Analysis Des	cription:	6020B MET		
		Laboratory:		Pace Analytical Serv	ices - Green Ba	
Associated Lab Sam	ples: 40235317001, 40235317002					
METHOD BLANK:	0004400	Matrice	\A/atan			
METHOD BLANK.	2304130	Matrix:	vvater			
Associated Lab Sam		Matrix:	vvater			
-		Blank	Reporting			

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

LABORATORY CONTROL SAMPLE: 2304131

	. 2004101	Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	ug/L	250	241	96	80-120	
Arsenic	ug/L	250	239	96	80-120	
Barium	ug/L	250	243	97	80-120	
Beryllium	ug/L	250	240	96	80-120	
Boron	ug/L	250	243	97	80-120	
Cadmium	ug/L	250	244	98	80-120	
Calcium	ug/L	10000	10000	100	80-120	
Chromium	ug/L	250	232	93	80-120	
Cobalt	ug/L	250	242	97	80-120	
Lead	ug/L	250	231	93	80-120	
Lithium	ug/L	250	242	97	80-120	
Mercury	ug/L	5	5.1	102	80-120	
Molybdenum	ug/L	250	240	96	80-120	
Selenium	ug/L	250	246	98	80-120	
Thallium	ug/L	250	237	95	80-120	

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REPORT OF LABORATORY ANALYSIS

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Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

MATRIX SPIKE & MATRIX S		CATE: 2304	132		2304133							
			MS	MSD								
	4	0235317001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	ug/L	<0.15	250	250	240	243	96	97	75-125	1	20	
Arsenic	ug/L	0.35J	250	250	240	241	96	96	75-125	1	20	
Barium	ug/L	7.7	250	250	251	254	97	98	75-125	1	20	
Beryllium	ug/L	<0.25	250	250	238	238	95	95	75-125	0	20	
Boron	ug/L	31.4	250	250	273	277	97	98	75-125	1	20	
Cadmium	ug/L	<0.15	250	250	243	244	97	98	75-125	1	20	
Calcium	ug/L	67800	10000	10000	77700	80700	100	129	75-125	4	20	P6
Chromium	ug/L	<1.0	250	250	232	236	93	94	75-125	2	20	
Cobalt	ug/L	0.34J	250	250	241	245	96	98	75-125	2	20	
Lead	ug/L	<0.24	250	250	234	236	93	94	75-125	1	20	
Lithium	ug/L	0.46J	250	250	242	244	97	98	75-125	1	20	
Mercury	ug/L	<0.093	5	5	5.2	5.4	104	107	75-125	3	20	
Molybdenum	ug/L	<0.44	250	250	244	245	97	98	75-125	1	20	
Selenium	ug/L	<0.32	250	250	244	245	98	98	75-125	0	20	
Thallium	ug/L	0.17J	250	250	243	244	97	97	75-125	0	20	

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,		VIBIA CCR BACKGR	ND					
	235317							
	98939		Analysis Me		SM 2540C			
QC Batch Method:	SM 2540C		Analysis De	escription:	2540C Total Di	ssolved Solids		
			Laboratory	:	Pace Analytica	I Services - Gre	een Ba	ıy
Associated Lab Sample	es: 40235317	7001, 40235317002						
METHOD BLANK: 23	03507		Matrix	k: Water				
Associated Lab Sample	es: 40235317	7001, 40235317002						
			Blank	Reporting				
Paramete	er	Units	Result	Limit	Analyze	d Quali	ifiers	
Total Dissolved Solids		 mg/L	<8.7	20	0.0 10/19/21 1	3:29		_
		-						
LABORATORY CONTR	OL SAMPLE:	2303508						
			Spike	LCS	LCS	% Rec		
Paramete	er	Units	Conc.	Result	% Rec	Limits	Qu	alifiers
Total Dissolved Solids		mg/L	575	566	98	80-120		
SAMPLE DUPLICATE:	2303509							
D		11.5	40235220001	Dup		Max		0 11
Paramete	er	Units	Result	Result	RPD	RPD		Qualifiers
Total Dissolved Solids		mg/L	248	3 27	72	9	10	
SAMPLE DUPLICATE:	2303510							
			40235316003	•		Max		
Paramete	er	Units	Result	Result	RPD	RPD		Qualifiers
Total Dissolved Solids		mg/L	374	4 39	90	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.



Project:	25219067 COLUM	BIA CCR BACKO	GRND					
Pace Project No.:	40235317							
QC Batch:	399227		Analysis Meth	iod:	EPA 9040			
QC Batch Method:	EPA 9040		Analysis Desc	ription:	9040 pH			
			Laboratory:		Pace Analytica	al Services	- Greer	n Bay
Associated Lab Sar	mples: 402353170	001, 4023531700	2					
SAMPLE DUPLICA	TE: 2304971							
			40235095010	Dup			/lax	
Parar	neter	Units	Result	Result	RPD	F	RPD	Qualifiers
pH at 25 Degrees C)	Std. Units	7.8	7	.8	0	2	20 H6
SAMPLE DUPLICA	TE: 2304972							
			40235316004	Dup		N	<i>l</i> lax	
Parar	neter	Units	Result	Result	RPD	F	RPD	Qualifiers
		Std. Units	7.8	_	.8		-	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.



QC Batch: 40	00930		Analy	sis Metho	l: E	PA 300.0						
QC Batch Method: El	PA 300.0			/sis Descri		00.0 IC An	ions					
				ratory:			ical Service	es - Green	Bav			
Associated Lab Samples	s: 402353170	001, 4023531700		,					- 7			
METHOD BLANK: 231	15482			Matrix: W	ater							
Associated Lab Samples	s: 402353170	001, 4023531700	2									
			Blar	nk l	Reporting							
Parameter	r	Units	Res	ult	Limit	Analy	yzed	Qualifier	S			
Chloride		mg/L		<0.43	2.0	11/08/2	1 19:10					
Fluoride		mg/L		<0.095	0.32	11/08/2	1 19:10					
Sulfate		mg/L		<0.44	2.0	11/08/2	1 19:10					
LABORATORY CONTRO	OL SAMPLE:	2315483										
			Spike	LC	S	LCS	% Re	ес				
Parameter	r	Units	Conc.	Res	ult	% Rec	Limi	ts (Qualifiers			
Chloride		mg/L	2	.0	18.7	9,	4 9	90-110				
Fluoride		mg/L		2	1.9	9:	3 9	90-110				
Sulfate		mg/L	2	:0	18.2	9	1 9	90-110				
MATRIX SPIKE & MATR	RIX SPIKE DUP	LICATE: 2315	484		2315485							
MATRIX SPIKE & MATR	RIX SPIKE DUP	LICATE: 2315	484 MS	MSD	2315485							
MATRIX SPIKE & MATF	RIX SPIKE DUP	LICATE: 23154 40235824001		MSD Spike	2315485 MS	MSD	MS	MSD	% Rec		Max	
MATRIX SPIKE & MATR Parameter	RIX SPIKE DUP	40235824001	MS			MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qua
Parameter		40235824001	MS Spike Conc. 20	Spike Conc. 20	MS Result 29.8	Result 30.1	-	-		RPD 1	RPD	
Parameter Chloride Fluoride	Units	40235824001 Result 7.3 <0.095	MS Spike Conc. 20 2	Spike Conc. 20 2	MS Result 29.8 2.2	Result 30.1 2.2	% Rec 113 110	% Rec 114 111	Limits 90-110 90-110	1	RPD 15 15	M0 M0
Parameter Chloride Fluoride	Units mg/L	40235824001 Result 7.3	MS Spike Conc. 20	Spike Conc. 20	MS Result 29.8	Result 30.1	% Rec 113	% Rec 114	Limits 90-110	1	RPD 15 15	M0 M0
Parameter Chloride Fluoride Sulfate	Units mg/L mg/L mg/L	40235824001 Result 7.3 <0.095 18.5	MS Spike Conc. 20 2 20	Spike Conc. 20 2	MS Result 29.8 2.2	Result 30.1 2.2	% Rec 113 110	% Rec 114 111	Limits 90-110 90-110	1	RPD 15 15	M0 M0
Parameter Chloride Fluoride Sulfate	Units mg/L mg/L mg/L	40235824001 Result 7.3 <0.095 18.5	MS Spike Conc. 20 2 20	Spike Conc. 20 2	MS Result 29.8 2.2 41.0	Result 30.1 2.2	% Rec 113 110	% Rec 114 111	Limits 90-110 90-110	1	RPD 15 15	M0 M0
Parameter Chloride Fluoride Sulfate	Units mg/L mg/L mg/L	40235824001 Result 7.3 <0.095 18.5	MS Spike Conc. 20 2 20 486	Spike Conc. 20 2 20	MS Result 29.8 2.2 41.0	Result 30.1 2.2	% Rec 113 110 112 MS	% Rec 114 111 113 MSD	Limits 90-110 90-110	1	RPD 15 15 15	M0 M0 M0
Parameter Chloride Fluoride Sulfate	Units mg/L mg/L mg/L	40235824001 Result 7.3 <0.095 18.5 LICATE: 2315	MS Spike Conc. 20 2 20 486 MS	Spike Conc. 20 2 20 MSD	MS Result 29.8 2.2 41.0 2315487	Result 30.1 2.2 41.1	% Rec 113 110 112	% Rec 114 111 113	Limits 90-110 90-110 90-110	1	RPD 15 15 15	M0 M0 M0
Parameter Chloride Fluoride Sulfate MATRIX SPIKE & MATR Parameter	Units mg/L mg/L RIX SPIKE DUP	40235824001 Result 7.3 <0.095 18.5 LICATE: 2315 40235317002	MS Spike Conc. 20 2 20 486 MS Spike	Spike Conc. 20 2 20 MSD Spike	MS Result 29.8 2.2 41.0 2315487 MS	Result 30.1 2.2 41.1 MSD	% Rec 113 110 112 MS	% Rec 114 111 113 MSD	Limits 90-110 90-110 90-110 % Rec	1 1 0	RPD 15 15 15 15 Max RPD	M0 M0 M0
Chloride Fluoride Sulfate MATRIX SPIKE & MATR	Units mg/L mg/L mg/L RIX SPIKE DUP	40235824001 Result 7.3 <0.095 18.5 LICATE: 2315 40235317002 Result	MS Spike Conc. 20 2 20 486 MS Spike Conc.	Spike Conc. 20 2 20 MSD Spike Conc.	MS Result 29.8 2.2 41.0 2315487 MS Result	Result 30.1 2.2 41.1 MSD Result	% Rec 113 110 112 MS % Rec	% Rec 114 111 113 MSD % Rec	Limits 90-110 90-110 90-110 90-110 % Rec Limits	1 1 0 RPD	RPD 15 15 15 15 Max RPD 15	M0 M0 M0 M0

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

Sample: MW-301 PWS:	Lab ID: 4023531 Site ID:	7001 Collected: 10/14/21 17:05 Sample Type:	Received:	10/16/21 08:35	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Ser	vices - Greensburg				
Radium-226	EPA 903.1	0.172 ± 0.337 (0.617) C:NA T:96%	pCi/L	11/17/21 12:14	13982-63-3	
	Pace Analytical Ser	vices - Greensburg				
Radium-228	EPA 904.0	-0.0327 ± 0.419 (0.973) C:61% T:89%	pCi/L	11/15/21 11:02	2 15262-20-1	
	Pace Analytical Ser	vices - Greensburg				
Total Radium	Total Radium Calculation	0.172 ± 0.756 (1.59)	pCi/L	11/24/21 15:38	3 7440-14-4	



ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

Sample: MW-84A PWS:	Lab ID: 4023 Site ID:	5317002 Collected: 10/14/21 15:20 Sample Type:	Received:	10/16/21 08:35	Matrix: Water	
F W3.	Sile 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 ± 0.242 (0.493) C:NA T:100%	pCi/L	11/17/21 12:14	13982-63-3	
	Pace Analytical	Services - Greensburg				
Radium-228	EPA 904.0	0.243 ± 0.576 (1.27) C:60% T:88%	pCi/L	11/15/21 11:01	15262-20-1	
	Pace Analytical	Services - Greensburg				
Total Radium	Total Radium Calculation	0.243 ± 0.818 (1.76)	pCi/L	11/24/21 15:38	3 7440-14-4	



QUALITY CONTROL - RADIOCHEMISTRY

Project:	25219067 COLU	VIBIA CCR BACKGR	ND			
Pace Project No.:	40235317					
QC Batch:	471019		Analysis Method:	EPA 903.1		
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-2	26	
			Laboratory:	Pace Analytical	Services - Greensbu	rg
Associated Lab Sa	mples: 4023531	7001, 40235317002				
METHOD BLANK:	2273682		Matrix: Water			
Associated Lab Sa	mples: 4023531	7001, 40235317002				
Para	meter	Act ± Uno	c (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226		-0.0899 ± 0.216 (0).540) C:NA T:95%	pCi/L	11/17/21 12:14	

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.



QUALITY CONTROL - RADIOCHEMISTRY

Project:	25219067 COLU	/IBIA CCR BACK	GRND			
Pace Project No.:	40235317					
QC Batch:	471020		Analysis Method:	EPA 904.0		
QC Batch Method:	EPA 904.0		Analysis Description:	904.0 Radium 2	228	
			Laboratory:	Pace Analytical	Services - Greensbu	rg
Associated Lab Sa	mples: 40235317	001, 402353170	02			
METHOD BLANK:	2273691		Matrix: Water			
Associated Lab Sa	mples: 40235317	001, 402353170	02			
Para	meter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228		0.552 ± 0.431	(0.853) C:67% T:79%	pCi/L	11/19/21 11:42	

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.



QUALIFIERS

Project: 25219067 COLUMBIA CCR BACKGRND

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

Pace Project No.: 40235317

DEFINITIONS

Act - Activity

(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

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

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

WORKORDER QUALIFIERS

WO: 40235317

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

ANALYTE QUALIFIERS

- H1 Analysis conducted outside the recognized method holding time.
- H6 Analysis initiated outside of the 15 minute EPA required holding time.
- M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
- P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.



QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40235317

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

				Full List A ALL SAM		12	1	5	9	8	7	6	G	4	3	N		ITEM #
				Fuil List Metals = B, Ca, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li Hg, Mo, Se, ALL SAMPLES UNFILTERED	ADDITIONAL COMMENTS									· _	· · · · · · · · · · · · · · · · · · ·	MW-84A	MW-301	Section A Required Client Information: Company: SCS ENGINEERS Address: 2830 Dairy Drive Address: 2830 Dairy Drive Fmail: mbiodgetu@csengineers.com Phone: 608-216-7362 Fax Requested Due Date: Requested Due D
			ß	Mo, Se, TI			- -											Section B Required Project Information: Report To: Meghan Blodgett Copy To: Purchase Order #: Project Name: 25219067 Q Project #: 2521907 Q Projec
			\mathbb{V}	•	RELIN	—		+			\vdash					5	5	MATRIX CODE (see valid codes to left)
			5	•	IQUISHE													SAMPLE TYPE (G=GRAB C=COMP)
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Contact	Blodgett, I	vleghan	Contact	Adam Watson			Contact	Milewsky, Dan	
Email	mblodgett	@scsengineers.com	Email	awatson@scseng	gineers.co	n	Email	dan.milewsky@pace	elabs.com
Address	2830 Dain	/ Drive	Address	2830 Dairy Drive			Address	1241 Bellevue Stree	t
Address 2	<u></u>		 Address 2				Address 2	Suite 9	
City	Madison		 City	Madison	·		City	Green Bay	
State	WI	Zip 53718	State	WI Zip 5	3718		State	WI Zip 5430)2
	608-216-7		Phone	608-216-7362			Phone	(920)469-2436	
Inf	fo								
		25219067 Columbia CCR Secondary Pond	Due Date	10/08/2021	Prof	ile <u>39</u> 4	46-12	Quote	
Project	Manager _	Milewsky, Dan	_ Return Date		Carri	ier Mo	st Economical	Location	
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4	wт	рН	250mL plas	stic unpres	4	0	M-1-203-03BB		
4	wт	TDS, CI, F, SO4	250mL plas	stic unpres	4	0	M-1-203-03BB		
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				Page 1 of	1			venneu by.	

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F-GB-C-046-Rev.03 (11Feb2020) Sample Preservation Receipt Form

	Doci	ument Name:		
Pace Analytical [®]	Sample Condition	on Upon Receipt (SC	CUR)	nt Revised: 26Mar2020
1241 Bellevue Street, Green Bay, WI 54302		cument No.:		Author:
See Bay, WI 54302	ENV-FRM-0	GBAY-0014-Rev.00	0 Pace Gre	een Bay Quality Office
Sample C	ondition Une			
Cample C	onation upc	on Receipt Forn	n (SCUR)	
Client Name SPE T		Project #:		
Client Name:) > Engineer	3		WO#:4	0235317
Client Name: SCS Engineer		Valtco		
Pace Other:				
Tracking #:			40235317	
Custody Seal on Cooler/Box Present: Tyes	no Seals intact	yes 🗖 no		
Custody Seal on Samples Present:	O Seals intact		· · · · · · · · · · · · · · · · · · ·	
Packing Material: 🔲 Bubble Wrap 🥅 Bubble	e Bags 🕅 Non	e 🗍 Other		
	Type of Ice: Wet	Blue Dry None	X Samples on	ice, cooling process has begun
Cooler Temperature Uncorr: 5 /Corr: 5	<u>></u>	-		Person examining contents:
Temp Blank Present: F yes R no	Biological	Tissue is Frozen: Г	yes no	Date: 016/21 /Initials: 12
Temp should be above freezing to 6°C. Biota Samples may be received at \leq 0°C if shipped on Dry			Γ	
		I	<u>l</u>	Labeled By Initials:
		2.2.14.		10/16/21 AZ
		3 does ha	ve date	Aime 10/16/21 M
Sampler Name Signature on COC:		4.	J	
Samples Arrived within Hold Time:	Yes 🗆 No	5.		
- VOA Samples frozen upon receipt	□Yes □No	Date/Time:		
	∃Yes XNo	6.		
Sufficient Volume:		7.	<u> </u>	
		8.		
			· · · · · · · · · · · · · · · · · · ·	
Correct Containers Used:	Yes No	9.		
-Pace Containers Used:	Yes □No □N/A			
-Pace IR Containers Used:	∃Yes □No Ska ZA			
Containers Intact:	QYes □No	10.		
Filtered volume received for Dissolved tests		11.		
-Includes date/time/ID/Analysis Matrix:				
	JYes DNo SAN/A	13		
	$\exists Yes \square No MN/A$	ю.		
Pace Trip Blank Lot # (if purchased):				
Client Notification/ Resolution:		If che	acked see attachor	d form for additional comments
Person Contacted:	Date/T			
Comments/ Resolution:			·····	·
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PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample logir

Page____of____

C4 December 2021 Resample



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

January 04, 2022

Meghan Blodgett SCS ENGINEERS 2830 Dairy Drive Madison, WI 53718

RE: Project: 25221067.00 ALLIANT COLUMBIA Pace Project No.: 40238756

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on December 22, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network: • Pace Analytical Services - Green Bay

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

Sincerely,

Day Milery

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

Enclosures

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





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

CERTIFICATIONS

Project: 25221067.00 ALLIANT COLUMBIA

Pace Project No.: 40238756

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302 Florida/NELAP Certification #: E87948 Illinois Certification #: 200050 Kentucky UST Certification #: 82 Louisiana Certification #: 04168 Minnesota Certification #: 055-999-334 New York Certification #: 12064 North Dakota Certification #: R-150 Virginia VELAP ID: 460263 South Carolina Certification #: 83006001 Texas Certification #: T104704529-14-1 Wisconsin Certification #: 405132750 Wisconsin DATCP Certification #: 105-444 USDA Soil Permit #: P330-16-00157 Federal Fish & Wildlife Permit #: LE51774A-0



SAMPLE SUMMARY

Project: 25221067.00 ALLIANT COLUMBIA

Pace Project No.: 40238756

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40238756001	MW-309	Water	12/21/21 13:40	12/22/21 07:30
40238756002	FIELD BLANK	Water	12/21/21 13:40	12/22/21 07:30



SAMPLE ANALYTE COUNT

Project: 25221067.00 ALLIANT COLUMBIA

Pace Project No.: 40238756

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40238756001	MW-309	EPA 6020B	 кхs	1
			MEA	7
40238756002	FIELD BLANK	EPA 6020B	KXS	1

PASI-G = Pace Analytical Services - Green Bay



ANALYTICAL RESULTS

Project: 25221067.00 ALLIANT COLUMBIA

i iojeci.

Pace Project No.: 40238756

Sample: MW-309	Lab ID:	40238756001	Collected	d: 12/21/21	13:40	Received: 12/	22/21 07:30 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytica	I Method: EPA 6	020B Prepa	aration Met	hod: Ef	PA 3010A			
	Pace Ana	alytical Services	- Green Bay	/					
Boron	36.4	ug/L	10.0	3.0	1	12/27/21 06:57	12/27/21 22:38	7440-42-8	
Field Data	Analytica	I Method:							
	Pace Ana	alytical Services	- Green Bay	/					
Field pH	7.45	Std. Units			1		12/21/21 13:40		
Field Specific Conductance	1382	umhos/cm			1		12/21/21 13:40		
Oxygen, Dissolved	9.33	mg/L			1		12/21/21 13:40	7782-44-7	
REDOX	142.9	mV			1		12/21/21 13:40		
Turbidity	2.67	NTU			1		12/21/21 13:40		
Static Water Level	782.93	feet			1		12/21/21 13:40		
Temperature, Water (C)	11.17	deg C			1		12/21/21 13:40		



ANALYTICAL RESULTS

Project: 25221067.00 ALLIANT COLUMBIA

Pace Project No.: 40238756

Sample: FIELD BLANK	Lab ID:	40238756002	Collecte	ed: 12/21/2	21 13:40	Received: 12/	22/21 07:30 Ma	atrix: Water	
Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	,	Method: EPA 6			ethod: EF	PA 3010A			
Boron	<3.0	ug/L	10.0	3.0	1	12/27/21 06:57	12/27/21 22:23	7440-42-8	



QUALITY CONTROL DATA

-)	21067.00 ALLIA 38756	ANT COLUMBIA										
QC Batch: 405	5008		Analy	ysis Metho	d: l	EPA 6020B						
QC Batch Method: EP	A 3010A		Anal	ysis Descri	ption: 6	6020B MET						
			Labo	oratory:	I	Pace Analy	ical Servic	es - Green	Bay			
Associated Lab Samples:	402387560	001, 4023875600	2									
METHOD BLANK: 2337	7706			Matrix: W	/ater							
Associated Lab Samples	402387560	001, 4023875600	2									
			Blai	nk	Reporting							
Parameter		Units	Res	ult	Limit	Anal	yzed	Qualifier	s			
Boron		ug/L		<3.0	10.	0 12/27/2	1 22:16					
LABORATORY CONTRO	L SAMPLE:	2337707										
			Spike	LC	S	LCS	% R	ec				
Parameter		Units	Conc.	Re	sult	% Rec	Limi	ts	Qualifiers			
Boron		ug/L	25	50	246	9	9 8	30-120		_		
MATRIX SPIKE & MATRI		LICATE: 2337	708		2337709							
		LIOATE. 2007	MS	MSD	2001100	,						
		40238756001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Boron	ug/L	36.4	250	250	273	272	94	94	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.



QUALIFIERS

Project: 25221067.00 ALLIANT COLUMBIA

Pace Project No.: 40238756

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.



QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:25221067.00 ALLIANT COLUMBIAPace Project No.:40238756

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40238756001	MW-309	EPA 3010A	405008	EPA 6020B	405071
40238756002	FIELD BLANK	EPA 3010A	405008	EPA 6020B	405071
40238756001	MW-309				

Pace Analytical*			STODY			•	i				LAB U	ISE ONLY- Aff		しょうしん ダイン アンド・ディー	el Here or List Pace Workorder Number or Number Here
Company: SCS Eng;			Billing Info								a a ser	ALL S	HADED	AREAS a	are for LAB USE ONLY
Address: 2830 Dai			E	Se	~~				11124 		Conta	iner Preserva	itive Type *	*	Lab Project Manager:
Report To: Meyhan B Copy To:	Jodgett		Email To: Site Collec	MBlc	odget	tesc		veari	(6) r	methan	ol, (7) sod		3) sodium thi	osulfate, (9) he	hloric acid, (4) sodium hydroxide, (5) zinc acetate, exane, (A) ascorbic acid, (B) ammonium sulfate,
Customer Project Name/Number:			Site Collec	County/Ci	ity: Ti	ime Zone C	ollected:					Analyse			Lab Profile/Line: Lab Sample Receipt Checklist:
25221067	1 m) #:	WI	Colum	Compliar] PT [] M		[] ET	-						Custody Seals Present/Intact N NA Custody Signatures Present Y N NA
Phone: Email: 608-224-2830 Collected By (print):	Purchase Orde	er #:			[] Yes DW PWS	[] No ID #:				- Constant		;			Collector Signature Present Y N NA Bottles Intact Y N NA Correct Bottles N NA
Ada Watton Collected By (signatyle):	Quote #: Turnaround D)ate Require	ed:		1	tion Code: tely Packed	on Ice:								Sufficient Volume Samples Received on Ice V NA VOA - Headspace Acceptable V NA
Sample Disposal:	Rush:			· · · · ·		[] No ered (if appl	licable):						and the second		USDA Regulated Soils Samples in Holding/Time Y N NA Residual Chloring Present Y N NA Cl Strips:
[] Dispose as appropriate [] Return [] Archive: [] Hold:	[] 2 Day			· · ·	[] Yes Analysis:	K) No	. *			5					Sample pH Acceptable Y N NA pH Strips: Sulfide Present Y N NA
* Matrix Codes (Insert in Matrix bo Product (P), Soil/Solid (SL), Oil (O										β					Lead Acetate Strips:
Customer Sample ID	Matrix *	Comp / Grab	Collect Composi	ite Start)	· ·	osite End	Res Cl	# of Ctns		Bo					Lab Sample # / Comments:
mw-309	GW	+	Date	Time 1340	Date	Time		1		X					1 001
Field Blank	2A		12/21/20				1	1		X					002
	_				<u> </u>	<u> </u>				<u> </u>					
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		!								<u> </u>					
Customer Remarks / Special Condit	ions / Possible I.		Type of Ice Packing Ma	aterial Use	d:			one		Lab	Tracking	s PRESENT (< #: 2 ived via:	697		/A Lab Sample Temperature Info: Temp Blank Received: 1 N NA Therm ID#:
Relinquished by/Company: (Signatu	ure)		Radchem s /Time:			500 cpm):		I NA			FEDEX Date/Tin	UPS Cli	ent Cou	rier Pace MTJL LAB US	Courier Cooler 1 Corrected Demp:oC
	CS Engly			1315	\wedge		11 1-10						Table	#:	
Relinquished by/Company: (Signatu	ire)	Date	Time		Received b		Kignat	They	DRI	0	Date/Tir	10°, 2/2,	Acctnu Templ Prelog	ate:	Trip Blank Received: Y N NA HCL MeOH TSP Other
Relinquished by Company: (Signatu	ıre)	Date	/Time:		Réceived b	oy/Company	/: (Signati	uje)	- <u>6~</u> 7	-	Date/Tir	ne:	PM: PB:	////	Non Conformance(s): Page: YES / NO

Clie	nt l	Nar	ne:	2	a. 5(10	$\hat{\boldsymbol{\Sigma}}$	\mathcal{C}	ŹŊ	J	NC	s Ver	Sam	ple	Pro	ese ojec	e rva st #	tio (n R	ece	eipt 58	Foi ဂါ (rm S (e.							1241 E	Bellevue	Services, LLC Street, Suite 9 Bay, WI 54302
	All o	contai	ners r	eedin	g pres	ervati	on ha	ve be	en ch	eoked Lab	and r Lot# c	noted to of pH p	below: baper:	7 ^{kes}	□N0 D0	□N/A 104	Lai	b Std i	#ID of	prese	ervatio	n (if pł	-l adju	sted):					Initial comp	when	Eu	Date/ Time:	
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			L		ass						Plast						als					ars		Ge	enera		ls (>61	0H ≤2	in Act _I	H ≥12	1≤2	after adjusted	Volume (mL)
Pace Lab #	AG1U	BG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	VG9A	DG9T	VG9U	VG9H	NG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	N	VOA Vials	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after	
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AG4S AG4U												lastic lastic									al HC al Me				PFU P5T		-		unpre Na T		Ifate		
AG40 AG5U				-						200	inc p	143110	1120						nL cle			011				ziplo							
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F-GB-C-046-Rev.03 (11Feb2020) Sample Preservation Receipt Form

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Page 11 of 12

	1	Document Name:	Degument Revised: 26Ma-2000
Pace Analytical®	Sample Cor	ndition Upon Receipt (SCU	
1241 Bellevue Street, Green Bay, WI 54302	ENV-FF	Document No.: RM-GBAY-0014-Rev.00	Author: Pace Green Bay Quality Office
Sample C		Upon Receipt Form (
$\leq \rho \leq$	Gna	Project #:	
Client Name:	<u>_ 41ep</u>		JO#:40238756
Courier: CS Logistics T Fed Ex T Speede	e 🗖 UP-6	Waltco	
Client Pace Other:			
Tracking #:			10238756
Custody Seal on Cooler/Box Present: 🔲 yes Custody Seal on Samples Present: 🗔 yes 🕅		intact: 🔲 yes 🔽 no 📃 intact: 🔲 yes 🗖 no	
Packing Material: 🔲 Bubble Wrap			
Thermometer Used SR - 105			Samples on ice, cooling process has begun
Cooler Temperature Uncorr: 2_/Corr:	2		Person examining contents:
Temp Blank Present: 🕅 yes 🔲 no	Biolog	jical Tissue is Frozen: 🔲 y	ves no Date: /Initials.
Temp should be above freezing to 6° C. Biota Samples may be received at $\leq 0^{\circ}$ C if shipped on Dr	y Ice.		Labeled By Initials: SRK
Chain of Custody Present:	Yes 🗆 No		
Chain of Custody Filled Out:	□Yes 口/No		الحراد ا
Chain of Custody Relinquished:	∏/res □No		ď
Sampler Name & Signature on COC:	Yes No	□n/A 4.	
Samples Arrived within Hold Time:	ØYes □No	5.	
- VOA Samples frozen upon receipt	□Yes □No	Date/Time:	
Short Hold Time Analysis (<72hr):	□Yes □No	6.	
Rush Turn Around Time Requested:	□Yes ZNo	7.	
Sufficient Volume:		8.	
For Analysis: Zı́Yes ⊡No MS/MSD	Yes No		d_{ij}
Correct Containers Used:	QYes □No	9.	
-Pace Containers Used:	ØYes □No	□n/A	
-Pace IR Containers Used:	□Yes □No		
Containers Intact:	ØYes □No	10.	
Filtered volume received for Dissolved tests	□Yes □No	ØN/A 11.	
Sample Labels match COC:	Yes Dyo	□N/A 12.	
-Includes date/time/ID/Analysis Matrix:	<u></u>		
Trip Blank Present:	□Yes □No	D N/A 13.	
Trip Blank Custody Seals Present	□Yes □No		
Pace Trip Blank Lot # (if purchased):		·	
Client Notification/ Resolution: Person Contacted:		If chec Date/Time:	ked, see attached form for additional comments
Comments/ Resolution:			

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

Page 2 of 2

Appendix D

Historical Monitoring Results

Number of Sampling Dates															
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	10/24/201
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
Calcium	ug/L	74000	72200	67600		74000	76000	70800	73200	76100	74900	77500	76600	76000	74000
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
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
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
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
Total Dissolved Solids	mg/L	316	322	316		324	316	328	342	344	342	314	328	372	330
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
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
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
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
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
Chromium	ug/L	2.5	1.9	1.8		2	2	1.9	2.4	2	1.6		2.4	1.5	1.6
Cobalt	ug/L	0.095	<0.036	0.053		<0.036	<0.036	<0.036	<0.036	<0.085	<0.085		<0.085	<0.085	<0.12
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
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
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
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
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
Thallium	ug/L	<0.14	<0.14	<0.14		<0.14	<0.14	<0.14	<0.14	<0.14	<0.14		<0.14	<0.14	<0.14
Total Radium	pCi/L	0.593	0.0809		1.37	0.825	0.404	1.39	0.0929	0.676	0.509		0.526	0.529	0.62
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
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
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
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
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
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
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
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
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

Location ID:	MW-84A						
Number of Sampling Dates							
Parameter Name	Units	4/3/2019	10/9/2019	2/3/2020	5/29/2020	10/8/2020	4/14/2021
Boron	ug/L	13.6	12	15.7	10	9.7	14.3
Calcium	ug/L	80100	73500	72700	77600	69200	69100
Chloride	mg/L	3.6	3.9	3.7	3.7	4.3	4.4
Fluoride	mg/L	<0.1	<0.1		<0.095	<0.095	<0.095
Field pH	Std. Units	7.03	7.23	7.51	7.34	7.49	7.34
Sulfate	mg/L	1.4	1.3	<2.2	1.5	1.3	1.4
Total Dissolved Solids	mg/L	318	310	316	340	320	328
Antimony	ug/L	<0.15	<0.15		<0.15	<0.15	0.55
Arsenic	ug/L	<0.28	0.46	0.38	0.34	0.49	0.91
Barium	ug/L	14.7	13.2	14	13.9	12.6	13.4
Beryllium	ug/L	<0.18	<0.25		<0.25	<0.25	0.47
Cadmium	ug/L	<0.15	<0.15		<0.15	<0.15	0.53
Chromium	ug/L	1.8	1.6	1.6	1.7	1.6	2.6
Cobalt	ug/L	<0.12	<0.12	<0.12	<0.12	<0.12	0.52
Lead	ug/L	<0.24	<0.24		<0.24	<0.24	0.55
Lithium	ug/L	0.56	0.52	0.58	0.4	0.39	1
Mercury	ug/L	<0.084	<0.084		<0.084	<0.066	<0.066
Molybdenum	ug/L	<0.44	<0.44	<0.44	<0.44	<0.44	0.62
Selenium	ug/L	<0.32	<0.32	<0.32	<0.32	<0.32	0.48
Thallium	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	0.66
Total Radium	pCi/L	0.681	0.247	0.1	0.395	0.39	0.285
Radium-226	pCi/L	0.199	0.247	0.1	0.368	0	-0.289
Radium-228	pCi/L	0.482	-0.024	-0.153	0.0273	0.39	0.285
Field Specific Conductance		637.2	614.1	618.4	613.7	610.1	610.9
Oxygen, Dissolved	mg/L	9.49	11.36	8.43	9.81	9.39	9.8
Field Oxidation Potential	my/L mV	103.4	181.7	121.5	135	153.2	95.6
Groundwater Elevation	feet	787.35	787.79	786.5	787.02	786.1	785.84
Temperature	deg C	10.2	11.8	10.3	10.6	11.9	10.2
Turbidity	NTU	1.9	2.41	1.23	2.15	0	2.45
pH at 25 Degrees C	Std. Units	7.4	7.5	7.4	7.6	7.6	7.6
pirat 25 Degrees C	Sid. Offics	7.4	7.5	7.4	7.0	7.0	7.0

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
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
Calcium	ug/L	126000	115000	108000	118000	129000	124000	120000	111000	108000	87200	112000	105000	101000	126000
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
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
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
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
Total Dissolved Solids	mg/L	478	486	464	490	444	514	502	458	462	362	464	502	424	462
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
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
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
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
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
Chromium	ug/L	2.1	0.58	0.59	<0.39	0.7	0.53	0.7	2.3	<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
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
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
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
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
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
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
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
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
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
eld Specific Conductance	umhos/cm	897	573	796	1464	859	1018	1354	698.4	691.7	561	774	799	767	883
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
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
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
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
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
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

Location ID:	MW-301					
Location ID: Number of Sampling Dates						
Parameter Name	Units	10/9/2019	2/3/2020	5/29/2020	10/8/2020	4/14/2021
Boron	ug/L	35.9	27.9	21.3	28.8	22.2
Calcium	ug/L	114000	113000	112000	93000	117000
Chloride	mg/L	1.7	1.3	2	3.4	1.5
Fluoride	mg/L	<0.1		<0.095	<0.095	<0.095
Field pH	Std. Units	6.67	6.89	6.73	6.95	6.66
Sulfate	mg/L	8.4	7.2	11.5	25.1	8.5
Total Dissolved Solids	mg/L	418	462	452	412	472
Antimony	ug/L	<0.15		<0.15	0.33	<0.15
Arsenic	ug/L	0.42	<0.28	0.33	0.62	<0.28
Barium	ug/L	10	10.9	9.8	9.4	8.9
Beryllium	ug/L	<0.25		<0.25	<0.25	<0.25
Cadmium	ug/L	<0.15		<0.15	0.19	<0.15
Chromium	ug/L	<1	<1	<1	<1	<1
Cobalt	ug/L	<0.12	0.17	<0.12	0.29	<0.12
Lead	•			-		
	ug/L	<0.24		<0.24	0.25	<0.24
Lithium	ug/L	0.61	0.67	0.47	0.46	0.58
Mercury	ug/L	<0.084		<0.084	<0.066	<0.066
Molybdenum	ug/L	<0.44	<0.44	<0.44	<0.44	<0.44
Selenium	ug/L	<0.32	<0.32	<0.32	<0.32	<0.32
Thallium	ug/L	<0.14	<0.14	<0.14	0.3	<0.14
Total Radium	pCi/L	0.701	0.502	0.193	0.38	1.16
Radium-226	pCi/L	0.252	0.136	0	0.0511	0.418
Radium-228	pCi/L	0.449	0.366	0.193	0.329	0.739
Field Specific Conductance	umhos/cm	801	868	797	760	857
Oxygen, Dissolved	mg/L	1.67	1.07	2	1.22	3.9
Field Oxidation Potential	mV	173	132.3	118.7	183.9	102.9
Groundwater Elevation	feet	788.47	787.24	787.77	786.53	786.5
Temperature	deg C	11.3	8.5	8.1	11	7.4
Turbidity	NTU	2.12	1.41	0	0	2.41
pH at 25 Degrees C	Std. Units	7	6.8	7	7.2	6.9

20																				
																				12/21/2021
•	-	-		-									50.7	55.3		65.9	-	49.9	-	36.4
ug/L			39600																	
mg/L	147	157	157	141	203	557	811	329		145	43.2	350			575		390		519	
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	
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
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	
mg/L	576	552	562	478	548	1210	1570	830		548	370	960			1160		916		1110	
ug/L	0.28	<0.15	0.36	0.24	0.76	0.31	0.57	<0.15												
ug/L	<0.28	0.35	0.77	<0.28	0.56	0.55	0.46	<0.28												
ug/L	24.1	22.2	21.3	15.3	18.3	31.2	46.2	22.2												
ug/L	0.21	<0.18	0.2	<0.18	0.38	<0.18	<0.18	<0.18												
ug/L	0.11	<0.081	0.27	<0.081	0.58	0.23	0.3	<0.15												
ug/L	2.3	1.9	2.3	1.9	2.2	<1	2.6	1.3												
ug/L	0.5	0.18	0.39	0.11	0.54	0.29	0.35	<0.12												
ug/L	0.66	<0.2	0.39	<0.2	0.76	0.34	0.39	<0.24												
ug/L	1.4	0.88	1.1	0.77	1.1	0.88	1.1	0.76												
ug/L	<0.13		<0.13	<0.13	<0.13	<0.13	<0.13	<0.084	<0.084											
ug/L	2.1	2.6	2	<0.44	0.7	0.47	<0.44	<0.44												
ug/L	0.39	0.37	0.6	0.41	1.1	0.51	0.39	0.33												
ug/L	0.16	<0.14	0.83	<0.14	0.57	0.42	0.38	<0.14												
pCi/L	0.516	1.25	1.13	0.895	0.673	1.74	0.754	0.569												
pCi/L	0.486	0.815	0.539	0.0638	-0.208	0.334	0.232	0.569												
pCi/L	0.03	0.431	0.595	0.831	0.673	1.41	0.522	-0.304												
umhos/cm	983	1094	985	921	1057	2290	2948	1423	1424	1041	687	1785	1726	1656	2222	2227	1804	3072	2079	1382
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
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
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
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
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
-	-																			
	mg/L Std. Units mg/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L u	ug/L 31.4 ug/L 42700 mg/L 147 mg/L 147 mg/L <0.1	ug/L 31.4 31 ug/L 42700 41800 mg/L 147 157 mg/L <0.1	ug/L 31.4 31 30.4 ug/L 42700 41800 39600 mg/L 147 157 157 mg/L <0.1	ug/L 31.4 31 30.4 28 ug/L 42700 41800 39600 52700 mg/L 147 157 157 141 mg/L 42700 41800 39600 52700 mg/L 147 157 157 141 mg/L 7.84 8.08 7.71 7.59 mg/L 12.2 12.2 12 17.5 mg/L 576 552 562 478 ug/L 0.28 0.15 0.36 0.24 ug/L 0.28 0.35 0.77 <0.28	ug/L 31.4 31 30.4 28 26.6 ug/L 42700 41800 39600 52700 67600 mg/L 147 157 157 141 203 mg/L <0.1	ug/L 31.4 31 30.4 28 26.6 35.5 ug/L 42700 41800 39600 52700 67600 63800 mg/L 147 157 157 141 203 557 mg/L <0.1	ug/L 31.4 31 30.4 28 26.6 35.5 40.5 ug/L 42700 41800 39600 52700 67600 63800 93600 mg/L 147 157 157 141 203 557 811 mg/L <0.1	ug/L31.43130.42826.635.540.530ug/L4270041800396005270067600638009360055200mg/L147157157141203557811329mg/L<0.1	ug/L 31.4 31 30.4 28 26.6 35.5 40.5 30 ug/L 42700 41800 39600 52700 67600 63800 93600 55200 mg/L 147 157 157 141 203 557 811 329 mg/L <0.1	ugll 31.4 31 30.4 28 26.6 35.5 40.5 30 37.4 ugl 42700 41800 39600 52700 67600 63800 93600 55200 45300 mgl 147 157 157 141 203 557 811 329 145 mgl 40.1 <0.1	ugl31.431.430.42826.635.540.53037.433.4ugl42700418003960052700676006380093600552004530046900mgl14715715714120355781132914543.2mgl50.1<0.1	ugl 31.4 31 30.4 28 26.6 35.5 40.5 30 37.4 33.4 54.6 ugl 42700 41800 39600 52700 67600 63800 93600 55200 45300 46900 51600 mgl 147 157 157 141 203 557 811 329 145 43.2 350 mgl 167.1 40.1 40.1 41.1 40.1 40.1 40.1 40.1 40.1 40.1 40.1 40.1 40.1 40.1 40.1 40.0	ugl314313042826.635.540.53037.433.454.650.7ugl4270041800396005270067600638009360055200453004690051600mgl14715715714120355781132914543.235.0skl1717.507.507.557.537.837.567.497.757.357.33mgl12.212.21217.524.133.143.335.935.221.928.6mgl57655255247854812101570830548370960ugl0.280.350.77<0.28	ugl. 31.4 31 30.4 28 28.6 35.5 40.5 30 37.4 33.4 54.6 50.7 55.3 ugl. 42700 41800 39600 52700 67600 63800 93600 55200 4530 46900 5100 mgl. 71.7 157 117 21.1 20.1 <-1.1 32.9 145 43.2 35.0 Std. Units 7.84 8.08 7.71 7.59 7.57 7.55 7.53 7.83 7.56 7.49 7.57 7.55 7.53 7.53 7.55 <	upl 314 31 304 28 26.8 35.5 40.5 30 37.4 33.4 54.8 50.7 55.3 57.7 uplL 4170 4180 3960 5700 67800 6380 9300 55200 4530 4630 56100 575 mgL 47.1 40.1 40.1 40.1 40.1 40.1 40.1 - 40.1 - 40.1 40.0 40.0 - 575 Std.unis 7.84 8.08 7.71 7.99 7.5 7.55 7.53 7.68 7.49 7.75 7.55 7.53 7.68 7.52 7.55 7.58 7.69 5.52 6.52 4562 4.10 5.53 7.53 7.69 5.52 6.52 4561 5.55 6.45 5.55 6.45 2.61 5.61 6.61 5.61 6.61 5.61 6.61 6.62 6.22 6.70 6.71 6.71 <td>upl 314 31 304 28 28.6 35.5 40.5 30 37.4 33.4 54.6 50.7 55.3 67.7 65.90 upl 4170 4150 3800 5270 6700 6300 5200 4530 4600 5160 6500 4530 4600 5160 67.0 5600 40.0 5100 40.0<</td> <td>upl 314 31 304 28 286 355 405 300 470 334 548 507 553 577 659 4500 upl 4470 4570 4500 5700 6700 6500 5500 570 163 320 6400 4600 4600 500 - 455 575 783 781 781 780 78</td> <td>uple 314 31 304 328 288 288 485 300 570 5700 5700 5700 5700 5700 5700 5700 5700 5700 5700 5700 5700 570 570 570 570 570 570 570 570 570 570 570 570 570 570 570 570 570 770 770 770 <t< td=""><td>upl 31.4 31.4 31.4 31.4 31.4 31.4 31.4 51.6 51.7 51.7 51.9 <th< td=""></th<></td></t<></td>	upl 314 31 304 28 28.6 35.5 40.5 30 37.4 33.4 54.6 50.7 55.3 67.7 65.90 upl 4170 4150 3800 5270 6700 6300 5200 4530 4600 5160 6500 4530 4600 5160 67.0 5600 40.0 5100 40.0<	upl 314 31 304 28 286 355 405 300 470 334 548 507 553 577 659 4500 upl 4470 4570 4500 5700 6700 6500 5500 570 163 320 6400 4600 4600 500 - 455 575 783 781 781 780 78	uple 314 31 304 328 288 288 485 300 570 5700 5700 5700 5700 5700 5700 5700 5700 5700 5700 5700 5700 570 570 570 570 570 570 570 570 570 570 570 570 570 570 570 570 570 770 770 770 <t< td=""><td>upl 31.4 31.4 31.4 31.4 31.4 31.4 31.4 51.6 51.7 51.7 51.9 <th< td=""></th<></td></t<>	upl 31.4 31.4 31.4 31.4 31.4 31.4 31.4 51.6 51.7 51.7 51.9 <th< td=""></th<>

Location ID:	MW-310																			
Number of Sampling Dates Parameter Name	: 19 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
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
Calcium	ug/L	32400	33400	32100	32100	34300	39700	38800	54100		38800		57600	55400	41100	62000	56800	49300		38900
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
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
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
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
Total Dissolved Solids	mg/L	406	398	396	436	438	532	526	736		470		650		582	846	700	654		498
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
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
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
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
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
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
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

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
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
Calcium	ug/L	58000	61000	56600	62500	70700	76800	65700	75400		65600	63900	62200	73400	59000	61000
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
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
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
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
Total Dissolved Solids	mg/L	260	274	262	304	352	372	332	424		276	272	326	380	270	276
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
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
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
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
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
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
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

Appendix E

Statistical Evaluation

January 10, 2020 File No. 25219067.00

TECHNICAL MEMORANDUM

- SUBJECT:Statistical Evaluation of Groundwater Monitoring ResultsCOL Mod 4 Landfill, October 2019 Sampling Event
- PREPARED BY: Sherren Clark
- CHECKED BY: Nicole Kron

STATISTICAL METHOD

The statistical analysis uses a prediction interval approach as recommended for detection monitoring in the March 2009 United States Environmental Protection Agency (USEPA) Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities. For the prediction interval evaluation, intrawell testing was selected based on the considerations outlined in Chapter 6 of the Unified Guidance. The statistical program used to calculate the intrawell prediction interval is Sanitas[™].Under the intrawell approach, detection monitoring results are compared to upper prediction limits (UPLs) calculated based on background monitoring results from the same wells.

Eight rounds of background monitoring were performed prior to CCR disposal in the Mod 4 CCR landfill. The background wells for Mod 4 (MW-84A and MW-301) are shared background wells for all of the COL CCR units. Compliance wells for Mod 4 include MW-309, MW-310, and MW-311. For the Mod 4 compliance wells, background monitoring was performed from February 2018 through September 2018. Because the Mod 4 evaluation is intrawell, the background well data is not used in the statistical evaluation, but is available for use in data interpretation as needed.

For the October 2019 monitoring event and future events, the statistical approach was modified slightly from the previous compliance events. The previous events used an intrawell UPL without retesting, calculated using ChemStat software. The October 2019 event and future events will use 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 October 2019 monitoring event includes the following sample dates:

- October 8-9, 2019: All wells, all detection monitoring parameters
- December 23, 2019: MW-310, retest for calcium



TECHNICAL MEMORANDUM January 10, 2020 Page 2

TIME SERIES PLOTS

Time series plots were prepared for the required detection monitoring parameters to show the concentration variations over time, and are included in **Attachment A**. The time series plots include the three compliance wells and two background wells for Mod 4.

OUTLIER ANALYSIS

For the intrawell evaluation, an outlier analysis was performed for the background monitoring results at each of the three compliance wells. A statistical outlier is a value that is extremely different from the other values in the data set. The Sanitas outlier tests identify data points that do not appear to fit the distribution of the rest of the data set and determine if they differ significantly from the rest of the data. The outlier analysis performed in Sanitas includes the following steps:

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

The Sanitas output for the outlier analysis is provided in Attachment B.

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

For the October 2019 data evaluation, the following background values were identified as potential outliers and handled as described:

• Sulfate (MW-310): Two high results from the July and September 2018 sampling were flagged by Sanitas as statistical outliers. These results were kept in the dataset because there was no known explanation for the varying results, and the results fall within a reasonable range for this parameter. Because the background samples were all collected within one calendar year, the degree of natural variation and seasonality cannot yet be determined.

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• Total Dissolved Solids (MW-310): One high result from the September 2018 sampling was flagged by Sanitas as a statistical outlier. This result was kept in the dataset because there was no known explanation for the varying results, and the result falls within a reasonable range for this parameter. Because the background samples were all collected within one calendar year, the degree of natural variation and seasonality cannot yet be determined.

INTRAWELL PREDICTION LIMITS

Intrawell upper prediction limits (UPLs) were calculated using background data from the compliance wells for each monitored constituent, with outliers handled as noted above. The prediction limit analysis performed in Sanitas includes the following steps:

- If more than 50 percent of results are non-detect, apply a non-parametric UPL. For small background sample sizes, the non-parametric UPL is the highest background value. For a parameter with 100 percent non-detects in the background values, the Double Quanitification rule applies, which says that an statistically significant increase (SSI) occurs when two results exceeding the quantification limit are reported for a compliance well.
- 2) If 50 percent or fewer of the results are non-detect, run normality test (Shapiro Wilk/Francia) to assess whether the data fit a normal distribution or can be transformed to fit a normal distribution (e.g., lognormal).
- 3) If normal or transformed normal, calculate parametric UPL.
- 4) If not normal or transformed normal, calculate non-parametric UPL.

Consistent with the Unified Guidance, parametric prediction limits were calculated based on a 1-of-2 retesting protocol and a target 10 percent annual site-wide false positive rate. Sanitas establishes the per-test significance level based on user inputs of the number of events per year, number of constituents being evaluated, and number of compliance wells. For the October 2019 event, the following values were used:

Parameter	Value	Comments
Evaluations per year	2	April and October events
Constituents analyzed	6	Total of 7 constituents analyzed for detection monitoring. Fluoride not counted because all background results were non-detect
Compliance wells	3	MW-309, MW-310, MW-311

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

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For results with 100 percent non-detects in the background data, evaluation under the Double Quantification Rule means that a SSI has not occurred for a compliance well unless two sample results from the well exceed the laboratory's reporting limit or quanitification limit. For evaluation of parameters with less than 100 percent non-detects in the background sampling, the non-detects were replaced with a value of one-half the detection limit. For all parameters, only results at or above the laboratory's reporting limit or quanitification limit are compared to the UPL for SSI determination.

Intrawell prediction limit analysis results for 2019 are included in Attachment C.

Sanitas settings are provided in Attachment D.

RESULTS

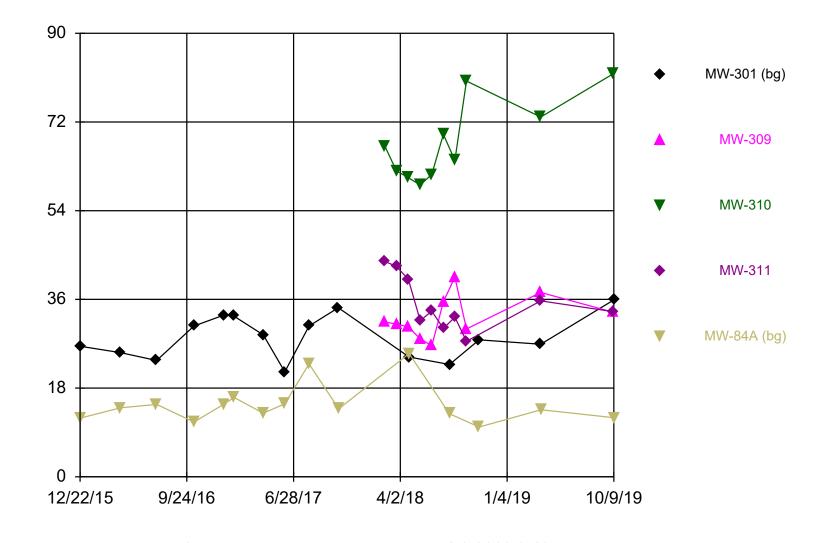
No SSIs were identified for the October 2019 monitoring event. Calcium exceeded the 1-of-2 UPL in the initial October sample from MW-310, but was below the UPL in the December retest sample; therefore, there is no SSI.

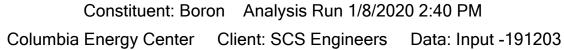
SCC/NDK/

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Attachment A

Times Series Plots



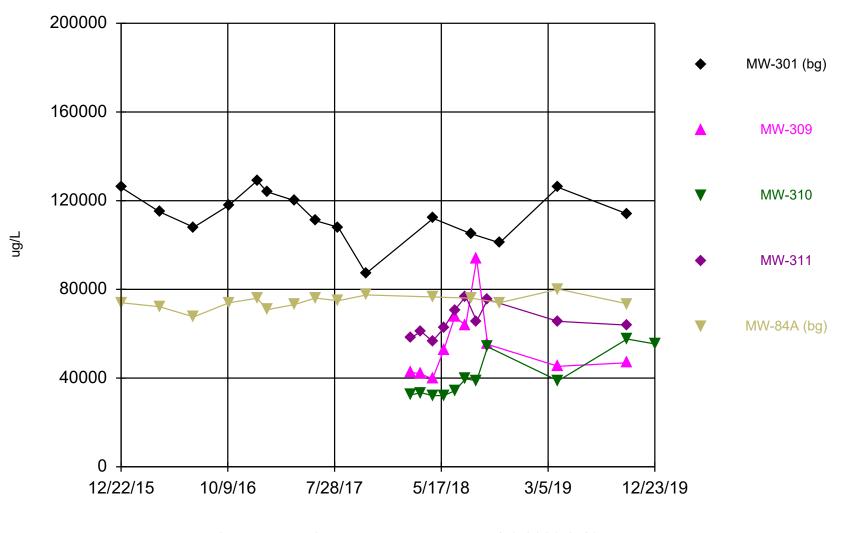


ng/L

Constituent: Boron (ug/L) Analysis Run 1/8/2020 2:42 PM

Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

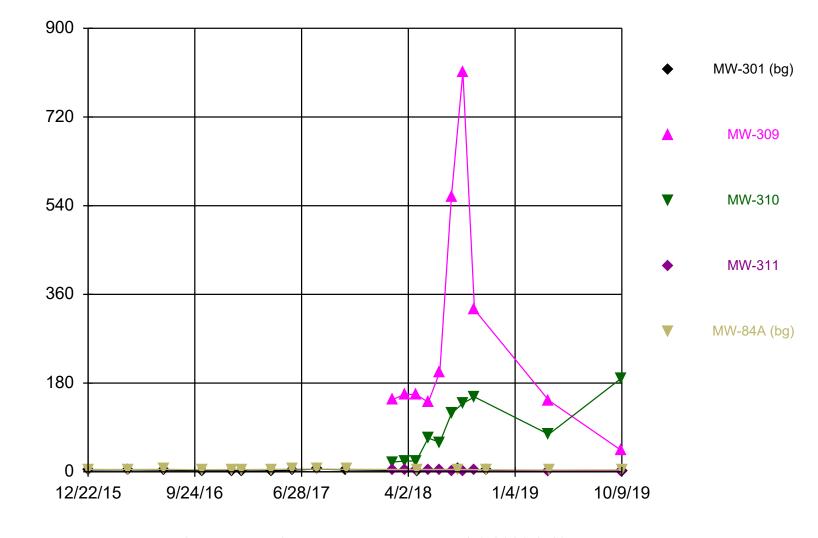


Constituent: Calcium Analysis Run 1/8/2020 2:40 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

Constituent: Calcium (ug/L) Analysis Run 1/8/2020 2:42 PM

Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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 (P6)		

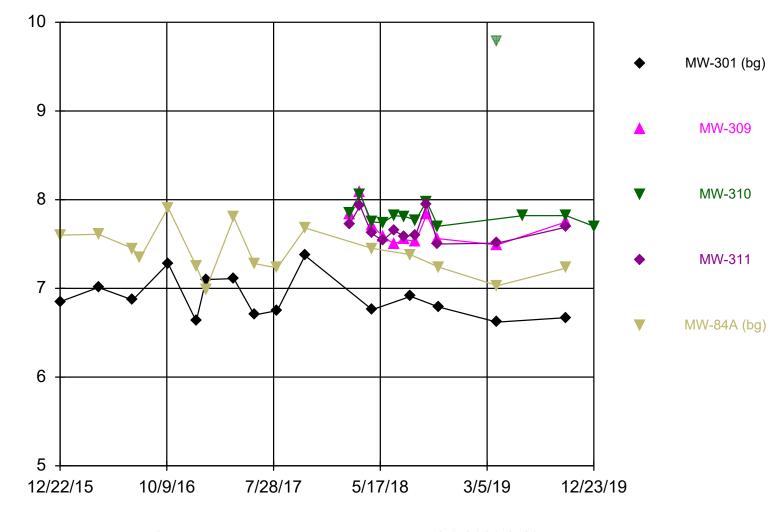


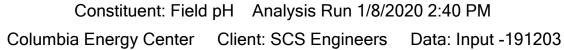
Constituent: Chloride Analysis Run 1/8/2020 2:40 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

mg/L

Constituent: Chloride (mg/L) Analysis Run 1/8/2020 2:42 PM

	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





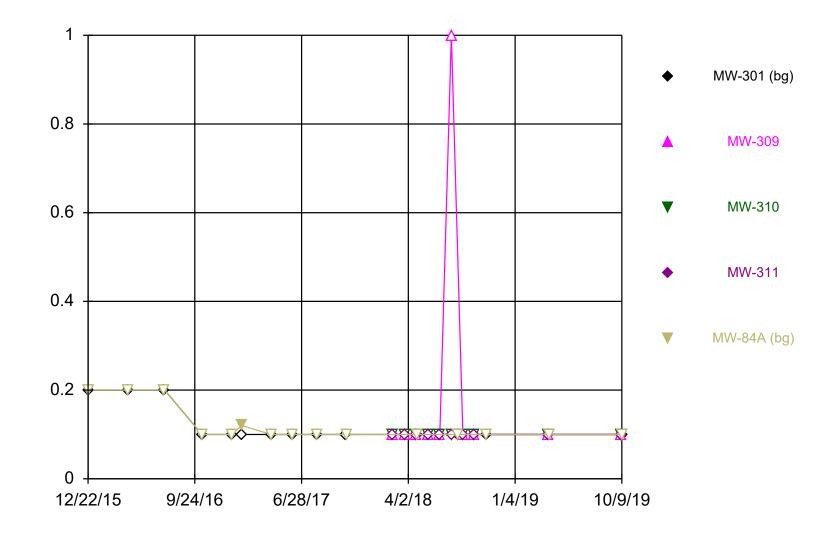
Std. Units

Constituent: Field pH (Std. Units) Analysis Run 1/8/2020 2:42 PM

	MW-301 (bg)	MW-309	MW-310	MW-311	MW-84A (bg)
12/22/2015	6.85				7.6
4/5/2016	7.01				7.61
7/8/2016	6.87				7.45
7/28/2016					7.34
10/13/2016	7.28				7.91
12/29/2016	6.63				7.25
1/25/2017	7.1				6.99
4/11/2017	7.11				7.8
6/6/2017	6.7				7.28
8/8/2017	6.75				7.23
10/23/2017	7.37				
10/24/2017					7.68
2/21/2018		7.84	7.85	7.72	
3/23/2018		8.08	8.06	7.93	
4/23/2018		7.71	7.75	7.62	
4/25/2018	6.76				7.45
5/24/2018		7.59	7.74	7.54	
6/23/2018		7.5	7.82	7.65	
7/23/2018		7.55	7.81	7.59	
8/8/2018	6.91				7.38
8/22/2018		7.53	7.77	7.6	
9/21/2018		7.83	7.98	7.95	
10/22/2018		7.56	7.7	7.5	
10/24/2018	6.79				7.24
4/2/2019	6.62	7.49	9.79 (R)	7.51	
4/3/2019					7.03
6/12/2019			7.82		
10/8/2019		7.75	7.82	7.69	
10/9/2019	6.67				7.23
12/23/2019			7.7		

Sanitas[™] v.9.6.24 Software licensed to SCS Engineers. UG Hollow symbols indicate censored values.



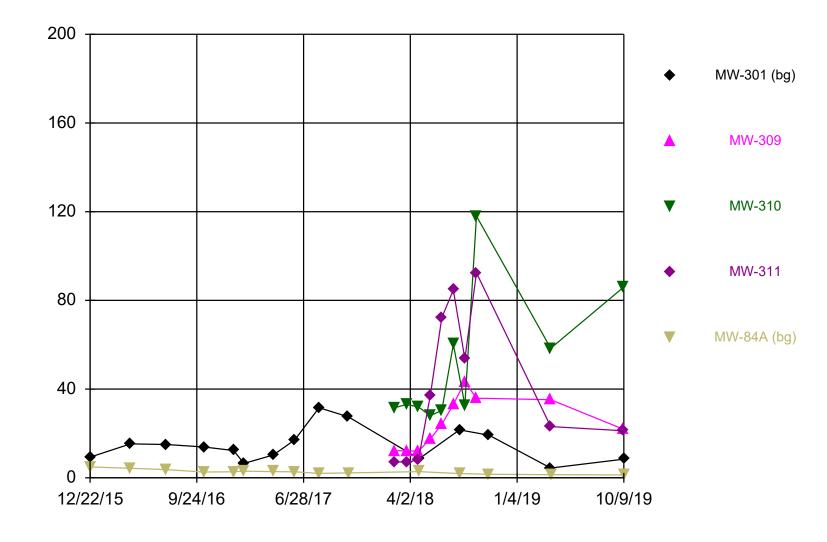


Constituent: Fluoride Analysis Run 1/8/2020 2:40 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

mg/L

Constituent: Fluoride (mg/L) Analysis Run 1/8/2020 2:42 PM

	MW-301 (bg)	MW-309	MW-310	MW-311	MW-84A (bg)
12/22/2015	<0.2				<0.2
4/5/2016	<0.2				<0.2
7/8/2016	<0.2				<0.2
10/13/2016	<0.1				<0.1
12/29/2016	<0.1				<0.1
1/25/2017	<0.1				0.12 (J)
4/11/2017	<0.1				<0.1
6/6/2017	<0.1				<0.1
8/8/2017	<0.1				<0.1
10/23/2017	<0.1				
10/24/2017					<0.1
2/21/2018		<0.1	<0.1	<0.1	
3/23/2018		<0.1	<0.1	<0.1	
4/23/2018		<0.1	<0.1	<0.1	
4/25/2018	<0.1				<0.1
5/24/2018		<0.1	<0.1	<0.1	
6/23/2018		<0.1	<0.1	<0.1	
7/23/2018		<1	<0.1	<0.1	
8/8/2018	<0.1				<0.1
8/22/2018		<0.1	<0.1	<0.1	
9/21/2018		<0.1	<0.1	<0.1	
10/24/2018	<0.1				<0.1
4/2/2019	<0.1	<0.1	<0.1	<0.1	
4/3/2019					<0.1
10/8/2019		<0.1	<0.1	<0.1	
10/9/2019	<0.1				<0.1

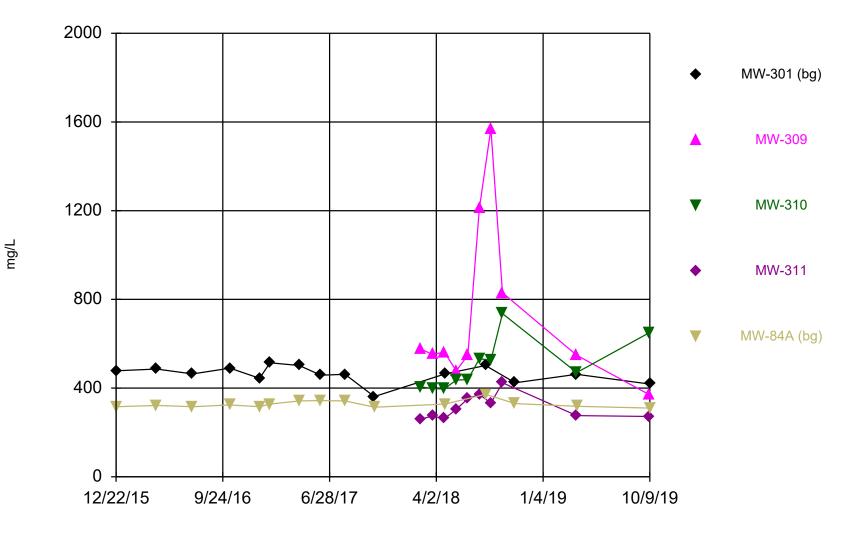


Constituent: Sulfate Analysis Run 1/8/2020 2:40 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

mg/L

Constituent: Sulfate (mg/L) Analysis Run 1/8/2020 2:42 PM

	MW-301 (bg)	MW-309	MW-310	MW-311	MW-84A (bg)
12/22/2015	9.3				4.9
4/5/2016	15.3				4.3
7/8/2016	15				3.7 (J)
10/13/2016	13.9				2.6 (J)
12/29/2016	12.3 (J)				2.7 (J)
1/25/2017	6.5				3
4/11/2017	10.3				2.8 (J)
6/6/2017	17.1				2.7 (J)
8/8/2017	31.6				2 (J)
10/23/2017	27.5				
10/24/2017					2.2 (J)
2/21/2018		12.2	31.6	7.1	
3/23/2018		12.2	33.1	7.2	
4/23/2018		12	32	7.9	
4/25/2018	8.6				2.8 (J)
5/24/2018		17.5	28	36.9	
6/23/2018		24.1	30.4	72.3	
7/23/2018		33.1	60.2	84.7	
8/8/2018	21.6				1.9 (J)
8/22/2018		43.3	32.8	53.6	
9/21/2018		35.9	118	92.4	
10/24/2018	19.2				1.6 (J)
4/2/2019	4.4	35.2	58.4	23.1	
4/3/2019					1.4 (J)
10/8/2019		21.9	85.9	21.2	
10/9/2019	8.4				1.3 (J)



Constituent: Total Dissolved Solids Analysis Run 1/8/2020 2:40 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

Constituent: Total Dissolved Solids (mg/L) Analysis Run 1/8/2020 2:42 PM

	MW-301 (bg)	MW-309	MW-310	MW-311	MW-84A (bg)
12/22/2015	478				316
4/5/2016	486				322
7/8/2016	464				316
10/13/2016	490				324
12/29/2016	444				316
1/25/2017	514				328
4/11/2017	502				342
6/6/2017	458				344
8/8/2017	462				342
10/23/2017	362				
10/24/2017					314
2/21/2018		576	406	260	
3/23/2018		552	398	274	
4/23/2018		562	396	262	
4/25/2018	464				328
5/24/2018		478	436	304	
6/23/2018		548	438	352	
7/23/2018		1210	532	372	
8/8/2018	502				372
8/22/2018		1570	526	332	
9/21/2018		830	736	424	
10/24/2018	424				330
4/2/2019	462	548	470	276	
4/3/2019					318
10/8/2019		370	650	272	
10/9/2019	418				310

Attachment B

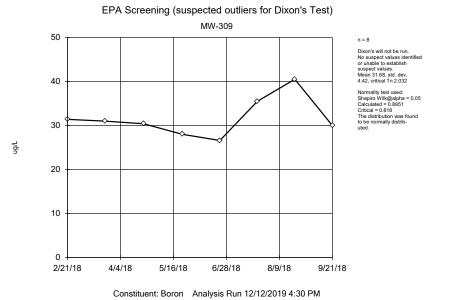
Outlier Analysis

Outlier Analysis

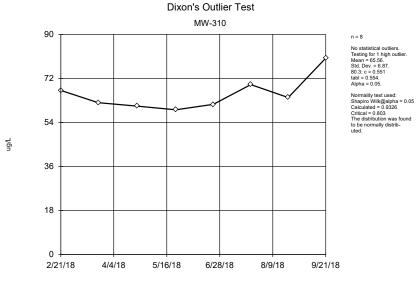
Columbia Energy Center Client: SCS Engineers Data: Input -191203 Printed 12/12/2019, 4:31 PM

Constituent	Well	<u>Outlier</u>	<u>Value(s)</u>	Date(s)	Method	<u>Alpha</u>	<u>N</u>	<u>Mean</u>	Std. Dev.	Distribution	Normality Test
Boron (ug/L)	MW-309	No	n/a	n/a	EPA 1989	0.05	8	31.68	4.42	normal	ShapiroWilk
Boron (ug/L)	MW-310	No	n/a	n/a	Dixon`s	0.05	8	65.56	6.87	normal	ShapiroWilk
Boron (ug/L)	MW-311	No	n/a	n/a	EPA 1989	0.05	8	35.23	6.1	normal	ShapiroWilk
Calcium (ug/L)	MW-309	No	n/a	n/a	EPA 1989	0.05	8	57125	17960	normal	ShapiroWilk
Calcium (ug/L)	MW-310	No	n/a	n/a	NP (nrm)	NaN	8	37113	7486	unknown	ShapiroWilk
Calcium (ug/L)	MW-311	No	n/a	n/a	EPA 1989	0.05	8	65838	7714	normal	ShapiroWilk
Chloride (mg/L)	MW-309	No	n/a	n/a	EPA 1989	0.05	8	312.8	246.6	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-310	No	n/a	n/a	EPA 1989	0.05	8	75.13	54.55	normal	ShapiroWilk
Chloride (mg/L)	MW-311	No	n/a	n/a	EPA 1989	0.05	8	2.825	0.6628	normal	ShapiroWilk
Field pH (Std. Units)	MW-309	No	n/a	n/a	EPA 1989	0.05	8	7.704	0.2016	normal	ShapiroWilk
Field pH (Std. Units)	MW-310	No	n/a	n/a	EPA 1989	0.05	8	7.848	0.1146	normal	ShapiroWilk
Field pH (Std. Units)	MW-311	No	n/a	n/a	EPA 1989	0.05	8	7.7	0.1569	normal	ShapiroWilk
Fluoride (mg/L)	MW-309	n/a	n/a	n/a	NP (nrm)	NaN	8	0.2125	0.3182	unknown	ShapiroWilk
Fluoride (mg/L)	MW-310	n/a	n/a	n/a	NP (nrm)	NaN	8	0.1	0	unknown	ShapiroWilk
Fluoride (mg/L)	MW-311	n/a	n/a	n/a	NP (nrm)	NaN	8	0.1	0	unknown	ShapiroWilk
Sulfate (mg/L)	MW-309	No	n/a	n/a	EPA 1989	0.05	8	23.79	12.31	normal	ShapiroWilk
Sulfate (mg/L)	MW-310	Yes	60.2,118	7/23/2018	Dixon`s	0.05	8	45.76	30.93	normal	ShapiroWilk
Sulfate (mg/L)	MW-311	No	n/a	n/a	EPA 1989	0.05	8	45.26	35.75	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-309	No	n/a	n/a	EPA 1989	0.05	8	790.8	395.8	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-310	Yes	736	9/21/2018	Dixon`s	0.05	8	483.5	115.4	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-311	No	n/a	n/a	EPA 1989	0.05	8	322.5	58.52	normal	ShapiroWilk

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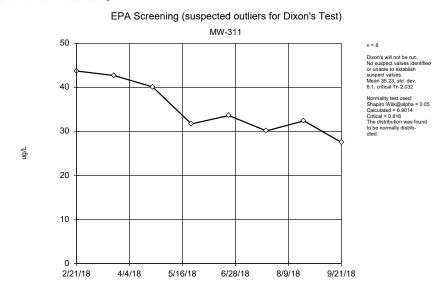


Columbia Energy Center Client: SCS Engineers Data: Input -191203



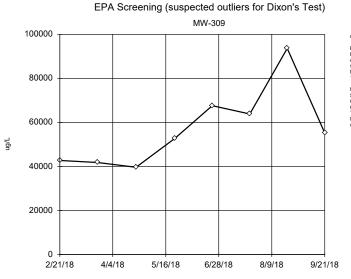
Constituent: Boron Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

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Constituent: Boron Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203





n = 8 Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 57125, std. dev. 17960, critical Tn 2.032

Normality test used: Shapiro Wilk@alpha = 0.05 Calculated = 0.8834 Critical = 0.818 The distribution was found to be normally distributed.

Constituent: Calcium Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

Constituent: Boron (ug/L) Analysis Run 12/12/2019 4:31 PM

	MW-309
2/21/2018	31.4
3/23/2018	31
4/23/2018	30.4
5/24/2018	28
6/23/2018	26.6
7/23/2018	35.5
8/22/2018	40.5
9/21/2018	30

Dixon's Outlier Test

Constituent: Boron (ug/L) Analysis Run 12/12/2019 4:31 PM

	MW-310
2/21/2018	67.1
3/23/2018	62.1
4/23/2018	60.7
5/24/2018	59.2
6/23/2018	61.4
7/23/2018	69.5
8/22/2018	64.2
9/21/2018	80.3

Constituent: Boron (ug/L) Analysis Run 12/12/2019 4:31 PM

	MW-311
2/21/2018	43.7
3/23/2018	42.7
4/23/2018	40.1
5/24/2018	31.7
6/23/2018	33.6
7/23/2018	30.1
8/22/2018	32.4
9/21/2018	27.5

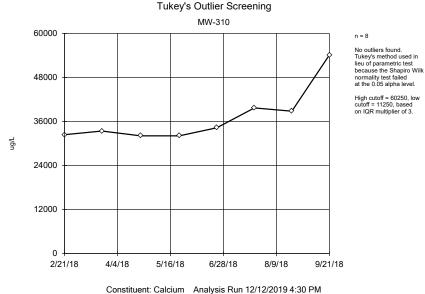
Constituent: Calcium (ug/L) Analysis Run 12/12/2019 4:31 PM

	MW-309
2/21/2018	42700
3/23/2018	41800
4/23/2018	39600
5/24/2018	52700
6/23/2018	67600
7/23/2018	63800
8/22/2018	93600
9/21/2018	55200

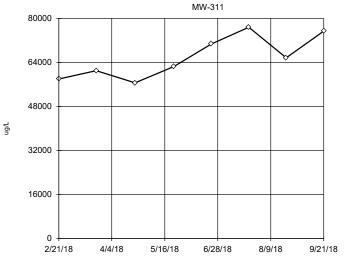
EPA Screening (suspected outliers for Dixon's Test)

Constituent: Calcium Analysis Run 12/12/2019 4:30 PM

Columbia Energy Center Client: SCS Engineers Data: Input -191203



Columbia Energy Center Client: SCS Engineers Data: Input -191203

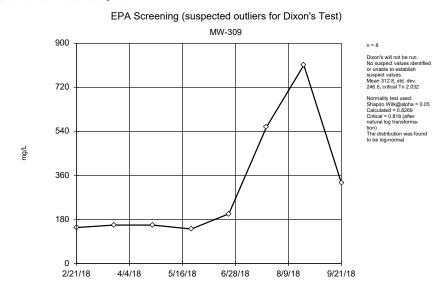


Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 65838, std. dev. 7714, critical Tn 2.032

n = 8

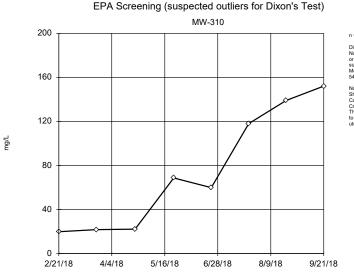
Normality test used: Shapiro Wilk@alpha = 0.05 Calculated = 0.9222 Critical = 0.818 The distribution was found to be normally distributed.

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Constituent: Chloride Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203





n = 8 Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 75.13, std. dev. 54.55, critical Tn 2.032

Normality test used: Shapiro Wilk@alpha = 0.05 Calculated = 0.8662 Critical = 0.818 The distribution was found to be normally distributed.

Constituent: Chloride Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

Constituent: Calcium (ug/L) Analysis Run 12/12/2019 4:31 PM

	MW-310
2/21/2018	32400
3/23/2018	33400
4/23/2018	32100
5/24/2018	32100
6/23/2018	34300
7/23/2018	39700
8/22/2018	38800
9/21/2018	54100

Constituent: Calcium (ug/L) Analysis Run 12/12/2019 4:31 PM

	MW-311			
2/21/2018	58000			
3/23/2018	61000			
4/23/2018	56600			
5/24/2018	62500			
6/23/2018	70700			
7/23/2018	76800			
8/22/2018	65700			
9/21/2018	75400			

Constituent: Chloride (mg/L) Analysis Run 12/12/2019 4:31 PM

	MW-309
2/21/2018	147
3/23/2018	157
4/23/2018	157
5/24/2018	141
6/23/2018	203
7/23/2018	557
8/22/2018	811
9/21/2018	329

Constituent: Chloride (mg/L) Analysis Run 12/12/2019 4:31 PM

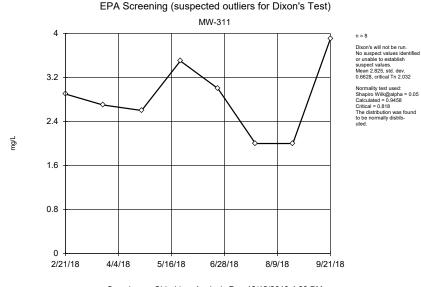
	MW-310
2/21/2018	19.8
3/23/2018	21.7
4/23/2018	22.1
5/24/2018	68.6
6/23/2018	59.8
7/23/2018	118
8/22/2018	139
9/21/2018	152



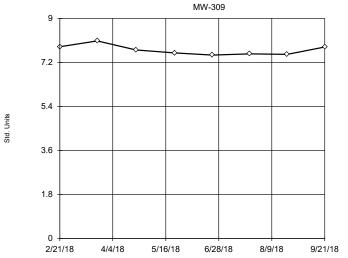
EPA Screening (suspected outliers for Dixon's Test)

Constituent: Field pH Analysis Run 12/12/2019 4:30 PM

Columbia Energy Center Client: SCS Engineers Data: Input -191203



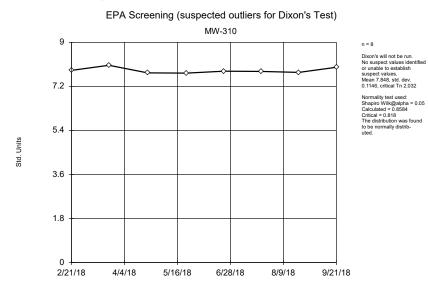
Constituent: Chloride Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203



n = 8 Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 7.704, std. dev. 0.2016, critical Tn 2.032

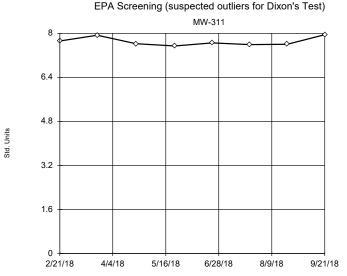
Normality test used: Shapiro Wilk@alpha = 0.05 Calculated = 0.8955 Critical = 0.818 The distribution was found to be normally distributed.





Constituent: Field pH Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203





n = 8 Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 7.7, std. dev. 0.1569, critical Tn 2.032

Normality test used: Shapiro Wilk@alpha = 0.05 Calculated = 0.8301 Critical = 0.818 The distribution was found to be normally distributed.

Constituent: Field pH Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

Constituent: Chloride (mg/L) Analysis Run 12/12/2019 4:31 PM

	MW-311
2/21/2018	2.9
3/23/2018	2.7
4/23/2018	2.6
5/24/2018	3.5
6/23/2018	3
7/23/2018	2 (J)
8/22/2018	2 (J)
9/21/2018	3.9

Constituent: Field pH (Std. Units) Analysis Run 12/12/2019 4:31 PM

	MW-309
2/21/2018	7.84
3/23/2018	8.08
4/23/2018	7.71
5/24/2018	7.59
6/23/2018	7.5
7/23/2018	7.55
8/22/2018	7.53
9/21/2018	7.83

Constituent: Field pH (Std. Units) Analysis Run 12/12/2019 4:31 PM

	MW-310
2/21/2018	7.85
3/23/2018	8.06
4/23/2018	7.75
5/24/2018	7.74
6/23/2018	7.82
7/23/2018	7.81
8/22/2018	7.77
9/21/2018	7.98

Constituent: Field pH (Std. Units) Analysis Run 12/12/2019 4:31 PM

	MW-311
2/21/2018	7.72
3/23/2018	7.93
4/23/2018	7.62
5/24/2018	7.54
6/23/2018	7.65
7/23/2018	7.59
8/22/2018	7.6
9/21/2018	7.95

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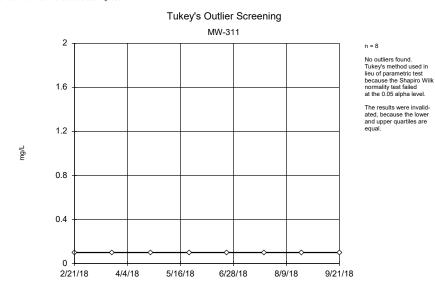
Tukey's Outlier Screening Tukey's Outlier Screening MW-309 MW-310 1 2 n = 8 No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level. 0.8 1.6 The results were invalidated, because the lower and upper quartiles are equal. 0.6 1.2 mg/L mg/L 0.4 0.8 0.2 0.4 Ω 0 2/21/18 4/4/18 5/16/18 6/28/18 8/9/18 9/21/18 2/21/18 4/4/18 5/16/18 6/28/18 8/9/18 9/21/18 Constituent: Fluoride Analysis Run 12/12/2019 4:30 PM Constituent: Fluoride Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203 Columbia Energy Center Client: SCS Engineers Data: Input -191203

n = 8

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

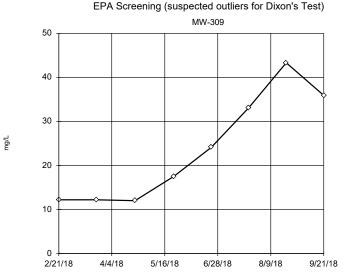
The results were invalidated, because the lower and upper quartiles are equal.

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Constituent: Fluoride Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203





n = 8 Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 23.79, std. dev. 12.31, critical Tn 2.032

Normality test used: Shapiro Wilk@alpha = 0.05 Calculated = 0.8739 Critical = 0.8789 Critical = 0.818 The distribution was found to be normally distrib-uted.

Constituent: Sulfate Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

Constituent: Fluoride (mg/L) Analysis Run 12/12/2019 4:31 PM

	MW-309
2/21/2018	<0.1
3/23/2018	<0.1
4/23/2018	<0.1
5/24/2018	<0.1
6/23/2018	<0.1
7/23/2018	<1
8/22/2018	<0.1
9/21/2018	<0.1

Constituent: Fluoride (mg/L) Analysis Run 12/12/2019 4:31 PM

	MW-310
2/21/2018	<0.1
3/23/2018	<0.1
4/23/2018	<0.1
5/24/2018	<0.1
6/23/2018	<0.1
7/23/2018	<0.1
8/22/2018	<0.1
9/21/2018	<0.1

Constituent: Fluoride (mg/L) Analysis Run 12/12/2019 4:31 PM

	MW-311
2/21/2018	<0.1
3/23/2018	<0.1
4/23/2018	<0.1
5/24/2018	<0.1
6/23/2018	<0.1
7/23/2018	<0.1
8/22/2018	<0.1
9/21/2018	<0.1

Constituent: Sulfate (mg/L) Analysis Run 12/12/2019 4:31 PM

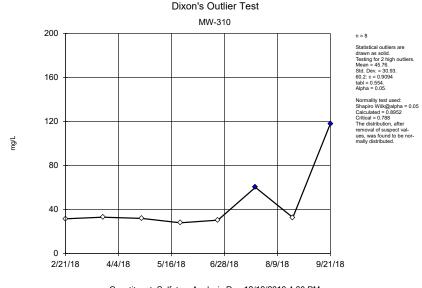
	MW-309
2/21/2018	12.2
3/23/2018	12.2
4/23/2018	12
5/24/2018	17.5
6/23/2018	24.1
7/23/2018	33.1
8/22/2018	43.3
9/21/2018	35.9

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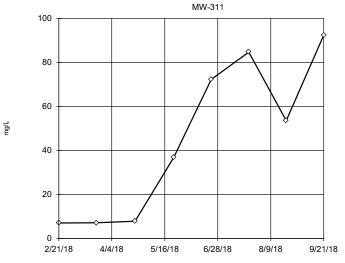
EPA Screening (suspected outliers for Dixon's Test)

Constituent: Sulfate Analysis Run 12/12/2019 4:30 PM

Columbia Energy Center Client: SCS Engineers Data: Input -191203



Constituent: Sulfate Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

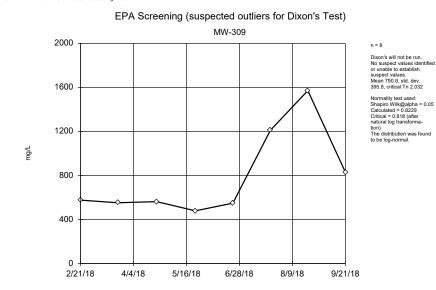


Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 45.26, std. dev. 35.75, critical Tn 2.032

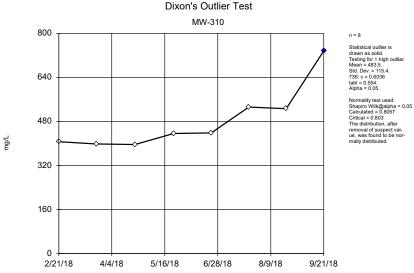
n = 8

Normality test used: Shapiro Wilk@alpha = 0.05 Calculated = 0.8714 Critical = 0.818 The distribution was found to be normally distrib-uted.

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Constituent: Total Dissolved Solids Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203 Sanitas[™] v.9.6.24 Software licensed to SCS Engineers. EPA



Constituent: Total Dissolved Solids Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

Dixon's Outlier Test

Constituent: Sulfate (mg/L) Analysis Run 12/12/2019 4:31 PM

	MW-310
2/21/2018	31.6
3/23/2018	33.1
4/23/2018	32
5/24/2018	28
6/23/2018	30.4
7/23/2018	60.2 (O)
8/22/2018	32.8
9/21/2018	118 (O)
	()

Constituent: Sulfate (mg/L) Analysis Run 12/12/2019 4:31 PM

	MW-311
2/21/2018	7.1
3/23/2018	7.2
4/23/2018	7.9
5/24/2018	36.9
6/23/2018	72.3
7/23/2018	84.7
8/22/2018	53.6
9/21/2018	92.4

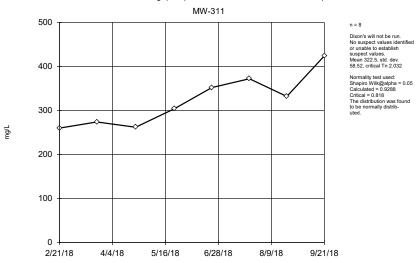
Constituent: Total Dissolved Solids (mg/L) Analysis Run 12/12/2019 4:31 PM

	MW-309
2/21/2018	576
3/23/2018	552
4/23/2018	562
5/24/2018	478
6/23/2018	548
7/23/2018	1210
8/22/2018	1570
9/21/2018	830

Dixon's Outlier Test

Constituent: Total Dissolved Solids (mg/L) Analysis Run 12/12/2019 4:31 PM

		MW-310
2/21/20	018	406
3/23/20)18	398
4/23/20)18	396
5/24/20	018	436
6/23/20	018	438
7/23/20)18	532
8/22/20)18	526
9/21/20)18	736 (O)
9/21/20)18	736 (O)



Constituent: Total Dissolved Solids Analysis Run 12/12/2019 4:30 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

EPA Screening (suspected outliers for Dixon's Test)

EPA 1989 Outlier Screening

Constituent: Total Dissolved Solids (mg/L) Analysis Run 12/12/2019 4:31 PM

	MW-311
2/21/2018	260
3/23/2018	274
4/23/2018	262
5/24/2018	304
6/23/2018	352
7/23/2018	372
8/22/2018	332
9/21/2018	424

Attachment C

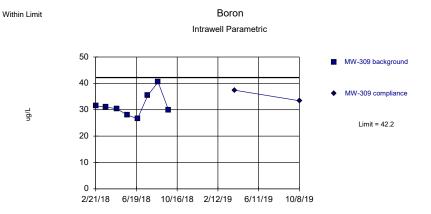
Intrawell Prediction Limit Analysis

Intrawell Prediction Limit

Columbia Energy Center Client: SCS Engineers Data: Input -191203 Printed 1/8/2020, 2:08 PM

								0	•							
Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	<u>Sig.</u>	<u>Bg I</u>	<u>N Bg Wells</u>	E	<u>Bg Mean</u>	Std. Dev	<u>. %NDs</u>	<u>ND Adj</u> .	Transform	<u>Alpha</u>	<u>Method</u>
Boron (ug/L)	MW-309	42.2	n/a	10/8/2019	33.4	No	8	n/a	3	31.68	4.42	0	None	No	0.002922	Param 1 of 2
Boron (ug/L)	MW-310	81.9	n/a	10/8/2019	81.8	No	8	n/a	6	65.56	6.87	0	None	No	0.002922	Param 1 of 2
Boron (ug/L)	MW-311	49.8	n/a	10/8/2019	33.5	No	8	n/a	3	35.23	6.1	0	None	No	0.002922	Param 1 of 2
Calcium (ug/L)	MW-309	99900	n/a	10/8/2019	46900	No	8	n/a	5	57125	17960	0	None	No	0.002922	Param 1 of 2
Calcium (ug/L)	MW-310	56000	n/a	12/23/2019	55400	No	8	n/a	1	10.51	0.1791	0	None	ln(x)	0.002922	Param 1 of 2
Calcium (ug/L)	MW-311	84200	n/a	10/8/2019	63900	No	8	n/a	6	65838	7714	0	None	No	0.002922	Param 1 of 2
Chloride (mg/L)	MW-309	901	n/a	10/8/2019	43.2	No	8	n/a	3	312.8	246.6	0	None	No	0.002922	Param 1 of 2
Chloride (mg/L)	MW-310	205	n/a	10/8/2019	190	No	8	n/a	7	75.13	54.55	0	None	No	0.002922	Param 1 of 2
Chloride (mg/L)	MW-311	4.41	n/a	10/8/2019	1.5	No	8	n/a	2	2.825	0.6628	0	None	No	0.002922	Param 1 of 2
Field pH (Std. Units)	MW-309	8.18	7.22	10/8/2019	7.75	No	8	n/a	7	7.704	0.2016	0	None	No	0.001461	Param 1 of 2
Field pH (Std. Units)	MW-310	8.12	7.57	12/23/2019	7.7	No	8	n/a	7	7.848	0.1146	0	None	No	0.001461	Param 1 of 2
Field pH (Std. Units)	MW-311	8.07	7.33	10/8/2019	7.69	No	8	n/a	7	7.7	0.1569	0	None	No	0.001461	Param 1 of 2
Fluoride (mg/L)	MW-309	0.100	n/a	10/8/2019	0.1ND	No	8	n/a	r	n/a	n/a	100	n/a	n/a	0.02144	NP (NDs) 1 of 2
Fluoride (mg/L)	MW-310	0.100	n/a	10/8/2019	0.1ND	No	8	n/a	r	n/a	n/a	100	n/a	n/a	0.02144	NP (NDs) 1 of 2
Fluoride (mg/L)	MW-311	0.100	n/a	10/8/2019	0.1ND	No	8	n/a	r	n/a	n/a	100	n/a	n/a	0.02144	NP (NDs) 1 of 2
Sulfate (mg/L)	MW-309	53.1	n/a	10/8/2019	21.9	No	8	n/a	2	23.79	12.31	0	None	No	0.002922	Param 1 of 2
Sulfate (mg/L)	MW-310	118	n/a	10/8/2019	85.9	No	8	n/a	r	n/a	n/a	0	n/a	n/a	0.02144	NP (normality) 1 of 2
Sulfate (mg/L)	MW-311	131	n/a	10/8/2019	21.2	No	8	n/a	4	45.26	35.75	0	None	No	0.002922	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-309	1730	n/a	10/8/2019	370	No	8	n/a	7	790.8	395.8	0	None	No	0.002922	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-310	759	n/a	10/8/2019	650	No	8	n/a	4	483.5	115.4	0	None	No	0.002922	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-311	462	n/a	10/8/2019	272	No	8	n/a	3	322.5	58.52	0	None	No	0.002922	Param 1 of 2

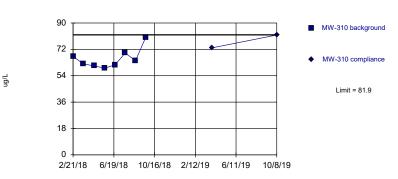
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Background Data Summary: Mean=31.68, Std. Dev=4.42, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8951, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.



Within Limit

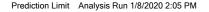


Boron

Intrawell Parametric

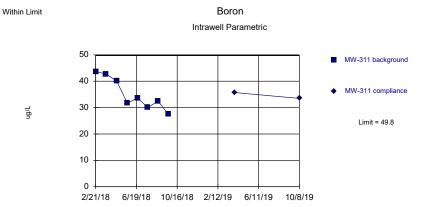
Background Data Summary: Mean=65.56, Std. Dev.=6.87, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8407, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

Prediction Limit Analysis Run 1/8/2020 2:05 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203



Columbia Energy Center Client: SCS Engineers Data: Input -191203

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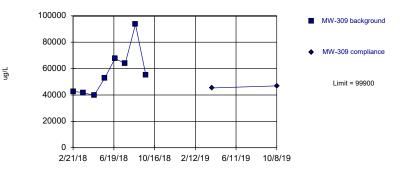


Background Data Summary: Mean=35.23, Std. Dev.=6.1, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk (@alpha = 0.01, calculated = 0.9014, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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Calcium



Background Data Summary: Mean=57125, Std. Dev.=17960, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8834, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.00292.

Constituent: Boron (ug/L) Analysis Run 1/8/2020 2:08 PM

	MW-309	MW-309
2/21/2018	31.4	
3/23/2018	31	
4/23/2018	30.4	
5/24/2018	28	
6/23/2018	26.6	
7/23/2018	35.5	
8/22/2018	40.5	
9/21/2018	30	
4/2/2019		37.4
10/8/2019		33.4

Constituent: Boron (ug/L) Analysis Run 1/8/2020 2:08 PM

	MW-310	MW-310
2/21/2018	67.1	
3/23/2018	62.1	
4/23/2018	60.7	
5/24/2018	59.2	
6/23/2018	61.4	
7/23/2018	69.5	
8/22/2018	64.2	
9/21/2018	80.3	
4/2/2019		73
10/8/2019		81.8

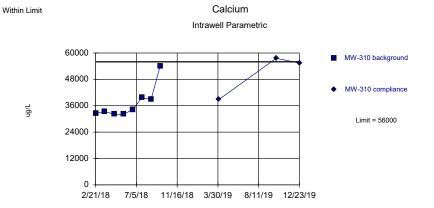
Constituent: Boron (ug/L) Analysis Run 1/8/2020 2:08 PM

	MW-311	MW-311
2/21/2018	43.7	
3/23/2018	42.7	
4/23/2018	40.1	
5/24/2018	31.7	
6/23/2018	33.6	
7/23/2018	30.1	
8/22/2018	32.4	
9/21/2018	27.5	
4/2/2019		35.7
10/8/2019		33.5

Constituent: Calcium (ug/L) Analysis Run 1/8/2020 2:08 PM

	MW-309
2/21/2018 42700	
3/23/2018 41800	
4/23/2018 39600	
5/24/2018 52700	
6/23/2018 67600	
7/23/2018 63800	
8/22/2018 93600	
9/21/2018 55200	
4/2/2019	45300
10/8/2019	46900

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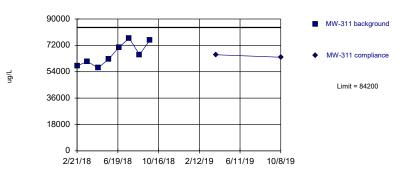


Background Data Summary (based on natural log transformation): Mean=10.51, Std. Dev.=0.1791, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7707, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.



Within Limit

Calcium



Background Data Summary: Mean=65838, Std. Dev.=7714, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9222, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.00292.

Prediction Limit Analysis Run 1/8/2020 2:05 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

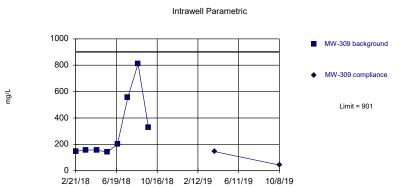
Chloride



Columbia Energy Center Client: SCS Engineers Data: Input -191203

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Within Limit

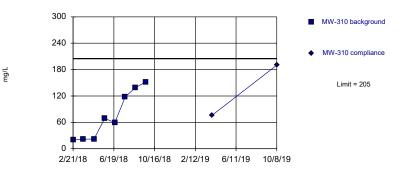


Background Data Summary: Mean=312.8, Std. Dev.=246.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7572, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.00522.

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Within Limit

Chloride Intrawell Parametric



Background Data Summary: Mean=75.13, Std. Dev.=54.55, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8662, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

Constituent: Calcium (ug/L) Analysis Run 1/8/2020 2:08 PM

	MW-310	MW-310
2/21/2018	32400	
3/23/2018	33400	
4/23/2018	32100	
5/24/2018	32100	
6/23/2018	34300	
7/23/2018	39700	
8/22/2018	38800	
9/21/2018	54100	
4/2/2019		38800
10/8/2019		57600
12/23/2019		55400 (P6)

Constituent: Calcium (ug/L) Analysis Run 1/8/2020 2:08 PM

	MW-311	MW-311
2/21/2018	58000	
3/23/2018	61000	
4/23/2018	56600	
5/24/2018	62500	
6/23/2018	70700	
7/23/2018	76800	
8/22/2018	65700	
9/21/2018	75400	
4/2/2019		65600
10/8/2019		63900

Constituent: Chloride (mg/L) Analysis Run 1/8/2020 2:08 PM

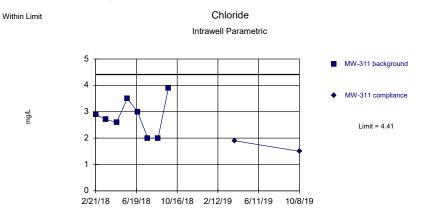
	MW-309	MW-309
2/21/2018	147	
3/23/2018	157	
4/23/2018	157	
5/24/2018	141	
6/23/2018	203	
7/23/2018	557	
8/22/2018	811	
9/21/2018	329	
4/2/2019		145
10/8/2019		43.2

Constituent: Chloride (mg/L) Analysis Run 1/8/2020 2:08 PM

	MW-310	MW-3
2/21/2018	19.8	
3/23/2018	21.7	
4/23/2018	22.1	
5/24/2018	68.6	
6/23/2018	59.8	
7/23/2018	118	
8/22/2018	139	
9/21/2018	152	
4/2/2019		76
10/8/2019		190

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mg/L

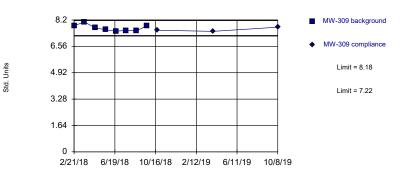


Background Data Summary: Mean=2.825, Std. Dev.=0.6628, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9458, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.



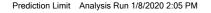
Within Limits

Field pH Intrawell Parametric



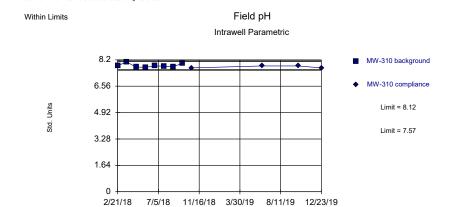
Background Data Summary: Mean=7.704, Std. Dev.=0.2016, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8955, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

Prediction Limit Analysis Run 1/8/2020 2:05 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203



Columbia Energy Center Client: SCS Engineers Data: Input -191203

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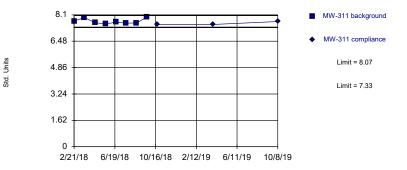


Background Data Summary: Mean=7.848, Std. Dev.=0.1146, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8584, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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Within Limits

Field pH Intrawell Parametric



Background Data Summary: Mean=7.7, Std. Dev.=0.1569, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8301, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

Constituent: Chloride (mg/L) Analysis Run 1/8/2020 2:08 PM

	MW-311	MW-311
2/21/2018	2.9	
3/23/2018	2.7	
4/23/2018	2.6	
5/24/2018	3.5	
6/23/2018	3	
7/23/2018	2 (J)	
8/22/2018	2 (J)	
9/21/2018	3.9	
4/2/2019		1.9 (J)
10/8/2019		1.5 (J)

Constituent: Field pH (Std. Units) Analysis Run 1/8/2020 2:08 PM

	MW-309	MW-309
2/21/2018	7.84	
3/23/2018	8.08	
4/23/2018	7.71	
5/24/2018	7.59	
6/23/2018	7.5	
7/23/2018	7.55	
8/22/2018	7.53	
9/21/2018	7.83	
10/22/2018		7.56
4/2/2019		7.49
10/8/2019		7.75

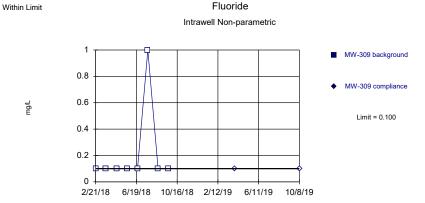
Constituent: Field pH (Std. Units) Analysis Run 1/8/2020 2:08 PM

	MW-310	MW-310
2/21/2018	7.85	
3/23/2018	8.06	
4/23/2018	7.75	
5/24/2018	7.74	
6/23/2018	7.82	
7/23/2018	7.81	
8/22/2018	7.77	
9/21/2018	7.98	
10/22/2018		7.7
4/2/2019		9.79 (R)
6/12/2019		7.82
10/8/2019		7.82
12/23/2019		7.7

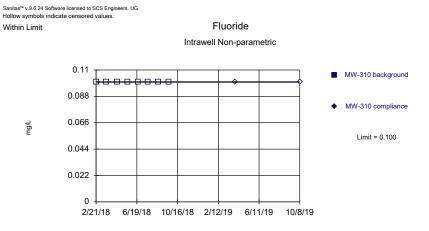
Constituent: Field pH (Std. Units) Analysis Run 1/8/2020 2:08 PM

	MW-311	MW-311
2/21/2018	7.72	
3/23/2018	7.93	
4/23/2018	7.62	
5/24/2018	7.54	
6/23/2018	7.65	
7/23/2018	7.59	
8/22/2018	7.6	
9/21/2018	7.95	
10/22/2018		7.5
4/2/2019		7.51
10/8/2019		7.69

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Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

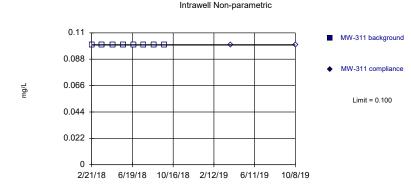
Prediction Limit Analysis Run 1/8/2020 2:05 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

Fluoride

Prediction Limit Analysis Run 1/8/2020 2:05 PM

Columbia Energy Center Client: SCS Engineers Data: Input -191203

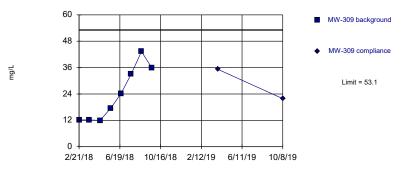




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Sulfate Intrawell Parametric



Background Data Summary: Mean=23.79, Std. Dev.=12.31, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8739, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Fluoride (mg/L) Analysis Run 1/8/2020 2:08 PM

IMN	1W-309	MW-309
2/21/2018 <0	0.1	
3/23/2018 <0	0.1	
4/23/2018 <0	0.1	
5/24/2018 <0	0.1	
6/23/2018 <0	0.1	
7/23/2018 <1	1	
8/22/2018 <0	0.1	
9/21/2018 <0	0.1	
4/2/2019		<0.1
10/8/2019		<0.1

Constituent: Fluoride (mg/L) Analysis Run 1/8/2020 2:08 PM

	MW-310	MW-310
2/21/2018	<0.1	
3/23/2018	<0.1	
4/23/2018	<0.1	
5/24/2018	<0.1	
6/23/2018	<0.1	
7/23/2018	<0.1	
8/22/2018	<0.1	
9/21/2018	<0.1	
4/2/2019		<0.1
10/8/2019		<0.1

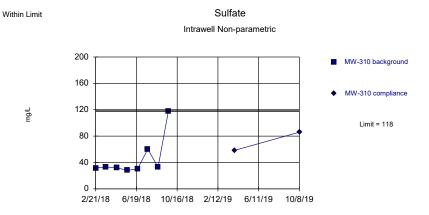
Constituent: Fluoride (mg/L) Analysis Run 1/8/2020 2:08 PM

	MW-311	MW-311
2/21/2018	<0.1	
3/23/2018	<0.1	
4/23/2018	<0.1	
5/24/2018	<0.1	
6/23/2018	<0.1	
7/23/2018	<0.1	
8/22/2018	<0.1	
9/21/2018	<0.1	
4/2/2019		<0.1
10/8/2019		<0.1
10/8/2019		<0.1

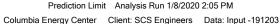
Constituent: Sulfate (mg/L) Analysis Run 1/8/2020 2:08 PM

2/21/2018 12.2 3/23/2018 12.2 4/23/2018 12 5/24/2018 17.5 6/1021010 04.1	
4/23/2018 12 5/24/2018 17.5	
5/24/2018 17.5	
0/00/0010 04.1	
6/23/2018 24.1	
7/23/2018 33.1	
8/22/2018 43.3	
9/21/2018 35.9	
4/2/2019	35.2
10/8/2019	21.9

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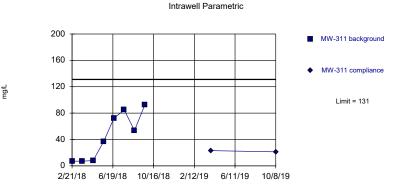
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.



Total Dissolved Solids



Within Limit



Sulfate

Background Data Summary: Mean=45.26, Std. Dev.=35.75, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8714, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

Prediction Limit Analysis Run 1/8/2020 2:05 PM

Columbia Energy Center Client: SCS Engineers Data: Input -191203

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Within Limit

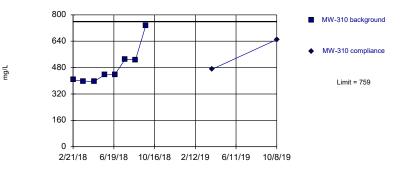
Intrawell Parametric 2000 MW-309 background 1600 1200 ng/L Limit = 1730 800 ٠ 400 0 2/21/18 6/19/18 10/16/18 2/12/19 6/11/19 10/8/19

MW-309 compliance

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Within Limit

Total Dissolved Solids Intrawell Parametric



Background Data Summary: Mean=483.5, Std. Dev.=115.4, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7774, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

Prediction Limit Analysis Run 1/8/2020 2:05 PM Columbia Energy Center Client: SCS Engineers Data: Input -191203

Background Data Summary: Mean=790.8, Std. Dev.=395.8, n=8. Insufficient data to test for seasonality: data were

not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.771, critical = 0.749. Kappa =

2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

Constituent: Sulfate (mg/L) Analysis Run 1/8/2020 2:08 PM

	MW-310	MW-310
2/21/2018	31.6	
3/23/2018	33.1	
4/23/2018	32	
5/24/2018	28	
6/23/2018	30.4	
7/23/2018	60.2	
8/22/2018	32.8	
9/21/2018	118	
4/2/2019		58.4
10/8/2019		85.9

Constituent: Sulfate (mg/L) Analysis Run 1/8/2020 2:08 PM

	MW-311	MW-311
2/21/2018	7.1	
3/23/2018	7.2	
4/23/2018	7.9	
5/24/2018	36.9	
6/23/2018	72.3	
7/23/2018	84.7	
8/22/2018	53.6	
9/21/2018	92.4	
4/2/2019		23.1
10/8/2019		21.2

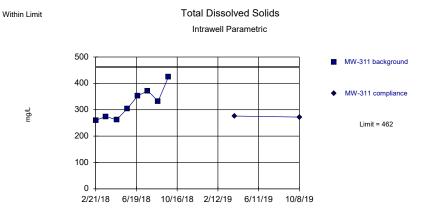
Constituent: Total Dissolved Solids (mg/L) Analysis Run 1/8/2020 2:08 PM

	MW-309	MW-309
2/21/2018	576	
3/23/2018	552	
4/23/2018	562	
5/24/2018	478	
6/23/2018	548	
7/23/2018	1210	
8/22/2018	1570	
9/21/2018	830	
4/2/2019		548
10/8/2019		370

Constituent: Total Dissolved Solids (mg/L) Analysis Run 1/8/2020 2:08 PM

	MW-310	MW-310
2/21/2018	406	
3/23/2018	398	
4/23/2018	396	
5/24/2018	436	
6/23/2018	438	
7/23/2018	532	
8/22/2018	526	
9/21/2018	736	
4/2/2019		470
10/8/2019		
		650

Sanitas[™] v.9.6.24 Software licensed to SCS Engineers. UG



Background Data Summary: Mean=322.5, Std. Dev.=58.52, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9288, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

Prediction Limit Analysis Run 1/8/2020 2:05 PM

Constituent: Total Dissolved Solids (mg/L) Analysis Run 1/8/2020 2:08 PM

	MW-311	MW-311
2/21/2018	260	
3/23/2018	274	
4/23/2018	262	
5/24/2018	304	
6/23/2018	352	
7/23/2018	372	
8/22/2018	332	
9/21/2018	424	
4/2/2019		276
10/8/2019		272

Attachment D

Sanitas Settings

Data	Output	Trend Test	Control Cht	Prediction Lim	Tolerance Lim	Conf/Tol Int	ANOVA	Welchs	Other Tests	
Exclud	e data flag	s: R			Observations with flags containing the following characters will be deselected: 'R', 'r',					
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O Median of Each: O Season										
Setup	Seasons									
Automatically Process Resamples 1 of 2										

Data	Output	Trend Test	Control Cht	Prediction Lim	Tolerance Lim	Conf/Tol Ir	nt ANOVA	Welchs	Other Tests
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Data Output Trend Test Control Cht Prediction Lim Tolerance Lim Conf/Tol Int ANOVA Welchs Other Tests					
Rank Von Neumann, Wilcoxon Rank Sum / Mann-Whitney					
Use Modified Alpha 2-Tailed Test Mode Combine Background Wells on Mann-Whitney					
Outlier Tests					
EPA 1989 Outlier Screening (fixed alpha of 0.05)					
O Dixon's at α= 0.05 v or if n > 25 v Rosner's at α= 0.01 v Use EPA Screening to establish Suspected Outliers					
Tukey's Outlier Screening, with IQR Multiplier = 3.0 Use Ladder of Powers to achieve Best W Stat					
Test For Normality using Shapiro-Wilk/Francia \checkmark at Alpha = 0.05 \checkmark					
O Stop if Non-Normal					
O Continue with Parametric Test if Non-Normal					
Tukey's if Non-Normal, with IQR Multiplier = 3.0 Use Ladder of Powers to achieve Best W Stat					
No Outlier If Less Than 3.0 Times Median					
Apply Rules found in Ohio Guidance Document 0715					
Combine Background Wells on the Outlier Report					
Piper, Stiff Diagram					
Combine Wells					
Combine Dates					
Use Default Constituent Names Note Cation-Anion Balance (Piper only)					
O Use Constituent Definition File Edit					

Data Output Trend Test Control	Cht Prediction Lim	Tolerance Lim	Conf/Tol Int	ANOVA	Welchs	Other Tests
 Test for Normality using Shapiro-Wilk Use Non-Parametric Test when Non-D Use Aitchison's Adjustment v when No Optional Further Refinement: Use Use Poisson Prediction Limit when No 	Netects Percent > n-Detects Percent > v w			Isformation Use Ladder Natural Log Never Tran Use Specifi Use Best W Plot Transfo	or No Tran sform ic Transform Natura / Statistic	nation: I Log V
Deseasonalize (Intra- and InterWell) If Seasonality Is Detected If Seasonality Is Detected Or Insuffi Always (When Sufficient Data)		Plot Ba		end Detect		
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Appendix F

Alternative Source Demonstrations (ASDs)

- F1 Alternative Source Demonstration October 2020
- F2 Alternative Source Demonstration April 2021

F1 Alternative Source Demonstration – October 2020

Alternative Source Demonstration October 2020 Detection Monitoring

Dry Ash Disposal Facility, Module 4 Columbia Energy Center Pardeeville, Wisconsin

Prepared for:



SCS ENGINEERS

25221067.00 | April 15, 2021

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

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Table 2.	Historical Analytical Results for Parameters with SSIs
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- Figure 2. Site Plan and Monitoring Well Locations
- Figure 3. Water Table Map October 2020

Appendices

- Appendix A Trend Plots for CCR Wells
- Appendix B Historical Groundwater Flow Maps

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PE CERTIFICATION

Sherren C.	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.
Sherren C. * Clark E-29863 Madison, Wis.	(signature) (date)
SUDNADENSTIMET	Sherren Clark (printed or typed name)
	License number E-29863
	My license renewal date is July 31, 2022.
	Pages or sheets covered by this seal:
	Alternative Source Demonstration, October 2020 Detection
	Monitoring, Dry Ash Disposal Facility, Module 4
	Columbia Energy Center, Pardeeville, Wisconsin (Entire Document)

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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 (USEPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule,* dated April 17, 2015 (USEPA, 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 a supplemental resampling event completed in December 2020.

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 2020 detection monitoring event at the Columbia Energy Center (COL) Dry Ash Disposal Facility, Module 4 CCR Unit (Mod 4). The first ASD was prepared for this facility evaluating the SSIs observed in the statistical evaluation of the April 2019 detection monitoring event.

This ASD report is evaluating the SSIs for boron, calcium, and chloride that were observed in the statistical evaluation of the October 2020 detection monitoring event, including the December 2020 resampling. The October 2020 result for total dissolved solids (TDS) at MW-310 exceeded the upper prediction limit (UPL), but the December retest result was below the UPL; therefore, there is no SSI for TDS at MW-310.

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 Module 4 of the ADF only. The Mod 4 CCR Unit became operational in 2018. The ADF is operated under the Wisconsin Department of Natural Resources (WDNR) License No. 3025.

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

• COL Dry Ash Disposal Facility – Module 4 (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 as **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 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 2020 and December 2020 sampling results, are summarized in the attached **Table 1**.

The October 2020 SSIs include the following parameters and wells:

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

The October 2020 result for TDS at MW-310 exceeded the UPL, but the December retest result was below the UPL; therefore, there is no SSI for TDS at 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 2020 detection monitoring event were included in the 2020 Annual Groundwater Monitoring and Corrective Action Report submitted in January 2021. 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. All CCR monitoring wells are screened within the unconsolidated sand unit.

Shallow groundwater at the site generally flows to the northwest across the existing landfill area, then generally flows west toward the Wisconsin River, with localized mounding associated with the ash ponds. A groundwater flow map for October 2020 is shown on **Figure 3**. The groundwater elevation data for the state and CCR and state 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 did not identify any other issues with the field analysis based on review of the data and field notes. Because boron, calcium, chloride, 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 October 2020 detection monitoring event as well as the December 2020 retest event were reviewed to determine if any laboratory analysis error or issue may have caused or contributed to an observed SSIs for boron, calcium, or chloride. 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.

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 concentrations observed are similar to historical concentrations.

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 2020 sample and December 2020 retest results, an SSI for boron occurred for MW-309, and calcium and chloride SSIs occurred for MW-310 for the October 2020 semiannual event, because both results exceeded the intrawell UPL.

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 an intrawell SSI for boron, calcium, and chloride at wells MW-309 and MW-310. However, the small size of the intrawell background data set (8 samples per well) and the short timeframe over which they were collected (8 months) may have contributed to the identification of the October 2020 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 intrawell UPLs will be updated in the future with additional data.

3.4 SUMMARY OF METHODOLOGY AND ANALYSIS REVIEW FINDINGS

In summary, no changes to the SSI determinations for the October 2020 monitoring event based on the methodology and analysis review, and no errors or issues caused or contributed to the reported SSIs identified.

4.0 ALTERNATIVE SOURCES

This section discusses the potential alternative sources for the boron, calcium, and chloride SSIs at the downgradient monitoring well, 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 2020 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.

As shown on the time series plots in **Appendix A**, the concentrations of boron in the May through October 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. Lower boron concentrations were detected in background sampling at upgradient wells MW-84A and MW-301.

For calcium, the October and December results at MW-310 slightly exceeded the intrawell UPL based on the 2018 background sampling at this well, but the calcium concentrations were lower than those detected at both upgradient wells as well as the other two compliance wells. The Feasibility Report prepared prior to the initial construction of the dry ash disposal facility indicated that calcium concentrations ranged from 30 mg/L to 66 mg/l for monitoring wells located within the site boundaries (Warzyn, 1978), and the recent calcium concentrations at MW-310 fall within this range. For chloride, the October and December 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 background and current monitoring at MW-309 (**Appendix A**).

Because the background sampling at the three compliance wells were 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 calcium variability may reflect natural variation, while boron and chloride 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 at MW-309 and for calcium and 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 ash ponds, Modules 1-3 of the ADF, 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.

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 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 CCR Unit.
- 2. Historical groundwater flow maps show that this area of the site was downgradient from the unlined ash ponds and ash pond effluent ditch for a significant portion of the site history.
- 3. MW-309 and MW-310 are located adjacent to the plant entrance road, where road salt impacts are likely.
- 4. The Mod 4 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 could have reached MW-309 and MW-310 by October 2020.

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

4.2.1 Background Concentrations

As discussed above in **Section 4.1.1**, the detected concentrations 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 CCR Unit. Historical boron, calcium, and chloride concentrations for all five Mod 4 wells are shown in **Table 2** and in the time series plots in **Appendix A**. Based on these results, it is likely that the boron, calcium, 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 Historical Groundwater Flow Directions

Historical groundwater flow maps show that this area of the site was downgradient from the unlined ash ponds and ash pond effluent ditch for a significant portion of the site history. Groundwater flow directions have changed through time due to changes in water management at the plant. The 1981 Plan of Operation, prepared by Warzyn in 1981, indicates that flow in the vicinity of the Mod 4 compliance wells was to the southeast, from the ash pond area. A water table map prepared by RMT, based on October 2002 water level measurements, shows flow from the ash pond area and the ash pond effluent ditch toward the current location of MW-309, MW-310, and MW-311. The 1981 and 2002 water table maps are provided in **Appendix B**.

Under current conditions, groundwater flow below the active Mod 4 is generally to the north and west. The flow changes with time reflect reduction in water level in the Secondary Pond and the WPDES pond, as well as the termination of discharge to the ash pond effluent ditch in the mid-2000s. When discharge via this ditch was active, the ditch and WPDES pond were sources of recharge to the groundwater and created a high groundwater area with flow moving away from the ditch to the east. After discharge to the ditch was terminated, water levels in this area decreased significantly and the groundwater flow direction changed.

The background concentrations of boron in the area of the Mod 4 compliance wells, likely reflect historical ash management activities at the site under different groundwater flow conditions.

4.2.3 Location Adjacent to Entrance Road

Monitoring wells MW-309 and MW-310 are located adjacent to the plant entrance road, where road salt impacts are likely. To be located as close as possible to the waste boundary of the CCR Unit (including the future Mod 5/6 additions to be 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.

4.2.4 Mod 4 Composite Liner

The Mod 4 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 could have reached MW-309 and MW-310 by October 2020. The liner system includes the following:

- 2 feet of compacted clay
- 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.

Given the liner system in place, a release from Mod 4 would have to penetrate the HDPE liner at a flaw, flow vertically through the compacted clay liner, and travel with the groundwater approximately 600 feet north to MW-309 and MW-310 in less than 2 years. Based on the hydraulic conductivity of the liner clay (10-⁸) and the very low estimated average groundwater velocity (0.2 to 4 feet per year, [SCS, 2021]), it is very unlikely that changes in boron, calcium, and chloride concentrations at MW-309 and MW-310 reflect a release from Mod 4.

5.0 ALTERNATIVE SOURCE DEMONSTRATION CONCLUSIONS

The lines of evidence discussed above regarding the SSIs reported for boron at MW-309 and for calcium and chloride at MW-310 demonstrate that the SSIs are likely due to sources other than the Mod 4 CCR Unit. Similar boron, calcium, and chloride concentrations were present in the area prior to disposal of CCR in Mod 4. The SSIs likely reflect natural variability (calcium), road salt impacts (chloride), and impacts associated with historical discharges from the ash ponds via the effluent ditch located west of the landfill (boron).

6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS

In accordance with section 257.94(e)(2) of the CCR Rule, the COL MOD 4 CCR Unit may continue with detection monitoring based on this ASD. The ASD report will be included in the 2021 Annual Report due January 31, 2022.

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

USEPA, 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

- 1 Groundwater Analytical Results Summary October and December 2020 Events
- 2 Historical Analytical Results for Parameters with SSIs
- 3 Groundwater Elevation State Monitoring Program and CCR Well Network

	Backgro	und Wells	Compliance Wells									
	MW-84A	MW-301		MW-309			MW-310	MW-311				
Parameter Name	10/8/2020	10/8/2020	Intrawell UPL	10/8/2020	12/11/2020	Intrawell UPL	10/8/2020	12/11/2020	Intrawell UPL	10/8/2020		
Boron, µg/L	9.7 J	28.8	42.2	57.7	65.9	81.9	77.6	NA	49.8	26.2		
Calcium, µg/L	69,200	93,000	99,900	65,300	NA	56,000	62,000	56,800	84,200	73,400		
Chloride, mg/L	4.3	3.4	901	575	NA	205	310	227	4.41	1.4 J		
Fluoride, mg/L	<0.095	<0.095	DQ	<0.095	NA	DQ	<0.095	NA	DQ	<0.095		
Field pH, Std. Units	7.49	6.95	8.18	7.33	7.42	8.12	7.52	7.62	8.07	7.66		
Sulfate, mg/L	1.3 J	25.1	53.1	21.8	NA	118	60	NA	131	72.1		
Total Dissolved Solids, mg/L	320	412	1,730	1,160	NA	759	846	700	462	380		

Table 1. Groundwater Analytical Results Summary - October and December 2020 EventsColumbia Dry Ash Disposal Facility - Module 4 / SCS Engineers Project #25221067.00

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

NA = 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 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 calculated from background sampling results for the compliance wells from February 2018 through October 2018.

Created by: AJR	Date: 1/21/2020
Last revision by: NDK	Date: 12/23/2020
Checked by: JSN	Date: 12/28/2020
Scientist/PM QA/QC: SCC	Date: 1/3/2021

I:\25221067.00\Deliverables\2020 Oct ASD MOD 4 LF\Tables\[Table 1 - CCR GW Screening Summary_COL LF Mod 4.xlsx]Current Event Table-original

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (µg/L)	Chloride (mg/L)
		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
	MW-301	8/8/2017	30.6	108,000	5.50
	10100-501	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
$\overline{\mathbf{n}}$		2/3/2020	27.9	113,000	1.30 J
Background		5/29/2020	21.3	112,000	2.00 J
lo		10/8/2020	28.8	93,000	3.40
kg		12/22/2015	11.9	74,000	4.90
gao		4/5/2016	14.0	72,200	4.70
ш		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
	MW-84A	8/8/2017	22.9	74,900	5.50
	IVIV-04A	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
		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
Ð		7/23/2018	35.5	63,800	557
Compliance		8/22/2018	40.5	93,600	811
plic	MW-309	9/21/2018	30.0	55,200	329
Ш		4/2/2019	37.4	45,300	145
ŭ		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		

Table 2. Historical Analytical Results for Parameters with SSIs Columbia Dry ADF, Module 4

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (µg/L)	Chloride (mg/L)
		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
	MW-310	8/22/2018	64.2	38,800	139
	10100-510	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
۵.		12/23/2019		55,400	
)Cé		5/29/2020	74.4	41,100	128
liar		10/8/2020	77.6	62,000	310
du		12/11/2020		56,800	227
Compliance		2/21/2018	43.7	58,000	2.90
0		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
	MW-311	7/23/2018	30.1	76,800	2.00 J
	10100-311	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

Table 2. Historical Analytical Results for Parameters with SSIs Columbia Dry ADF, Module 4

Abbreviations:

 μ g/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:	NDK	Date:	3/18/2021
Last revision by:	NDK	Date:	3/18/2021
Checked by:	JR	Date:	3/22/2021
Scientist Check:	TK	Date:	4/4/2021

I:\25221067.00\Deliverables\2020 Oct ASD MOD 4 LF\Tables\[Table 2 - Historical Analytical Results with SSIs.xIsx]Table 2. Analy. Rsits- CCR

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

	Well Number	MW-1AR	MW-4	MW-5R	MW-33AR	MW-33BR	MW-34A	MW-34B	MW-37A	MW-83	MW-84A	MW-84B	MW-86	MW-91AR	MW-91B	MW-92A	MW-92B
1	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
	Screen Length (ft)																
	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
	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
	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
	April 15, 2013	785.44	784.02	786.09	784.16	784.14	784.74	784.79	783.87	784.49	785.83	785.76	785.22	785.14	785.01	785.75	785.34
	October 8, 2013													785.66	785.42	785.97	785.52
	October 15, 2013	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.66	785.42	785.97	785.52
	April 14, 2014	784.95	784.09	785.63	783.74	783.91	784.63	784.70	783.45	783.73	785.58	785.52	784.96	785.04	784.96	785.99	785.54
Dry Ash	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
Facility	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
(Facility ID	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
#03025)	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
#03023)	October 11-13, 2016	786.64	aband	788.00	787.36	786.46	786.45	786.32	786.40	786.81	787.22	787.11	786.96	787.17	786.81	787.68	787.25
	April 10-13, 2017	786.96	aband	788.13 786.66	786.39	785.99	786.30	786.28	786.34	786.23	787.16	787.06	786.96	787.24 786.08	787.03	787.90	787.60
	October 3-5, 2017 October 9-10, 2017	785.48 NM	aband aband	786.66 NM	784.51 NM	784.22 NM	784.67 NM	784.63 NM	784.86 NM	784.29 NM	NM 785.56 ⁽⁶⁾	786.49 NM	785.58 NM	786.08 NM	785.83 NM	786.47 NM	786.02 NM
1 ·																	
	February 21, 2018 April 23-25, 2018	783.97 783.99	aband	NM 785.36	NM 783.09	NM 786.36	NM 781.77	NM 780.79	NM 783.28	NM 783.32	NM 785.88	NM 784.91	NM 782.54	784.68 784.71	784.46 784.53	NM 785.23	NM 784.81
	October 23-25, 2018	788.25	aband aband	789.71	788.77	787.96	787.88	787.73	787.62	788.26	788.32	788.19	782.34	788.59	788.31	789.32	788.87
	April 1-4, 2019	787.05	aband	788.64	786.63	786.54	786.82	786.92	786.47	786.78	787.35	787.34	787.16	787.45	787.18	788.04	787.63
	October 7-9, 2019	787.26	aband	789.23	788.26	787.64	787.92	787.74	786.77	788.90	787.79	787.73	787.44	787.78	787.62	788.63	788.17
	May 27-28, 2020	786.92	aband	788.34	786.01	785.75	785.98	785.99	786.22	786.03	787.02	786.99	786.94	787.26	787.05	787.86	787.47
	October 7-8, 2020	785.95	aband	787.76	785.91	785.45	785.70	785.68	785.52	785.72	786.10	786.06	786.10	786.55	786.33	786.85	786.38
1 [February 25, 2021	NM	aband	NM	NM	NM	784.75	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
l í	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
L		770:15	700.10	,,,,,,,,	///.21	/ 50.07	770.02	747.10	701.24	702.04	774.07	/02.24	///.00	,,	/ 00.0/		
	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]
	Well Number Top of Casing Elevation (feet amsl)																
		M-3 788.23	M-4R 806.10	MW-39A 809.62	MW-39B 809.50	MW-48A 828.86	MW-48B 828.84	MW-57 786.29	MW-59 815.48	MW-216R 814.21	MW-217 791.55	MW-220RR 792.90	SG-1	SG-2	SG-3	SG-4	
	Top of Casing Elevation (feet amsl) Screen Length (ft) Total Depth (ft from top of casing)	M-3 788.23 16.90	M-4R 806.10 25.55	MW-39A 809.62 34.80	MW-39B 809.50 76.07	MW-48A 828.86 51.88	MW-48B 828.84 75.80	MW-57 786.29 14.40	MW-59 815.48 38.50	MW-216R 814.21 37.85	MW-217 791.55 37.37	MW-220RR 792.90 18.96	SG-1	SG-2	SG-3	SG-4	
	Top of Casing Elevation (feet amsl) Screen Length (ft)	M-3 788.23	M-4R 806.10	MW-39A 809.62	MW-39B 809.50	MW-48A 828.86	MW-48B 828.84	MW-57 786.29	MW-59 815.48	MW-216R 814.21	MW-217 791.55	MW-220RR 792.90	SG-1 792.06	SG-2 795.25	SG-3	SG-4 805.36	
	Top of Casing Elevation (feet amsl) Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date	M-3 788.23 16.90 771.33	M-4R 806.10 25.55 780.55	MW-39A 809.62 34.80 774.82	MW-39B 809.50 76.07 733.43	MW-48A 828.86 51.88 776.98	MW-48B 828.84 75.80 753.04	MW-57 786.29 14.40 771.89	MW-59 815.48 38.50 776.98	MW-216R 814.21 37.85 776.36	MW-217 791.55 37.37 754.18	MW-220RR 792.90 18.96 773.94	SG-1 792.06	SG-2 795.25	SG-3 808.60	SG-4 805.36	
	Top of Casing Elevation (feet amsl) Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft)	M-3 788.23 16.90	M-4R 806.10 25.55	MW-39A 809.62 34.80	MW-39B 809.50 76.07	MW-48A 828.86 51.88 776.98 782.03	MW-48B 828.84 75.80	MW-57 786.29 14.40 771.89 780.58	MW-59 815.48 38.50	MW-216R 814.21 37.85	MW-217 791.55 37.37	MW-220RR 792.90 18.96	SG-1 792.06 789.14	SG-2 795.25	SG-3 808.60	SG-4 805.36	
	Top of Casing Elevation (feet amsl) Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date	M-3 788.23 16.90 771.33	M-4R 806.10 25.55 780.55	MW-39A 809.62 34.80 774.82	MW-39B 809.50 76.07 733.43	MW-48A 828.86 51.88 776.98	MW-48B 828.84 75.80 753.04	MW-57 786.29 14.40 771.89	MW-59 815.48 38.50 776.98	MW-216R 814.21 37.85 776.36	MW-217 791.55 37.37 754.18	MW-220RR 792.90 18.96 773.94	SG-1 792.06	SG-2 795.25	SG-3 808.60	SG-4 805.36	
	Top of Casing Elevation (feet amsl) Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012	M-3 788.23 16.90 771.33 780.13	M-4R 806.10 25.55 780.55 786.76	MW-39A 809.62 34.80 774.82 781.49	MW-39B 809.50 76.07 733.43 781.34	MW-48A 828.86 51.88 776.98 782.03	MW-48B 828.84 75.80 753.04 781.93	MW-57 786.29 14.40 771.89 780.58	MW-59 815.48 38.50 776.98 779.88	MW-216R 814.21 37.85 776.36 781.91	MW-217 791.55 37.37 754.18 780.95	MW-220RR 792.90 18.96 7773.94 780.55	SG-1 792.06 789.14	SG-2 795.25 793.85	SG-3 808.60 dry	SG-4 805.36 dry	
	Top of Casing Elevation (feet amsl) Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013	M-3 788.23 16.90 771.33 780.13 785.16	M-4R 806.10 25.55 780.55 786.76 788.39	MW-39A 809.62 34.80 774.82 781.49 783.97	MW-39B 809.50 76.07 733.43 781.34 781.34 784.00 NM	MW-48A 828.86 51.88 776.98 782.03 783.77	MW-48B 828.84 75.80 753.04 781.93 783.78	MW-57 786.29 14.40 771.89 780.58 784.69 NM	MW-59 815.48 38.50 776.98 779.88 783.66 NM	MW-216R 814.21 37.85 776.36 781.91 784.09	MW-217 791.55 37.37 754.18 780.95 784.75	MW-220RR 792.90 18.96 7773.94 780.55 785.02	SG-1 792.06 789.14 789.5 ⁽¹⁾	SG-2 795.25 793.85 NM	SG-3 808.60 dry dry	SG-4 805.36 dry dry	
	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 8, 2013October 15, 2013	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM	M-4R 806.10 25.55 780.55 786.76 786.76 788.39 786.67 NM	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94	MW-39B 809.50 76.07 733.43 781.34 781.34 784.00 NM 782.81	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM	MW-48B 828.84 75.80 753.04 781.93 783.78 783.78 783.58 NM	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM	MW-220RR 792.90 18.96 773.94 780.55 785.02 785.02	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾	SG-2 795.25 793.85 NM 791.33	SG-3 808.60 dry dry dry dry	SG-4 805.36 dry dry dry dry	
Ash Pond	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 8, 2013October 15, 2013April 14, 2014	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04	M-4R 806.10 25.55 780.55 786.76 786.76 786.67 NM 788.96	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56	MW-48B 828.84 75.80 753.04 781.93 783.78 783.58 NM 783.57	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49 783.41	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25	MW-220RR 792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 788.90	SG-2 795.25 793.85 NM 791.33 NM dry	SG-3 808.60 dry dry dry dry NM dry dry	SG-4 805.36 dry dry dry dry NM dry	
Facility	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16	M-4R 806.10 25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05	MW-48B 828.84 75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94	MW-57 786.29 14.40 771.89 780.58 780.58 784.69 NM 782.47 785.51 782.32	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63	MW-220RR 792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 788.90 NM	SG-2 795.25 793.85 NM 791.33 NM dry dry dry	SG-3 808.60 dry dry dry dry dry dry dry dry dry dry	SG-4 805.36 dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ff)Total Depth (ff from top of casing)Top of Well Screen Elevation (ff)Measurement DateOctober 2, 2012April 15, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08	M-4R 806.10 25.55 780.55 786.76 786.76 786.67 NM 788.96 787.55 786.83	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80	MW-48B 828.84 75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55 782.83	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.79 782.93	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34	MW-220RR 792.90 18.96 7773.94 780.55 785.02 785.02 782.36 NM 785.87 783.03 783.03	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 788.90 NM 789.3	SG-2 795.25 793.85 NM 791.33 NM dry dry dry 791.70	SG-3 808.60 dry dry dry dry dry dry dry dry dry dry	SG-4 805.36 dry dry dry dry dry dry dry dry dry	
Facility	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 8, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66	M-4R 806.10 25.55 780.55 786.76 786.76 786.67 NM 788.96 786.83 786.12	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10	MW-48B 828.84 75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55 782.83 783.25	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.79 782.93 783.18	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95	MW-220RR 792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 788.90 NM 789.3 788.48	SG-2 795.25 793.85 NM 791.33 NM dry dry dry 791.70 791.58	SG-3 808.60 dry dry dry dry dry dry dry dry dry dry	SG-4 805.36 dry dry dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 8, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015April 4-6, 2016	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21	M-4R 806.10 25.55 780.55 780.55 786.76 786.76 786.39 786.67 NM 788.96 787.55 786.83 786.12 789.09	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97 782.97 785.27	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81 782.81 785.27	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79	MW-48B 828.84 75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.73 783.78 783.8 783.18	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02	MW-220RR 792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.90 NM 789.3 788.48 NM	SG-2 795.25 793.85 NM 791.33 NM dry dry dry 791.70 791.58 793.40	SG-3 808.60	SG-4 805.36 dry dry dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 4, 2013October 8, 2013October 15, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015April 4-6, 2016October 11-13, 2016	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88	M-4R 806.10 25.55 780.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97 785.27 785.27	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 783.10 784.79 785.73	MW-48B 828.84 75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.73 783.73 783.8 785.68 786.16	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75	MW-220RR 792.90 18.96 773.94 780.55 785.02 782.36 NM 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.36	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.5 NM 789.3 788.48 NM 788.32	SG-2 795.25 793.85 NM 791.33 NM dry dry 791.70 793.40 792.52	SG-3 808.60	SG-4 805.36 dry dry dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 2, 2012April 15, 2013October 8, 2013October 8, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015April 4-6, 2016October 11-13, 2016April 10-13, 2017	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94	M-4R 806.10 25.55 780.55 786.76 786.76 786.67 NM 788.96 787.55 786.83 786.12 787.88 787.95	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.77 785.27 785.75 785.44	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81 785.27 785.52 785.52	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80 783.10 783.10 784.79 785.73 785.82	MW-48B 828.84 75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.69	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 782.77	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.73 783.79 782.93 783.18 785.68 786.16 785.95	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 784.29	MW-220RR 792.90 18.96 773.94 780.55 785.02 782.36 NM 782.36 NM 785.87 783.03 783.42 783.42 782.26 784.36 784.09 784.09	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32 788.31	SG-2 795.25 793.85 NM 791.33 NM dry dry dry 791.70 791.58 793.40 792.52 793.85	SG-3 808.60	SG-4 805.36 dry dry dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 2, 2012April 15, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015April 4-6, 2016October 11-13, 2016April 10-13, 2017October 3-5, 2017	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93	M-4R 806.10 25.55 780.55 786.76 786.76 786.76 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.04	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.77 782.97 785.27 785.27 785.44 783.35	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52 785.52 785.52 785.20 783.18	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80 783.10 783.10 784.79 785.73 785.82 784.30	MW-48B 828.84 75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94 783.94 782.82 783.01 784.76 785.61 785.69 784.19	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 782.77 782.37	MW-59 815.48 38.50 776.98 783.66 NM 783.49 783.41 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.79 782.93 783.18 785.68 786.16 785.95 783.89	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 783.34 781.95 785.02 783.75 784.29 782.48	MW-220RR 792.90 18.96 773.94 780.55 785.02 785.02 782.36 NM 785.87 783.03 783.42 783.42 782.26 784.36 784.09 784.09 784.09	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.30 NM 789.3 788.48 NM 788.32 788.31 788.31 788.3	SG-2 795.25 793.85 NM 791.33 NM dry dry dry dry 791.70 791.58 793.40 792.52 793.85 793.45	SG-3 808.60 dry dry dry dry dry dry dry dry dry dry	SG-4 805.36 dry dry dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 4, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015April 4-6, 2016October 11-13, 2017October 3-5, 2017April 23-25, 2018	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93 782.89	M-4R 806.10 25.55 780.55 786.76 786.76 786.67 NM 788.96 787.55 786.83 786.12 787.95 787.95 787.04 790.43	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97 785.27 785.27 785.75 785.44 783.35 782.86	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52 785.52 785.20 783.18 782.87	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80 783.10 783.10 785.73 785.82 785.82 784.30 783.14	MW-48B 828.84 75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 783.94 782.82 783.01 784.76 785.61 785.69 784.19 783.09	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 782.77 782.37 783.04	MW-59 815.48 38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23 783.02	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.73 783.73 783.8 785.68 785.68 785.68 785.95 783.89 783.23	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 784.29 784.29 782.48 783.26	MW-220RR 792.90 18.96 7773.94 780.55 785.02 785.02 782.36 NM 785.87 783.03 783.42 783.42 782.26 784.36 784.09 784.09 784.09 782.61 783.45	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.90 NM 789.3 788.48 NM 788.32 788.31 788.33 788.33	SG-2 795.25 793.85 NM 791.33 NM dry dry 791.70 791.58 793.40 792.52 793.85 793.45 >795.25	SG-3 808.60	SG-4 805.36 dry dry dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 2, 2012April 15, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015April 4-6, 2016October 11-13, 2016April 10-13, 2017October 3-5, 2017	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93	M-4R 806.10 25.55 780.55 786.76 786.76 786.76 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.04	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.77 782.97 785.27 785.27 785.44 783.35	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52 785.52 785.52 785.20 783.18	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 783.10 784.79 785.73 785.82 784.30 783.14 787.12	MW-48B 828.84 75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94 783.94 782.82 783.01 784.76 785.61 785.69 784.19	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 782.77 782.37	MW-59 815.48 38.50 776.98 783.66 NM 783.49 783.41 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.79 782.93 783.18 785.68 786.16 785.95 783.89	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 783.34 781.95 785.02 783.75 784.29 782.48	MW-220RR 792.90 18.96 773.94 780.55 785.02 785.02 782.36 NM 785.87 783.03 783.42 783.42 782.26 784.36 784.09 784.09 784.09	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.30 NM 789.3 788.48 NM 788.32 788.31 788.31 788.3	SG-2 795.25 793.85 NM 791.33 NM dry dry dry dry 791.70 791.58 793.40 792.52 793.85 793.45	SG-3 808.60 dry dry dry dry dry dry dry dry dry dry	SG-4 805.36 dry dry dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 4, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015April 4-6, 2016October 11-13, 2017October 3-5, 2017April 23-25, 2018	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93 782.89	M-4R 806.10 25.55 780.55 786.76 786.76 786.67 NM 788.96 787.55 786.83 786.12 787.95 787.95 787.04 790.43	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97 785.27 785.27 785.75 785.44 783.35 782.86	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52 785.52 785.20 783.18 782.87	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80 783.10 783.10 785.73 785.82 785.82 784.30 783.14	MW-48B 828.84 75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 783.94 782.82 783.01 784.76 785.61 785.69 784.19 783.09	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 782.77 782.37 783.04	MW-59 815.48 38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23 783.02	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.73 783.73 783.8 785.68 785.68 785.68 785.95 783.89 783.23	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 784.29 784.29 782.48 783.26	MW-220RR 792.90 18.96 7773.94 780.55 785.02 785.02 782.36 NM 785.87 783.03 783.42 783.42 782.26 784.36 784.09 784.09 784.09 782.61 783.45	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.90 NM 789.3 788.48 NM 788.32 788.31 788.33 788.33	SG-2 795.25 793.85 NM 791.33 NM dry dry 791.70 791.58 793.40 792.52 793.85 793.45 >795.25	SG-3 808.60	SG-4 805.36 dry dry dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 4, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015April 4-6, 2016October 11-13, 2017October 3-5, 2017April 23-25, 2018October 23-25, 2018	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 780.66 784.21 781.88 780.93 782.94 782.95	M-4R 806.10 25.55 780.55 786.76 786.76 786.67 NM 788.96 786.83 786.12 789.09 787.88 787.95 787.04 790.43 788.47	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97 785.27 785.27 785.75 785.44 783.35 782.86 787.12	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81 785.27 785.52 785.52 785.52 785.20 783.18 783.18 782.87 786.88	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 783.10 784.79 785.73 785.82 784.30 783.14 787.12	MW-48B 828.84 75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.61 785.69 784.19 783.09 786.99	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 782.32 782.81 781.82 783.21 783.12 783.12 783.77 782.37 783.04 783.48	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55 782.83 783.25 782.83 783.25 784.97 786.51 786.09 784.23 783.02 787.73	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.73 783.79 782.93 783.8 785.68 786.16 785.95 783.89 783.23 783.23	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 785.02 783.75 784.29 782.48 783.26 784.90	MW-220RR 792.90 18.96 773.94 780.55 785.02 785.02 782.36 NM 785.87 783.03 783.42 783.03 783.42 782.26 784.36 784.09 784.09 784.09 782.61 783.45 784.52	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.90 NM 789.3 788.48 NM 788.32 788.31 788.33 788.33 788.38 788.38	SG-2 795.25 793.85 NM 791.33 NM dry dry dry 791.70 791.58 793.40 792.52 793.85 793.45 >795.25 793.25	SG-3 808.60 dry dry	SG-4 805.36 dry dry dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 4, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015April 4-6, 2016October 1-13, 2017October 3-5, 2017April 23-25, 2018October 23-25, 2018April 1-4, 2019	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93 782.89 782.95 785.68	M-4R 806.10 25.55 780.55 786.76 786.83 786.67 NM 788.96 786.83 786.12 789.09 787.88 787.95 787.04 790.43 789.44	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.97 785.27 785.75 785.44 783.35 782.86 787.12 786.28	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 783.32 785.27 785.27 785.52 785.20 783.18 782.87 786.88 786.31	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 784.05 784.05 784.79 785.73 785.73 785.82 784.30 783.14 783.14 787.12 786.56	MW-48B 828.84 75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.69 784.19 783.09 786.99 786.45	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12 783.12 783.12 783.04 783.04 783.48 785.27	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 784.97 786.51 786.09 784.23 783.02 787.73 787.39	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.73 783.73 783.8 785.68 786.16 785.95 783.89 783.23 783.23 787.49 786.53	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 785.02 783.75 784.29 782.48 783.26 784.90 786.33	MW-220RR 792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 783.42 784.52 783.45 783.45 783.45 783.45	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.90 NM 789.3 788.48 NM 788.32 788.31 788.31 788.33 788.33 788.38 787.76 	SG-2 795.25 793.85 NM 791.33 NM dry dry 791.70 791.58 793.40 792.52 793.45 >795.25 793.25 794.60	SG-3 808.60 dry dry	SG-4 805.36 dry dry dry dry dry dry dry dry dry dry	
Facility (Facility ID	Top of Casing Elevation (feet amsl)Screen Length (ft)Total Depth (ft from top of casing)Top of Well Screen Elevation (ft)Measurement DateOctober 2, 2012April 15, 2013October 8, 2013October 8, 2013October 15, 2013April 14, 2014October 1-3, 2014April 13-14, 2015October 6-7, 2015April 4-6, 2016October 11-13, 2017October 3-5, 2017April 23-25, 2018October 23-25, 2019October 7-9, 2019	M-3 788.23 16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 780.66 784.21 781.88 782.94 780.93 782.89 782.89 782.95 785.68 785.33	M-4R 806.10 25.55 780.55 786.76 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.04 790.43 789.44 790.65	MW-39A 809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 785.27 785.75 785.44 783.35 782.86 787.12 786.28 787.10	MW-39B 809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 783.32 785.27 785.52 785.52 785.52 785.52 785.20 783.18 782.87 786.88 786.31 787.02	MW-48A 828.86 51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79 785.73 785.73 785.82 784.30 783.14 783.14 787.12 786.56 786.68	MW-48B 828.84 75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.61 785.69 784.19 783.09 786.99 786.99 786.45 786.65	MW-57 786.29 14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12 783.12 783.77 783.04 783.48 785.27 785.29	MW-59 815.48 38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55 782.83 783.25 782.83 783.25 784.97 786.51 786.09 784.23 783.02 787.73 787.39 786.68	MW-216R 814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.73 783.73 783.73 783.87 783.18 785.68 785.68 785.68 785.16 785.95 783.89 783.23 783.23 787.49 786.53 787.07	MW-217 791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 783.34 781.95 785.02 783.75 785.02 783.75 784.29 783.26 784.90 786.33 786.01	MW-220RR 792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 783.45 784.52 785.46 785.46	SG-1 792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 789.3 788.48 NM 788.32 788.31 788.31 788.33 788.33 788.38 787.76 748.48	SG-2 795.25 793.85 NM 791.33 NM dry dry 791.70 791.58 793.40 792.52 793.45 >795.25 793.25 794.60 795.20	SG-3 808.60 dry dry dry dry	SG-4 805.36 dry dry	

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

	Well Number	MW-301	MW-302	MW-303	MW-304	MW-305	M-4R	MW-33AR	MW-34A	MW-84A	MW-306	MW-307	MW-308	MW-309	MW-310	MW-31
	Top of Casing Elevation (feet amsl)	806.89	813.00	811.52	805.42	806.32	806.10	808.29	805.95	814.28	807.63	806.89	806.9	813.27	813.62	809.7
	Screen Length (ft)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Total Depth (ft from top of casing)	29.40	33.6	35.80	25.7	25.6	39.58	31.08	35.43	40.21	27	26.5	28	37.67	38.41	36.1
	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.
	Measurement Date															
	December 21-22, 2015	NM	784.78	784.11	786.13	788.96	787.58	783.77	783.50	785.31						
	April 4-5, 2016	786.78	785.81	785.48	788.08	789.61	789.09	785.29	785.63	786.37						
	July 7-8, 2016	786.31	786.28	784.60	787.36	789.26	787.43	785.19	785.05	785.89						
	July 28, 2016	NM	NM	784.35	NM	NM	NM	NM	784.86	785.61						
	October 11-13, 2016	787.64	787.76	786.18	788.18	789.78	787.88	787.36	786.45	787.22						
	December 29, 2016	787.37	787.05	NM	NM	NM	NM	785.66	785.72	786.63						
	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			
	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			
	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			
	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			
	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			
	February 21, 2018	NM	NM	NM	NM	NM	NM	783.19	783.05	783						
	March 23, 2018	NM	NM	NM	NM	NM	NM	783.10	783.10	783						
	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
CR Rule	May 24, 2018	NM	NM	NM	785.79	785.09	NM	785.45	785.97	786						
Wells	June 23, 2018	NM	NM	NM	NM	NM	NM	786.03	786.64	786						
	July 23, 2018	NM	NM	NM	NM	NM	NM	786.27	786.35	786						
	August 7, 2018	787.06	NM	785.20	788.25	788.56	787.63	NM	NM	786.55	NM	NM	NM	NM	NM	NI
	August 22, 2018	NM	NM	NM	NM	NM	NM	785.54	785.40	785						
	September 21, 2018	NM	788.37	786.50	NM	NM	NM	787.90	787.01	NM	NM	NM	NM	787.08	787.24	787
	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
	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
	June 12, 2019	NM	NM	NM	NM	NM	NM	NM	787.25	NA						
	June 19, 2019	NM	NM	786.81	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	N/
_	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
	December 13, 2019										787.03	785.68	786.43			
	December 23, 2019														775.22	
_	January 17, 2020			785.58												
	February 3, 2020	787.24	NM	NM	NM	NM	NM	NM	NM	786.50	785.77	785.57	786.48	NM	NM	NA
	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
	June 30, 2020	NM	NM	NM	NM	NM	NM	786.18	NM	N						
_	August 6, 2020	NM	NM	NM	NM	NM	NM	785.93	NM	N						
	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
	December 11, 2020					788.19								785.26	785.26	
	February 25, 2021	NM	NM	784.27	NM	788.36	NM	NM	784.75	NM	NM	NM	NM	NM	NM	NI
	Bottom of Well Elevation (ft)	771.33	780.55	774.82	733.43	776.98	753.04	771.89	776.98	776.36	780.63	780.39	778.90	775.60	775.21	773

Checked by: RM Date: 4/5/2021 Proj Mgr QA/QC: TK Date: 4/5/2021

(1) The elevation for SG-1 is read off of the staff gauge (rather than measured from the top of the gauge).

(2) SG-2 could not be located during the April 2013 event.

(3) SG-3 could not be located during the October 2013 event. SG-1 could not be safely accessed during the October 2013 event.

(4) LH-2 measurements are given as leachate depth, measured by a transducer.

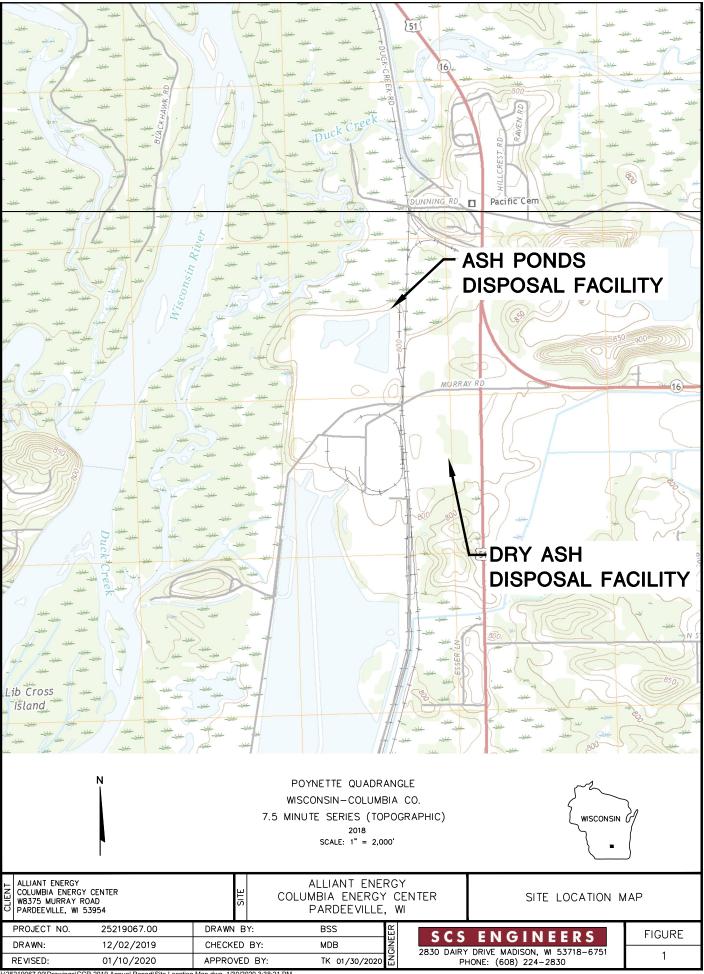
(5) LH-2 and LH-3 measurements were collected by WPL staff on October 9, 2017.

(6) The depth to water at MW-84A was not measured prior to purging for sampling during the October 3-5 sampling event. The level was allowed to return to static and was measured on 10/10/2017.

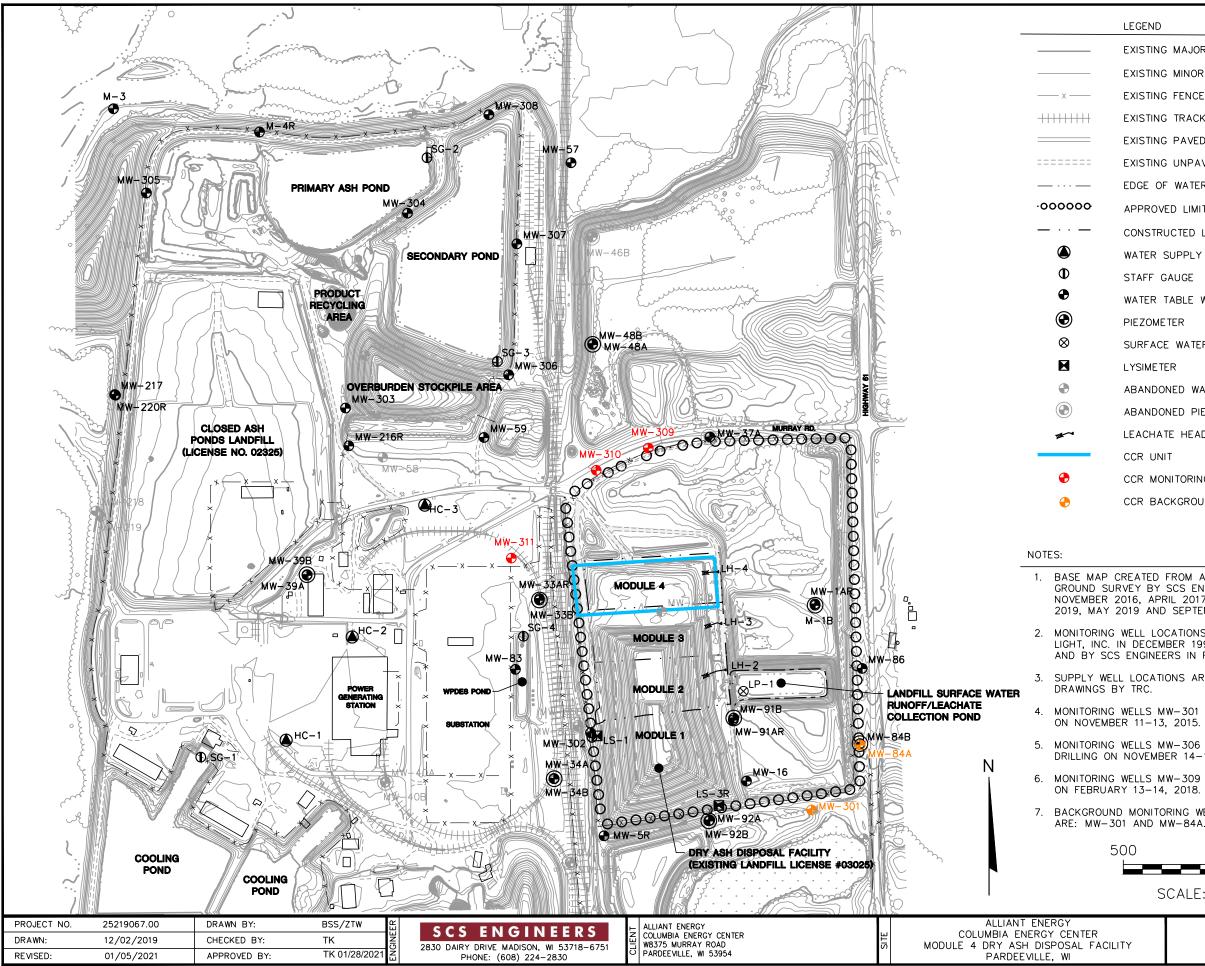
I:\25221067.00\Deliverables\2020 Oct ASD MOD 4 LF\Tables\[Table 3 - Groundwater Elevation Summary.xls]levels

Figures

- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations
- 3 Water Table Map October 2020



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



:\25220067.00\Drawings\Mod 4\Site Plan and Monitoring Well Locations.dwg, 1/20/2021 1:46:12 Pl

LEGEND

EXISTING MAJOR CONTOUR (10' INTERVAL)
EXISTING MINOR CONTOUR (2' CONTOUR)
EXISTING FENCELINE
EXISTING TRACKS
EXISTING PAVED ROAD
EXISTING UNPAVED ROAD
EDGE OF WATER
APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL
NATER SUPPLY WELL
STAFF GAUGE
NATER TABLE WELL
PIEZOMETER
SURFACE WATER SAMPLE LOCATION
YSIMETER
ABANDONED WATER TABLE WELL
ABANDONED PIEZOMETER
EACHATE HEADWELL
CCR UNIT
CCR MONITORING WELL

CCR BACKGROUND MONITORING WELL

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 AND SEPTEMBER 2020.

2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND JANUARY 2016, AND BY SCS ENGINEERS IN FEBRUARY 2018.

3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013

4. MONITORING WELLS MW-301 THROUGH MW-305 INSTALLED BY BADGER STATE DRILLING

5. MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15, 2016.

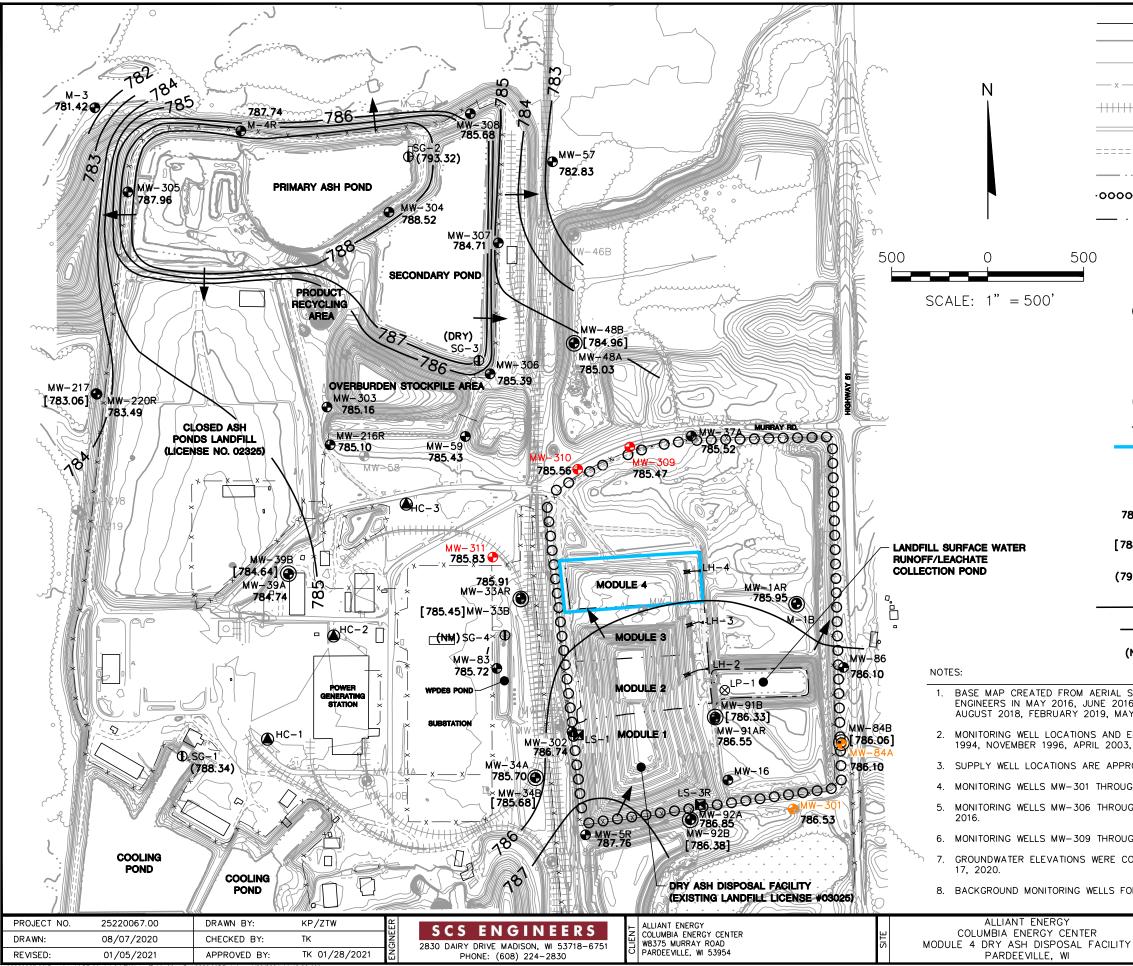
6. MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING

7. BACKGROUND MONITORING WELLS FOR THE MODULE 4 DRY ASH DISPOSAL FACILITY

500 \cap

SCALE: 1'' = 500'

	SITE PLAN AND MONITORING	FIGURE
Ý	WELL LOCATIONS	2



:\25220067.00\Drawings\ASD Mod 1-3 LF\Water Table Map Oct 2020 MOD 4.dwg, 1/28/2021 11:42:03 AM

	LEGEND					
	EXISTING MAJOR CONTOUR (10' INTERVAL)					
	EXISTING MINOR CONTOUR (2' CONTOUR)					
x	EXISTING FENCE LINE					
+++++++	EXISTING TRACKS					
	EXISTING PAVED ROAD					
=====	EXISTING UNPAVED ROAD					
	EDGE OF WATER					
00000	APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)					
· · <u> </u>	CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL)					
	WATER SUPPLY WELL					
Ф	STAFF GAUGE					
•	WATER TABLE WELL					
۲	PIEZOMETER					
\otimes	SURFACE WATER SAMPLE LOCATION					
	LYSIMETER					
•	ABANDONED WATER TABLE WELL					
	ABANDONED PIEZOMETER					
***	LEACHATE HEADWELL					
	CCR UNIT					
•	CCR MONITORING WELL					
e	CCR BACKGROUND MONITORING WELL					
87.62	WATER TABLE ELEVATION MEASURED OCTOBER 2020					
88.87]	POTENTIOMETRIC SURFACE ELEVATION MEASURED OCTOBER 2020 (NOT CONTOURED)					
95.20)	SURFACE WATER ELEVATION MEASURED OCTOBER 2020 (NOT CONTOURED)					
	WATER TABLE CONTOUR					
→	APPROXIMATE GROUNDWATER FLOW DIRECTION					
(NM)	NOT MEASURED					
6, OCTOBER 2	BM, FLOWN DECEMBER 1, 2014, AND GROUND SURVEY BY SCS 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, JULY 2018, SEPTEMBER 2020.					
	ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER , AND JANUARY 2016 AND BY SCS ENGINEERS IN FEBRUARY 2018.					
OXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY TRC.						
GH M₩-305 IN	NSTALLED BY BADGER STATE DRILLING ON NOVEMBER 11-13, 2015.					
ICH MW_308 1	H MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15					

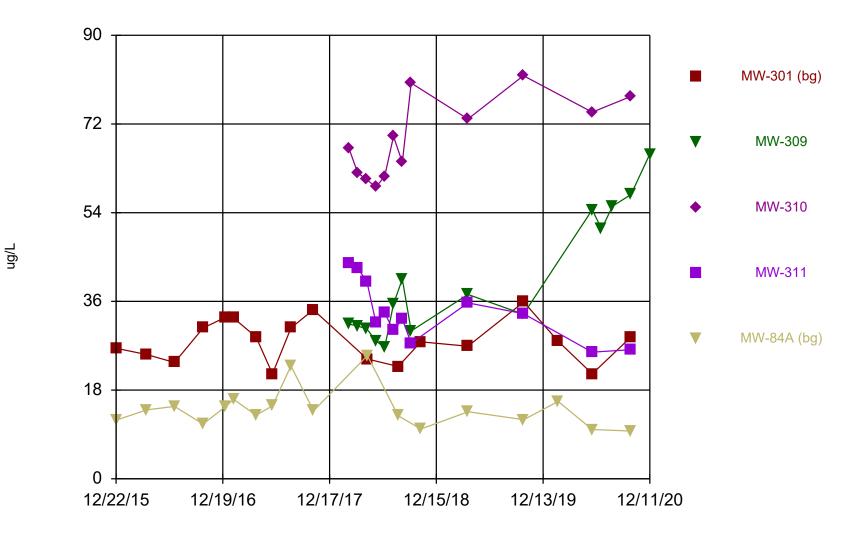
5. MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15,

MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING ON FEBRUARY 13-14, 2018.
 GROUNDWATER ELEVATIONS WERE COLLECTED FROM MONITORING WELLS AND PIEZOMETERS ON OCTOBER 7, 8, and

8. BACKGROUND MONITORING WELLS FOR THE MODULE 4 DRY ASH DISPOSAL FACILITY ARE: MW-301 AND MW-84A.

	WATER TABLE MAP	FIGURE
Ý	OCTOBER 2020	3

Appendix A Trend Plots for CCR Wells Boron



Time Series Analysis Run 4/5/2021 6:00 PM View: MOD 4 LF Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

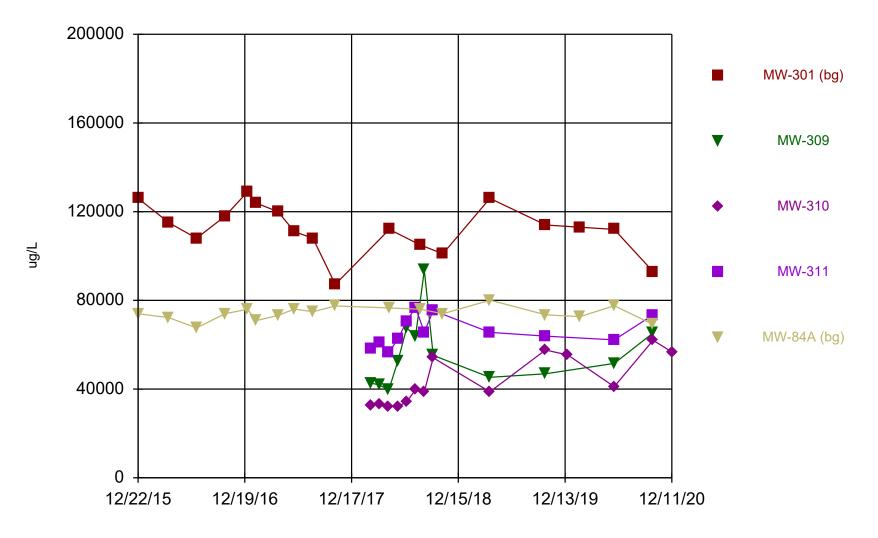
Time Series

Constituent: Boron (ug/L) Analysis Run 4/5/2021 6:03 PM View: MOD 4 LF

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	57.7	77.6	26.2	9.7 (J)
12/11/2020		65.9 (R)			

Calcium



Time SeriesAnalysis Run 4/5/2021 6:00 PMView: MOD 4 LFColumbia Energy CenterClient: SCS EngineersData: December - Chem- export-Dec2020

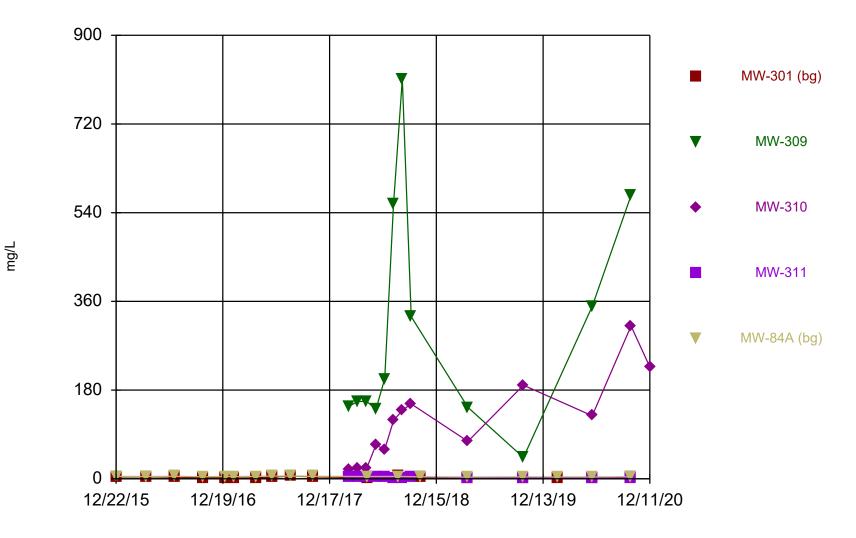
Time Series

Constituent: Calcium (ug/L) Analysis Run 4/5/2021 6:03 PM View: MOD 4 LF

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

			0,		
	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	62000	73400	69200
12/11/2020			56800 (R)		

Chloride



Time Series Analysis Run 4/5/2021 6:00 PM View: MOD 4 LF Columbia Energy Center Client: SCS Engineers Data: December - Chem- export-Dec2020

Time Series

Constituent: Chloride (mg/L) Analysis Run 4/5/2021 6:03 PM View: MOD 4 LF

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	310	1.4 (J)	4.3
12/11/2020			227 (R)		

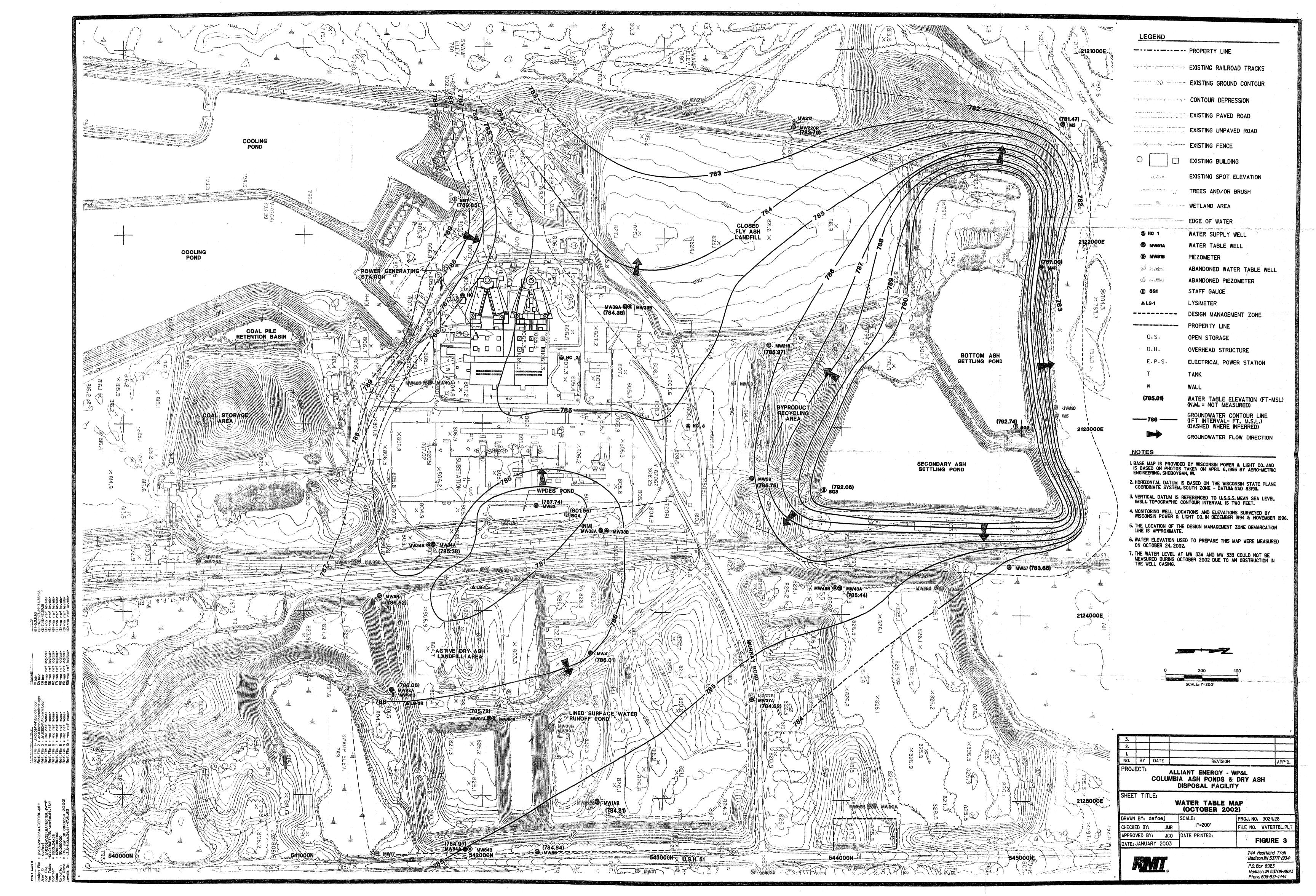
Appendix B

Historical Groundwater Flow Maps



	LEGEND
	PROPOSED PROJECT AREA
₩ ⁶³ 720.29	OBSERVATION WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
+	BORING LOCATION AND NUMBER
· · · ·	WETLANDS
and the second	TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL: 20 FT.)
	PRIVATE RESIDENCES (ASSUMED LOCATIONS OF PRIVATE WATER SUPPLY WELLS)
	COMMERCIAL BUILDINGS (ASSUMED LOCATIONS OF POSSIBLE PUBLIC WATER SUPPLY WELLS)
	SURFACE WATERS (STREAMS OR DRAINAGE DITCHES) ARROWS INDICATE DIRECTION OF FLOW
	OTHER BUILDINGS (GARAGES, BARNS, ETC.)
\$	HIGH CAPICITY WELLS
-790-	WATER TABLE CONTOURS (CONTOUR INTERVAL: I FT.)
	DIRECTION OF GROUNDWATER FLOW

NO	BY	DATE		REVISION		APP'D		
		WAT	ER TABLE CON	TOUR MAP 2/4	1/81	•		
PLA	ANC	DF OPE	ERATION - /	ASH DISPOS	SAL FAC	ILITY		
			COLUM	BIA SITE				
	WISCONSIN POWER & LIGHT COMPANY							
			T OF SECTIONS					
TOV	NN (OF PA	CIFIC COL	UMBIA CO.	WISCO	ONSIN		
W	AR	ZYN	DRAWN TDH	SCALE "= 300'	SHEET 39	OF 39		
			CHECKED RJK	DATE 2/10/81	DRAWING NO.			
	APPROVED C7134-					-94		
ENG	ENGINEERING INC REFERENCE PRINTE					3/88		



F2 Alternative Source Demonstration – April 2021

Alternative Source Demonstration April 2021 Detection Monitoring

Dry Ash Disposal Facility, Module 4 Columbia Energy Center Pardeeville, Wisconsin

Prepared for:



SCS ENGINEERS

25221067.00 | October 13, 2021

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

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Tabla 3	Groundwater Elevation - State Monitoring Program and

Table 3.Groundwater Elevation – State Monitoring Program and CCR Well Network

i

Figures

Figure 1. Site Location Map

- Site Plan and Monitoring Well Locations Water Table Map April 2021 Figure 2.
- Figure 3.

Appendices

Trend Plots for CCR Wells Appendix A

I:\25221067.00\Deliverables\2021 April ASD MOD 4 LF\211013_COL_4 LF_Apr21 ASD_Final.docx

PE CERTIFICATION

	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.
Sherren C. Clark E-298e3 Medison, Wis. SoonAll Elements 10 - 12 - 2	Shevven Clark (signature) (date) Shevven Clark (printed or typed name) License number E-29863 My license renewal date is July 31, 2022. Pages or sheets covered by this seal: Alternative Source Demonstration, April 2021 Detection Monitoring, Dry Ash Disposal Facility, Module 4
	Columbia Energy Center, Pardeeville, Wisconsin (Entire Document)

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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 a supplemental resampling event completed in June 2021.

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 April 2021 detection monitoring event at the Columbia Energy Center (COL) Dry Ash Disposal Facility, Module 4 CCR Unit (Mod 4). The first ASD was prepared for this facility evaluating the SSIs observed in the statistical evaluation of the April 2019 detection monitoring event.

This ASD report is evaluating the SSIs for boron and chloride that were observed in the statistical evaluation of the April 2021 sampling and June 2021 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 of the ADF only. The Mod 4 CCR Unit became operational in 2018. The ADF is operated under the Wisconsin Department of Natural Resources (WDNR) License No. 3025.

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

• COL Dry Ash Disposal Facility – Module 4 (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 as **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 April 2021 and June 2021 sampling results, are summarized in the attached **Table 1**.

The April 2021 SSIs include the following parameters and wells:

- Boron: 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 April 2021 detection monitoring event will be included in the 2021 Annual Groundwater Monitoring and Corrective Action Report to be submitted in January 2022. 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. All CCR monitoring wells are screened within the unconsolidated sand unit.

Shallow groundwater at the site generally flows to the northwest across the existing landfill area, then generally flows west toward the Wisconsin River, with localized mounding associated with the ash ponds. A groundwater flow map for April 2021 is shown on **Figure 3**. The groundwater elevation data for the state and CCR and state 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 did not identify any other issues with the field analysis based on review of the data and field notes. Because boron 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 April 2021 detection monitoring event and the June 2021 retest event were reviewed to determine if any laboratory analysis error or issue may have caused or contributed to an observed SSIs for boron or chloride. 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.

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 concentrations observed are similar to historical concentrations.

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 2021 sample and June 2021 retest results, an SSI for boron occurred for MW-309, and a chloride SSI occurred for MW-310 for the April 2021 semiannual event, because both results exceeded the intrawell UPL.

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 and 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 April 2021 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 intrawell UPLs will be updated in the future with additional data.

3.4 SUMMARY OF METHODOLOGY AND ANALYSIS REVIEW FINDINGS

In summary, no changes to the SSI determinations for the April 2021 monitoring event based on the methodology and analysis review, and no errors or issues caused or contributed to the reported SSIs identified.

4.0 ALTERNATIVE SOURCES

This section discusses the potential alternative sources for the boron and chloride SSIs at the downgradient monitoring well, 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 2021 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.

As shown on the time series plots in **Appendix A**, 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. Lower boron concentrations were detected in background sampling at upgradient wells MW-84A and MW-301.

For chloride, the April and June 2021 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 background and current monitoring at MW-309 (**Appendix A**).

Because the background sampling at the three compliance wells was performed after other potential man-made sources of boron and chloride had been in operation for many years, it is difficult to determine how much of the variation in boron 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 and chloride 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 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 and chloride SSIs could include the closed ash pond landfill, the active and inactive ash ponds, Modules 1-3 of the ADF, 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.

4.2 LINES OF EVIDENCE

The lines of evidence indicating that the SSIs for boron 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 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 CCR Unit.
- 2. MW-309 and MW-310 are located adjacent to the plant entrance road, where road salt impacts are likely.
- 3. The Mod 4 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 could have reached MW-309 and MW-310 by April 2021.

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

4.2.1 Background Concentrations

As discussed above in **Section 4.1.1**, the detected concentrations exceeding intrawell UPLs are below the background concentrations at other wells in the monitoring network. Historical boron and chloride concentrations for all five Mod 4 wells are shown in **Table 2** and in the time series plots in **Appendix A**. 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 CCR Unit. 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 compliance wells likely reflect historical ash management activities at the site under different groundwater flow conditions.

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 Location Adjacent to Entrance Road

Monitoring wells MW-309 and MW-310 are located adjacent to the plant entrance road, where road salt impacts are likely. To be located as close as possible to the waste boundary of the CCR Unit (including the Mod 5/6 additions under construction 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.

4.2.3 Mod 4 Composite Liner

The Mod 4 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 could have reached MW-309 and MW-310 by April or June 2021. 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.

Given the liner system in place, a release from Mod 4 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 in less than 2 years. 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, 2021]), it is very unlikely that changes in boron and chloride concentrations at MW-309 and MW-310 reflect a release from Mod 4.

5.0 ALTERNATIVE SOURCE DEMONSTRATION CONCLUSIONS

The lines of evidence discussed above regarding the SSIs reported for boron at MW-309 and for chloride at MW-310 demonstrate that the SSIs are likely due to sources other than the Mod 4 CCR Unit. Similar boron and chloride concentrations were present in the area prior to disposal of CCR in Mod 4. The SSIs likely reflect road salt impacts (chloride) and impacts associated with historical discharges from the ash ponds via the effluent ditch located west of the landfill (boron).

6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS

In accordance with section 257.94(e)(2) of the CCR Rule, the COL Mod 4 CCR Unit may continue with detection monitoring based on this ASD. The ASD report will be included in the 2021 Annual Report due January 31, 2022.

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

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

- 1 Groundwater Analytical Results Summary
- 2 Historical Analytical Results for Parameters with SSIs
- 3 Groundwater Elevation State Monitoring Program and CCR Well Network

Table 1. Groundwater Analytical Results SummaryColumbia Dry Ash Disposal Facility - Module 4 / SCS Engineers Project #25221067.00

	Backgro	ound Wells	Compliance Wells										
	MW-84A	MW-301		MW-309			MW-310	MW-311					
Parameter Name	4/14/2021	4/14/2021	Intrawell UPL	4/13/2021	6/11/2021	Intrawell UPL	4/13/2021	6/11/2021	Intrawell UPL	4/14/2021			
Boron, µg/L	14.3	22.2	42.2	48	49.9	81.9	69.6		49.8	33.6			
Calcium, µg/L	69,100	117,000 P6	99,900	62,300		56,000	49,300		84,200	59,000			
Chloride, mg/L	4.4	1.5 J	901	390		205	227	220	4.41	1.3 J			
Fluoride, mg/L	<0.095	<0.095	DQ	<0.095		DQ	<0.095		DQ	<0.095			
Field pH, Std. Units	7.34	6.66	8.18	7.68	7.71	8.12	7.73	7.73	8.07	7.46			
Sulfate, mg/L	1.4 J	8.5	53.1	30.3		118	43.3		131	15.6			
Total Dissolved Solids, mg/L	328	472	1,730	916		759	654		462	270			

4.4

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

ma/L = milliarams per liter

 $\mu g/L = micrograms per liter$

SSI = Statistically Significant Increase

Abbreviations:

UPL = Upper Prediction Limit

DQ = Double Quantification

-- = Not Analyzed

Lab Notes:

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

Notes:

- 1. Intrawell UPLs 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 calculated from background sampling results for the compliance wells from February 2018 through October 2018.

LOQ = Limit of Quantitation

LOD = Limit of Detection

Created by: NDK	Date: 5/17/2021
Last revision by: NDK	Date: 6/21/2021
Checked by: RM	Date: 6/21/2021
Scientist/PM QA/QC: TK	Date: 9/23/2021

I:\25221067.00\Deliverables\2021 April ASD MOD 4 LF\Tables\[Table 1 - COL LF Mod 4_Screening Summary.xlsx]Current Event Table-original

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (µg/L)	Chloride (mg/L)
		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
	MW-301	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	<u>27.9</u> 21.3	113,000	1.30 J
рг		5/29/2020	21.3	112,000 93,000	2.00 J 3.40
Background		10/8/2020 4/14/2021	20.0	117,000	1.50 J
gra		12/22/2015	11.9	74,000	4.90
Å X		4/5/2016	14.0	72,200	4.70
BC		7/8/2016	14.0	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	14.7	70,800	4.60
		4/11/2017	12.9	73,200	4.80
		6/6/2017	14.8	76,100	5.50
		8/8/2017	22.9	74,900	5.50
	MW-84A	10/24/2017	13.8	77,500	5.10
	10100-171	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
		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
0 C		8/22/2018	40.5	93,600	811
Compliance		9/21/2018	30.0	55,200	329
plic	MW-309	4/2/2019	37.4	45,300	145
ш		10/8/2019	33.4	46,900	43.2
ŭ		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		

Table 2. Historical Analytical Results for Parameters with SSIsColumbia Dry ADF, Module 4

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (µg/L)	Chloride (mg/L)
		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
	MW-310	9/21/2018	80.3	54,100	152
	10100-510	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
0 U		10/8/2020	77.6	62,000	310
aŭ		12/11/2020		56,800	227
plic		4/13/2021	69.6	49,300	227
Compliance		6/11/2021			220
Ŭ		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
	MW-311	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

Table 2. Historical Analytical Results for Parameters with SSIsColumbia Dry ADF, Module 4

Abbreviations:

 μ g/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:	NDK	Date:	3/18/2021
Last revision by:	RM	Date:	7/6/2021
Checked by:	ZTW	Date:	7/7/2021
PM QC Check:	TK	Date:	9/23/2021

I:\25221067.00\Deliverables\2021 April ASD MOD 4 LF\Tables\[Table 2 - Historical Analytical Results with SSIs.xIsx]Table 2. Analy. RsIts- CCR

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

									-	acilities / S			# LOLL TOOP									
	Well Number	MW-1AR	MW-4	MW-5R	MW-33AR	MW-33BR	MW-34A	MW-34B	MW-37A	MW-83			MW-86	MW-91AR	MW-91B	MW-92A	MW-92B	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					
	Screen Length (ft)																					
	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	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	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			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	NM	dry	dry		
	October 8, 2013													785.66	785.42	785.97	785.52	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					
	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	NM	dry	eachate depth = 0.2 ir	r 1	
	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	NM	dry	eachate depth = 0.3 ir	r 1	
Dry Ash	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	dry		dry		
Facility	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	broken	dry	achate depth = 14.8 i	i	
(Facility ID	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	broken	dry	15.9"		
#03025)	October 11-13, 2016 April 10-13, 2017	786.64 786.96	aband aband	788.00 788.13	787.36 786.39	786.46 785.99	786.45 786.30	786.32 786.28	786.40 786.34	786.81 786.23	787.22 787.16	787.11 787.06	786.96 786.96	787.17 787.24	786.81 787.03	787.68 787.90	787.25	liquid depth = 3.5' liquid depth = 3.0'	dry dry	0.8" -0.3	1.4"	
#03023]	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	liquid depth = 3.0	dry	-0.3 NM	NM	
	October 9-10, 2017	NM	aband	700.00 NM	NM	NM	NM	704.03 NM	704.00 NM	NM	785.56 (6)	NM	NM	700.00 NM	705.05 NM	NM	NM	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	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	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	drv	id depth =	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	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	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	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	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	NM	NM	-0.1	2.7	2.6
	April 14, 2021	785.11	aband	787.29	784.27	784.05	784.77	784.77	784.46	С	785.84	785.81	785.60	785.86	785.69	786.47	786.06	liquid depth = 3.7'			0.2333	0.2167
	June 11, 2021	NM	aband	NM	784.19	NM	784.66	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	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						
													001			50 7						
	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)	788.23	806.10			828.86	828.84	786.29	815.48													
	· · · · · ·	788.23	806.10 25.55			828.86 51.88	75.80	786.29	38.50	814.21 37.85	791.55 37.37											
	Screen Length (ft)			809.62	809.50					814.21	791.55	792.90	792.06	795.25	808.60	805.36						
	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date	16.90 771.33	25.55 780.55	809.62 34.80 774.82	809.50 76.07 733.43	51.88 776.98	75.80 753.04	14.40 771.89	38.50 776.98	814.21 37.85 776.36	791.55 37.37 754.18	792.90 18.96 773.94	 	795.25 	808.60	805.36						
	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012	16.90 771.33 780.13	25.55 780.55 786.76	809.62 34.80 774.82 781.49	809.50 76.07 733.43 781.34	51.88 776.98 782.03	75.80 753.04 781.93	14.40 771.89 780.58	38.50	814.21 37.85 776.36 781.91	791.55 37.37 754.18 780.95	792.90 18.96 773.94 780.55	792.06 789.14	795.25	808.60	805.36						
	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date	16.90 771.33	25.55 780.55	809.62 34.80 774.82	809.50 76.07 733.43	51.88 776.98	75.80 753.04	14.40 771.89	38.50 776.98	814.21 37.85 776.36	791.55 37.37 754.18	792.90 18.96 773.94	 	795.25 	808.60 	805.36 						
	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012	16.90 771.33 780.13 785.16	25.55 780.55 786.76	809.62 34.80 774.82 781.49	809.50 76.07 733.43 781.34	51.88 776.98 782.03	75.80 753.04 781.93 783.78	14.40 771.89 780.58	38.50 776.98 779.88	814.21 37.85 776.36 781.91 784.09	791.55 37.37 754.18 780.95 784.75	792.90 18.96 773.94 780.55 785.02	792.06 789.14 789.5 ⁽¹⁾	795.25 793.85	808.60 dry dry	805.36 dry dry						
	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013	16.90 771.33 780.13 785.16 781.22	25.55 780.55 786.76 786.76 788.39 786.67	809.62 34.80 774.82 781.49 783.97 NM	809.50 76.07 733.43 781.34 784.00 NM	51.88 776.98 782.03 783.77 783.69	75.80 753.04 781.93 783.78 783.58	14.40 771.89 780.58 784.69 NM	38.50 776.98 779.88 783.66 NM	814.21 37.85 776.36 781.91 784.09 783.39	791.55 37.37 754.18 780.95 784.75 782.27	792.90 18.96 773.94 780.55 785.02 782.36	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾	795.25 793.85 NM 791.33	808.60 dry dry dry dry	805.36 dry dry dry						
	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013	16.90 771.33 780.13 785.16 781.22 NM	25.55 780.55 786.76 786.76 788.39 786.67 NM	809.62 34.80 774.82 781.49 783.97 NM 782.94	809.50 76.07 733.43 781.34 784.00 NM 782.81	51.88 776.98 782.03 783.77 783.69 NM	75.80 753.04 781.93 783.78 783.58 NM	14.40 771.89 780.58 784.69 NM 782.47	38.50 776.98 779.88 783.66 NM 783.49	814.21 37.85 776.36 781.91 784.09 783.39 NM	791.55 37.37 754.18 780.95 784.75 782.27 NM	792.90 18.96 773.94 780.55 785.02 782.36 NM	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM	795.25 793.85 NM 791.33 NM	808.60 dry dry dry NM	805.36 dry dry dry NM						
	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 April 14, 2014	16.90 771.33 780.13 785.16 781.22 NM 786.04	25.55 780.55 786.76 788.39 786.67 NM 788.96	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68	51.88 776.98 782.03 783.77 783.69 NM 783.56	75.80 753.04 781.93 783.78 783.58 NM 783.57	14.40 771.89 780.58 784.69 NM 782.47 785.51	38.50 776.98 779.88 783.66 NM 783.49 783.41	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 788.90	795.25 793.85 NM 791.33 NM dry	808.60 dry dry dry NM dry	805.36 dry dry dry NM dry						
Ash Pond	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16	25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05	75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32	38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 788.90 NM	795.25 793.85 NM 791.33 NM dry dry	808.60 dry dry dry NM dry dry dry	805.36 dry dry dry MM dry dry dry						
Ash Pond Facility	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08	25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80	75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94 782.82	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81	38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55 782.83	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 788.90 NM 789.3	795.25 793.85 NM 791.33 NM dry dry 791.70	808.60 dry dry dry NM dry dry dry dry	805.36 dry dry dry dry MM dry dry dry dry						
Facility	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66	25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80 783.10	75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82	38.50 776.98 779.88 783.66 NM 783.49 783.41 783.55 782.83 783.25	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 788.90 NM 789.3 788.48	795.25 793.85 NM 791.33 NM dry dry dry 791.70 791.58	808.60 dry dry dry NM dry dry dry dry dry dry	805.36 dry dry dry dry MM dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 8, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21	25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97 785.27	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81 782.81 782.68	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79	75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 789.3 788.48 NM	795.25 793.85 NM 791.33 NM dry dry dry 791.70 791.58 793.40	808.60 dry dry dry dry NM dry dry dry dry dry dry dry	805.36 dry dry dry dry dry dry dry dry dry dry						
Facility	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 8, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 11-13, 2016	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88	25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97 785.27 785.27	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81 782.81 785.27 785.52	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80 783.10 784.79 785.73	75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32	795.25 793.85 NM 791.33 NM dry dry 791.70 791.58 793.40 792.52	808.60 dry dry dry NM dry dry dry dry dry dry	805.36 dry dry dry dry MM dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 8, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21	25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97 785.27	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81 782.81 782.68	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79	75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 789.3 788.48 NM	795.25 793.85 NM 791.33 NM dry dry dry 791.70 791.58 793.40	808.60 dry dry dry dry NM dry dry dry dry dry dry dry	805.36 dry dry dry dry dry dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 8, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 11-13, 2016	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88	25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97 785.27 785.27	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81 782.81 785.27 785.52	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80 783.10 784.79 785.73	75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32	795.25 793.85 NM 791.33 NM dry dry 791.70 791.58 793.40 792.52	808.60 dry dry dry dry dry dry dry dry dry dry	805.36 dry dry dry dry dry dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 8, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 11-13, 2016 April 10-13, 2017	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94	25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.88 787.95	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 782.97 785.27 785.27 785.75 785.44	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81 785.27 785.52 785.20	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79 785.73 785.82	75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.69	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16 785.95	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 784.29	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09 784.09	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32 788.31	795.25 793.85 NM 791.33 NM dry dry 791.70 791.58 793.40 792.52 793.85	808.60 dry dry dry dry dry dry dry dry dry dry	805.36 dry dry dry dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 8, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 11-13, 2016 April 10-13, 2017 October 3-5, 2017	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93	25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.95 787.04	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 785.27 785.27 785.27 785.27 785.75 785.44 783.35	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52 785.52 785.20 783.18	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80 783.10 784.79 785.73 785.82 784.30	75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.61 785.69 784.19	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12 782.77 782.37	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16 785.95 783.89	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 785.02 783.75 784.29 782.48	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09 784.09 782.61	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32 788.31 788.3	795.25 793.85 NM 791.33 NM dry dry 791.70 791.58 793.40 792.52 793.85 793.45	808.60 dry dry dry dry dry dry dry dry dry dry	805.36 dry dry dry dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 11-13, 2017 October 3-5, 2017 April 23-25, 2018	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93 782.89	25.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.04 790.43	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 785.27 785.27 785.27 785.27 785.44 783.35 782.86	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81 785.27 785.52 785.52 785.20 783.18 782.87	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79 785.73 785.82 784.30 783.14	75.80 753.04 781.93 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.61 785.69 784.19 783.09	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12 783.77 782.37 783.04 783.48	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23 783.02	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16 785.95 783.89 783.23	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 785.02 783.75 784.29 782.48 783.26	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09 784.09 782.61 783.45	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32 788.31 788.3 788.3 788.3	795.25 793.85 NM 791.33 NM dry dry 791.70 791.58 793.40 792.52 793.85 793.45 >795.25	808.60	805.36 dry dry dry dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 1-13, 2017 October 3-5, 2017 April 23-25, 2018 October 23-25, 2018 April 1-4, 2019	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93 782.89 782.89 782.95 785.68	25.55 780.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.04 787.04 790.43 788.47 789.44	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 785.27 785.27 785.27 785.27 785.44 783.35 785.44 783.35 782.86 787.12 786.28	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 782.81 785.27 785.52 785.52 785.52 785.52 785.20 783.18 782.87 786.88 786.31	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 782.80 783.10 784.79 785.73 785.82 784.30 783.14 787.12 786.56	75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.61 785.69 784.19 783.09 786.99 786.45	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12 783.12 783.12 783.12 783.12 783.14 783.48 783.48 785.27	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23 783.02 787.73 787.39	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16 785.95 783.89 783.23 787.49 786.53	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 785.02 783.75 784.29 782.48 783.26 783.26 784.90 786.33	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09 784.09 784.09 782.61 783.45 784.52 785.46	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32 788.31 788.3 788.33 788.33 788.33 788.33	795.25 	808.60 dry	805.36 dry dry dry dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 1-13, 2017 October 3-5, 2017 April 23-25, 2018 October 23-25, 2018 April 1-4, 2019 October 7-9, 2019	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93 782.89 782.89 782.95 785.68 785.33	25.55 780.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.04 787.04 790.43 788.47 789.44 790.65	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 785.27 785.27 785.27 785.27 785.27 785.44 783.35 782.86 787.12 786.28 787.10	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52 785.52 785.52 785.52 785.20 783.18 782.87 786.88 786.31 787.02	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79 785.73 785.82 784.30 783.14 787.12 786.56 786.68	75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.61 785.69 784.19 783.09 786.99 786.45 786.65	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12 783.12 783.12 783.12 783.12 783.48 783.04 783.48 785.27 785.29	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23 783.02 787.73 787.39 786.68	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16 785.95 783.89 783.23 787.49 786.53 787.07	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 785.02 783.75 784.29 782.48 783.26 784.20 786.33 786.01	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09 784.09 784.09 782.61 783.45 783.45 784.52 785.46 785.42	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32 788.31 788.3 788.33 788.33 788.33 788.34 788.3 788.3 788.3 788.3 788.3 788.3 788.3 788.3	795.25 	808.60 dry	805.36 dry dry dry dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 3-5, 2017 April 10-13, 2017 October 3-5, 2017 April 23-25, 2018 October 23-25, 2018 April 1-4, 2019 October 7-9, 2019	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93 782.94 780.93 782.89 782.95 785.68 785.33 781.80	25.55 780.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.04 787.04 790.43 788.47 789.44 790.65 787.73	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 785.27 785.27 785.27 785.27 785.27 785.44 783.35 785.44 783.35 782.86 787.12 786.28 787.10 785.12	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52 785.52 785.52 785.52 785.20 783.18 782.87 786.88 786.31 787.02 784.92	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79 785.73 785.82 784.30 783.14 785.73 785.82 784.30 783.14 787.12 786.56 786.68 785.74	75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.61 785.69 784.19 783.09 786.99 786.45 786.65 785.59	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12 783.77 783.04 783.48 783.48 785.27 785.29 783.11	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23 783.02 787.73 787.39 786.68 785.89	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16 785.95 783.89 783.23 787.49 786.53 787.07 785.60	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 785.02 783.75 784.29 782.48 783.26 783.26 784.90 786.33 786.01 783.41	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09 784.09 784.09 782.61 783.45 783.45 784.52 785.46 785.42 783.89	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32 788.31 788.33 788.33 788.33 788.33 788.33 788.33 788.34 788.33 788.34 788.38 787.76 788.40 748.48	795.25 	808.60 dry	805.36 dry dry dry dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 October 15, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 3-5, 2017 April 10-13, 2017 October 3-5, 2017 April 23-25, 2018 October 23-25, 2018 April 1-4, 2019 October 7-9, 2019 May 27-29, 2020 October 7-8 & 17, 2020	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93 782.89 782.95 785.68 785.33 781.80 781.42	25.55 780.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.04 787.04 790.43 788.47 789.44 790.65 787.73 787.74	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 785.27 785.27 785.27 785.27 785.44 783.35 785.44 783.35 782.86 787.12 786.28 787.10 785.12 784.74	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52 785.52 785.52 785.20 783.18 782.87 786.88 786.31 787.02 784.92 784.64	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79 785.73 785.82 784.30 783.14 785.73 785.82 784.30 783.14 785.12 786.56 786.68 785.74 785.03	75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.61 785.69 784.19 783.09 786.99 786.45 786.65 785.59 784.96	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12 783.12 783.7 783.04 783.48 785.27 785.29 783.11 782.83	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23 783.02 787.73 787.39 786.68 785.89 785.43	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16 785.95 783.89 783.23 787.49 786.53 787.07 785.60 785.10	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 785.02 783.75 784.29 782.48 783.26 784.29 782.48 783.26 784.90 786.33 786.01 783.41 783.06	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09 784.09 784.09 784.09 782.61 783.45 783.45 784.52 785.46 785.42 783.89 783.49	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32 788.31 788.33 788.33 788.38 788.33 788.38 787.76 788.40 748.48 748.48 748.48 788.34	795.25 	808.60 dry	805.36 dry dry dry dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 3-5, 2017 April 10-13, 2017 October 3-5, 2017 April 23-25, 2018 October 23-25, 2018 April 1-4, 2019 October 7-9, 2019	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93 782.94 780.93 782.89 782.95 785.68 785.33 781.80	25.55 780.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.04 787.04 790.43 788.47 789.44 790.65 787.73	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 785.27 785.27 785.27 785.27 785.27 785.44 783.35 785.44 783.35 782.86 787.12 786.28 787.10 785.12	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52 785.52 785.52 785.52 785.20 783.18 782.87 786.88 786.31 787.02 784.92	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79 785.73 785.82 784.30 783.14 785.73 785.82 784.30 783.14 787.12 786.56 786.68 785.74	75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.61 785.69 784.19 783.09 786.99 786.45 786.65 785.59	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12 783.77 783.04 783.48 783.48 785.27 785.29 783.11	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23 783.02 787.73 787.39 786.68 785.89	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16 785.95 783.89 783.23 787.49 786.53 787.07 785.60	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 785.02 783.75 784.29 782.48 783.26 783.26 784.90 786.33 786.01 783.41	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09 784.09 784.09 782.61 783.45 783.45 784.52 785.46 785.42 783.89	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32 788.31 788.33 788.33 788.33 788.33 788.33 788.33 788.34 788.33 788.34 788.38 787.76 788.40 748.48	795.25 	808.60 dry	805.36 dry dry dry dry dry dry dry dry						
Facility (Facility ID	Screen Length (ft) Total Depth (ft from top of casing) Top of Well Screen Elevation (ft) Measurement Date October 2, 2012 April 15, 2013 October 8, 2013 October 15, 2013 October 15, 2013 October 15, 2013 April 14, 2014 October 1-3, 2014 April 13-14, 2015 October 6-7, 2015 April 4-6, 2016 October 3-5, 2017 April 10-13, 2017 October 3-5, 2017 April 23-25, 2018 October 23-25, 2018 April 1-4, 2019 October 7-9, 2019 May 27-29, 2020 October 7-8 & 17, 2020	16.90 771.33 780.13 785.16 781.22 NM 786.04 781.16 783.08 780.66 784.21 781.88 782.94 780.93 782.89 782.95 785.68 785.33 781.80 781.42	25.55 780.55 780.55 786.76 788.39 786.67 NM 788.96 787.55 786.83 786.12 789.09 787.88 787.95 787.04 787.04 790.43 788.47 789.44 790.65 787.73 787.74	809.62 34.80 774.82 781.49 783.97 NM 782.94 783.57 783.42 782.77 785.27 785.27 785.27 785.27 785.44 783.35 785.44 783.35 782.86 787.12 786.28 787.10 785.12 784.74	809.50 76.07 733.43 781.34 784.00 NM 782.81 783.68 783.32 782.68 783.32 782.68 782.81 785.27 785.52 785.52 785.52 785.20 783.18 782.87 786.88 786.31 787.02 784.92 784.64	51.88 776.98 782.03 783.77 783.69 NM 783.56 784.05 784.05 782.80 783.10 784.79 785.73 785.82 784.30 783.14 785.73 785.82 784.30 783.14 785.12 786.56 786.68 785.74 785.03	75.80 753.04 781.93 783.78 783.78 783.58 NM 783.57 783.94 782.82 783.01 784.76 785.61 785.61 785.69 784.19 783.09 786.99 786.45 786.65 785.59 784.96	14.40 771.89 780.58 784.69 NM 782.47 785.51 782.32 782.81 781.82 783.21 783.12 783.12 783.12 783.7 783.04 783.48 785.27 785.29 783.11 782.83	38.50 776.98 783.66 NM 783.49 783.41 783.55 782.83 783.25 784.97 786.51 786.09 784.23 783.02 787.73 787.39 786.68 785.89 785.43	814.21 37.85 776.36 781.91 784.09 783.39 NM 783.73 783.79 782.93 783.18 785.68 786.16 785.95 783.89 783.23 787.49 786.53 787.07 785.60 785.10	791.55 37.37 754.18 780.95 784.75 782.27 NM 785.25 782.63 783.34 781.95 785.02 783.75 785.02 783.75 784.29 782.48 783.26 784.29 782.48 783.26 784.90 786.33 786.01 783.41 783.06	792.90 18.96 773.94 780.55 785.02 782.36 NM 785.87 783.03 783.42 782.26 784.36 784.09 784.09 784.09 784.09 782.61 783.45 783.45 784.52 785.46 785.42 783.89 783.49	792.06 789.14 789.5 ⁽¹⁾ 789.5 ⁽¹⁾ NM 789.3 788.48 NM 788.32 788.31 788.33 788.33 788.38 788.33 788.38 787.76 788.40 748.48 748.48 748.48 788.34	795.25 	808.60 dry	805.36 dry dry dry dry dry dry dry dry						

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

	Well Number	MW-301	MW-302	MW-303	MW-304	MW-305	M-4R	MW-33AR	MW-34A	MW-84A	MW-306	MW-307	MW-308	MW-309	MW-310	MW-311
	Top of Casing Elevation (feet amsl)	806.89	813.00	811.52	805.42	806.32	806.10	808.29	805.95	814.28	807.63	806.89	806.9	813.27	813.62	809.74
	Screen Length (ff)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Total Depth (ft from top of casing)	29.40	33.6	35.80	25.7	25.6	39.58	31.08	35.43	40.21	27	26.5	28	37.67	38.41	36.19
	Top of Well Screen Elevation (ft)	787.49	789.40	785.72	789.72	790.72	776.52	787.21	780.52	784.07	790.63	790.39	788.90	785.60	785.21	783.55
	Measurement Date															
	December 21-22, 2015	NM	784.78	784.11	786.13	788.96	787.58	783.77	783.50	785.31						
	April 4-5, 2016	786.78	785.81	785.48	788.08	789.61	789.09	785.29	785.63	786.37						
	July 7-8, 2016	786.31	786.28	784.60	787.36	789.26	787.43	785.19	785.05	785.89						
	July 28, 2016	NM	NM	784.35	NM	NM	NM	NM	784.86	785.61						
	October 11-13, 2016	787.64	787.76	786.18	788.18	789.78	787.88	787.36	786.45	787.22						
	December 29, 2016	787.37	787.05	NM	NM	NM	NM	785.66	785.72	786.63						
	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			
	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			
	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			
	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			
	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			
	February 21, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.19	783.05	783.02
	March 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	783.10	783.10	783.00
	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
	May 24, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.79	785.09	NM	785.45	785.97	786.11
CCR Rule	June 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.03	786.64	786.47
Wells	July 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.27	786.35	786.55
	August 7, 2018	787.06	NM	785.20	788.25	788.56	787.63	NM	NM	786.55	NM	NM	NM	NM	NM	NM
	August 22, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.54	785.40	785.46
	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
	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
	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
	June 12, 2019	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	787.25	NM
	June 19, 2019	NM	NM	786.81	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	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
	December 13, 2019										787.03	785.68	786.43			
	December 23, 2019														775.22	
	January 17, 2020			785.58												
	February 3, 2020	787.24	NM	NM	NM	NM	NM	NM	NM	786.50	785.77	785.57	786.48	NM	NM	NM
	May 27-29, 2020	787.77	787.29	785.56	789.30	787.78	787.73	786.01	785.98	787.02	785.77	785.35	786.28	785.98	785.81	785.85
	June 30, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.18	NM	NM
	August 6, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.93	NM	NM
	October 7-8, 2020	786.53	786.74	785.16	788.52	787.96	787.74	785.91	785.70	786.10	785.39	784.71	785.68	785.47	785.56	785.83
	December 11, 2020					788.19								785.26	785.26	
	February 25, 2021			784.27		788.36			784.75							
	April 12, 2021	786.50	785.77	784.07	787.99	788.11	786.34	784.27	784.77	785.84	784.32	784.21	785.55	784.29	784.24	784.15
	June 11, 2021	NM	NM	NM	NM	NM	NM	784.19	784.66	NM	NM	NM	NM	784.20	784.05	NM
	Bottom of Well Elevation (ft)	771.33	780.55	774.82	733.43	776.98	753.04	771.89	776.98	776.36	780.63	780.39	778.90	775.60	775.21	773.55
	Notes:	Created by	y: MDB	Date:	5/6/2013											
	NM = not measured	Last revision by	y: RM	Date:	6/11/2021	=										

 A = not measured
 Last revision by:
 RM
 Date:
 6/11/2021

 Checked by:
 JR
 Date:
 6/14/2021

(1) The elevation for SG-1 is read off of the staff gauge (rather than measured from the top of the gauge).

(2) SG-2 could not be located during the April 2013 event.

(3) SG-3 could not be located during the October 2013 event. SG-1 could not be safely accessed during the October 2013 event.

(4) LH-2 measurements are given as leachate depth, measured by a transducer.

(5) LH-2 and LH-3 measurements were collected by WPL staff on October 9, 2017.

(6) The depth to water at MW-84A was not measured prior to purging for sampling during the October 3-5 sampling event. The level was allowed to return to static and was measured on 10/10/2017.

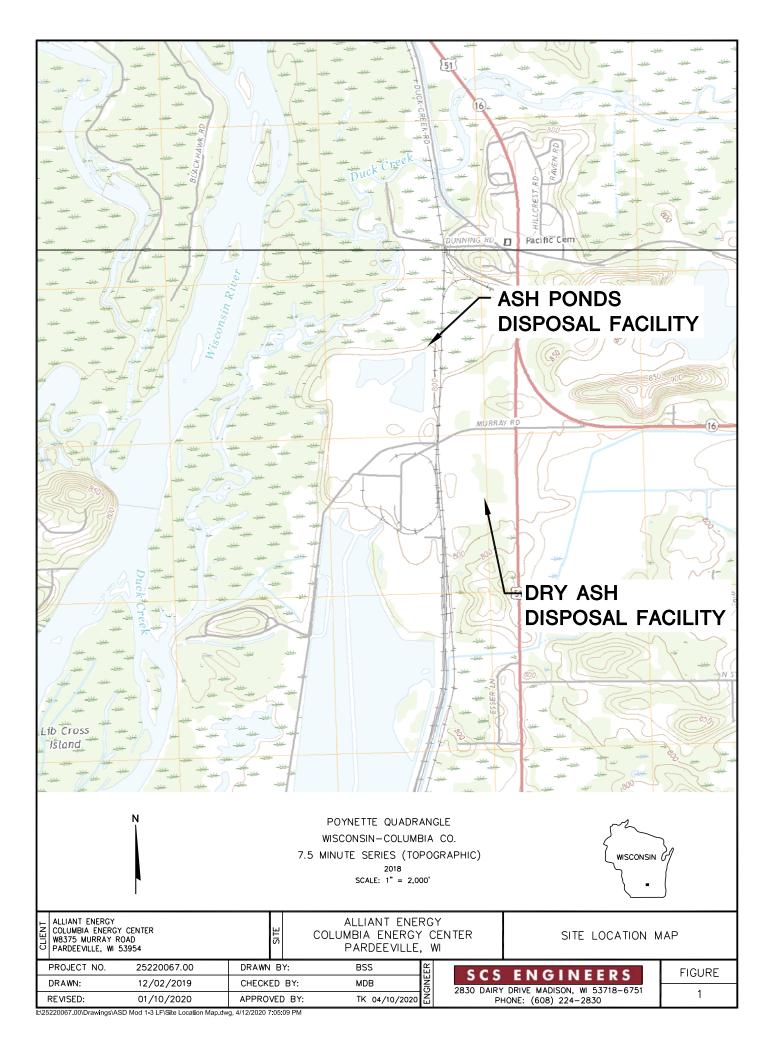
(7) BC = Brian Clepper; NS= Nate Sievers - Columbia Site employees.

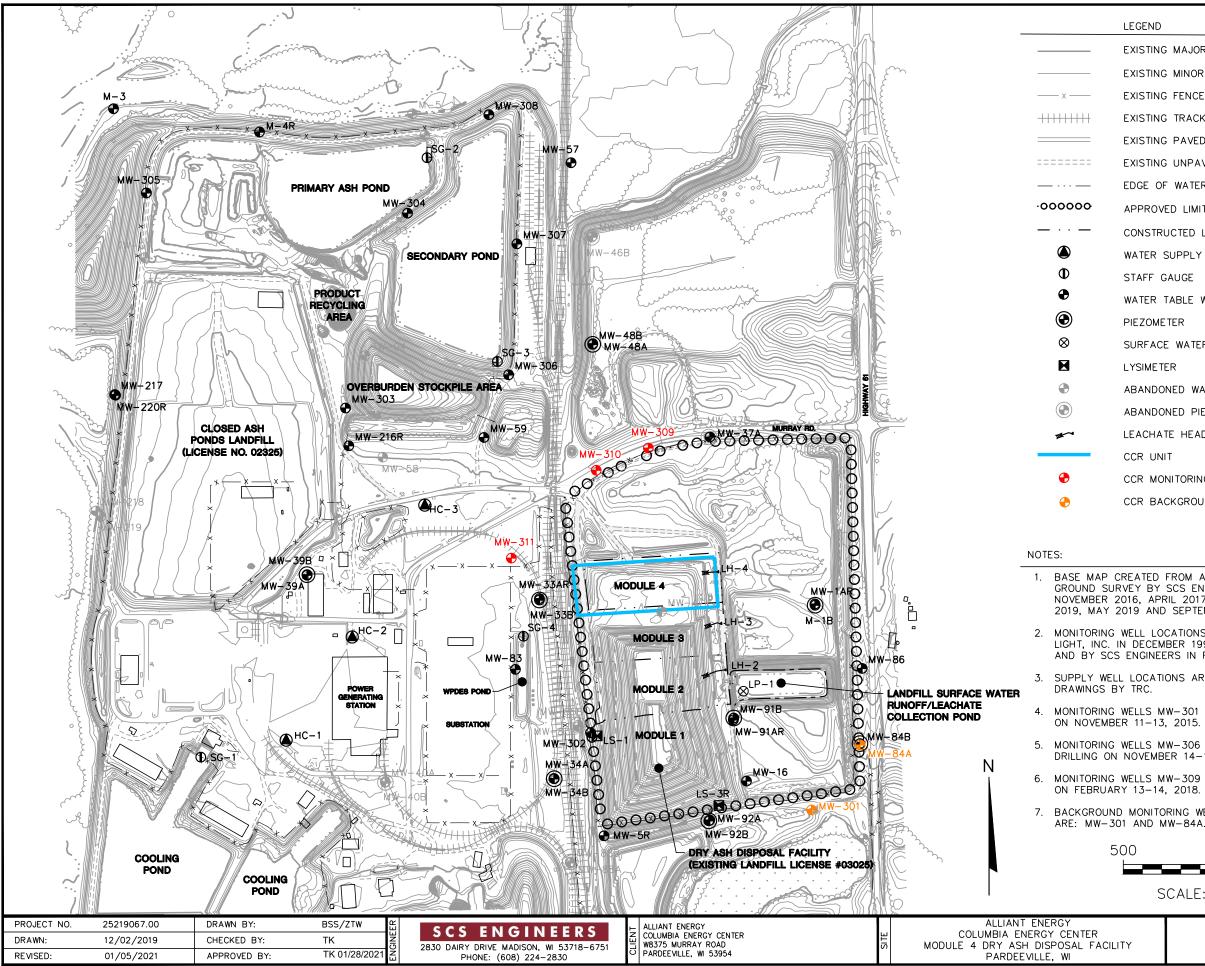
I:\25221067.00\Deliverables\2021 April ASD MOD 4 LF\Tables\[Table 3 - Groundwater Elevations.xls]levels



Figures

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





:\25220067.00\Drawings\Mod 4\Site Plan and Monitoring Well Locations.dwg, 1/20/2021 1:46:12 Pl

LEGEND

EXISTING MAJOR CONTOUR (10' INTERVAL)
EXISTING MINOR CONTOUR (2' CONTOUR)
EXISTING FENCELINE
EXISTING TRACKS
EXISTING PAVED ROAD
EXISTING UNPAVED ROAD
EDGE OF WATER
APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL
NATER SUPPLY WELL
STAFF GAUGE
NATER TABLE WELL
PIEZOMETER
SURFACE WATER SAMPLE LOCATION
YSIMETER
ABANDONED WATER TABLE WELL
ABANDONED PIEZOMETER
EACHATE HEADWELL
CCR UNIT
CCR MONITORING WELL

CCR BACKGROUND MONITORING WELL

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 AND SEPTEMBER 2020.

2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND JANUARY 2016, AND BY SCS ENGINEERS IN FEBRUARY 2018.

3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013

4. MONITORING WELLS MW-301 THROUGH MW-305 INSTALLED BY BADGER STATE DRILLING

5. MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15, 2016.

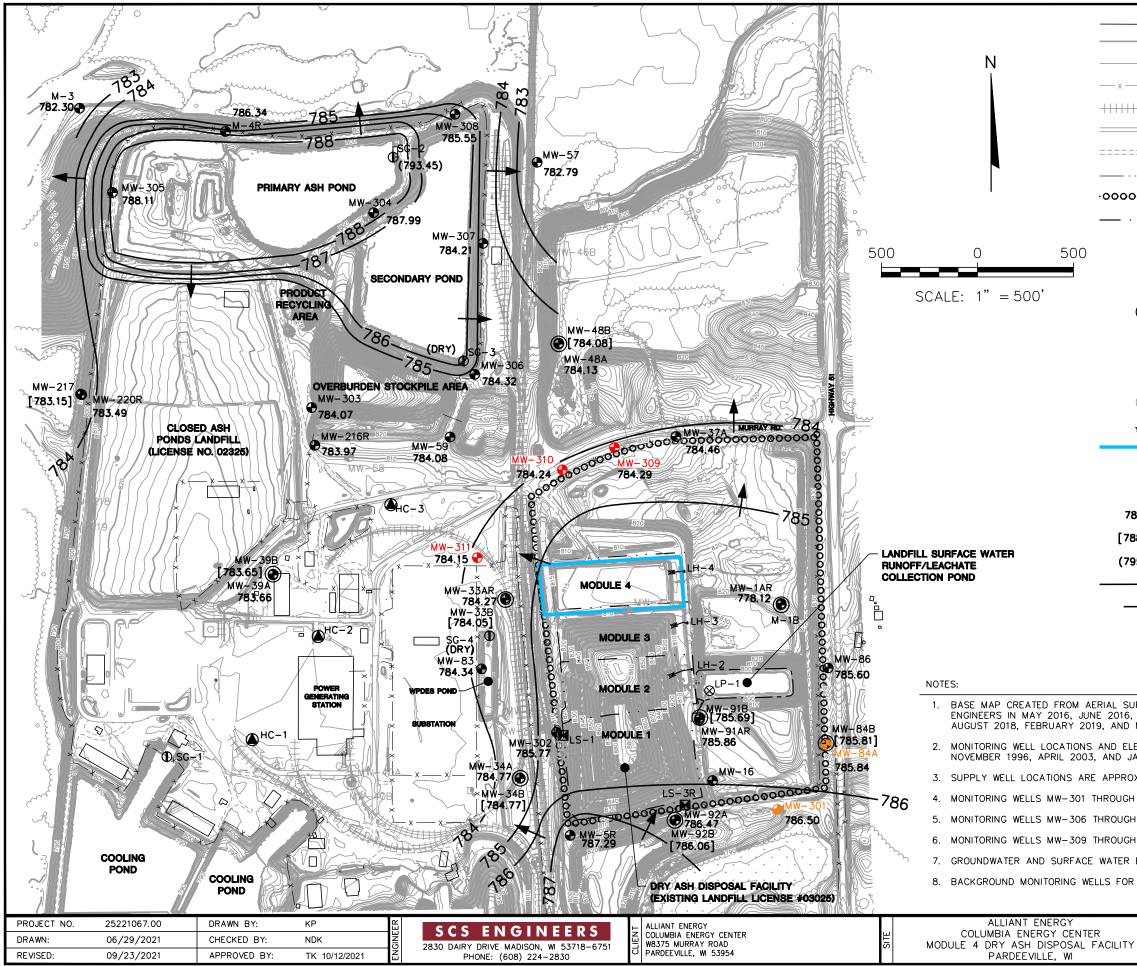
6. MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING

7. BACKGROUND MONITORING WELLS FOR THE MODULE 4 DRY ASH DISPOSAL FACILITY

500 \cap

SCALE: 1'' = 500'

	SITE PLAN AND MONITORING	FIGURE
ŕ	WELL LOCATIONS	2



I:\25221067.00\Drawings\Water Table Map April 2021 MOD4.dwg, 9/23/2021 3:23:18 PM

	LEGEND						
	EXISTING MAJOR CONTOUR (10' INTERVAL)						
	EXISTING MINOR CONTOUR (2' CONTOUR)						
x	EXISTING FENCE LINE						
+++++++	EXISTING TRACKS						
	EXISTING PAVED ROAD						
=====	EXISTING UNPAVED ROAD						
	EDGE OF WATER						
00000	APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)						
	CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL)						
	WATER SUPPLY WELL						
Φ	STAFF GAUGE						
•	WATER TABLE WELL						
۲	PIEZOMETER						
\otimes	SURFACE WATER SAMPLE LOCATION						
	LYSIMETER						
•	ABANDONED WATER TABLE WELL						
	ABANDONED PIEZOMETER						
B	LEACHATE HEADWELL						
	CCR UNIT						
•	CCR MONITORING WELL						
e	CCR BACKGROUND MONITORING WELL						
87.62	WATER TABLE ELEVATION						
88.87]	POTENTIOMETRIC SURFACE ELEVATION (NOT CONTOURED)						
95.20)	SURFACE WATER ELEVATION (NOT CONTOURED)						
	WATER TABLE CONTOUR						
-	APPROXIMATE GROUNDWATER FLOW DIRECTION						

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.

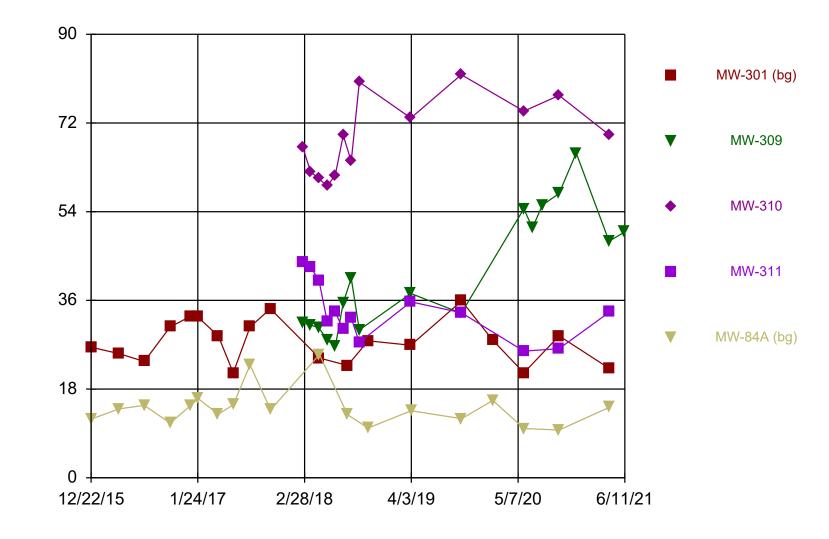
SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY TRC.
 MONITORING WELLS MW-301 THROUGH MW-305 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 11-13, 2015.
 MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15, 2016.
 MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING ON FEBRUARY 13-14, 2018.
 GROUNDWATER AND SURFACE WATER ELEVATIONS WERE MEASURED ON APRIL 12-14, 2021.

8. BACKGROUND MONITORING WELLS FOR THE MODULE 4 DRY ASH FACILITY ARE: MW-301 AND MW-84A.

WATER TABLE MAP	FIGURE	
APRIL 2021	3	

Appendix A Trend Plots for CCR Wells ng/L

Boron



Time SeriesAnalysis Run 9/10/2021 2:51 PMView: MOD 4 LFColumbia Energy CenterClient: SCS EngineersData: December - Chem- export-Dec2020

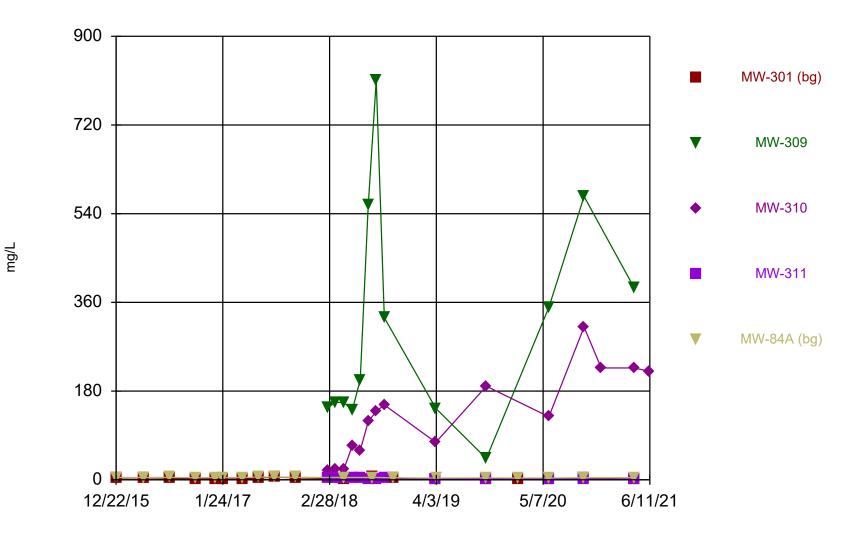
Time Series

Constituent: Boron (ug/L) Analysis Run 9/10/2021 2:52 PM View: MOD 4 LF

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	57.7	77.6	26.2	9.7 (J)
12/11/2020		65.9 (R)			
4/13/2021		48	69.6		
4/14/2021	22.2			33.6	14.3
6/11/2021		49.9 (R)			

Chloride



Time SeriesAnalysis Run 9/10/2021 2:51 PMView: MOD 4 LFColumbia Energy CenterClient: SCS EngineersData: December - Chem- export-Dec2020

Time Series

Constituent: Chloride (mg/L) Analysis Run 9/10/2021 2:52 PM View: MOD 4 LF

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	310	1.4 (J)	4.3
12/11/2020			227 (R)		
4/13/2021		390	227		
4/14/2021	1.5 (J)			1.3 (J)	4.4
6/11/2021			220 (R)		