

2020 Annual Groundwater Monitoring and Corrective Action Report

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

Prepared for:

Alliant Energy



SCS ENGINEERS

25220067.00 | January 29, 2021

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OVERVIEW OF CURRENT STATUS

Columbia Energy Center, Dry Ash Disposal Facility, Module 4 2020 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 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 a statistically significant increase over background for one or more constituents listed in appendix III to this part pursuant to §257.94(e):	
	(A) Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase; and	<u>May/June/August 2020</u> Boron: MW-309 <u>October/December 2020</u> Boron: MW-309 Calcium: MW-310 Chloride: MW-310
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	Alternative Source Demonstration prepared for May 2020 event during 2020. Assessment monitoring not required. Alternative source for October 2020 SSIs will be evaluated in 2021.

Category	Rule Requirement	Site Status
Statistically Significant Levels (SSL) Above Groundwater Protection Standard	(iv) If it was determined that there was a statistically significant level above the groundwater protection standard for one or more constituents listed in appendix IV to this part pursuant to §257.95(g) include all of the following:	Not applicable – Appendix IV sampling not required
	(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;	
	(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	
	(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	
	(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	
Selection of Remedy	(v) Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection; and	Not applicable – Site is in detection monitoring
Corrective Action	(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	Not applicable – Site is in detection monitoring

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1.0 INTRODUCTION

This 2020 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the Coal Combustion Residuals (CCR) Rule [40 CFR 257.50-107]. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.90(e). The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2020 Annual Groundwater Monitoring and Corrective Action Report for the CCR Unit.

This report covers the period of groundwater monitoring from January 1, 2020, through December 31, 2020.

The Columbia Energy Center (COL) Dry Disposal Ash Facility is an active CCR landfill and includes three existing CCR units and one new CCR landfill unit, which became operational in 2018. The groundwater monitoring system addressed in this report is evaluating conditions at:

- COL Dry Ash Disposal Facility – Module 4

The system is designed to detect monitored constituents at the waste boundary of Module 4 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 Module 4. 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 Module 4 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 groundwater flow pattern on May 2020 is shown on **Figure 3**, and the groundwater flow pattern of the October 2020 sampling is 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 each of the 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 Module 4 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 Module 4 of the Dry Ash Disposal Facility in 2020.

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 May, June, August, October, and December 2020 at COL Dry Ash Disposal Module 4 as part of ongoing detection monitoring. As part of the May 2020 semiannual event, retest samples were collected in June and August 2020. As part of the October 2020 semiannual event, a retest sample was collected at two monitoring wells in December 2020.

Groundwater samples collected during the semiannual events, in May and October 2020, were analyzed for the Appendix III constituents. 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 2020 are summarized in **Table 5**. Field parameter results for the 2020 sampling events are provided in **Table 6**. The analytical laboratory reports for 2020 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 2020. The COL Dry Ash Disposal Facility, Module 4, remained in the detection monitoring program.

In 2020, the monitoring results for the October 2019 and May 2020 monitoring events were evaluated for statistically significant increases (SSIs) in detection monitoring parameters relative to background. As part of the evaluation of the October 2019 monitoring results, the Intrawell UPLs were updated in January 2020 to be based on additional background monitoring results from the compliance wells (MW-309, MW-310, and MW-311). The Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (USEPA, 2009) recommends periodic updating of background. The UPL update calculations are included in **Appendix E**. The UPLs calculated in the January 2020 were applied to the evaluation of the October 2019, May 2020, and October 2020 monitoring results.

For the May 2020 event, an SSI for boron at MW-309 was identified; however, an alternative source demonstration (ASD) was completed, demonstrating that sources other than the Mod 4 CCR unit were the likely cause of the observed concentrations. The ASD report is provided in **Appendix F**. A similar evaluation of alternative sources is anticipated to be performed in 2021 for SSIs identified in the October 2020 monitoring results.

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 2020 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 2020.

Summary of Key Actions Completed.

- Statistical evaluation and determination of SSIs for the October 2019 and May 2020 monitoring events.
- ASD report for the SSI identified from the October 2019 monitoring event.
- Two semiannual groundwater sampling and analysis events (May and October 2020).
- Resampling events at MW-309 in June, August, and December 2020.

Description of Any Problems Encountered: No problems were encountered in 2020.

Discussion of Actions to Resolve the Problems. Not applicable.

Projection of Key Activities for the Upcoming Year (2021):

- Statistical evaluation and determination of any SSIs for the October 2020 and April 2021 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 semi-annual groundwater sampling and analysis events (April and October 2021).

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 report prepared to address the SSI observed for the May 2020 sampling event is provided in **Appendix F**. The ASD report is certified by a qualified professional engineer.

3.5.4 § 257.95(c) Alternative Assessment Monitoring Frequency

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

Not applicable. Assessment monitoring has not been initiated.

3.5.5 § 257.95(d)(3) Assessment Monitoring Results and Standards

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

Not applicable. Assessment monitoring has not been initiated.

3.5.6 § 257.95(g)(3)(ii) Alternative Source Demonstration for Assessment Monitoring

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

Not applicable. Assessment monitoring has not been initiated.

3.5.7 § 257.96(a) Extension of Time for Corrective Measures Assessment

The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measure due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer attesting that the demonstration is accurate. The

90-day deadline to complete the assessment of corrective measures may be extended for longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not applicable. Corrective measures assessment has not been initiated.

3.6 §257.90(E)(6) OVERVIEW

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

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

4.0 REFERENCES

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

U.S. Environmental Protection Agency (USEPA), 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.

Tables

- 1 Groundwater Monitoring Network
- 2 Groundwater Samples Summary
- 3 Groundwater Elevation
- 4 Horizontal Gradients and Flow Velocity
- 5 2020 Groundwater Analytical Results Summary
- 6 Groundwater Field Data Summary

**Table 1. Groundwater Monitoring Well Network
Columbia Energy Center - Dry Ash Disposal Facility MOD 4
SCS Engineers Project #25220067.00**

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
 Last revision by: RM
 Checked by: NDK

Date: 12/14/2020
 Date: 1/7/2021
 Date: 1/8/2021

Table 2. Groundwater Samples Summary
Columbia Energy Center-Dry Ash Disposal Facility MOD 4 / SCS Engineers Project #25220067.00

Sample Dates	Downgradient Wells			Background Wells	
	MW-309	MW-310	MW-311	MW-84A	MW-301
May 29, 2020	D	D	D	D	D
June 30, 2020	D-R	--	--	--	--
August 6, 2020	D-R	--	--	--	--
October 8, 2020	D-R	D	D	D	D
December 11, 2020	D-R	D-R	--	--	--
Total Samples	5	3	2	2	2

Abbreviations:

D = Detection Monitoring

D-R = Detection Monitoring Retest Sample

-- = Not Sampled

Created by: NDK

Date: 1/3/2019

Last revision by: RM

Date: 1/8/2021

Checked by: NDK

Date: 1/8/2021

Table 3. Groundwater Elevation
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25220067.00

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
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	785.52
October 15, 2013	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	785.66	785.42	785.52
April 14, 2014	784.95	784.09	785.63	783.74	783.91	784.63	784.70	783.45	783.73	785.58	785.52	784.96	785.04	784.96	785.99	785.54
October 2-3, 2014	785.03	785.39	786.08	784.37	784.28	784.57	784.54	784.56	dry	785.24	785.18	785.19	785.47	785.28	785.75	785.33
April 13-14, 2015	783.96	783.63	785.25	783.01	782.74	783.65	783.95	782.87	dry	784.43	784.51	784.17	784.48	784.37	785.07	784.66
October 6-7, 2015	784.28	784.44	785.72	783.68	783.33	784.05	784.02	783.66	dry	784.80	784.76	784.66	784.89	784.70	785.20	784.76
April 4-6, 2016	785.82	aband	787.02	785.29	785.07	785.63	785.67	784.76	785.43	786.37	786.26	785.89	786.05	785.95	786.61	786.21
October 11-13, 2016	786.64	aband	788.00	787.36	786.46	786.45	786.32	786.40	786.81	787.22	787.11	786.96	787.17	786.81	787.68	787.25
April 10-13, 2017	786.96	aband	788.13	786.39	785.99	786.30	786.28	786.34	786.23	787.16	787.06	786.96	787.24	787.03	787.90	787.60
October 3-5, 2017	785.48	aband	786.66	784.51	784.22	784.67	784.63	784.86	784.29	NM	786.49	785.58	786.08	785.83	786.47	786.02
October 9-10, 2017	NM	aband	NM	NM	NM	NM	NM	NM	NM	NM	785.56 ⁽⁶⁾	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

Well Number	M-3	M-4R	MW-39A	MW-39B	MW-48A	MW-48B	MW-57	MW-59	MW-216R	MW-217	MW-220RR	SG-1	SG-2	SG-3	SG-4
Top of Casing Elevation (feet amsl)	788.23	806.10	809.62	809.50	828.86	828.84	786.29	815.48	814.21	791.55	792.90	792.06	795.25	808.60	805.36
Screen Length (ft)															
Total Depth (ft from top of casing)	16.90	25.55	34.80	76.07	51.88	75.80	14.40	38.50	37.85	37.37	18.96	--	--	--	--
Top of Well Screen Elevation (ft)	771.33	780.55	774.82	733.43	776.98	753.04	771.89	776.98	776.36	754.18	773.94	--	--	--	--
Measurement Date															
October 2, 2012	780.13	786.76	781.49	781.34	782.03	781.93	780.58	779.88	781.91	780.95	780.55	789.14	793.85	dry	dry
April 15, 2013	785.16	788.39	783.97	784.00	783.77	783.78	784.69	783.66	784.09	784.75	785.02	789.5 ⁽¹⁾	NM	dry	dry
October 8, 2013	781.22	786.67	NM	NM	783.69	783.58	NM	NM	783.39	782.27	782.36	789.5 ⁽¹⁾	791.33	dry	dry
October 15, 2013	NM	NM	782.94	782.81	NM	NM	782.47	783.49	NM	NM	NM	NM	NM	NM	NM
April 14, 2014	786.04	788.96	783.57	783.68	783.56	783.57	785.51	783.41	783.73	785.25	785.87	788.90	dry	dry	dry
October 1-3, 2014	781.16	787.55	783.42	783.32	784.05	783.94	782.32	783.55	783.79	782.63	783.03	NM	dry	dry	dry
April 13-14, 2015	783.08	786.83	782.77	782.68	782.80	782.82	782.81	782.83	782.93	783.34	783.42	789.3	791.70	dry	dry
October 6-7, 2015	780.66	786.12	782.97	782.81	783.10	783.01	781.82	783.25	783.18	781.95	782.26	788.48	791.58	dry	dry
April 4-6, 2016	784.21	789.09	785.27	785.27	784.79	784.76	783.21	784.97	785.68	785.02	784.36	NM	793.40	dry	dry
October 11-13, 2016	781.88	787.88	785.75	785.52	785.73	785.61	783.12	786.51	786.16	783.75	784.09	788.32	792.52	dry	dry
April 10-13, 2017	782.94	787.95	785.44	785.20	785.82	785.69	782.77	786.09	785.95	784.29	784.09	788.31	793.85	dry	dry
October 3-5, 2017	780.93	787.04	783.35	783.18	784.30	784.19	782.37	784.23	783.89	782.48	782.61	788.3	793.45	dry	dry
April 23-25, 2018	782.89	790.43	782.86	782.87	783.14	783.09	783.04	783.02	783.23	783.26	783.45	788.38	>795.25	dry	dry
October 23-25, 2018	782.95	788.47	787.12	786.88	787.12	786.99	783.48	787.73	787.49	784.90	784.52	787.76	793.25	dry	dry
April 1-4, 2019	785.68	789.44	786.28	786.31	786.56	786.45	785.27	787.39	786.53	786.33	785.46	--	794.60	dry	dry
October 7-9, 2019	785.33	790.65	787.10	787.02	786.68	786.65	785.29	786.68	787.07	786.01	785.42	748.48	795.20	dry	dry
May 27-29, 2020	781.80	787.73	785.12	784.92	785.74	785.59	783.11	785.89	785.60	783.41	783.89	748.48	>795.25	dry	dry
Bottom of Well Elevation (ft)	771.33	780.55	774.82	733.43	776.98	753.04	771.89	776.98	776.36	754.18	773.94	--	--	--	--

Table 3. Groundwater Elevation
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25220067.00

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	--	--	--	--	--	--
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
June 23, 2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	786.03	786.64	786.47
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	--
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:
 NM = not measured

Created by: MDB Date: 5/6/2013
 Last revision by: NDK Date: 12/11/2020
 Checked by: JSN Date: 12/17/2020
 Proj Mgr QA/QC: TK Date: 1/6/2021

- (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.

**Table 4. Horizontal Gradients and Flow Velocity
Columbia Energy Center - MOD 4 /
SCS Engineers Project #25220067.00
January - December 2020**

North					
Sampling Dates	h1 (ft)	h2 (ft)	Δl (ft)	Δh/Δl (ft/ft)	V (ft/d)
5/27-29/2020	787.00	785.98	305.25	0.0033	0.007
10/7-8/2020	786.00	785.47	848.55	0.0006	0.0013

Northwest					
Sampling Dates	h1 (ft)	h2 (ft)	Δl (ft)	Δh/Δl (ft/ft)	V (ft/d)
10/7-8/2020	786.00	785.91	379.40	0.0002	0.0005

West					
Sampling Dates	h1 (ft)	h2 (ft)	Δl (ft)	Δh/Δl (ft/ft)	V (ft/d)
5/27-29/2020	787.00	786.01	201.35	0.0049	0.010

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

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

ft = feet
ft/d = feet per day
K = hydraulic conductivity
n = effective porosity
V = groundwater flow velocity

h1, h2 = point interpreted groundwater elevation at locations 1 and 2
Δl = distance between location 1 and 2
Δh/Δl = hydraulic gradient

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

Date: 12/29/2020
Date: 1/15/2021
Date: 1/15/2021

**Table 5. 2020 Groundwater Analytical Results Summary
Columbia Dry Ash Disposal Facility - Module 4 / SCS Engineers Project #25220067.00**

Parameter Name	Background Wells					Compliance Wells											
	MW-84A		MW-301		Intrawell UPL	MW-309					MW-310			Intrawell UPL	MW-311		
	5/29/2020	10/8/2020	5/29/2020	10/8/2020		5/29/2020	6/30/2020	8/7/2020	10/8/2020	12/11/2020	5/29/2020	10/8/2020	12/11/2020		5/29/2020	10/8/2020	
Boron, µg/L	10.0	9.70 J	21.3	28.8	42.2	54.6	50.7	55.3	57.7	65.9	81.9	74.4	77.6	NA	49.8	25.7	26.2
Calcium, µg/L	77,600	69,200	112,000	93,000	99,900	51,600	NA	NA	65,300	NA	56,000	41,100	62,000	56,800	84,200	62,200	73,400
Chloride, mg/L	3.70	4.30	2.00 J	3.40	901	350	NA	NA	575	NA	205	128	310	227	4.41	1.50 J	1.40 J
Fluoride, mg/L	<0.095	<0.095	<0.095	<0.095	DQ	<0.095	NA	NA	<0.095	NA	DQ	<0.095	<0.095	NA	DQ	<0.095	<0.095
Field pH, Std. Units	7.34	7.49	6.73	6.95	8.18	7.35	7.33	7.72	7.33	7.42	8.12	7.54	7.52	7.62	8.07	7.37	7.66
Sulfate, mg/L	1.50 J	1.30 J	11.5 J	25.1	53.1	28.6	NA	NA	21.8	NA	118	68.2	60.0	NA	131	39.1	72.1
Total Dissolved Solids, mg/L	340	320	452	412	1,730	960	NA	NA	1,160	NA	759	582	846	700	462	326	380

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

Abbreviations:

mg/L = milligrams per liter
µg/L = micrograms per liter

UPL = Upper Prediction Limit
DQ = Double Quantification

SSI = Statistically Significant Increase
NA = Not Analyzed

LOQ = Limit of Quantitation
LOD = Limit of Detection

Lab Notes:

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

Notes:

- 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.
- 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: SCC Date: 1/15/2021
Checked by: NDK Date: 1/15/2021
Scientist/PM QA/QC: TK Date: 1/15/2021

I:\25220067.00\Deliverables\2020 Fed Annual Report - COL MOD 4\Tables\[Table 5 - 2020 Groundwater Analytical Results Summary.xlsx]Table 5 - 2020 Analytical

Table 6. Groundwater Field Data Summary
Columbia Energy Center - Dry Ash Disposal Facility - MOD 4 / SCS Engineers Project #25220067.00
January - December 2020

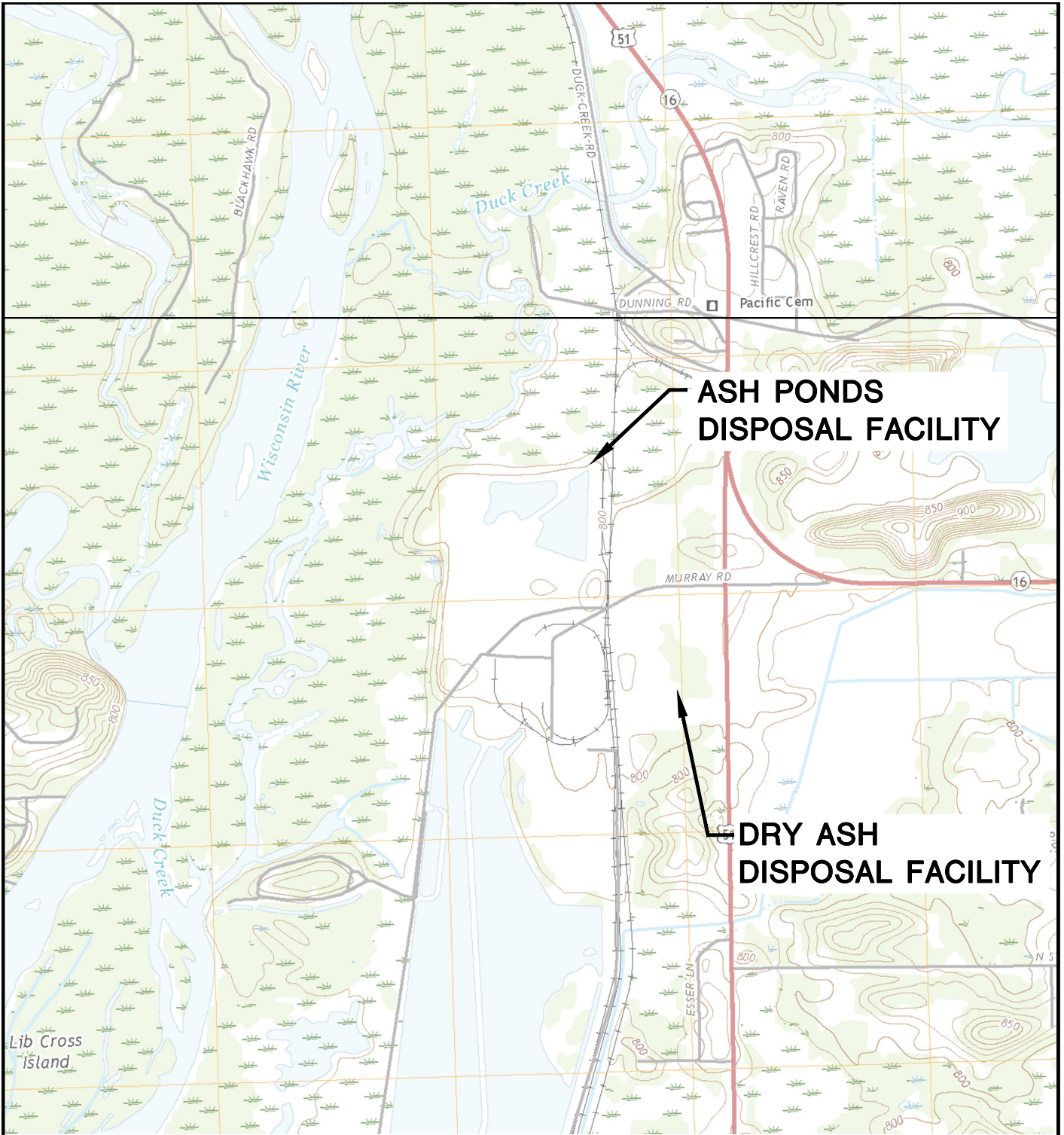
Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Oxygen, Dissolved (mg/L)	Field Specific Conductance (umhos/cm)	Field Oxidation Potential (mV)	Turbidity (NTU)
MW-84A	5/29/2020	787.02	10.6	7.34	9.81	613.7	135.0	2.15
	10/8/2020	786.10	11.9	7.49	9.39	610.1	153.2	0.00
MW-301	5/29/2020	787.77	8.1	6.73	2.00	797.0	118.7	0.00
	10/8/2020	786.53	11.0	6.95	1.22	760.0	183.9	0.00
MW-309	5/29/2020	785.98	11.0	7.35	9.83	1,785	230.6	1.74
	6/30/2020	786.18	13.3	7.33	9.71	1,726	65.7	3.74
	8/6/2020	785.93	12.9	7.72	9.05	1,656	224.2	3.56
	10/8/2020	785.47	12.9	7.33	9.40	2,222	147.7	0.00
	12/11/2020	785.26	11.8	7.42	8.08	2,227	112.2	0.00
MW-310	5/29/2020	785.81	11.5	7.54	10.07	1,035	207.8	1.96
	10/8/2020	785.56	13.2	7.52	9.63	1,481	150.4	0.00
	12/11/2020	785.26	12.5	7.62	8.30	1,212	111.5	0.00
MW-311	5/29/2020	785.85	10.5	7.37	10.64	547.2	176.3	4.70
	10/8/2020	785.83	12.7	7.66	9.38	606.1	137.1	0.70

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

Date: 12/22/2020
 Date: 1/7/2021
 Date: 1/8/2021

Figures

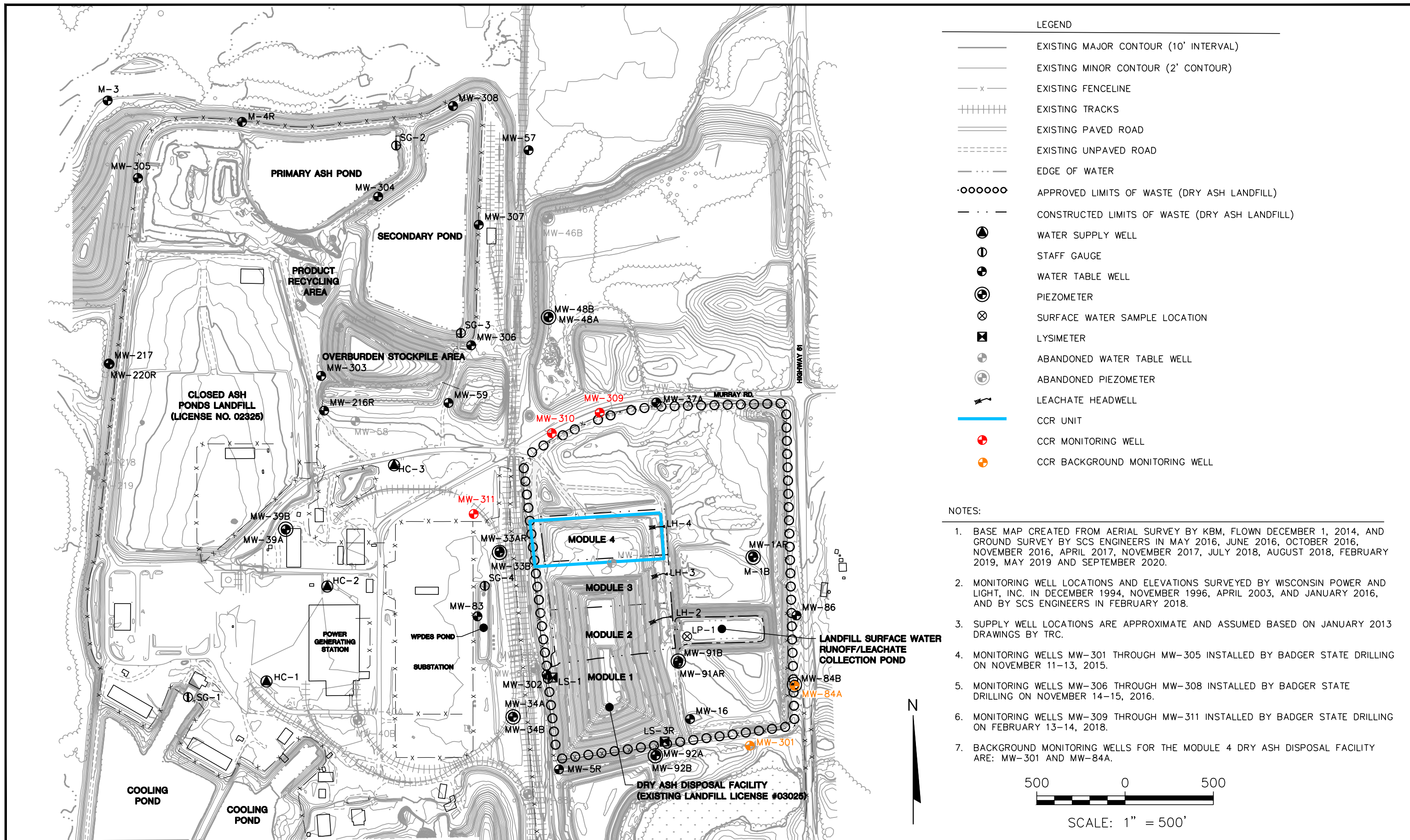
- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations
- 3 Water Table Map, May 2020
- 4 Water Table Map, October 2020



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

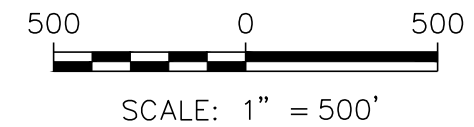


CLIENT	ALLIANT ENERGY COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WI 53954		SITE	ALLIANT ENERGY COLUMBIA ENERGY CENTER PARDEEVILLE, WI		ENGINEER	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830		FIGURE 1
	PROJECT NO.	25219067.00		DRAWN BY:	BSS		APPROVED BY:	TK 01/30/2020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

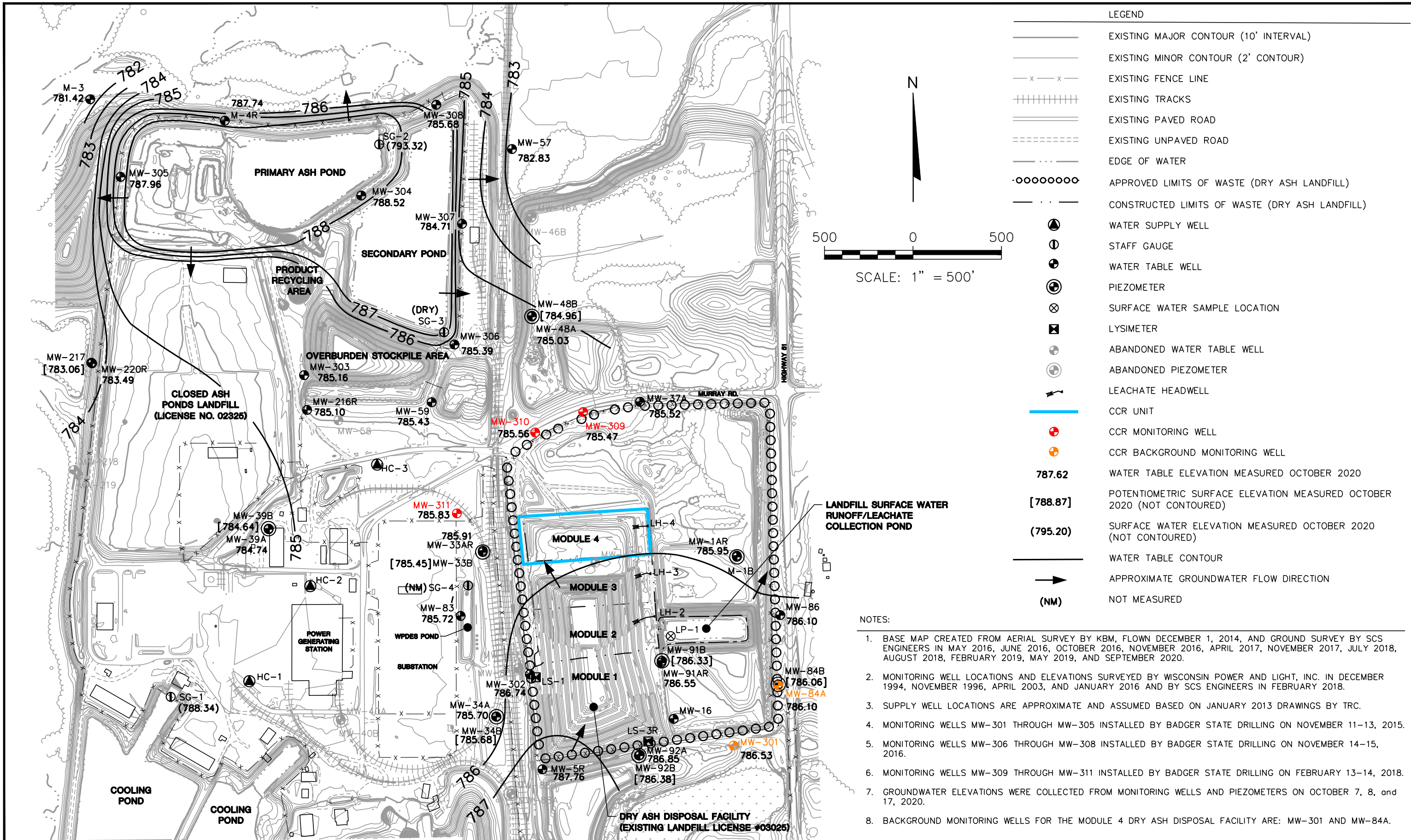


- LEGEND
- EXISTING MAJOR CONTOUR (10' INTERVAL)
 - EXISTING MINOR CONTOUR (2' CONTOUR)
 - x - EXISTING FENCELINE
 - ||||| EXISTING TRACKS
 - ==== EXISTING PAVED ROAD
 - EXISTING UNPAVED ROAD
 - . - . - . EDGE OF WATER
 - APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
 - · - · - · CONSTRUCTED LIMITS OF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

- NOTES:
1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014, AND GROUND 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 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 MODULE 4 DRY ASH DISPOSAL FACILITY ARE: MW-301 AND MW-84A.




PROJECT NO. 25219067.00	DRAWN BY: BSS/ZTW	<p>2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830</p>	<p>CLIENT ALLIANT ENERGY COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WI 53954</p>	<p>SITE ALLIANT ENERGY COLUMBIA ENERGY CENTER MODULE 4 DRY ASH DISPOSAL FACILITY PARDEEVILLE, WI</p>	<p>FIGURE 2</p>
DRAWN: 12/02/2019	CHECKED BY: TK				
REVISED: 01/05/2021	APPROVED BY: TK 01/28/2021				



- LEGEND**
- (solid line) EXISTING MAJOR CONTOUR (10' INTERVAL)
 - (dashed line) EXISTING MINOR CONTOUR (2' CONTOUR)
 - x - x - EXISTING FENCE LINE
 - ||||| EXISTING TRACKS
 - ==== EXISTING PAVED ROAD
 - EXISTING UNPAVED ROAD
 - · - · - EDGE OF WATER
 - · · · · APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
 - - - - - CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL)
 - ⊕ WATER SUPPLY WELL
 - ⊖ STAFF GAUGE
 - ⊙ WATER TABLE WELL
 - ⊗ PIEZOMETER
 - ⊗ SURFACE WATER SAMPLE LOCATION
 - ⊠ LYSIMETER
 - ⊕ ABANDONED WATER TABLE WELL
 - ⊗ ABANDONED PIEZOMETER
 - ↖ LEACHATE HEADWELL
 - (blue line) CCR UNIT
 - ⊕ (red) CCR MONITORING WELL
 - ⊕ (orange) CCR BACKGROUND MONITORING WELL
 - 787.62 WATER TABLE ELEVATION MEASURED OCTOBER 2020
 - [788.87] POTENTIOMETRIC SURFACE ELEVATION MEASURED OCTOBER 2020 (NOT CONTOURED)
 - (795.20) SURFACE WATER ELEVATION MEASURED OCTOBER 2020 (NOT CONTOURED)
 - (solid line) WATER TABLE CONTOUR
 - APPROXIMATE GROUNDWATER FLOW DIRECTION
 - (NM) NOT MEASURED

- NOTES:**
1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014, AND GROUND SURVEY BY SCS ENGINEERS IN MAY 2016, JUNE 2016, OCTOBER 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, JULY 2018, AUGUST 2018, FEBRUARY 2019, MAY 2019, 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 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 ELEVATIONS WERE COLLECTED FROM MONITORING WELLS AND PIEZOMETERS ON OCTOBER 7, 8, and 17, 2020.
 8. BACKGROUND MONITORING WELLS FOR THE MODULE 4 DRY ASH DISPOSAL FACILITY ARE: MW-301 AND MW-84A.

PROJECT NO. 25220067.00	DRAWN BY: KP/ZTW	<p>ENGINEER</p> <p>2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830</p>	<p>CLIENT</p> <p>ALLIANT ENERGY COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WI 53954</p>	<p>SITE</p> <p>ALLIANT ENERGY COLUMBIA ENERGY CENTER MODULE 4 DRY ASH DISPOSAL FACILITY PARDEEVILLE, WI</p>	<p>FIGURE</p> <p>4</p>
DRAWN: 08/07/2020	CHECKED BY: TK				
REVISED: 01/05/2021	APPROVED BY: TK 01/28/2021				



Appendix A
Summary of Regional Hydrogeologic Stratigraphy

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

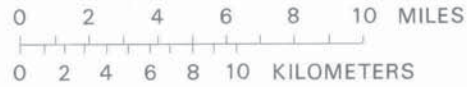
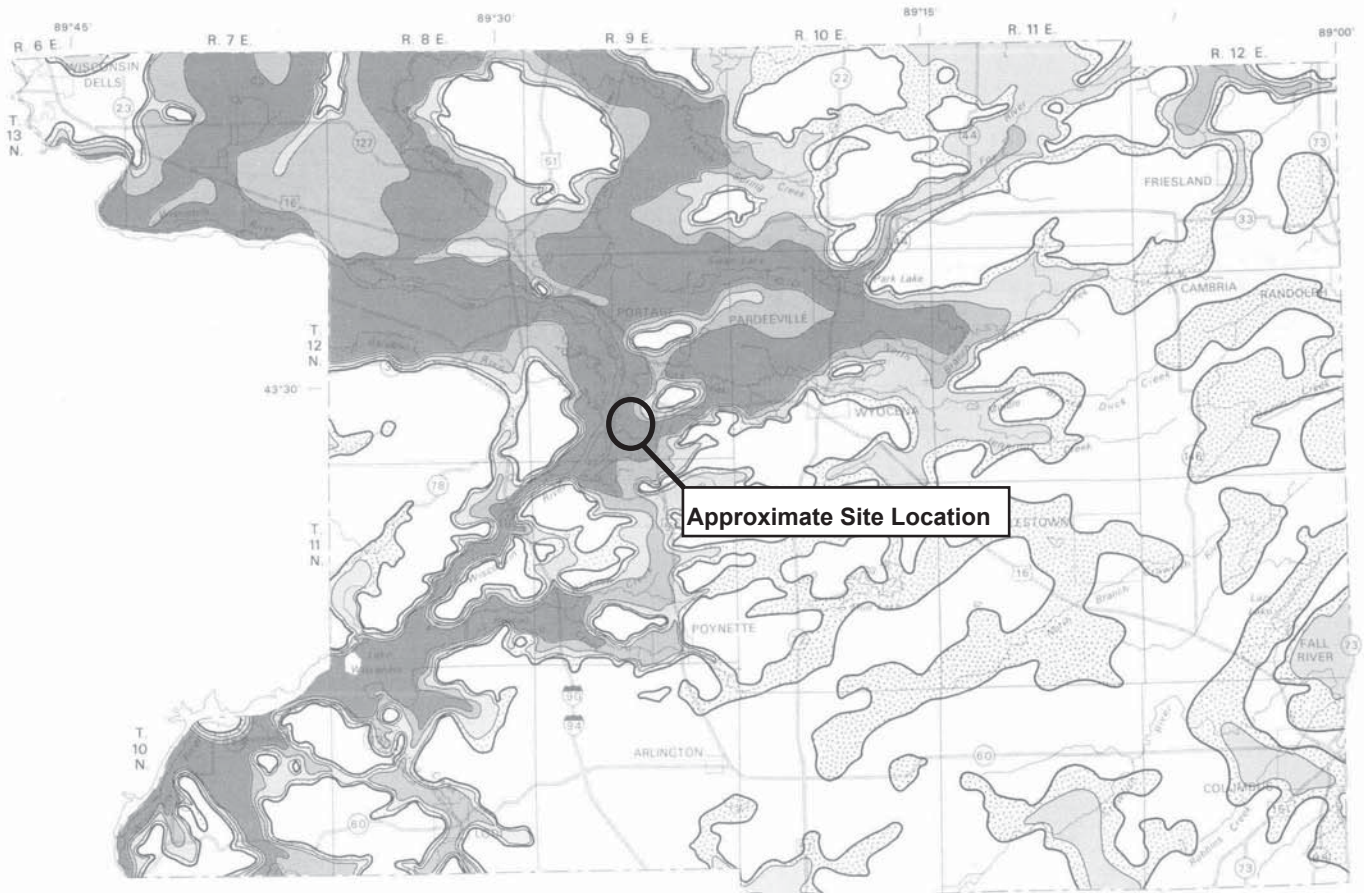
Approximate Age	Hydrogeologic Unit	General Thickness (feet)	Name of Rock Unit*	Predominant Lithology
Quaternary (0-1 million years old)	Surficial Aquifer	0 to 300+	Holocene & Pleistocene Deposits	<ul style="list-style-type: none"> • Unconsolidated clay, silt, sand, gravel, cobbles, boulders, and organic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

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

Sources:

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

I:\25215053\Reports\Report 3 - Columbia\Tables\Table_2_Regional_Hydrogeologic_Stratigraphy.doc



EXPLANATION

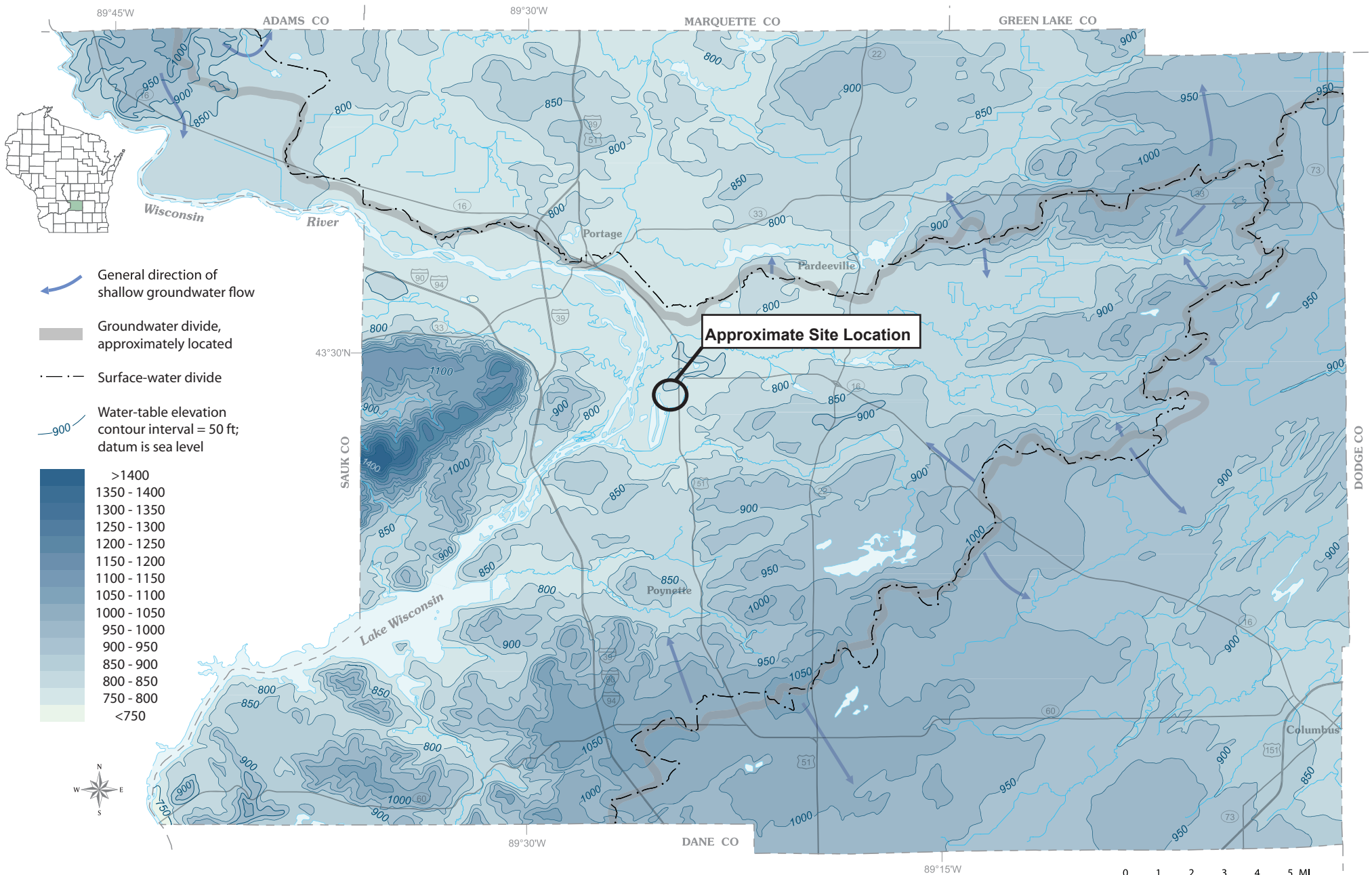
Probable well yields




Boundary of saturated sand-and-gravel aquifer

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

Generalized water-table elevation in Columbia County, Wisconsin





Appendix B
Boring Logs and Well Construction Documentation

WARZYN**ENGINEERING INC****LOG OF TEST BORING**Project Wisconsin Power & LightLocation Columbia Generating StationBoring No. MW-84ASurface Elevation 813.4Job No. C 7134Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9536, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE**VISUAL CLASSIFICATION and Remarks****SOIL PROPERTIES**

No.	Type	Recovery		Moisture		N	Depth
		↓	↓	↓	↓		
							5
							10
							15
							20
							25
							30
							35
							40

Dark Brown Silty SAND (SM)

Brown Fine to Medium SAND,
Little Silt, Trace to Little
Gravel and Boulders (SM)

End Boring at 37'

Well Installed at 37'

WATER LEVEL OBSERVATIONS**GENERAL NOTES**

While Drilling _____
 Upon Completion of Drilling _____
 Time After Drilling _____
 Depth to Water _____
 Depth to Cave In _____

10/5/83 10/5/83
 Start Complete
 Crew Chief JVS Rig B-40
 Drilling Method ED 0-37'

WELL DETAIL INFORMATION SHEET

JOB NO. C 7134

BORING NO. MW-84A

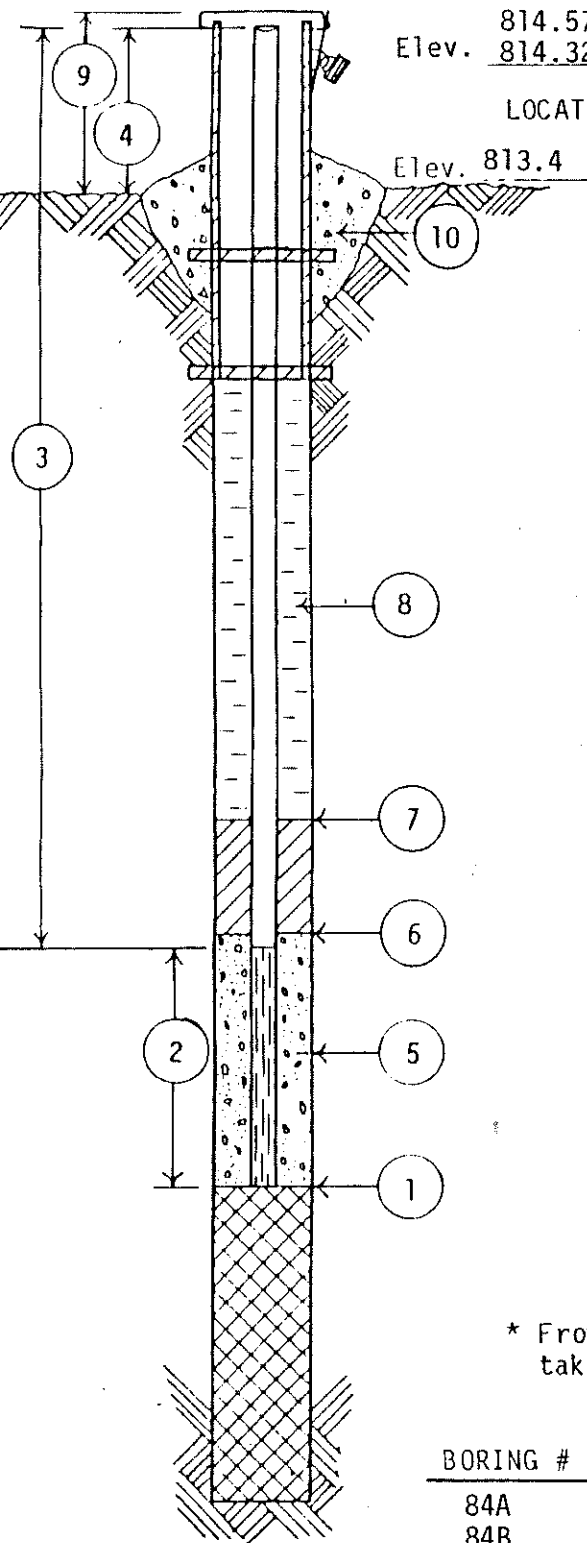
DATE 10/5/83

Elev. 814.57 Steel
Elev. 814.32 PVC CHIEF JS

LOCATION WP&L-Columbia Generating Station

Elev. 813.4

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



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

WATER LEVEL CHECKS

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

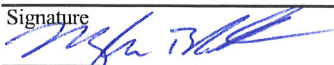
BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
84A	10/7/83	3 days	21'	
84B	10/7/83	3 days	19'6"	

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

Facility/Project Name WPL-Columbia		SCS#: 25215135.00		License/Permit/Monitoring Number		Boring Number MW-301	
Boring Drilled By: Name of crew chief (first, last) and Firm Kevin Durst Badger State Drilling				Date Drilling Started 11/11/2015		Date Drilling Completed 11/11/2015	
WI Unique Well No. VY701		DNR Well ID No.		Common Well Name		Drilling Method hollow stem auger	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/>		State Plane 541562.2 N, 2025001.0 E		Final Static Water Level Feet		Surface Elevation 803.69 Feet	
1/4 of		1/4 of Section 27, T 12 N, R 9 E		Borehole Diameter 8.5 in.		Local Grid Location Feet <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County Columbia		County Code 11		Civil Town/City/ or Village Portage	

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

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

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

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

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

Facility/Project Name WPL - Alliant Columbia Generating Station SCS#: 25217156.01		License/Permit/Monitoring Number		Boring Number MW-309	
Boring Drilled By: Name of crew chief (first, last) and Firm Mark Crampton Badger State Drilling, Co.		Date Drilling Started 2/13/2018		Date Drilling Completed 2/14/2018	
Drilling Method hollow stem auger		WI Unique Well No. VR111		DNR Well ID No.	
Common Well Name MW-309		Final Static Water Level 26.7 Feet MSL		Surface Elevation 809.88 Feet MSL	
Borehole Diameter 8.5 in.		Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/>		Local Grid Location	
State Plane 543,448 N, 2,124,151 E S/C/N		Lat _____ "		Feet <input type="checkbox"/> N <input type="checkbox"/> E	
NW 1/4 of SE 1/4 of Section 27, T 12 N, R 9 E		Long _____ "		Feet <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County Columbia		County Code 11	
				Civil Town/City/ or Village Town of Pacific	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties						RQD/Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200			
			1	Hydrovaced boring to 8.5 below ground surface; open hole.												
			2													
			3													
			4													
			5													
			6													
			7													
			8													
S1	20	11 14 18	9	POORLY GRADED SAND, fine to coarse, yellow, (10YR 7/6), rounded grains.						N/A	M					
S2	20	12 15 20 28	12	Same but with trace gravel.	SP					N/A	M					
S3	24	16 20 26	14	Same as above but with no gravel.						N/A	M					

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

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

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

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

Facility/Project Name WPL - Alliant Columbia Generating Station SCS#: 25217156.01		License/Permit/Monitoring Number		Boring Number MW-310	
Boring Drilled By: Name of crew chief (first, last) and Firm Dave Cruise Badger State Drilling, Co.		Date Drilling Started 2/13/2018		Date Drilling Completed 2/13/2018	
Drilling Method hollow stem auger		WI Unique Well No. VR110		DNR Well ID No.	
Common Well Name MW-310		Final Static Water Level 27.9 Feet MSL		Surface Elevation 810.96 Feet MSL	
Borehole Diameter 8.5 in.		Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/>		Local Grid Location	
State Plane 543,332 N, 2,123,880 E S/C/N		Lat _____ ° _____ ' _____ "		Feet <input type="checkbox"/> N <input type="checkbox"/> E	
NW 1/4 of SE 1/4 of Section 27, T 12 N, R 9 E		Long _____ ° _____ ' _____ "		Feet <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County Columbia		County Code 11	
				Civil Town/City/ or Village Town of Pacific	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties						RQD/ Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200			
			1	Hydrovaced boring to 8 feet below ground surface; open hole.												
			2													
			3													
			4													
			5													
			6													
			7													
			8													
S1	18	46 88	9	POORLY GRADED SAND AND GRAVEL, fine to medium sand, coarse gravel, brownish yellow, (10YR 6/6), angular gravel, round sand.						N/A	M					
			10													
			11	Same as above but trace gravel.												
S2	24	1827 3840	12		SP					N/A	M					
			13													
			14													
S3	24	2632 4038	15							N/A	M					

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

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

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

Facility/Project Name WPL - Alliant Columbia Generating Station SCS#: 25217156.01		License/Permit/Monitoring Number		Boring Number MW-311	
Boring Drilled By: Name of crew chief (first, last) and Firm Mark Crampton Badger State Drilling, Co.		Date Drilling Started 2/14/2018		Date Drilling Completed 2/14/2018	
Drilling Method hollow stem auger					
WI Unique Well No. VR112	DNR Well ID No.	Common Well Name MW-311	Final Static Water Level 23.5 Feet MSL	Surface Elevation 806.53 Feet MSL	Borehole Diameter 8.5 in.
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/>		State Plane 542,874 N, 2,123,437 E S/C/N		Local Grid Location	
NE 1/4 of SW 1/4 of Section 27, T 12 N, R 9 E		Lat _____ ° _____ ' _____ "		Feet <input type="checkbox"/> N <input type="checkbox"/> E	
		Long _____ ° _____ ' _____ "		Feet <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID	County Columbia	County Code 11	Civil Town/City/ or Village Town of Pacific		

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
			1-8	Hydrovaced boring to 8 feet below ground surface; open hole.											
S1	24	12 16 20 24	9-10	POORLY GRADED SAND AND GRAVEL, fine to coarse sand, coarse gravel, yellow, (10YR 7/6), rounded sand, angular gravel.					N/A	M					
S2	24	17 27 30 38	12	Same as above but with trace silt.	SP				N/A	M					
S3	24	18 26 31	14						N/A	M					

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

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

State of Wisconsin
Department of Natural Resources

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

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

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

<p>A. Protective pipe, top elevation --- 807.16 ft. MSL</p> <p>B. Well casing, top elevation --- 806.89 ft. MSL</p> <p>C. Land surface elevation --- 803.69 ft. MSL</p> <p>D. Surface seal, bottom --- 791.69 ft. MSL or --- 12 ft.</p>		<p>1. Cap and lock? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>2. Protective cover pipe: a. Inside diameter: --- 6 in. b. Length: --- 5 ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/> d. Additional protection? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: bumper posts</p> <p>3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/></p> <p>4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Bentonite to grade, sand above Other <input type="checkbox"/></p> <p>5. Annular space seal: a. Granular/Chipped Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight Bentonite slurry <input type="checkbox"/> 31 d. _____ % Bentonite Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input type="checkbox"/> 02 Gravity <input type="checkbox"/> 08</p> <p>6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite chips <input checked="" type="checkbox"/> 32 c. _____ 4 ft³ Other <input type="checkbox"/></p> <p>7. Fine sand material: Manufacturer, product name & mesh size a. RW Sidley Inc. #7 <input type="checkbox"/> b. Volume added _____ 0.5 ft³</p> <p>8. Filter pack material: Manufacturer, product name & mesh size a. RW Sidley #5 <input type="checkbox"/> b. Volume added _____ 2 ft³</p> <p>9. Well casing: Flush threaded PVC schedule 40 <input checked="" type="checkbox"/> 23 Flush threaded PVC schedule 80 <input type="checkbox"/> 24 Other <input type="checkbox"/></p> <p>10. Screen material: PVC a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/> b. Manufacturer Johnson c. Slot size: 0.01 in. d. Slotted length: --- 10 ft.</p> <p>11. Backfill material (below filter pack): None <input type="checkbox"/> 14 Native <input checked="" type="checkbox"/></p>
<p>E. Bentonite seal, top --- 803.69 ft. MSL or --- 0 ft.</p> <p>F. Fine sand, top --- 791.69 ft. MSL or --- 12 ft.</p> <p>G. Filter pack, top --- 789.69 ft. MSL or --- 14 ft.</p> <p>H. Screen joint, top --- 787.69 ft. MSL or --- 16 ft.</p> <p>I. Well bottom --- 777.69 ft. MSL or --- 26 ft.</p> <p>J. Filter pack, bottom --- 776.69 ft. MSL or --- 27 ft.</p> <p>K. Borehole, bottom --- 775.69 ft. MSL or --- 28 ft.</p> <p>L. Borehole, diameter --- 8.5 in.</p> <p>M. O.D. well casing --- 2.4 in.</p> <p>N. I.D. well casing --- 2.0 in.</p>		

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

Signature Firm SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718-6751

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

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

Facility/Project Name WPL-Columbia Generating Station	Local Grid Location of Well 543447.673 ft. <input checked="" type="checkbox"/> N. <input type="checkbox"/> S. 2124151.113 ft. <input checked="" type="checkbox"/> E. <input type="checkbox"/> W.	Well Name MW-309
Facility License, Permit or Monitoring No.	Local Grid Origin (estimated: <input type="checkbox"/>) or Well Location <input type="checkbox"/> Lat. " Long. " or " "	Wis. Unique Well No. VR111
Facility ID	St. Plane _____ ft. N. _____ ft. E. S/C/N	Date Well Installed <u>02</u> / <u>14</u> / <u>2018</u> m m d d y y y y
Type of Well Well Code <u>11</u> / MW	Section Location of Waste/Source NW 1/4 of SE 1/4 of Sec. <u>27</u> , T. <u>12</u> N, R. <u>09</u> <input checked="" type="checkbox"/> E <input type="checkbox"/> W	Well Installed By: Name (first, last) and Firm Mark Crampton
Distance from Waste/Source _____ ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input checked="" type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Gov. Lot Number _____
Enf. Stds. Apply <input checked="" type="checkbox"/>		Badger State Drilling Co., Inc.

<p>A. Protective pipe, top elevation --- 813.59 ft. MSL</p> <p>B. Well casing, top elevation --- 813.28 ft. MSL</p> <p>C. Land surface elevation --- 809.88 ft. MSL</p> <p>D. Surface seal, bottom --- 807.61 ft. MSL or --- 2.27 ft.</p> <p>12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input checked="" type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input type="checkbox"/></p> <p>13. Sieve analysis performed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>14. Drilling method used: Rotary <input type="checkbox"/> 5 0 Hollow Stem Auger <input checked="" type="checkbox"/> 4 1 Other <input type="checkbox"/></p> <p>15. Drilling fluid used: Water <input type="checkbox"/> 0 2 Air <input type="checkbox"/> 0 1 Drilling Mud <input type="checkbox"/> 0 3 None <input checked="" type="checkbox"/> 9 9</p> <p>16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Describe -- _____</p> <p>17. Source of water (attach analysis, if required): ---</p>	<p>1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>2. Protective cover pipe: a. Inside diameter: --- 6 in. b. Length: --- 5 ft. c. Material: Steel <input checked="" type="checkbox"/> 0 4 Other <input type="checkbox"/> d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____</p> <p>3. Surface seal: Bentonite <input checked="" type="checkbox"/> 3 0 Concrete <input type="checkbox"/> 0 1 Other <input type="checkbox"/></p> <p>4. Material between well casing and protective pipe: Bentonite <input type="checkbox"/> 3 0 Filter Sand (#5) Other <input checked="" type="checkbox"/></p> <p>5. Annular space seal: a. Granular/Chipped Bentonite <input checked="" type="checkbox"/> 3 3 b. ___ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 3 5 c. ___ Lbs/gal mud weight ... Bentonite slurry <input type="checkbox"/> 3 1 d. ___ % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 5 0 e. 0.342 Ft³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 0 1 Tremie pumped <input type="checkbox"/> 0 2 Gravity <input checked="" type="checkbox"/> 0 8</p> <p>6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 3 3 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite chips <input checked="" type="checkbox"/> 3 2 c. Other <input type="checkbox"/></p> <p>7. Fine sand material: Manufacturer, product name & mesh size a. RW Sidley #7 (1 bag) <input checked="" type="checkbox"/></p> <p>8. Filter pack material: Manufacturer, product name & mesh size a. RW Sidley #5 (6 bags) <input checked="" type="checkbox"/></p> <p>9. Well casing: Flush threaded PVC schedule 40 <input checked="" type="checkbox"/> 2 3 Flush threaded PVC schedule 80 <input type="checkbox"/> 2 4 Other <input type="checkbox"/></p> <p>10. Screen material: PVC a. Screen type: Factory cut <input checked="" type="checkbox"/> 1 1 Continuous slot <input type="checkbox"/> 0 1 Other <input type="checkbox"/></p> <p>b. Manufacturer Monoflex c. Slot size: 0.010 in. d. Slotted length: 10 ft.</p> <p>11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 1 4 Other <input type="checkbox"/></p>
<p>E. Bentonite seal, top --- 807.61 ft. MSL or --- 2.27 ft.</p> <p>F. Fine sand, top --- 788.61 ft. MSL or --- 21.27 ft.</p> <p>G. Filter pack, top --- 786.61 ft. MSL or --- 23.27 ft.</p> <p>H. Screen joint, top --- 785.61 ft. MSL or --- 24.27 ft.</p> <p>I. Well bottom --- 775.61 ft. MSL or --- 34.27 ft.</p> <p>J. Filter pack, bottom --- 773.38 ft. MSL or --- 36.5 ft.</p> <p>K. Borehole, bottom --- 773.38 ft. MSL or --- 36.5 ft.</p> <p>L. Borehole, diameter --- 8.5 in.</p> <p>M. O.D. well casing --- 2.38 in.</p> <p>N. I.D. well casing --- 2.01 in.</p>	

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

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

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

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

Facility/Project Name WPL-Columbia Generating Station	Local Grid Location of Well 543331.971 ft. <input checked="" type="checkbox"/> N. <input type="checkbox"/> S. 2123879.85 ft. <input checked="" type="checkbox"/> E. <input type="checkbox"/> W.	Well Name MW-310
Facility License, Permit or Monitoring No.	Local Grid Origin (estimated: <input type="checkbox"/>) or Well Location <input type="checkbox"/> Lat. _____ " Long. _____ "	Wis. Unique Well No. <u>VR110</u> DNR Well ID No. _____
Facility ID	St. Plane _____ ft. N. _____ ft. E. S/C/N	Date Well Installed <u>02 / 13 / 2018</u> m m d d y y y y
Type of Well Well Code <u>11 / MW</u>	Section Location of Waste/Source NW 1/4 of SE 1/4 of Sec. <u>27</u> , T. <u>12</u> N, R. <u>09</u> <input checked="" type="checkbox"/> E <input type="checkbox"/> W	Well Installed By: Name (first, last) and Firm <u>Dave Cruise</u>
Distance from Waste/Source _____ ft.	Location of Well Relative to Waste/Source <input type="checkbox"/> Upgradient <input type="checkbox"/> Sidegradient <input checked="" type="checkbox"/> Downgradient <input type="checkbox"/> Not Known	Gov. Lot Number _____
Enf. Stds. Apply <input checked="" type="checkbox"/>		<u>Badger State Drilling Co., Inc.</u>

A. Protective pipe, top elevation --- 813.93 ft. MSL

B. Well casing, top elevation --- 813.62 ft. MSL

C. Land surface elevation --- 810.96 ft. MSL

D. Surface seal, bottom --- 809.21 ft. MSL or --- 1.75 ft.

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

13. Sieve analysis performed? Yes No

14. Drilling method used: Rotary 5 0
 Hollow Stem Auger 4 1
 Other

15. Drilling fluid used: Water 0 2 Air 0 1
 Drilling Mud 0 3 None 9 9

16. Drilling additives used? Yes No
 Describe --

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

E. Bentonite seal, top --- 809.21 ft. MSL or --- 1.75 ft.

F. Fine sand, top --- 789.21 ft. MSL or --- 21.75 ft.

G. Filter pack, top --- 787.21 ft. MSL or --- 23.75 ft.

H. Screen joint, top --- 785.21 ft. MSL or --- 25.75 ft.

I. Well bottom --- 775.21 ft. MSL or --- 35.75 ft.

J. Filter pack, bottom --- 774.46 ft. MSL or --- 36.5 ft.

K. Borehole, bottom --- 774.46 ft. MSL or --- 36.5 ft.

L. Borehole, diameter --- 8.5 in.

M. O.D. well casing --- 2.38 in.

N. I.D. well casing --- 2.01 in.

1. Cap and lock? Yes No

2. Protective cover pipe:
 a. Inside diameter: --- 6 in.
 b. Length: --- 5 ft.
 c. Material: Steel 0 4
 Other
 d. Additional protection? Yes No
 If yes, describe: _____

3. Surface seal:
 Bentonite 3 0
 Concrete 0 1
 Other

4. Material between well casing and protective pipe:
 Bentonite 3 0
 Filter Sand (#5)

5. Annular space seal:
 a. Granular/Chipped Bentonite 3 3
 b. ___ Lbs/gal mud weight ... Bentonite-sand slurry 3 5
 c. ___ Lbs/gal mud weight ... Bentonite slurry 3 1
 d. ___ % Bentonite ... Bentonite-cement grout 5 0
 e. 0.369 Ft³ volume added for any of the above
 f. How installed: Tremie 0 1
 Tremie pumped 0 2
 Gravity 0 8

6. Bentonite seal:
 a. Bentonite granules 3 3
 b. 1/4 in. 3/8 in. 1/2 in. Bentonite chips 3 2
 c. Other

7. Fine sand material: Manufacturer, product name & mesh size
 a. RW Sidley #7 (1 bag)
 b. Volume added _____ ft³

8. Filter pack material: Manufacturer, product name & mesh size
 a. RW Sidley #5 (7 bags)
 b. Volume added _____ ft³

9. Well casing: Flush threaded PVC schedule 40 2 3
 Flush threaded PVC schedule 80 2 4
 Other

10. Screen material: PVC
 a. Screen type: Factory cut 1 1
 Continuous slot 0 1
 Other
 b. Manufacturer Monoflex
 c. Slot size: 0.010 in.
 d. Slotted length: 10 ft.

11. Backfill material (below filter pack): None 1 4
 Other

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


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

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

Facility/Project Name WPL-Columbia Generating Station	Local Grid Location of Well 542874.39 ft. <input checked="" type="checkbox"/> N. <input checked="" type="checkbox"/> S. <input type="checkbox"/> E. <input type="checkbox"/> W. 2123437.50 ft.	Well Name MW-311
Facility License, Permit or Monitoring No.	Local Grid Origin (estimated: <input type="checkbox"/>) or Well Location <input type="checkbox"/> Lat. " Long. " or	Wis. Unique Well No. VR112 DNR Well ID No.
Facility ID	St. Plane ft. N. ft. E. S/C/N	Date Well Installed 02 / 14 / 2018 m m d d y y y y
Type of Well Well Code 11 / MW	Section Location of Waste/Source NE 1/4 of SW 1/4 of Sec. 27, T. 12 N, R. 09 <input checked="" type="checkbox"/> E <input type="checkbox"/> W	Well Installed By: Name (first, last) and Firm Mark Crampton
Distance from Waste/Source ft.	Enf. Stds. Apply <input checked="" type="checkbox"/> Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input checked="" type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Gov. Lot Number Badger State Drilling Co., Inc.

A. Protective pipe, top elevation --- 810.05 ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation --- 809.74 ft. MSL	2. Protective cover pipe: a. Inside diameter: --- 6 in. b. Length: --- 5 ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation --- 806.53 ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom --- 803.55 ft. MSL or --- 2.98 ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input checked="" type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input type="checkbox"/> 30 Filter Sand (#5) <input checked="" type="checkbox"/>
13. Sieve analysis performed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Annular space seal: a. Granular/Chipped Bentonite <input checked="" type="checkbox"/> 33 b. --- Lbs/gal mud weight . . . Bentonite-sand slurry <input type="checkbox"/> 35 c. --- Lbs/gal mud weight . . . Bentonite slurry <input type="checkbox"/> 31 d. --- % Bentonite Bentonite-cement grout <input type="checkbox"/> 50 e. 0.288 Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input type="checkbox"/> 02 Gravity <input checked="" type="checkbox"/> 08
14. Drilling method used: Rotary <input type="checkbox"/> 50 Hollow Stem Auger <input checked="" type="checkbox"/> 41 Other <input type="checkbox"/>	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite chips <input checked="" type="checkbox"/> 32 c. --- Other <input type="checkbox"/>
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input type="checkbox"/> 03 None <input checked="" type="checkbox"/> 99	7. Fine sand material: Manufacturer, product name & mesh size a. RW Sidley #7 (1 bag) <input checked="" type="checkbox"/> b. Volume added --- ft ³
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Describe: ---	8. Filter pack material: Manufacturer, product name & mesh size a. RW Sidley #5 (6 bags) <input checked="" type="checkbox"/> b. Volume added --- ft ³
17. Source of water (attach analysis, if required): ---	9. Well casing: Flush threaded PVC schedule 40 <input checked="" type="checkbox"/> 23 Flush threaded PVC schedule 80 <input type="checkbox"/> 24 Other <input type="checkbox"/>
E. Bentonite seal, top --- 803.55 ft. MSL or --- 2.98 ft.	10. Screen material: PVC a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
F. Fine sand, top --- 787.55 ft. MSL or --- 18.98 ft.	b. Manufacturer Monoflex c. Slot size: 0.010 in. d. Slotted length: --- 10 ft.
G. Filter pack, top --- 785.55 ft. MSL or --- 20.98 ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
H. Screen joint, top --- 783.55 ft. MSL or --- 22.98 ft.	
I. Well bottom --- 773.55 ft. MSL or --- 32.98 ft.	
J. Filter pack, bottom --- 773.53 ft. MSL or --- 33 ft.	
K. Borehole, bottom --- 773.53 ft. MSL or --- 33 ft.	
L. Borehole, diameter --- 8.5 in.	
M. O.D. well casing --- 2.38 in.	
N. I.D. well casing --- 2.01 in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.
Signature  Firm SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

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

Facility/Project Name WPL - Alliant Columbia Generating Station	County Name Columbia	Well Name MW-309	
Facility License, Permit or Monitoring Number	County Code 11	Wis. Unique Well Number VR111	DNR Well ID Number

1. Can this well be purged dry? Yes No

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

3. Time spent developing well _____ 75 min.

4. Depth of well (from top of well casing) _____ 37.67 ft.

5. Inside diameter of well _____ 2.0 in.

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

7. Volume of water removed from well _____ 50.0 gal.

8. Volume of water added (if any) _____ gal.

9. Source of water added _____

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

17. Additional comments on development:

Two cycles of well purging dry and recharging.

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. _____ 30.07 ft.	_____ 32.29 ft.
Date	b. <u>02</u> / <u>16</u> / <u>2018</u>	<u>02</u> / <u>16</u> / <u>2018</u>
	m m d d y y	m m d d y y
Time	c. <u>12</u> : <u>47</u> <input type="checkbox"/> a.m. <input checked="" type="checkbox"/> p.m.	<u>13</u> : <u>50</u> <input type="checkbox"/> a.m. <input checked="" type="checkbox"/> p.m.

12. Sediment in well bottom _____ inches

13. Water clarity
Clear 1 0 Clear 2 0
Turbid 1 5 Turbid 2 5
(Describe) (Describe)

Brown	_____
Silty	_____
_____	_____
_____	_____

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

14. Total suspended _____ mg/l _____ mg/l
solids

15. COD _____ mg/l _____ mg/l

16. Well developed by: Name (first, last) and Firm

First Name: Kyle Last Name: Kramer

Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

Name and Address of Facility Contact/Owner/Responsible Party

First Name: Nate Last Name: Sievers

Facility/Firm: Wisconsin Power and Light

Street: W8375 Murray Road

City/State/Zip: Pardeeville, Wisconsin 53954

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

Signature: Kyle Kramer

Print Name: Kyle Kramer

Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

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

Facility/Project Name WPL - Alliant Columbia Generating Station	County Name Columbia	Well Name MW-310	
Facility License, Permit or Monitoring Number	County Code 11	Wis. Unique Well Number VR110	DNR Well ID Number

1. Can this well be purged dry? Yes No

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

3. Time spent developing well _____ 171 min.

4. Depth of well (from top of well casing) _____ 38.41 ft.

5. Inside diameter of well _____ 2.0 in.

6. Volume of water in filter pack and well casing _____ 7.28 gal.

7. Volume of water removed from well _____ 60.0 gal.

8. Volume of water added (if any) _____ gal.

9. Source of water added _____

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

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

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. _____ 30 _____ 55 ft.	_____ 32 _____ 30 ft.
Date	b. <u>2</u> / <u>16</u> / <u>2018</u> <u>2</u> / <u>16</u> / <u>2018</u> m m d d y y y y m m d d y y y y	
Time	c. <u>9</u> : <u>45</u> <input checked="" type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<u>12</u> : <u>36</u> <input type="checkbox"/> a.m. <input checked="" type="checkbox"/> p.m.
12. Sediment in well bottom	_____ inches	_____ inches
13. Water clarity	Clear <input type="checkbox"/> 1 0 Turbid <input checked="" type="checkbox"/> 1 5 (Describe) _____	Clear <input checked="" type="checkbox"/> 2 0 Turbid <input type="checkbox"/> 2 5 (Describe) _____

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

14. Total suspended solids _____ mg/l _____ mg/l


15. COD _____ mg/l _____ mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Kyle Last Name: Kramer
Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

Name and Address of Facility Contact/Owner/Responsible Party

First Name: Nate Last Name: Sievers
Facility/Firm: Wisconsin Power and Light
Street: W8375 Murray Road
City/State/Zip: Pardeeville, Wisconsin 53954

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

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

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

Facility/Project Name WPL - Alliant Columbia Generating Station	County Name Columbia	Well Name MW-311	
Facility License, Permit or Monitoring Number	County Code 11	Wis. Unique Well Number VR112	DNR Well ID Number

1. Can this well be purged dry? Yes No

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

3. Time spent developing well _____ 168 min.

4. Depth of well (from top of well casing) _____ 36.19 ft.

5. Inside diameter of well _____ 2.0 in.

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

7. Volume of water removed from well _____ 100.0 gal.

8. Volume of water added (if any) _____ gal.

9. Source of water added _____

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

17. Additional comments on development:

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. _____ 26.75 ft.	_____ 28.51 ft.
Date	b. <u>2</u> / <u>16</u> / <u>2018</u>	<u>2</u> / <u>16</u> / <u>2018</u>
Time	c. <u>2:00</u> <input type="checkbox"/> a.m. <input checked="" type="checkbox"/> p.m.	<u>4:48</u> <input type="checkbox"/> a.m. <input checked="" type="checkbox"/> p.m.
12. Sediment in well bottom	_____ inches	_____ inches
13. Water clarity	Clear <input type="checkbox"/> 1 0 Turbid <input checked="" type="checkbox"/> 1 5 (Describe) _____	Clear <input checked="" type="checkbox"/> 2 0 Turbid <input type="checkbox"/> 2 5 (Describe) _____

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

14. Total suspended solids _____ mg/l _____ mg/l

15. COD _____ mg/l _____ mg/l

16. Well developed by: Name (first, last) and Firm

First Name: Kyle Last Name: Kramer

Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

Name and Address of Facility Contact /Owner/Responsible Party

First Name: Nate Last Name: Sievers

Facility/Firm: Columbia Dry Ash & Ash Pond Disposal Facilities

Street: W8375 Murray Road

City/State/Zip: Pardeeville, Wisconsin 53954

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

Signature: 

Print Name: Kyle Kramer

Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718

Appendix C

Laboratory Reports

- C1 May 2020 Detection Monitoring
- C2 June 2020 Resample
- C3 August 2020 Resample
- C4 October 2020 Detection Monitoring
- C5 December 2020 Resample

C1 May 2020 Detection Monitoring

June 16, 2020

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40208542

Dear Meghan Blodgett:

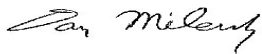
Enclosed are the analytical results for sample(s) received by the laboratory on May 30, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Green Bay

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40208542

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky UST Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 12064

North Dakota Certification #: R-150

Virginia VELAP ID: 460263

South Carolina Certification #: 83006001

Texas Certification #: T104704529-14-1

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

USDA Soil Permit #: P330-16-00157

Federal Fish & Wildlife Permit #: LE51774A-0

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40208542

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40208542001	MW-309	Water	05/29/20 09:45	05/30/20 08:00
40208542002	MW-310	Water	05/29/20 10:25	05/30/20 08:00
40208542003	MW-311	Water	05/29/20 11:10	05/30/20 08:00
40208542004	FIELD BLANK MOD4	Water	05/29/20 09:45	05/30/20 08:00

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40208542

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40208542001	MW-309	EPA 6020	KXS	2
			HMG	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40208542002	MW-310	EPA 6020	KXS	2
			HMG	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40208542003	MW-311	EPA 6020	KXS	2
			HMG	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40208542004	FIELD BLANK MOD4	EPA 6020	KXS	2
			HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3

PASI-G = Pace Analytical Services - Green Bay

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40208542

Sample: MW-309 **Lab ID: 40208542001** Collected: 05/29/20 09:45 Received: 05/30/20 08:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay							
Boron	54.6	ug/L	10.0	3.0	1	06/01/20 17:36	06/05/20 19:02	7440-42-8	
Calcium	51600	ug/L	254	76.2	1	06/01/20 17:36	06/04/20 20:56	7440-70-2	
Field Data		Analytical Method: Pace Analytical Services - Green Bay							
Field pH	7.35	Std. Units			1		05/29/20 09:45		
Field Specific Conductance	1785	umhos/cm			1		05/29/20 09:45		
Oxygen, Dissolved	9.83	mg/L			1		05/29/20 09:45	7782-44-7	
REDOX	230.6	mV			1		05/29/20 09:45		
Turbidity	1.74	NTU			1		05/29/20 09:45		
Static Water Level	785.98	feet			1		05/29/20 09:45		
Temperature, Water (C)	11.0	deg C			1		05/29/20 09:45		
2540C Total Dissolved Solids		Analytical Method: SM 2540C Pace Analytical Services - Green Bay							
Total Dissolved Solids	960	mg/L	20.0	8.7	1		06/02/20 14:51		
9040 pH		Analytical Method: EPA 9040 Pace Analytical Services - Green Bay							
pH at 25 Degrees C	8.0	Std. Units	0.10	0.010	1		06/03/20 09:42		H6
300.0 IC Anions		Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay							
Chloride	350	mg/L	20.0	4.3	10		06/16/20 04:36	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		06/16/20 01:05	16984-48-8	
Sulfate	28.6	mg/L	2.0	0.44	1		06/16/20 01:05	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.

ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40208542

Sample: MW-310 **Lab ID: 40208542002** Collected: 05/29/20 10:25 Received: 05/30/20 08:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Boron	74.4	ug/L	10.0	3.0	1	06/01/20 17:36	06/05/20 19:09	7440-42-8	
Calcium	41100	ug/L	254	76.2	1	06/01/20 17:36	06/04/20 21:03	7440-70-2	
Field Data									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.54	Std. Units			1		05/29/20 10:25		
Field Specific Conductance	1035	umhos/cm			1		05/29/20 10:25		
Oxygen, Dissolved	10.07	mg/L			1		05/29/20 10:25	7782-44-7	
REDOX	207.8	mV			1		05/29/20 10:25		
Turbidity	1.96	NTU			1		05/29/20 10:25		
Static Water Level	785.81	feet			1		05/29/20 10:25		
Temperature, Water (C)	11.5	deg C			1		05/29/20 10:25		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	582	mg/L	20.0	8.7	1		06/02/20 14:52		
9040 pH									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	8.0	Std. Units	0.10	0.010	1		06/03/20 09:45		H6
300.0 IC Anions									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	128	mg/L	20.0	4.3	10		06/16/20 04:50	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		06/16/20 01:18	16984-48-8	
Sulfate	68.2	mg/L	20.0	4.4	10		06/16/20 04:50	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40208542

Sample: MW-311 **Lab ID: 40208542003** Collected: 05/29/20 11:10 Received: 05/30/20 08:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay							
Boron	25.7	ug/L	10.0	3.0	1	06/01/20 17:36	06/05/20 19:16	7440-42-8	
Calcium	62200	ug/L	254	76.2	1	06/01/20 17:36	06/04/20 21:10	7440-70-2	
Field Data		Analytical Method: Pace Analytical Services - Green Bay							
Field pH	7.37	Std. Units			1		05/29/20 11:10		
Field Specific Conductance	547.2	umhos/cm			1		05/29/20 11:10		
Oxygen, Dissolved	10.64	mg/L			1		05/29/20 11:10	7782-44-7	
REDOX	176.3	mV			1		05/29/20 11:10		
Turbidity	4.70	NTU			1		05/29/20 11:10		
Static Water Level	785.85	feet			1		05/29/20 11:10		
Temperature, Water (C)	10.5	deg C			1		05/29/20 11:10		
2540C Total Dissolved Solids		Analytical Method: SM 2540C Pace Analytical Services - Green Bay							
Total Dissolved Solids	326	mg/L	20.0	8.7	1		06/02/20 14:52		
9040 pH		Analytical Method: EPA 9040 Pace Analytical Services - Green Bay							
pH at 25 Degrees C	7.7	Std. Units	0.10	0.010	1		06/03/20 09:46		H6
300.0 IC Anions		Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay							
Chloride	1.5J	mg/L	2.0	0.43	1		06/16/20 01:32	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		06/16/20 01:32	16984-48-8	
Sulfate	39.1	mg/L	2.0	0.44	1		06/16/20 01:32	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40208542

Sample: FIELD BLANK MOD4 **Lab ID: 40208542004** Collected: 05/29/20 09:45 Received: 05/30/20 08:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Boron	<3.0	ug/L	10.0	3.0	1	06/01/20 17:36	06/05/20 17:54	7440-42-8	
Calcium	<76.2	ug/L	254	76.2	1	06/01/20 17:36	06/04/20 21:17	7440-70-2	
2540C Total Dissolved Solids									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	<8.7	mg/L	20.0	8.7	1		06/02/20 14:52		
9040 pH									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	6.8	Std. Units	0.10	0.010	1		06/03/20 09:48		H6
300.0 IC Anions									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	<0.43	mg/L	2.0	0.43	1		06/16/20 01:45	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		06/16/20 01:45	16984-48-8	
Sulfate	<0.44	mg/L	2.0	0.44	1		06/16/20 01:45	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40208542

QC Batch: 356328 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40208542001, 40208542002, 40208542003, 40208542004

METHOD BLANK: 2060969 Matrix: Water
Associated Lab Samples: 40208542001, 40208542002, 40208542003, 40208542004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.0	10.0	06/04/20 17:39	
Calcium	ug/L	<76.2	254	06/04/20 17:39	

LABORATORY CONTROL SAMPLE: 2060970

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	500	492	98	80-120	
Calcium	ug/L	5000	4940	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2060971 2060972

Parameter	Units	40208448001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	16.2	500	500	516	512	100	99	75-125	1	20	
Calcium	ug/L	48200	5000	5000	51200	50900	59	54	75-125	1	20	P6

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40208542

QC Batch:	356448	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
		Laboratory:	Pace Analytical Services - Green Bay

Associated Lab Samples: 40208542001, 40208542002, 40208542003, 40208542004

METHOD BLANK: 2061521 Matrix: Water
Associated Lab Samples: 40208542001, 40208542002, 40208542003, 40208542004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	06/02/20 14:49	

LABORATORY CONTROL SAMPLE: 2061522

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	559	540	97	80-120	

SAMPLE DUPLICATE: 2061523

Parameter	Units	40208499001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	306	304	1	10	

SAMPLE DUPLICATE: 2061524

Parameter	Units	40208542001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	960	988	3	10	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40208542

QC Batch:	356504	Analysis Method:	EPA 9040
QC Batch Method:	EPA 9040	Analysis Description:	9040 pH
		Laboratory:	Pace Analytical Services - Green Bay

Associated Lab Samples: 40208542001, 40208542002, 40208542003, 40208542004

SAMPLE DUPLICATE: 2061791

Parameter	Units	40208541003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.6	7.8	3	20	H6,PI

SAMPLE DUPLICATE: 2061792

Parameter	Units	40208560016 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.5	7.6	1	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40208542

QC Batch: 356987 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40208542001, 40208542002, 40208542003, 40208542004

METHOD BLANK: 2064877 Matrix: Water
Associated Lab Samples: 40208542001, 40208542002, 40208542003, 40208542004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	06/15/20 20:54	
Fluoride	mg/L	<0.095	0.32	06/15/20 20:54	
Sulfate	mg/L	<0.44	2.0	06/15/20 20:54	

LABORATORY CONTROL SAMPLE: 2064878

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.5	98	90-110	
Fluoride	mg/L	2	2.0	99	90-110	
Sulfate	mg/L	20	19.4	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2064879 2064880

Parameter	Units	40208499001		MS		MSD		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Conc.	Result	Result							
Chloride	mg/L	0.76J	20	20	21.1	20.4	102	98	90-110	3	15			
Fluoride	mg/L	<0.095	2	2	2.1	2.0	106	102	90-110	4	15			
Sulfate	mg/L	6.9	20	20	27.6	26.7	103	99	90-110	3	15			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2064881 2064882

Parameter	Units	40208801002		MS		MSD		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Conc.	Result	Result							
Chloride	mg/L	65.2	100	100	166	164	101	99	90-110	2	15			
Fluoride	mg/L	<0.48	10	10	10.2	10.1	102	101	90-110	1	15			
Sulfate	mg/L	23.1	100	100	122	121	99	98	90-110	1	15			

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40208542

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.

PI The precision between the sample and the duplicate sample exceeded laboratory control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40208542

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40208542001	MW-309	EPA 3010	356328	EPA 6020	356381
40208542002	MW-310	EPA 3010	356328	EPA 6020	356381
40208542003	MW-311	EPA 3010	356328	EPA 6020	356381
40208542004	FIELD BLANK MOD4	EPA 3010	356328	EPA 6020	356381
40208542001	MW-309				
40208542002	MW-310				
40208542003	MW-311				
40208542001	MW-309	SM 2540C	356448		
40208542002	MW-310	SM 2540C	356448		
40208542003	MW-311	SM 2540C	356448		
40208542004	FIELD BLANK MOD4	SM 2540C	356448		
40208542001	MW-309	EPA 9040	356504		
40208542002	MW-310	EPA 9040	356504		
40208542003	MW-311	EPA 9040	356504		
40208542004	FIELD BLANK MOD4	EPA 9040	356504		
40208542001	MW-309	EPA 300.0	356987		
40208542002	MW-310	EPA 300.0	356987		
40208542003	MW-311	EPA 300.0	356987		
40208542004	FIELD BLANK MOD4	EPA 300.0	356987		

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY / Analytical Request Document

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

40208542

Section A

Required Client Information:
 Company: SCS ENGINEERS
 Address: 2930 Dairy Drive
 Madison, WI 53718
 Email: mblodgett@scsengineers.com
 Phone: 608-216-7362 Fax
 Requested Due Date:

Section B

Required Project Information:
 Report To: Meghan Blodgett
 Copy To:
 Purchase Order #:
 Project Name: 25219067 Columbia CCR Mod 4
 Project #:

Section C

Invoice Information:
 Attention:
 Company Name:
 Address:
 Pace Quote:
 Pace Project Manager: dan.milensky@paceclabs.com
 Pace Profile #: x

Page: 1 of 1

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / , -) Sample ids must be unique	MATRIX		CODE		MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Analyses Test	Y/N	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	
		Drinking Water	Waste Water	DW	WT			START DATE	END DATE								Unpreserved
1																	
2	MW-309			WT		WT		5/29	9:45					X	X	X	001
3	MW-310			WT		WT		5/29	16:25					X	X	X	002
4	MW-311			WT		WT		5/29	11:10					X	X	X	003
5	FIELD BLANK MOD4			WT		WT		5/29	9:45					X	X	X	004
6																	
7																	
8																	
9																	
10																	
11																	
12																	

TEMP in C

Received on Ice (Y/N)

Custody Sealed Cooler (Y/N)

Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER:

DATE Signed:

Pace Container Order #648417

40208542

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

Info					
Project Name	25219067 Columbia CCR Mod 4	Due Date	05/19/2020	Profile	x
Project Manager	Milewsky, Dan	Return Date		Carrier	Most Economical
				Location	
				Quote	

Trip Blanks

Include Trip Blanks

Bottle Labels

Blank

Pre-Printed No Sample IDs

Pre-Printed With Sample IDs

Bottles

Boxed Cases

Individually Wrapped

Grouped By Sample ID/Matrix

Return Shipping Labels

No Shipper

With Shipper

Misc

Sampling Instructions

Custody Seal

Temp. Blanks

Coolers

Syringes

Extra Bubble Wrap

Short Hold/Rush Stickers

DI Water

USDA Regulated Soils

COC Options

Number of Blanks

Pre-Printed

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
5	WT	Boron/Calcium	250mL plastic w/HNO3	5	0	M-9-354-03BB	
5	WT	pH	250mL plastic unpres	5	0	M-9-311-06BB	
5	WT	TDS, Cl, F, SO4	250mL plastic unpres	5	0	M-9-311-06BB	

Hazard Shipping Placard In Place : NA

LAB USE:

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

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

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

*Payment term are net 30 days.

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

Ship Date :

Prepared By:

Verified By:

Sample

CLIENT USE (Optional):

ALL SAMPLES UNFILTERED

Date Rec'd:

Received By:

Verified By:

Client Name: SCS

Sample Preservation Receipt Form

Project # 40208542

All containers needing preservation have been checked and noted below: Yes No N/A
 Lab Lot# of pH paper: 1052791 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: W

Date/Time:

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

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

AG1U	1 liter amber glass
BG1U	1 liter clear glass
AG1H	1 liter amber glass HCL
AG4S	125 mL amber glass H2SO4
AG4U	120 mL amber glass unpres
AG5U	100 mL amber glass unpres
AG2S	500 mL amber glass H2SO4
BG3U	250 mL clear glass unpres

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

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

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

*5/30/20
W*



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

Sample Condition Upon Receipt Form (SCUR)

Client Name: SCS
 Courier: CS Logistics Fed Ex Speedee UPS Waltco
 Client Pace Other: _____

Project #: _____

WO# : 40208542

40208542

Tracking #: 1578 052820
 Custody Seal on Cooler/Box Present: yes no Seals intact: yes no
 Custody Seal on Samples Present: yes no Seals intact: yes no
 Packing Material: Bubble Wrap Bubble Bags None Other
 Thermometer Used SR - N/A Type of Ice: Wet Blue Dry None
 Cooler Temperature Uncorr: 10.5 /Corr: _____
 Samples on ice, cooling process has begun
 Temp Blank Present: yes no Biological Tissue is Frozen: yes no

Person examining contents:
 Date: 5/30/20 Initials: SMW
 Labeled By Initials: SMW

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

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2. <u>NO PI # / NO PR STATE</u>
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3. <u>SMW 5/30/20</u>
Sampler Name & Signature on COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume:		8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>U</u>		
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

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

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

June 23, 2020

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on May 30, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

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

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

Pace Analytical Services Pennsylvania

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

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

Pace Analytical Services Green Bay

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

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

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40208571

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40208571001	MW-301	Water	05/29/20 13:30	05/30/20 08:00
40208571002	MW-84A	Water	05/29/20 12:40	05/30/20 08:00

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40208571001	MW-301	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			HMG	7	PASI-G
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	HNT	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		40208571002	MW-84A	EPA 6020	DS1
EPA 7470	AJT			1	PASI-G
	HMG			7	PASI-G
EPA 903.1	MK1			1	PASI-PA
EPA 904.0	VAL			1	PASI-PA
Total Radium Calculation	CMC			1	PASI-PA
SM 2540C	HNT			1	PASI-G
EPA 9040	ALY			1	PASI-G
EPA 300.0	HMB			3	PASI-G

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

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

Sample: MW-301 **Lab ID: 40208571001** Collected: 05/29/20 13:30 Received: 05/30/20 08:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	06/01/20 18:15	06/11/20 08:30	7440-36-0	
Arsenic	0.33J	ug/L	1.0	0.28	1	06/01/20 18:15	06/11/20 08:30	7440-38-2	
Barium	9.8	ug/L	2.3	0.70	1	06/01/20 18:15	06/11/20 08:30	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	06/01/20 18:15	06/11/20 08:30	7440-41-7	
Boron	21.3	ug/L	10.0	3.0	1	06/01/20 18:15	06/11/20 17:29	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	06/01/20 18:15	06/11/20 08:30	7440-43-9	
Calcium	112000	ug/L	254	76.2	1	06/01/20 18:15	06/11/20 08:30	7440-70-2	
Chromium	<1.0	ug/L	3.4	1.0	1	06/01/20 18:15	06/11/20 08:30	7440-47-3	
Cobalt	<0.12	ug/L	1.0	0.12	1	06/01/20 18:15	06/11/20 08:30	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	06/01/20 18:15	06/11/20 08:30	7439-92-1	
Lithium	0.47J	ug/L	1.0	0.22	1	06/01/20 18:15	06/11/20 08:30	7439-93-2	
Molybdenum	<0.44	ug/L	1.5	0.44	1	06/01/20 18:15	06/11/20 08:30	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	06/01/20 18:15	06/11/20 08:30	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	06/01/20 18:15	06/11/20 08:30	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.084	ug/L	0.28	0.084	1	06/10/20 10:40	06/11/20 09:21	7439-97-6	
Field Data									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	6.73	Std. Units			1		05/29/20 13:30		
Field Specific Conductance	797	umhos/cm			1		05/29/20 13:30		
Oxygen, Dissolved	2.00	mg/L			1		05/29/20 13:30	7782-44-7	
REDOX	118.7	mV			1		05/29/20 13:30		
Turbidity	0.0	NTU			1		05/29/20 13:30		
Static Water Level	787.77	feet			1		05/29/20 13:30		
Temperature, Water (C)	8.1	deg C			1		05/29/20 13:30		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	452	mg/L	20.0	8.7	1		06/02/20 14:53		
9040 pH									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.0	Std. Units	0.10	0.010	1		06/03/20 09:50		H6
300.0 IC Anions									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	2.0J	mg/L	2.0	0.43	1		06/16/20 01:58	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		06/16/20 01:58	16984-48-8	
Sulfate	11.5	mg/L	2.0	0.44	1		06/16/20 01:58	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

Sample: MW-84A **Lab ID: 40208571002** Collected: 05/29/20 12:40 Received: 05/30/20 08:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	06/01/20 18:15	06/11/20 08:37	7440-36-0	
Arsenic	0.34J	ug/L	1.0	0.28	1	06/01/20 18:15	06/11/20 08:37	7440-38-2	
Barium	13.9	ug/L	2.3	0.70	1	06/01/20 18:15	06/11/20 08:37	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	06/01/20 18:15	06/11/20 08:37	7440-41-7	
Boron	10.0	ug/L	10.0	3.0	1	06/01/20 18:15	06/11/20 17:36	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	06/01/20 18:15	06/11/20 08:37	7440-43-9	
Calcium	77600	ug/L	254	76.2	1	06/01/20 18:15	06/11/20 08:37	7440-70-2	
Chromium	1.7J	ug/L	3.4	1.0	1	06/01/20 18:15	06/11/20 08:37	7440-47-3	
Cobalt	<0.12	ug/L	1.0	0.12	1	06/01/20 18:15	06/11/20 08:37	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	06/01/20 18:15	06/11/20 08:37	7439-92-1	
Lithium	0.40J	ug/L	1.0	0.22	1	06/01/20 18:15	06/11/20 08:37	7439-93-2	
Molybdenum	<0.44	ug/L	1.5	0.44	1	06/01/20 18:15	06/11/20 08:37	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	06/01/20 18:15	06/11/20 08:37	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	06/01/20 18:15	06/11/20 08:37	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.084	ug/L	0.28	0.084	1	06/10/20 10:40	06/11/20 09:23	7439-97-6	
Field Data									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.34	Std. Units			1		05/29/20 12:40		
Field Specific Conductance	613.7	umhos/cm			1		05/29/20 12:40		
Oxygen, Dissolved	9.81	mg/L			1		05/29/20 12:40	7782-44-7	
REDOX	135.0	mV			1		05/29/20 12:40		
Turbidity	2.15	NTU			1		05/29/20 12:40		
Static Water Level	787.02	feet			1		05/29/20 12:40		
Temperature, Water (C)	10.6	deg C			1		05/29/20 12:40		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	340	mg/L	20.0	8.7	1		06/02/20 14:53		
9040 pH									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.6	Std. Units	0.10	0.010	1		06/03/20 09:51		H6
300.0 IC Anions									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	3.7	mg/L	2.0	0.43	1		06/16/20 02:11	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		06/16/20 02:11	16984-48-8	
Sulfate	1.5J	mg/L	2.0	0.44	1		06/16/20 02:11	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

QC Batch: 357238 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40208571001, 40208571002

METHOD BLANK: 2066129 Matrix: Water
Associated Lab Samples: 40208571001, 40208571002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.084	0.28	06/11/20 08:58	

LABORATORY CONTROL SAMPLE: 2066130

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.1	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2066131 2066132

Parameter	Units	2066131		2066132		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		40208929001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							MSD Result
Mercury	ug/L	<0.084	5	5	5.3	4.9	105	98	85-115	7	20	

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

QC Batch: 356333 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40208571001, 40208571002

METHOD BLANK: 2060982 Matrix: Water

Associated Lab Samples: 40208571001, 40208571002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	06/11/20 05:17	
Arsenic	ug/L	<0.28	1.0	06/11/20 05:17	
Barium	ug/L	<0.70	2.3	06/11/20 05:17	
Beryllium	ug/L	<0.25	1.0	06/11/20 05:17	
Boron	ug/L	<3.0	10.0	06/11/20 15:11	
Cadmium	ug/L	<0.15	1.0	06/11/20 05:17	
Calcium	ug/L	<76.2	254	06/11/20 05:17	
Chromium	ug/L	<1.0	3.4	06/11/20 05:17	
Cobalt	ug/L	<0.12	1.0	06/11/20 05:17	
Lead	ug/L	<0.24	1.0	06/11/20 05:17	
Lithium	ug/L	<0.22	1.0	06/11/20 05:17	
Molybdenum	ug/L	<0.44	1.5	06/11/20 05:17	
Selenium	ug/L	<0.32	1.1	06/11/20 05:17	
Thallium	ug/L	<0.14	1.0	06/11/20 05:17	

LABORATORY CONTROL SAMPLE: 2060983

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	528	106	80-120	
Arsenic	ug/L	500	494	99	80-120	
Barium	ug/L	500	488	98	80-120	
Beryllium	ug/L	500	448	90	80-120	
Boron	ug/L	500	461	92	80-120	
Cadmium	ug/L	500	513	103	80-120	
Calcium	ug/L	5000	5060	101	80-120	
Chromium	ug/L	500	476	95	80-120	
Cobalt	ug/L	500	471	94	80-120	
Lead	ug/L	500	493	99	80-120	
Lithium	ug/L	500	425	85	80-120	
Molybdenum	ug/L	500	508	102	80-120	
Selenium	ug/L	500	471	94	80-120	
Thallium	ug/L	500	486	97	80-120	

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40208571

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2060984		2060985		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40208496001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Antimony	ug/L	0.22J	500	500	552	539	110	108	75-125	2	20		
Arsenic	ug/L	5.9	500	500	521	508	103	100	75-125	3	20		
Barium	ug/L	13.8	500	500	524	514	102	100	75-125	2	20		
Beryllium	ug/L	0.36J	500	500	446	438	89	87	75-125	2	20		
Boron	ug/L	2700	500	500	3180	3090	94	78	75-125	3	20		
Cadmium	ug/L	0.30J	500	500	521	510	104	102	75-125	2	20		
Calcium	ug/L	27400	5000	5000	32700	30400	107	61	75-125	7	20	P6	
Chromium	ug/L	42.8	500	500	530	525	98	96	75-125	1	20		
Cobalt	ug/L	0.49J	500	500	484	474	97	95	75-125	2	20		
Lead	ug/L	0.32J	500	500	514	516	103	103	75-125	0	20		
Lithium	ug/L	1.2	500	500	438	432	87	86	75-125	1	20		
Molybdenum	ug/L	67.1	500	500	604	587	107	104	75-125	3	20		
Selenium	ug/L	18.7	500	500	500	495	96	95	75-125	1	20		
Thallium	ug/L	0.28J	500	500	509	513	102	102	75-125	1	20		

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

QC Batch: 356448 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40208571001, 40208571002

METHOD BLANK: 2061521 Matrix: Water
Associated Lab Samples: 40208571001, 40208571002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	06/02/20 14:49	

LABORATORY CONTROL SAMPLE: 2061522

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	559	540	97	80-120	

SAMPLE DUPLICATE: 2061523

Parameter	Units	40208499001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	306	304	1	10	

SAMPLE DUPLICATE: 2061524

Parameter	Units	40208542001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	960	988	3	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40208571

QC Batch: 356504

Analysis Method: EPA 9040

QC Batch Method: EPA 9040

Analysis Description: 9040 pH

Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40208571001, 40208571002

SAMPLE DUPLICATE: 2061791

Parameter	Units	40208541003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.6	7.8	3	20	H6,PI

SAMPLE DUPLICATE: 2061792

Parameter	Units	40208560016 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.5	7.6	1	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

QC Batch: 356987 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40208571001, 40208571002

METHOD BLANK: 2064877 Matrix: Water
Associated Lab Samples: 40208571001, 40208571002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	06/15/20 20:54	
Fluoride	mg/L	<0.095	0.32	06/15/20 20:54	
Sulfate	mg/L	<0.44	2.0	06/15/20 20:54	

LABORATORY CONTROL SAMPLE: 2064878

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.5	98	90-110	
Fluoride	mg/L	2	2.0	99	90-110	
Sulfate	mg/L	20	19.4	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2064879 2064880

Parameter	Units	40208499001		MS		MSD		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result							
Chloride	mg/L	0.76J	20	20	21.1	20.4	102	98	90-110	3	15			
Fluoride	mg/L	<0.095	2	2	2.1	2.0	106	102	90-110	4	15			
Sulfate	mg/L	6.9	20	20	27.6	26.7	103	99	90-110	3	15			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2064881 2064882

Parameter	Units	40208801002		MS		MSD		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result							
Chloride	mg/L	65.2	100	100	166	164	101	99	90-110	2	15			
Fluoride	mg/L	<0.48	10	10	10.2	10.1	102	101	90-110	1	15			
Sulfate	mg/L	23.1	100	100	122	121	99	98	90-110	1	15			

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REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40208571

Sample: MW-301 **Lab ID: 40208571001** Collected: 05/29/20 13:30 Received: 05/30/20 08:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Pace Analytical Services - Greensburg						
Radium-226	EPA 903.1	0.000 ± 0.307 (0.495) C:NA T:82%	pCi/L	06/22/20 15:54	13982-63-3	
Pace Analytical Services - Greensburg						
Radium-228	EPA 904.0	0.193 ± 0.370 (0.813) C:71% T:90%	pCi/L	06/18/20 10:59	15262-20-1	
Pace Analytical Services - Greensburg						
Total Radium	Total Radium Calculation	0.193 ± 0.677 (1.31)	pCi/L	06/23/20 09:27	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40208571

Sample: MW-84A **Lab ID: 40208571002** Collected: 05/29/20 12:40 Received: 05/30/20 08:00 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	0.368 ± 0.419 (0.661) C:NA T:97%	pCi/L	06/22/20 15:54	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	0.0273 ± 0.391 (0.895) C:71% T:86%	pCi/L	06/18/20 10:59	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	0.395 ± 0.810 (1.56)	pCi/L	06/23/20 09:27	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40208571

QC Batch: 399236

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40208571001, 40208571002

METHOD BLANK: 1933438

Matrix: Water

Associated Lab Samples: 40208571001, 40208571002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.176 ± 0.245 (0.622) C:NA T:95%	pCi/L	06/22/20 15:33	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40208571

QC Batch: 399239

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40208571001, 40208571002

METHOD BLANK: 1933446

Matrix: Water

Associated Lab Samples: 40208571001, 40208571002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.173 ± 0.299 (0.652) C:77% T:94%	pCi/L	06/18/20 10:58	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

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.

PI The precision between the sample and the duplicate sample exceeded laboratory control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40208571

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40208571001	MW-301	EPA 3010	356333	EPA 6020	356385
40208571002	MW-84A	EPA 3010	356333	EPA 6020	356385
40208571001	MW-301	EPA 7470	357238	EPA 7470	357374
40208571002	MW-84A	EPA 7470	357238	EPA 7470	357374
40208571001	MW-301				
40208571002	MW-84A				
40208571001	MW-301	EPA 903.1	399236		
40208571002	MW-84A	EPA 903.1	399236		
40208571001	MW-301	EPA 904.0	399239		
40208571002	MW-84A	EPA 904.0	399239		
40208571001	MW-301	Total Radium Calculation	402044		
40208571002	MW-84A	Total Radium Calculation	402044		
40208571001	MW-301	SM 2540C	356448		
40208571002	MW-84A	SM 2540C	356448		
40208571001	MW-301	EPA 9040	356504		
40208571002	MW-84A	EPA 9040	356504		
40208571001	MW-301	EPA 300.0	356987		
40208571002	MW-84A	EPA 300.0	356987		

REPORT OF LABORATORY ANALYSIS

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Pace Container Order #648412

40208571

Addresses

Order By :

Company SCS ENGINEERS
 Contact Blodgett, Meghan
 Email mblodgett@scsengineers.com
 Address 2830 Dairy Drive
 Address 2 _____
 City Madison
 State WI Zip 53718
 Phone 608-216-7362

Ship To :

Company SCS ENGINEERS (Pace Analytical Green)
 Contact Paul Grover
 Email pgrover@scsengineers.com
 Address 2830 Dairy Drive
 Address 2 _____
 City Madison
 State WI Zip 53718
 Phone 608-216-7362

Return To:

Company Pace Analytical Green Bay
 Contact Milewsky, Dan
 Email dan.milewsky@pacelabs.com
 Address 1241 Bellevue Street
 Address 2 Suite 9
 City Green Bay
 State WI Zip 54302
 Phone (920)469-2436

Info

Project Name 25219067 Columbia CCR Background **Due Date** 05/19/2020 **Profile** x **Quote** _____
Project Manager Milewsky, Dan **Return Date** _____ **Carrier** Most Economical **Location** _____

Trip Blanks

Include Trip Blanks

Bottle Labels

Blank
 Pre-Printed No Sample IDs
 Pre-Printed With Sample IDs

Bottles

Boxed Cases
 Individually Wrapped
 Grouped By Sample ID/Matrix

Return Shipping Labels

No Shipper
 With Shipper

Misc

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

COC Options

Number of Blanks _____
 Pre-Printed _____

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
2	WT	Radium 226	1L Plastic HNO3 pres	2	0		
2	WT	Radium 228	1L Plastic HNO3 pres	2	0		
2	WT	Metals	250mL plastic w/HNO3	2	0	M-9-354-03BB	
2	WT	pH	250mL plastic unpres	2	0	M-9-311-06BB	
2	WT	TDS, Cl, F, SO4	250mL plastic unpres	2	0	M-9-311-06BB	

Hazard Shipping Placard In Place : NA

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

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

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

*Payment term are net 30 days.

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

LAB USE:


Ship Date : 05/14/2020
Prepared By: Mai Yer Her
Verified By: _____

Sample

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

CLIENT USE (Optional):

Date Rec'd: _____
Received By: _____
Verified By: _____


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

Sample Condition Upon Receipt Form (SCUR)

Client Name: SCS

Courier: CS Logistics Fed Ex Speedee UPS Walto
 Client Pace Other: _____

Project #: **WO# : 40208571**



40208571

Tracking #: 1578 052820

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

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

Packing Material: Bubble Wrap Bubble Bags None Other

Thermometer Used SR - 97 Type of Ice: Wet Blue Dry None Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 1.0 / Corr: 1.0

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

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

Person examining contents:
Date 5/30/20 / Initials: SMW
Labeled By Initials: WP

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

C2 June 2020 Resample

July 08, 2020

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25220067.00 ALLIANT-COLUMBIA
Pace Project No.: 40210436

Dear Meghan Blodgett:

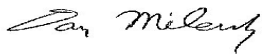
Enclosed are the analytical results for sample(s) received by the laboratory on July 01, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Green Bay

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40210436

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky UST Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 12064

North Dakota Certification #: R-150

Virginia VELAP ID: 460263

South Carolina Certification #: 83006001

Texas Certification #: T104704529-14-1

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

USDA Soil Permit #: P330-16-00157

Federal Fish & Wildlife Permit #: LE51774A-0

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40210436

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40210436001	MW-309	Water	06/30/20 13:30	07/01/20 09:05
40210436002	FIELD BLANK	Water	06/30/20 13:35	07/01/20 09:05

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SAMPLE ANALYTE COUNT

Project: 25220067.00 ALLIANT-COLUMBIA
Pace Project No.: 40210436

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40210436001	MW-309	EPA 6020	DS1	1
			AXL	7
40210436002	FIELD BLANK	EPA 6020	DS1	1

PASI-G = Pace Analytical Services - Green Bay

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SUMMARY OF DETECTION

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40210436

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40210436001	MW-309					
EPA 6020	Boron	50.7	ug/L	10.0	07/06/20 21:31	
	Field pH	7.33	Std. Units		06/30/20 13:30	
	Field Specific Conductance	1726	umhos/cm		06/30/20 13:30	
	Oxygen, Dissolved	9.71	mg/L		06/30/20 13:30	
	REDOX	65.7	mV		06/30/20 13:30	
	Turbidity	3.74	NTU		06/30/20 13:30	
	Static Water Level	786.18	feet		06/30/20 13:30	
	Temperature, Water (C)	13.3	deg C		06/30/20 13:30	
40210436002	FIELD BLANK					
EPA 6020	Boron	19.6	ug/L	10.0	07/06/20 18:46	

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ANALYTICAL RESULTS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40210436

Sample: MW-309 **Lab ID: 40210436001** Collected: 06/30/20 13:30 Received: 07/01/20 09:05 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay								
Boron	50.7	ug/L	10.0	3.0	1	07/02/20 05:35	07/06/20 21:31	7440-42-8	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	7.33	Std. Units			1		06/30/20 13:30		
Field Specific Conductance	1726	umhos/cm			1		06/30/20 13:30		
Oxygen, Dissolved	9.71	mg/L			1		06/30/20 13:30	7782-44-7	
REDOX	65.7	mV			1		06/30/20 13:30		
Turbidity	3.74	NTU			1		06/30/20 13:30		
Static Water Level	786.18	feet			1		06/30/20 13:30		
Temperature, Water (C)	13.3	deg C			1		06/30/20 13:30		

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ANALYTICAL RESULTS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40210436

Sample: FIELD BLANK **Lab ID: 40210436002** Collected: 06/30/20 13:35 Received: 07/01/20 09:05 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Boron	19.6	ug/L	10.0	3.0	1	07/02/20 05:35	07/06/20 18:46	7440-42-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25220067.00 ALLIANT-COLUMBIA
Pace Project No.: 40210436

QC Batch: 359221	Analysis Method: EPA 6020
QC Batch Method: EPA 3010	Analysis Description: 6020 MET
	Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40210436001, 40210436002

METHOD BLANK: 2077633 Matrix: Water
Associated Lab Samples: 40210436001, 40210436002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.0	10.0	07/06/20 18:39	

LABORATORY CONTROL SAMPLE: 2077634

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	500	457	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2077635 2077636

Parameter	Units	2077635		2077636		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40210425001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
Boron	ug/L	9.7J	500	500	469	468	92	92	75-125	0	20

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40210436

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.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25220067.00 ALLIANT-COLUMBIA
Pace Project No.: 40210436

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40210436001	MW-309	EPA 3010	359221	EPA 6020	359289
40210436002	FIELD BLANK	EPA 3010	359221	EPA 6020	359289
40210436001	MW-309				

REPORT OF LABORATORY ANALYSIS

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(Please Print Clearly)



www.faceanals.com

UPPER MIDWEST REGION

MN: 612-607-1700 WI: 920-469-2436

40815435

CHAIN OF CUSTODY

Preservation Codes
 A=None B=HCl C=H2SO4 D=HNO3 E=D1 Water F=Methanol G=NaOH
 H= Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

FILTERED?
(YES/NO)
PRESERVATION
(CODE)

Company Name: SCS
Branch/Location: Madison WI
Project Contact: Mary Block
Phone: 608 216-7362
Project Number: 25880067.00
Project Name: Alliant - Columbia
Project State: WI
Sampled By (Print): Paul A. Grover
Sampled By (Sign): Paul A. Grover
PO #:

Data Package Options
 EPA Level III
 EPA Level IV

MS/MSD
 On your sample (billable)
 NOT needed on your sample

Matrix Codes
 A = Air
 B = Biotia
 C = Charcoal
 O = Oil
 S = Soil
 SI = Sludge
 W = Water
 DW = Drinking Water
 GW = Ground Water
 SW = Surface Water
 WP = Waste Water
 WP = Wipe

PAGE LAB # CLIENT FIELD ID
 001 MW 309
 002 FIRM BLANK

DATE TIME MATRIX
 6-30-00 13:30 GW
 13:35 DT

Y/N	Pick Letter	Analyses Requested
N/D	D	Boron

Rush Turnaround Time Requested - Prelims
 (Rush TAT subject to approval/surcharge)
Date Needed:
Transmit Prelim Rush Results by (complete what you want):

Email #1:
Email #2:
Telephone:
Fax:

Samples on HOLD are subject to special pricing and release of liability

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
Paul A. Grover	6-30-00 15:15	Michelle Face	7/12/00 09:05
CS Logistics	7/12/00 09:05		

Quote #:
Mail To Contact:
Mail To Company:
Mail To Address:
Invoice To Contact:
Invoice To Company:
Invoice To Address:
Invoice To Phone:
CLIENT COMMENTS
LAB COMMENTS (Lab Use Only)
Profile #

PAGE Project No.
 40815435

Receipt Temp = RPT
Sample Receipt pH
 OK/Adjusted
 Present / Not Present
 Intact / Not Intact

Cooler Custody Seal

Version 6.0 06/14/05
ORIGINAL

Client Name: SES

Sample Preservation Receipt Form
Project # 4021043a

All containers needing preservation have been checked and noted below: Yes No N/A
Lab Lot# of pH paper: BU2291 Lab Std #ID of preservation (if pH adjusted):


Initial when completed: SMU Date/Time:

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

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

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

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

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

Sample Condition Upon Receipt Form (SCUR)

Client Name: SCS

Courier: CS Logistics Fed Ex Speedee UPS Walto
 Client Pace Other: _____

Tracking #: 1859 063020

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

Packing Material: Bubble Wrap Bubble Bags None Other


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

Cooler Temperature Uncorr: R02 / Corr: _____

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

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

Project #: **WO#: 40210436**



40210436

Person examining contents:
 Date: 7/1/20 / Initials: SMU
 Labeled By Initials: AB

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

C3 August 2020 Resample

August 18, 2020

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25220067.00 ALLIANT-COLUMBIA
Pace Project No.: 40212500

Dear Meghan Blodgett:

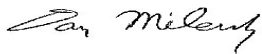
Enclosed are the analytical results for sample(s) received by the laboratory on August 07, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Green Bay

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky UST Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 12064

North Dakota Certification #: R-150

Virginia VELAP ID: 460263

South Carolina Certification #: 83006001

Texas Certification #: T104704529-14-1

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

USDA Soil Permit #: P330-16-00157

Federal Fish & Wildlife Permit #: LE51774A-0

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 25220067.00 ALLIANT-COLUMBIA
Pace Project No.: 40212500

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40212500001	FIELD BLANK	Water	08/06/20 09:25	08/07/20 07:50
40212500002	MW-309	Water	08/06/20 09:45	08/07/20 07:50

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40212500001	FIELD BLANK	EPA 6020	KXS	1
40212500002	MW-309	EPA 6020	KXS	1
			AXL	7

PASI-G = Pace Analytical Services - Green Bay

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SUMMARY OF DETECTION

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Lab Sample ID	Client Sample ID					
Method	Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40212500002	MW-309					
EPA 6020	Boron	55.3	ug/L	10.0	08/18/20 01:45	
	Field pH	7.72	Std. Units		08/06/20 09:45	
	Field Specific Conductance	1656	umhos/cm		08/06/20 09:45	
	Oxygen, Dissolved	9.05	mg/L		08/06/20 09:45	
	REDOX	224.2	mV		08/06/20 09:45	
	Turbidity	3.56	NTU		08/06/20 09:45	
	Static Water Level	785.93	feet		08/06/20 09:45	
	Temperature, Water (C)	12.9	deg C		08/06/20 09:45	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Sample: FIELD BLANK **Lab ID: 40212500001** Collected: 08/06/20 09:25 Received: 08/07/20 07:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Boron	<3.0	ug/L	10.0	3.0	1	08/11/20 05:17	08/18/20 00:10	7440-42-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Sample: MW-309 **Lab ID: 40212500002** Collected: 08/06/20 09:45 Received: 08/07/20 07:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay							
Boron	55.3	ug/L	10.0	3.0	1	08/11/20 05:17	08/18/20 01:45	7440-42-8	
Field Data		Analytical Method: Pace Analytical Services - Green Bay							
Field pH	7.72	Std. Units			1		08/06/20 09:45		
Field Specific Conductance	1656	umhos/cm			1		08/06/20 09:45		
Oxygen, Dissolved	9.05	mg/L			1		08/06/20 09:45	7782-44-7	
REDOX	224.2	mV			1		08/06/20 09:45		
Turbidity	3.56	NTU			1		08/06/20 09:45		
Static Water Level	785.93	feet			1		08/06/20 09:45		
Temperature, Water (C)	12.9	deg C			1		08/06/20 09:45		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

QC Batch: 362581

Analysis Method: EPA 6020

QC Batch Method: EPA 3010

Analysis Description: 6020 MET

Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40212500001, 40212500002

METHOD BLANK: 2095707

Matrix: Water

Associated Lab Samples: 40212500001, 40212500002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.0	10.0	08/18/20 00:03	

LABORATORY CONTROL SAMPLE: 2095708

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	500	474	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2095709 2095710

Parameter	Units	2095709		2095710		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40212421001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
Boron	ug/L	11.2	500	500	506	493	99	96	75-125	3	20

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

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.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40212500001	FIELD BLANK	EPA 3010	362581	EPA 6020	362665
40212500002	MW-309	EPA 3010	362581	EPA 6020	362665
40212500002	MW-309				

REPORT OF LABORATORY ANALYSIS

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(Please Print Clearly)

UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

Page 1 of 1



CHAIN OF CUSTODY

A=None	B=HCL	C=H2SO4	D=HNO3	E=D Water	F=Methanol	G=NaOH
H=Sodium Bisulfate Solution	I=Sodium Thiosulfate	J=Other				

Company Name: **SCS**
 Branch/location: **Madison WI**
 Project Contact: **Max Biedert**
 Phone: **(608) 218-7362**
 Project Number: **2520067.00**
 Project Name: **Alliant-Columbia**
 Project State: **WI**
 Sampled By (Print): **Paul A. Smoller**
 Sampled By (Sign): **Paul A. Smoller**
 PO #: _____
 Regulatory Program: _____

Data Package Options (billable)
 EPA Level III
 EPA Level IV

MS/MSD
 On your sample (billable)
 NOT needed on your sample

Matrix Codes
 A = Air B = Biota C = Charcoal O = Oil S = Soil SI = Sludge
 W = Water DW = Drinking Water GW = Ground Water SW = Surface Water WW = Waste Water WP = Wipe

PAGE LAB # CLIENT FIELD ID
001 Field Blank
002 MW-389

DATE	TIME	MATRIX	Analyses Requested	FILTERED? (YES/NO)		PRESERVATION (CODE)*	
				Y/N	Pick Letter		
8-7-20	9:35	DT	Boron		D		
9-15		GW					


Rush Turnaround Time Requested - Prelims
 (Rush TAT subject to approval/surcharge)
 Date Needed: _____
 Transmit Prelim Rush Results by (complete what you want):
 Email #1: _____
 Email #2: _____
 Telephone: _____
 Fax: _____

Relinquished By: **Paul A. Smoller** Date/Time: **8-7-20 11:30**
 Relinquished By: **C. S Logistics** Date/Time: **8/16 0950**
 Relinquished By: _____ Date/Time: _____
 Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____
 Received By: **[Signature]** Date/Time: **8/16 0950**
 Received By: _____ Date/Time: _____
 Received By: _____ Date/Time: _____

Quote #: _____
 Mail To Contact: _____
 Mail To Company: _____
 Mail To Address: _____
 Invoice To Contact: _____
 Invoice To Company: _____
 Invoice To Address: _____
 Invoice To Phone: _____
 CLIENT COMMENTS: _____
 LAB COMMENTS (Lab Use Only): _____
 Profile #: _____
 PACS Project No. **40212500**
 Receipt Temp = **18** °C
 Sample Receipt pH **6.2** Adjusted
 Cooler Custody Seal Present / Not Present
 Intact / Not Intact

40212500

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

Sample Condition Upon Receipt Form (SCUR)

Project #: _____

Client Name: SCS

WO#: 40212500

Courier: CS Logistics Fed Ex Speedee UPS Walto
 Client Pace Other: _____



Tracking #: 1299 080 620

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

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

Packing Material: Bubble Wrap Bubble Bags None Other

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

Cooler Temperature Uncorr: POF / Corr: _____

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

Person examining contents:	
Date: <u>8/7/20</u>	Initials: <u>JP</u>
Labeled By Initials: <u>EMW</u>	

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

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2. <u>Mail, Invoice, pg#</u> <u>8/7/20</u>
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3. <u>JP</u>
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Date/Time: _____
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume:		8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12. <u>"8/7/20" date on both samples</u> <u>EMW</u>
-Includes date/time/ID/Analysis Matrix: <u>W</u>		<u>8/7/20</u>
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____		

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

C4 October 2020 Detection Monitoring

October 29, 2020

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40216285

Dear Meghan Blodgett:


Enclosed are the analytical results for sample(s) received by the laboratory on October 10, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Green Bay

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40216285

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky UST Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 12064

North Dakota Certification #: R-150

Virginia VELAP ID: 460263

South Carolina Certification #: 83006001

Texas Certification #: T104704529-14-1

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

USDA Soil Permit #: P330-16-00157

Federal Fish & Wildlife Permit #: LE51774A-0

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40216285

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40216285001	MW-309	Water	10/08/20 10:00	10/10/20 08:15
40216285002	MW-310	Water	10/08/20 10:45	10/10/20 08:15
40216285003	MW-311	Water	10/08/20 11:35	10/10/20 08:15
40216285004	FIELD BLANK MOD4	Water	10/08/20 10:45	10/10/20 08:15

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40216285

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40216285001	MW-309	EPA 6020	KXS	2
			VGC	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40216285002	MW-310	EPA 6020	KXS	2
			VGC	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40216285003	MW-311	EPA 6020	KXS	2
			VGC	7
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40216285004	FIELD BLANK MOD4	EPA 6020	KXS	2
		SM 2540C	HNT	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3

PASI-G = Pace Analytical Services - Green Bay

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40216285

Sample: MW-309 **Lab ID: 40216285001** Collected: 10/08/20 10:00 Received: 10/10/20 08:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Boron	57.7	ug/L	10.0	3.0	1	10/13/20 05:31	10/15/20 14:04	7440-42-8	
Calcium	65300	ug/L	254	76.2	1	10/13/20 05:31	10/15/20 14:04	7440-70-2	
Field Data									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.33	Std. Units			1		10/08/20 10:00		
Field Specific Conductance	2222.0	umhos/cm			1		10/08/20 10:00		
Oxygen, Dissolved	9.40	mg/L			1		10/08/20 10:00	7782-44-7	
REDOX	147.7	mV			1		10/08/20 10:00		
Turbidity	0.00	NTU			1		10/08/20 10:00		
Static Water Level	785.47	feet			1		10/08/20 10:00		
Temperature, Water (C)	12.9	deg C			1		10/08/20 10:00		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	1160	mg/L	20.0	8.7	1		10/13/20 17:26		
9040 pH									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.7	Std. Units	0.10	0.010	1		10/13/20 10:03		H6
300.0 IC Anions									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	575	mg/L	40.0	8.6	20		10/21/20 22:39	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		10/21/20 20:29	16984-48-8	
Sulfate	21.8	mg/L	2.0	0.44	1		10/21/20 20:29	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40216285

Sample: MW-310 **Lab ID: 40216285002** Collected: 10/08/20 10:45 Received: 10/10/20 08:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay							
Boron	77.6	ug/L	10.0	3.0	1	10/13/20 05:31	10/15/20 14:11	7440-42-8	
Calcium	62000	ug/L	254	76.2	1	10/13/20 05:31	10/15/20 14:11	7440-70-2	
Field Data		Analytical Method: Pace Analytical Services - Green Bay							
Field pH	7.52	Std. Units			1		10/08/20 10:45		
Field Specific Conductance	1481.0	umhos/cm			1		10/08/20 10:45		
Oxygen, Dissolved	9.63	mg/L			1		10/08/20 10:45	7782-44-7	
REDOX	150.4	mV			1		10/08/20 10:45		
Turbidity	0.00	NTU			1		10/08/20 10:45		
Static Water Level	785.56	feet			1		10/08/20 10:45		
Temperature, Water (C)	13.2	deg C			1		10/08/20 10:45		
2540C Total Dissolved Solids		Analytical Method: SM 2540C Pace Analytical Services - Green Bay							
Total Dissolved Solids	846	mg/L	20.0	8.7	1		10/13/20 17:26		
9040 pH		Analytical Method: EPA 9040 Pace Analytical Services - Green Bay							
pH at 25 Degrees C	7.8	Std. Units	0.10	0.010	1		10/13/20 10:04		H6
300.0 IC Anions		Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay							
Chloride	310	mg/L	20.0	4.3	10		10/21/20 23:36	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		10/21/20 20:44	16984-48-8	
Sulfate	60.0	mg/L	2.0	0.44	1		10/21/20 20:44	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40216285

Sample: MW-311 **Lab ID: 40216285003** Collected: 10/08/20 11:35 Received: 10/10/20 08:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay							
Boron	26.2	ug/L	10.0	3.0	1	10/13/20 05:31	10/15/20 14:18	7440-42-8	
Calcium	73400	ug/L	254	76.2	1	10/13/20 05:31	10/15/20 14:18	7440-70-2	
Field Data		Analytical Method: Pace Analytical Services - Green Bay							
Field pH	7.66	Std. Units			1		10/08/20 11:35		
Field Specific Conductance	606.1	umhos/cm			1		10/08/20 11:35		
Oxygen, Dissolved	9.38	mg/L			1		10/08/20 11:35	7782-44-7	
REDOX	137.1	mV			1		10/08/20 11:35		
Turbidity	0.70	NTU			1		10/08/20 11:35		
Static Water Level	785.83	feet			1		10/08/20 11:35		
Field Temperature, C	12.7	deg C			1		10/08/20 11:35		
2540C Total Dissolved Solids		Analytical Method: SM 2540C Pace Analytical Services - Green Bay							
Total Dissolved Solids	380	mg/L	20.0	8.7	1		10/13/20 17:27		
9040 pH		Analytical Method: EPA 9040 Pace Analytical Services - Green Bay							
pH at 25 Degrees C	7.7	Std. Units	0.10	0.010	1		10/13/20 10:05		H6
300.0 IC Anions		Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay							
Chloride	1.4J	mg/L	2.0	0.43	1		10/21/20 20:58	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		10/21/20 20:58	16984-48-8	
Sulfate	72.1	mg/L	10.0	2.2	5		10/21/20 23:51	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40216285

Sample: FIELD BLANK MOD4 **Lab ID: 40216285004** Collected: 10/08/20 10:45 Received: 10/10/20 08:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Boron	<3.0	ug/L	10.0	3.0	1	10/13/20 05:31	10/15/20 12:13	7440-42-8	
Calcium	<76.2	ug/L	254	76.2	1	10/13/20 05:31	10/15/20 12:13	7440-70-2	
2540C Total Dissolved Solids									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	24.0	mg/L	20.0	8.7	1		10/13/20 17:27		
9040 pH									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	6.3	Std. Units	0.10	0.010	1		10/13/20 10:08		H6
300.0 IC Anions									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	<0.43	mg/L	2.0	0.43	1		10/21/20 21:13	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		10/21/20 21:13	16984-48-8	
Sulfate	<0.44	mg/L	2.0	0.44	1		10/21/20 21:13	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40216285

QC Batch:	368040	Analysis Method:	EPA 6020
QC Batch Method:	EPA 3010	Analysis Description:	6020 MET
		Laboratory:	Pace Analytical Services - Green Bay

Associated Lab Samples: 40216285001, 40216285002, 40216285003, 40216285004

METHOD BLANK: 2127606 Matrix: Water

Associated Lab Samples: 40216285001, 40216285002, 40216285003, 40216285004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.0	10.0	10/15/20 12:07	
Calcium	ug/L	<76.2	254	10/15/20 12:07	

LABORATORY CONTROL SAMPLE: 2127607

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	500	455	91	80-120	
Calcium	ug/L	5000	4740	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2127608 2127609

Parameter	Units	40216309001		2127608		2127609		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec				
Boron	ug/L	226	500	500	690	704	93	96	75-125	2	20
Calcium	ug/L	83700	5000	5000	91400	92200	154	171	75-125	1	20 P6

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40216285

QC Batch:	368069	Analysis Method:	EPA 9040
QC Batch Method:	EPA 9040	Analysis Description:	9040 pH
		Laboratory:	Pace Analytical Services - Green Bay

Associated Lab Samples: 40216285001, 40216285002, 40216285003, 40216285004

SAMPLE DUPLICATE: 2127694

Parameter	Units	40216239003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.5	7.5	1	20	H6

SAMPLE DUPLICATE: 2127695

Parameter	Units	40216282001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.6	7.6	0	20	H6

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40216285

QC Batch: 368415 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40216285001, 40216285002, 40216285003, 40216285004

METHOD BLANK: 2129758 Matrix: Water
Associated Lab Samples: 40216285001, 40216285002, 40216285003, 40216285004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	10/21/20 18:08	
Fluoride	mg/L	<0.095	0.32	10/21/20 18:08	
Sulfate	mg/L	<0.44	2.0	10/21/20 18:08	

LABORATORY CONTROL SAMPLE: 2129759

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2129760 2129761

Parameter	Units	40216435001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	199	100	100	289	289	90	90	90-110	0	15	
Fluoride	mg/L	<0.48	10	10	11.3	11.5	109	110	90-110	1	15	
Sulfate	mg/L	43.4	100	100	149	150	106	106	90-110	1	15	

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25219067 COLUMBIA CCR MOD 4

Pace Project No.: 40216285

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.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25219067 COLUMBIA CCR MOD 4
Pace Project No.: 40216285

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40216285001	MW-309	EPA 3010	368040	EPA 6020	368132
40216285002	MW-310	EPA 3010	368040	EPA 6020	368132
40216285003	MW-311	EPA 3010	368040	EPA 6020	368132
40216285004	FIELD BLANK MOD4	EPA 3010	368040	EPA 6020	368132
40216285001	MW-309				
40216285002	MW-310				
40216285003	MW-311				
40216285001	MW-309	SM 2540C	368159		
40216285002	MW-310	SM 2540C	368159		
40216285003	MW-311	SM 2540C	368159		
40216285004	FIELD BLANK MOD4	SM 2540C	368159		
40216285001	MW-309	EPA 9040	368069		
40216285002	MW-310	EPA 9040	368069		
40216285003	MW-311	EPA 9040	368069		
40216285004	FIELD BLANK MOD4	EPA 9040	368069		
40216285001	MW-309	EPA 300.0	368415		
40216285002	MW-310	EPA 300.0	368415		
40216285003	MW-311	EPA 300.0	368415		
40216285004	FIELD BLANK MOD4	EPA 300.0	368415		

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY / Analytical Request Document

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

40216285

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

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9, -,) Sample IDs must be unique	MATRIX	CODE	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives							Analyses Test		Residual Chlorine (Y/N)		
				START DATE	END DATE			Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Boron/Calcium		pH	TDS, Cl, F, SO4
1			WT																
2	MM-309	Drinking Water	WT	10/21/20			2	1											021
3	MM-310	Water	WT	10/4/20			2	1											022
4	MM-311	Water	WT	11/3/20			2	1											023
5	FIELD BLANK MOD4	Water	WT	10/4/20			2	1											024
6																			
7																			
8																			
9																			
10																			
11																			
12																			

ADDITIONAL COMMENTS	REINQUIRED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
ALL SAMPLES UNFILTERED							
	CS Logistics	10-10-20	0815	Maddini J. Bahala force	10-10-20	0815	0.5 Y N Y

SAMPLER NAME AND SIGNATURE	
PRINT Name of SAMPLER:	Ryan Matzak
SIGNATURE of SAMPLER:	<i>[Signature]</i>
DATE Signed:	10/9/2020

Pace Container Order #703793

402/6285

Addresses

Order By :

Company SCS ENGINEERS
 Contact Blodgett, Meghan
 Email mblodgett@scsengineers.com
 Address 2830 Dairy Drive
 Address 2 _____
 City Madison
 State WI Zip 53718
 Phone 608-216-7362

Ship To :

Company SCS ENGINEERS (Pace Analytical Green
 Contact Paul Grover
 Email pgrover@scsengineers.com
 Address 2830 Dairy Drive
 Address 2 _____
 City Madison
 State WI Zip 53718
 Phone 608-216-7362

Return To:

Company Pace Analytical Green Bay
 Contact Milewsky, Dan
 Email dan.milewsky@pacelabs.com
 Address 1241 Bellevue Street
 Address 2 Suite 9
 City Green Bay
 State WI Zip 54302
 Phone (920)469-2436

Info

Project Name 25219067 Columbia CCR Mod 4 Due Date 10/06/2020 Profile 3946-13 Quote _____
 Project Manager Milewsky, Dan Return Date _____ Carrier Most Economical Location _____

Trip Blanks

Include Trip Blanks

Bottle Labels

Blank
 Pre-Printed No Sample IDs
 Pre-Printed With Sample IDs

Bottles

Boxed Cases
 Individually Wrapped
 Grouped By Sample ID/Matrix

Return Shipping Labels

No Shipper
 With Shipper

Misc

Sampling Instructions
 Custody Seal
 Temp. Blanks
 Coolers _____
 Syringes _____
 Extra Bubble Wrap
 Short Hold/Rush Stickers
 DI Water 1 Liter(s)
 USDA Regulated Soils

COC Options

Number of Blanks _____
 Pre-Printed _____

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
5	WT	Boron/Calcium	250mL plastic w/HNO3	5	0	M-0-156-04BB	
5	WT	pH	250mL plastic unpres	5	0	M-0-156-04BB	
5	WT	TDS, Cl, F, SO4	250mL plastic unpres	5	0	M-0-156-04BB	

Hazard Shipping Placard In Place : NA

LAB USE:

Ship Date : 10/05/2020
 Prepared By: Mai Yer Her
 Verified By: _____

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

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

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

Payment term are net 30 days.

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

Sample

CLIENT USE (Optional):

ALL SAMPLES UNFILTERED

Date Rec'd: _____
 Received By: _____
 Verified By: _____

Client Name: SCS Engineers Project # 40216285

Sample Preservation Receipt Form

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

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


Lab Lot# of pH paper: BDY194 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: MLR Date/Time:

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

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

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

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

Sample Condition Upon Receipt Form (SCUR)

Client Name: SCS Engineers
Courier: CS Logistics Fed Ex Speedee UPS Waltco
 Client Pace Other: _____

Project # _____

WO#: 40216285



40216285

Tracking #: _____
Custody Seal on Cooler/Box Present: yes no **Seals intact:** yes no
Custody Seal on Samples Present: yes no **Seals intact:** yes no
Packing Material: Bubble Wrap Bubble Bags None Other
Thermometer Used SR - 99 **Type of Ice:** Wet Blue Dry None Samples on ice, cooling process has begun
Cooler Temperature Uncorr: 0.5 / Corr: 0.5
Temp Blank Present: yes no **Biological Tissue is Frozen:** yes no

Person examining contents:
 Date: 10-10-20 / Initials: MJR
 Labeled By Initials: MD

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

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2. <u>copy to info, proj #, invoice info, proj.</u>
Chain of Custody Relinquished:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3. <u>state, sample type, # containers</u> <u>MJR</u>
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4. <u>10-10-20</u>
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume:		8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>W</u>		
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

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

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

November 06, 2020

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40216311

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on October 10, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

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

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40216311

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
Guam Certification
Florida: Cert E871149 SEKS WET
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991

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

Pace Analytical Services Green Bay

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

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

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40216311

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40216311001	MW-301	Water	10/08/20 14:45	10/10/20 08:15
40216311002	MW-84A	Water	10/08/20 14:35	10/10/20 08:15

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40216311

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40216311001	MW-301	EPA 6020	DS1	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	CMC	1	PASI-PA
		SM 2540C	HNT	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
		40216311002	MW-84A	EPA 6020	DS1
EPA 7470	AJT			1	PASI-G
	VGC			7	PASI-G
EPA 903.1	MK1			1	PASI-PA
EPA 904.0	VAL			1	PASI-PA
Total Radium Calculation	CMC			1	PASI-PA
SM 2540C	HNT			1	PASI-G
EPA 9040	ALY			1	PASI-G
EPA 300.0	HMB			3	PASI-G

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

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40216311

Sample: MW-301 **Lab ID: 40216311001** Collected: 10/08/20 14:45 Received: 10/10/20 08:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Antimony	0.33J	ug/L	1.0	0.15	1	10/13/20 07:04	10/15/20 22:04	7440-36-0	
Arsenic	0.62J	ug/L	1.0	0.28	1	10/13/20 07:04	10/15/20 22:04	7440-38-2	
Barium	9.4	ug/L	2.3	0.70	1	10/13/20 07:04	10/15/20 22:04	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/13/20 07:04	10/15/20 22:04	7440-41-7	
Boron	28.8	ug/L	10.0	3.0	1	10/13/20 07:04	10/15/20 22:04	7440-42-8	
Cadmium	0.19J	ug/L	1.0	0.15	1	10/13/20 07:04	10/15/20 22:04	7440-43-9	
Calcium	93000	ug/L	2540	762	10	10/13/20 07:04	10/15/20 21:36	7440-70-2	P6
Chromium	<1.0	ug/L	3.4	1.0	1	10/13/20 07:04	10/15/20 22:04	7440-47-3	
Cobalt	0.29J	ug/L	1.0	0.12	1	10/13/20 07:04	10/15/20 22:04	7440-48-4	
Lead	0.25J	ug/L	1.0	0.24	1	10/13/20 07:04	10/15/20 22:04	7439-92-1	
Lithium	0.46J	ug/L	1.0	0.22	1	10/13/20 07:04	10/15/20 22:04	7439-93-2	
Molybdenum	<0.44	ug/L	1.5	0.44	1	10/13/20 07:04	10/15/20 22:04	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	10/13/20 07:04	10/15/20 22:04	7782-49-2	
Thallium	0.30J	ug/L	1.0	0.14	1	10/13/20 07:04	10/15/20 22:04	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	10/14/20 10:10	10/15/20 10:45	7439-97-6	
Field Data									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	6.95	Std. Units			1		10/08/20 14:45		
Field Specific Conductance	760.0	umhos/cm			1		10/08/20 14:45		
Oxygen, Dissolved	1.22	mg/L			1		10/08/20 14:45	7782-44-7	
REDOX	183.9	mV			1		10/08/20 14:45		
Turbidity	0.00	NTU			1		10/08/20 14:45		
Static Water Level	786.53	feet			1		10/08/20 14:45		
Temperature, Water (C)	11.0	deg C			1		10/08/20 14:45		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	412	mg/L	20.0	8.7	1		10/12/20 14:17		
9040 pH									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.2	Std. Units	0.10	0.010	1		10/13/20 10:30		H6
300.0 IC Anions									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	3.4	mg/L	2.0	0.43	1		10/20/20 13:09	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		10/20/20 13:09	16984-48-8	
Sulfate	25.1	mg/L	2.0	0.44	1		10/20/20 13:09	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40216311

Sample: MW-84A **Lab ID: 40216311002** Collected: 10/08/20 14:35 Received: 10/10/20 08:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Antimony	<0.15	ug/L	1.0	0.15	1	10/13/20 07:04	10/15/20 22:45	7440-36-0	
Arsenic	0.49J	ug/L	1.0	0.28	1	10/13/20 07:04	10/15/20 22:45	7440-38-2	
Barium	12.6	ug/L	2.3	0.70	1	10/13/20 07:04	10/15/20 22:45	7440-39-3	
Beryllium	<0.25	ug/L	1.0	0.25	1	10/13/20 07:04	10/15/20 22:45	7440-41-7	
Boron	9.7J	ug/L	10.0	3.0	1	10/13/20 07:04	10/15/20 22:45	7440-42-8	
Cadmium	<0.15	ug/L	1.0	0.15	1	10/13/20 07:04	10/15/20 22:45	7440-43-9	
Calcium	69200	ug/L	254	76.2	1	10/13/20 07:04	10/15/20 22:45	7440-70-2	
Chromium	1.6J	ug/L	3.4	1.0	1	10/13/20 07:04	10/15/20 22:45	7440-47-3	
Cobalt	<0.12	ug/L	1.0	0.12	1	10/13/20 07:04	10/15/20 22:45	7440-48-4	
Lead	<0.24	ug/L	1.0	0.24	1	10/13/20 07:04	10/15/20 22:45	7439-92-1	
Lithium	0.39J	ug/L	1.0	0.22	1	10/13/20 07:04	10/15/20 22:45	7439-93-2	
Molybdenum	<0.44	ug/L	1.5	0.44	1	10/13/20 07:04	10/15/20 22:45	7439-98-7	
Selenium	<0.32	ug/L	1.1	0.32	1	10/13/20 07:04	10/15/20 22:45	7782-49-2	
Thallium	<0.14	ug/L	1.0	0.14	1	10/13/20 07:04	10/15/20 22:45	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Green Bay									
Mercury	<0.066	ug/L	0.20	0.066	1	10/14/20 10:10	10/15/20 10:47	7439-97-6	
Field Data									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.49	Std. Units			1		10/08/20 14:35		
Field Specific Conductance	610.1	umhos/cm			1		10/08/20 14:35		
Oxygen, Dissolved	9.39	mg/L			1		10/08/20 14:35	7782-44-7	
REDOX	153.2	mV			1		10/08/20 14:35		
Turbidity	0.00	NTU			1		10/08/20 14:35		
Static Water Level	786.10	feet			1		10/08/20 14:35		
Temperature, Water (C)	11.9	deg C			1		10/08/20 14:35		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	320	mg/L	20.0	8.7	1		10/12/20 14:17		
9040 pH									
Analytical Method: EPA 9040 Pace Analytical Services - Green Bay									
pH at 25 Degrees C	7.6	Std. Units	0.10	0.010	1		10/13/20 10:33		H6
300.0 IC Anions									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	4.3	mg/L	2.0	0.43	1		10/20/20 13:24	16887-00-6	
Fluoride	<0.095	mg/L	0.32	0.095	1		10/20/20 13:24	16984-48-8	
Sulfate	1.3J	mg/L	2.0	0.44	1		10/20/20 13:24	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40216311

QC Batch: 368204 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40216311001, 40216311002

METHOD BLANK: 2128432 Matrix: Water

Associated Lab Samples: 40216311001, 40216311002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.066	0.20	10/15/20 10:08	

LABORATORY CONTROL SAMPLE: 2128433

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2128434 2128435

Parameter	Units	2128434		2128435		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		40216436001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							MSD Result
Mercury	ug/L	<0.066	5	5	5.1	5.0	101	101	85-115	0	20	

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40216311

QC Batch: 368047 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40216311001, 40216311002

METHOD BLANK: 2127636 Matrix: Water

Associated Lab Samples: 40216311001, 40216311002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	10/15/20 21:23	
Arsenic	ug/L	<0.28	1.0	10/15/20 21:23	
Barium	ug/L	<0.70	2.3	10/15/20 21:23	
Beryllium	ug/L	<0.25	1.0	10/15/20 21:23	
Boron	ug/L	<3.0	10.0	10/15/20 21:23	
Cadmium	ug/L	<0.15	1.0	10/15/20 21:23	
Calcium	ug/L	<76.2	254	10/15/20 21:23	
Chromium	ug/L	<1.0	3.4	10/15/20 21:23	
Cobalt	ug/L	<0.12	1.0	10/15/20 21:23	
Lead	ug/L	<0.24	1.0	10/15/20 21:23	
Lithium	ug/L	<0.22	1.0	10/15/20 21:23	
Molybdenum	ug/L	<0.44	1.5	10/15/20 21:23	
Selenium	ug/L	<0.32	1.1	10/15/20 21:23	
Thallium	ug/L	<0.14	1.0	10/15/20 21:23	

LABORATORY CONTROL SAMPLE: 2127637

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	516	103	80-120	
Arsenic	ug/L	500	498	100	80-120	
Barium	ug/L	500	476	95	80-120	
Beryllium	ug/L	500	446	89	80-120	
Boron	ug/L	500	433	87	80-120	
Cadmium	ug/L	500	511	102	80-120	
Calcium	ug/L	5000	4980	100	80-120	
Chromium	ug/L	500	462	92	80-120	
Cobalt	ug/L	500	463	93	80-120	
Lead	ug/L	500	442	88	80-120	
Lithium	ug/L	500	426	85	80-120	
Molybdenum	ug/L	500	500	100	80-120	
Selenium	ug/L	500	511	102	80-120	
Thallium	ug/L	500	450	90	80-120	

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40216311

Parameter	Units	2127638		2127639		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40216311001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Antimony	ug/L	0.33J	500	500	513	524	102	105	75-125	2	20		
Arsenic	ug/L	0.62J	500	500	503	512	100	102	75-125	2	20		
Barium	ug/L	9.4	500	500	486	501	95	98	75-125	3	20		
Beryllium	ug/L	<0.25	500	500	470	479	94	96	75-125	2	20		
Boron	ug/L	28.8	500	500	494	508	93	96	75-125	3	20		
Cadmium	ug/L	0.19J	500	500	506	515	101	103	75-125	2	20		
Calcium	ug/L	93000	5000	5000	98400	103000	107	194	75-125	4	20	P6	
Chromium	ug/L	<1.0	500	500	465	478	93	95	75-125	3	20		
Cobalt	ug/L	0.29J	500	500	464	477	93	95	75-125	3	20		
Lead	ug/L	0.25J	500	500	442	458	88	92	75-125	4	20		
Lithium	ug/L	0.46J	500	500	459	473	92	95	75-125	3	20		
Molybdenum	ug/L	<0.44	500	500	509	522	102	104	75-125	2	20		
Selenium	ug/L	<0.32	500	500	509	513	102	102	75-125	1	20		
Thallium	ug/L	0.30J	500	500	459	474	92	95	75-125	3	20		

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40216311

QC Batch: 367994 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40216311001, 40216311002

METHOD BLANK: 2127414 Matrix: Water
Associated Lab Samples: 40216311001, 40216311002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	10/12/20 14:13	

LABORATORY CONTROL SAMPLE: 2127415

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	584	552	95	80-120	

SAMPLE DUPLICATE: 2127416

Parameter	Units	40216194004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	508	500	2	10	

SAMPLE DUPLICATE: 2127417

Parameter	Units	40216312001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	532	524	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40216311

QC Batch: 368069

Analysis Method: EPA 9040

QC Batch Method: EPA 9040

Analysis Description: 9040 pH

Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40216311001, 40216311002

SAMPLE DUPLICATE: 2127694

Parameter	Units	40216239003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.5	7.5	1	20	H6

SAMPLE DUPLICATE: 2127695

Parameter	Units	40216282001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.6	7.6	0	20	H6

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40216311

QC Batch: 368419 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40216311001, 40216311002

METHOD BLANK: 2129786 Matrix: Water
Associated Lab Samples: 40216311001, 40216311002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	10/20/20 09:28	
Fluoride	mg/L	<0.095	0.32	10/20/20 09:28	
Sulfate	mg/L	<0.44	2.0	10/20/20 09:28	

LABORATORY CONTROL SAMPLE: 2129787

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.2	96	90-110	
Fluoride	mg/L	2	1.8	91	90-110	
Sulfate	mg/L	20	19.2	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2129788 2129789

Parameter	Units	40216308001 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	MS Result	MSD Result							
Chloride	mg/L	0.63J	20	21.8	21.8	106	106	90-110	0	15		
Fluoride	mg/L	<0.095	2	2.2	2.2	109	109	90-110	0	15		
Sulfate	mg/L	8.4	20	30.2	30.3	109	109	90-110	0	15		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2129790 2129791

Parameter	Units	40216573006 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	MS Result	MSD Result							
Chloride	mg/L	35.3	20	54.3	54.3	95	95	90-110	0	15		
Fluoride	mg/L	<0.095	2	2.3	2.3	113	114	90-110	0	15 M0		
Sulfate	mg/L	37.0	20	56.6	56.6	98	98	90-110	0	15		

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REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40216311

Sample: MW-301 **Lab ID: 40216311001** Collected: 10/08/20 14:45 Received: 10/10/20 08:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Pace Analytical Services - Greensburg						
Radium-226	EPA 903.1	0.0511 ± 0.361 (0.720) C:NA T:88%	pCi/L	10/29/20 15:16	13982-63-3	
Pace Analytical Services - Greensburg						
Radium-228	EPA 904.0	0.329 ± 0.354 (0.740) C:83% T:87%	pCi/L	10/28/20 10:59	15262-20-1	
Pace Analytical Services - Greensburg						
Total Radium	Total Radium Calculation	0.380 ± 0.715 (1.46)	pCi/L	11/02/20 13:23	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40216311

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: MW-84A Lab ID: 40216311002 Collected: 10/08/20 14:35 Received: 10/10/20 08:15 Matrix: Water PWS: Site ID: Sample Type:						
Pace Analytical Services - Greensburg						
Radium-226	EPA 903.1	0.000 ± 0.374 (0.810) C:NA T:85%	pCi/L	10/29/20 15:16	13982-63-3	
Pace Analytical Services - Greensburg						
Radium-228	EPA 904.0	0.390 ± 0.280 (0.537) C:82% T:92%	pCi/L	10/28/20 10:58	15262-20-1	
Pace Analytical Services - Greensburg						
Total Radium	Total Radium Calculation	0.390 ± 0.654 (1.35)	pCi/L	11/02/20 13:23	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40216311

QC Batch: 418548

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40216311001, 40216311002

METHOD BLANK: 2023103

Matrix: Water

Associated Lab Samples: 40216311001, 40216311002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.545 ± 0.288 (0.495) C:81% T:94%	pCi/L	10/28/20 10:57	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40216311

QC Batch: 418546

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 40216311001, 40216311002

METHOD BLANK: 2023102

Matrix: Water

Associated Lab Samples: 40216311001, 40216311002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0400 ± 0.260 (0.524) C:NA T:93%	pCi/L	10/29/20 14:53	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25219067 COLUMBIA CCR BACKGRND

Pace Project No.: 40216311

DEFINITIONS

Act - Activity

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

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

ND - Not Detected at or above LOD.

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

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

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

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

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

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25219067 COLUMBIA CCR BACKGRND
Pace Project No.: 40216311

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40216311001	MW-301	EPA 3010	368047	EPA 6020	368141
40216311002	MW-84A	EPA 3010	368047	EPA 6020	368141
40216311001	MW-301	EPA 7470	368204	EPA 7470	368253
40216311002	MW-84A	EPA 7470	368204	EPA 7470	368253
40216311001	MW-301				
40216311002	MW-84A				
40216311001	MW-301	EPA 903.1	418546		
40216311002	MW-84A	EPA 903.1	418546		
40216311001	MW-301	EPA 904.0	418548		
40216311002	MW-84A	EPA 904.0	418548		
40216311001	MW-301	Total Radium Calculation	421177		
40216311002	MW-84A	Total Radium Calculation	421177		
40216311001	MW-301	SM 2540C	367994		
40216311002	MW-84A	SM 2540C	367994		
40216311001	MW-301	EPA 9040	368069		
40216311002	MW-84A	EPA 9040	368069		
40216311001	MW-301	EPA 300.0	368419		
40216311002	MW-84A	EPA 300.0	368419		

REPORT OF LABORATORY ANALYSIS

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Pace Container Order #703790

40216311

Addresses

Order By :

Company SCS ENGINEERS
 Contact Blodgett, Meghan
 Email mblodgett@scsengineers.com
 Address 2830 Dairy Drive
 Address 2 _____
 City Madison
 State WI Zip 53718
 Phone 608-216-7362

Ship To :

Company SCS ENGINEERS (Pace Analytical Green)
 Contact Paul Grover
 Email pgrover@scsengineers.com
 Address 2830 Dairy Drive
 Address 2 _____
 City Madison
 State WI Zip 53718
 Phone 608-216-7362

Return To:

Company Pace Analytical Green Bay
 Contact Milewsky, Dan
 Email dan.milewsky@pacelabs.com
 Address 1241 Bellevue Street
 Address 2 Suite 9
 City Green Bay
 State WI Zip 54302
 Phone (920)469-2436

Info

Project Name 25219067 Columbia CCR Background **Due Date** 10/06/2020 **Profile** 3946-12 **Quote** _____
Project Manager Milewsky, Dan **Return Date** _____ **Carrier** Most Economical **Location** _____

Trip Blanks

Include Trip Blanks

Bottle Labels

Blank
 Pre-Printed No Sample IDs
 Pre-Printed With Sample IDs

Bottles

Boxed Cases
 Individually Wrapped
 Grouped By Sample ID/Matrix

Return Shipping Labels

No Shipper
 With Shipper

Misc

Sampling Instructions
 Custody Seal
 Temp. Blanks
 Coolers _____
 Syringes _____

Extra Bubble Wrap
 Short Hold/Rush Stickers
 DI Water _____ Liter(s)
 USDA Regulated Soils

COC Options

Number of Blanks _____
 Pre-Printed _____

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
2	WT	Radium 226	1L Plastic HNO3 pres	2	0		
2	WT	Radium 228	1L Plastic HNO3 pres	2	0		
2	WT	Metals	250mL plastic w/HNO3	2	0	M-0-156-04BB	
2	WT	pH	250mL plastic unpres	2	0	M-0-156-05BB	
2	WT	TDS, Cl, F, SO4	250mL plastic unpres	2	0	M-0-156-05BB	

Hazard Shipping Placard In Place : NA

LAB USE:

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

Ship Date : 10/05/2020

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

Prepared By: Mai Yer Her

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

Verified By: _____

*Payment term are net 30 days.

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

Sample

CLIENT USE (Optional):

Date Rec'd: _____

Received By: _____

Verified By: _____

Page 20 of 22

Full List Metals = B, Ca, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li Hg, Mo, Se, Ti
 ALL SAMPLES UNFILTERED

Sample Preservation Receipt Form

1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Client Name: SCS Engineers

Project # 40216311

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

Lab Lot# of pH paper: 1004194

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

Initial when completed: VP Date/Time:


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

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

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

Sample Condition Upon Receipt Form (SCUR)

Client Name: SCS Engineers

Project #:
WO#: 40216311

 40216311

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

Tracking #: _____
 Custody Seal on Cooler/Box Present: yes no Seals intact: yes no
 Custody Seal on Samples Present: yes no Seals intact: yes no
 Packing Material: Bubble Wrap Bubble Bags None Other
 Thermometer Used SR - ~~AAA~~ 99 Type of Ice: Wet Blue Dry None Samples on ice, cooling process has begun
 Cooler Temperature 1.0 Uncorr: 1.0 ICorr: 1.0 10/10/20 SRK
 Temp Blank Present: yes no Biological Tissue is Frozen: yes no

Person examining contents:
 Date: 10/10/20 / Initials: MP
 Labeled By Initials: SRK

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

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2. <u>pv #, invoice info.,</u> <u>10/10/20</u> <u>SRK</u> <u>10/10/20</u>
Chain of Custody Relinquished:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3. <u>proj. state</u>
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume:		8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>W</u>		
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

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

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

C5 December 2020 Resample

December 18, 2020

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25220067.00 WPL-COLUMBIA-CCR
Pace Project No.: 40219777

Dear Meghan Blodgett:


Enclosed are the analytical results for sample(s) received by the laboratory on December 12, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Green Bay

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 25220067.00 WPL-COLUMBIA-CCR

Pace Project No.: 40219777

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky UST Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 12064

North Dakota Certification #: R-150

Virginia VELAP ID: 460263

South Carolina Certification #: 83006001

Texas Certification #: T104704529-14-1

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

USDA Soil Permit #: P330-16-00157

Federal Fish & Wildlife Permit #: LE51774A-0

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 25220067.00 WPL-COLUMBIA-CCR

Pace Project No.: 40219777

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40219777002	MW-310	Water	12/11/20 12:05	12/12/20 08:45
40219777003	MW-309	Water	12/11/20 12:55	12/12/20 08:45
40219777004	FIELD BLANK-1	Water	12/11/20 11:50	12/12/20 08:45
40219777005	FIELD BLANK-2	Water	12/11/20 11:50	12/12/20 08:45

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SAMPLE ANALYTE COUNT

Project: 25220067.00 WPL-COLUMBIA-CCR
Pace Project No.: 40219777

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40219777002	MW-310	EPA 6020	KXS	1
			VGC	7
		SM 2540C	HNT	1
		EPA 300.0	HMB	1
40219777003	MW-309	EPA 6020	KXS	1
			VGC	7
40219777004	FIELD BLANK-1	SM 2540C	HNT	1
		EPA 300.0	HMB	1
40219777005	FIELD BLANK-2	EPA 6020	KXS	2

PASI-G = Pace Analytical Services - Green Bay

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25220067.00 WPL-COLUMBIA-CCR

Pace Project No.: 40219777

Sample: MW-310 **Lab ID: 40219777002** Collected: 12/11/20 12:05 Received: 12/12/20 08:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Calcium	56800	ug/L	254	76.2	1	12/15/20 06:34	12/17/20 00:12	7440-70-2	
Field Data									
Analytical Method: Pace Analytical Services - Green Bay									
Field pH	7.62	Std. Units			1		12/11/20 12:05		
Field Specific Conductance	1212	umhos/cm			1		12/11/20 12:05		
Oxygen, Dissolved	8.30	mg/L			1		12/11/20 12:05	7782-44-7	
REDOX	111.5	mV			1		12/11/20 12:05		
Turbidity	0.00	NTU			1		12/11/20 12:05		
Static Water Level	785.26	feet			1		12/11/20 12:05		
Temperature, Water (C)	12.5	deg C			1		12/11/20 12:05		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	700	mg/L	20.0	8.7	1		12/16/20 11:56		
300.0 IC Anions									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	227	mg/L	20.0	4.3	10		12/14/20 14:09	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25220067.00 WPL-COLUMBIA-CCR

Pace Project No.: 40219777

Sample: MW-309 **Lab ID: 40219777003** Collected: 12/11/20 12:55 Received: 12/12/20 08:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay							
Boron	65.9	ug/L	10.0	3.0	1	12/15/20 06:34	12/17/20 00:26	7440-42-8	
Field Data		Analytical Method: Pace Analytical Services - Green Bay							
Field pH	7.42	Std. Units			1		12/11/20 12:55		
Field Specific Conductance	2227	umhos/cm			1		12/11/20 12:55		
Oxygen, Dissolved	8.08	mg/L			1		12/11/20 12:55	7782-44-7	
REDOX	112.2	mV			1		12/11/20 12:55		
Turbidity	0.00	NTU			1		12/11/20 12:55		
Static Water Level	785.26	feet			1		12/11/20 12:55		
Temperature, Water (C)	11.8	deg C			1		12/11/20 12:55		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25220067.00 WPL-COLUMBIA-CCR

Pace Project No.: 40219777

Sample: FIELD BLANK-1 **Lab ID: 40219777004** Collected: 12/11/20 11:50 Received: 12/12/20 08:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids									
Analytical Method: SM 2540C Pace Analytical Services - Green Bay									
Total Dissolved Solids	22.0	mg/L	20.0	8.7	1		12/16/20 11:57		
300.0 IC Anions									
Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay									
Chloride	<0.43	mg/L	2.0	0.43	1		12/14/20 14:24	16887-00-6	

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ANALYTICAL RESULTS

Project: 25220067.00 WPL-COLUMBIA-CCR

Pace Project No.: 40219777

Sample: FIELD BLANK-2 **Lab ID: 40219777005** Collected: 12/11/20 11:50 Received: 12/12/20 08:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010									
Pace Analytical Services - Green Bay									
Boron	<3.0	ug/L	10.0	3.0	1	12/15/20 06:34	12/16/20 18:51	7440-42-8	
Calcium	<76.2	ug/L	254	76.2	1	12/15/20 06:34	12/16/20 18:51	7440-70-2	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25220067.00 WPL-COLUMBIA-CCR
Pace Project No.: 40219777

QC Batch: 373758 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40219777002, 40219777003, 40219777005

METHOD BLANK: 2160114 Matrix: Water
Associated Lab Samples: 40219777002, 40219777003, 40219777005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.0	10.0	12/16/20 18:44	
Calcium	ug/L	<76.2	254	12/16/20 18:44	

LABORATORY CONTROL SAMPLE: 2160115

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	500	470	94	80-120	
Calcium	ug/L	5000	4920	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2160116 2160117

Parameter	Units	40219777001		2160116		2160117		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec				
Boron	ug/L	1230	500	500	1750	1800	104	113	75-125	2	20
Calcium	ug/L	131000	5000	5000	145000	142000	280	220	75-125	2	20 P6

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25220067.00 WPL-COLUMBIA-CCR

Pace Project No.: 40219777

QC Batch: 373952	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
	Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40219777002, 40219777004

METHOD BLANK: 2161062 Matrix: Water

Associated Lab Samples: 40219777002, 40219777004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	12/16/20 11:55	

LABORATORY CONTROL SAMPLE: 2161063

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	586	578	99	80-120	

SAMPLE DUPLICATE: 2161067

Parameter	Units	40219825001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	640	676	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.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25220067.00 WPL-COLUMBIA-CCR
Pace Project No.: 40219777

QC Batch: 373709 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40219777002, 40219777004

METHOD BLANK: 2159907 Matrix: Water
Associated Lab Samples: 40219777002, 40219777004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	12/14/20 12:25	

LABORATORY CONTROL SAMPLE: 2159908

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	18.8	94	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2159909 2159910

Parameter	Units	2159909		2159910		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		40219790008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							MSD Result
Chloride	mg/L	71.5	200	200	284	287	106	108	90-110	1	15	

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25220067.00 WPL-COLUMBIA-CCR

Pace Project No.: 40219777

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

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25220067.00 WPL-COLUMBIA-CCR
Pace Project No.: 40219777

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40219777002	MW-310	EPA 3010	373758	EPA 6020	373835
40219777003	MW-309	EPA 3010	373758	EPA 6020	373835
40219777005	FIELD BLANK-2	EPA 3010	373758	EPA 6020	373835
40219777002	MW-310				
40219777003	MW-309				
40219777002	MW-310	SM 2540C	373952		
40219777004	FIELD BLANK-1	SM 2540C	373952		
40219777002	MW-310	EPA 300.0	373709		
40219777004	FIELD BLANK-1	EPA 300.0	373709		

REPORT OF LABORATORY ANALYSIS

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(Please Print Clearly)

Company Name: **SCS Engineers**
 Branch/Location: **Madison**
 Project Contact: **Tom Karwowski**
 Phone: **(608) 957 9332**
 Project Number: **25220067.00**
 Project Name: **WPL - Columbia Energy Center GW**
 Project State: **WI**
 Sampled By (Print): **Ryan Matzuk**
 Sampled By (Sign): *[Signature]*
 PO #:

Data Package Options (billable)
 EPA Level III
 EPA Level IV
 On your sample (billable)
 NOT needed on your sample
 Matrix Codes:
 A = Air, B = Biota, C = Charcoal, O = Oil, S = Soil, SI = Sludge, W = Water, DW = Drinking Water, GW = Ground Water, SW = Surface Water, WW = Waste Water, WP = Wipe
 PAGE LAB # CLIENT FIELD ID DATE TIME MATRIX



CHAIN OF CUSTODY

REGULATORY PROGRAM:
 FILTERED? (YES/NO) (CODE)*
 A=None, B=HCL, C=H2SO4, D=HNO3, E=DI Water, F=Meq/mand, G=NaOH, H=Sodium Bisulfate Solution, I=Sodium Thiosulfate, J=Other

PAGE LAB #	CLIENT FIELD ID	DATE	TIME	MATRIX	Analyses Requested														
					Y/N	Pick/Lab	Chloride	TDS	Baron	Molybdenum	Calcium								
661	MW-305	12/11	1115	GW															
662	MW-310		1205	GW			X												
663	MW-309		1255	GW			X												
664	Field Blank-1		1150	W			X												
605	Field Blank-2		1150	W			X												

Relinquished By: *[Signature]* Date/Time: 1530 12/11
 Relinquished By: *[Signature]* Date/Time: 121220 0845
 Relinquished By: *[Signature]* Date/Time: 121220 0845
 Received By: *[Signature]* Date/Time: 121220 0845
 Received By: *[Signature]* Date/Time: 121220 0845
 Received By: *[Signature]* Date/Time: 121220 0845

Quote #: _____
 Mail To Contact: _____
 Mail To Company: _____
 Mail To Address: _____
 Invoice To Contact: _____
 Invoice To Company: _____
 Invoice To Address: _____
 Invoice To Phone: _____
 CLIENT COMMENTS: _____
 LAB COMMENTS (Lab Use Only): _____
 Profile # _____

40219777

UPPER MIDWEST REGION
 MN: 612-607-1700 WI: 920-469-2436

Sample Preservation Receipt Form

Client Name: SCS Engineers

Project # W0249777

Pace Analytical Services, LLC
1241 Bellevue Street, Suite 5
Green Bay, WI 54306

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

Lab Lot# of pH paper: 1004194

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

Initial when completed: MP Date/Time:

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

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

AG1U	1 liter amber glass
BG1U	1 liter clear glass
AG1H	1 liter amber glass HCL
AG4S	125 mL amber glass H2SO4
AG4U	120 mL amber glass unpres
AG5U	100 mL amber glass unpres
AG2S	500 mL amber glass H2SO4
BG3U	250 mL clear glass unpres

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

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

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

Sample Condition Upon Receipt Form (SCUR)

Project #: _____

Client Name: SCS Engineers

WO#: 40219777

Courier: CS Logistics Fed Ex Speedee UPS Walto
 Client Pace Other: _____



Tracking #: _____

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

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

Packing Material: Bubble Wrap Bubble Bags None Other

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

Cooler Temperature Uncorr: 101 /Corr: _____

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

Temp should be above freezing to 6°C.

Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Person examining contents:
 Date: 12/12/20 Initials: [Signature]
 Labeled By Initials: [Signature]

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2. <u>Mail Invoice pg #</u> <u>12/12/20</u>
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3. <u>HP</u>
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.
Sufficient Volume:		8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>W</u>		
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		


Client Notification/ Resolution:

If checked, see attached form for additional comments

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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



Appendix D
Historical Monitoring Results

Single Location

Name: WPL - Columbia

Location ID: MW-84A		Number of Sampling Dates: 19																		
Parameter Name	Units	GPS	12/22/2015	4/5/2016	7/8/2016	7/28/2016	10/13/2016	12/29/2016	1/25/2017	4/11/2017	6/6/2017	8/8/2017	10/24/2017	4/25/2018	8/8/2018	10/24/2018	4/3/2019	10/9/2019	2/3/2020	
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 J	13.6	12	15.7	
Calcium	ug/L	--	74000	72200	67600	--	74000	76000	70800	73200	76100	74900	77500	76600	76000	74000	80100	73500	72700	
Chloride	mg/L	--	4.9	4.7	5.1	--	4.3	4.7	4.6	4.9	5.5	5.5	5.1	4.8	4.9	4.2	3.6	3.9	3.7	
Fluoride	mg/L	4	<0.2 U	<0.2 U	<0.2 U	--	<0.1 U	<0.1 U	0.12 J	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	--	
Field pH	Std. Units	--	7.6	7.61	7.45	7.34	7.91	7.25	6.99	7.8	7.28	7.23	7.68	7.45	7.38	7.24	7.03	7.23	7.51	
Sulfate	mg/L	--	4.9	4.3	3.7 J	--	2.6 J	2.7 J	3	2.8 J	2.7 J	2 J	2.2 J	2.8 J	1.9 J	1.6 J	1.4 J	1.3 J	<2.2 U	
Total Dissolved Solids	mg/L	--	316	322	316	--	324	316	328	342	344	342	314	328	372	330	318	310	316	
Antimony	ug/L	6	<0.073 U	0.084 J	0.1 J	--	<0.073 U	<0.073 U	<0.073 U	<0.073 U	<0.15 U	<0.15 U	--	<0.15 U	<0.15 U	<0.15 U	<0.15 U	<0.15 U	--	
Arsenic	ug/L	10	0.15 J	0.29 J	0.14 J	--	0.35 J	0.19 J	0.35 J	<0.099 U	<0.28 U	0.28 J	--	<0.28 U	<0.28 U	0.33 J	<0.28 U	0.46 J	0.38 J	
Barium	ug/L	2000	15.3	12.7	12.2	--	14.2	18.4	13.8	14.1	13.4	14	--	14.6	13.7	14.5	14.7	13.2	14	
Beryllium	ug/L	4	<0.13 U	<0.13 U	<0.13 U	--	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.18 U	<0.18 U	--	<0.18 U	<0.18 U	<0.18 U	<0.18 U	<0.25 U	--	
Cadmium	ug/L	5	<0.089 U	<0.089 U	<0.089 U	--	<0.089 U	<0.089 U	<0.089 U	<0.089 U	<0.081 U	<0.081 U	--	<0.081 U	--	<0.15 U	<0.15 U	<0.15 U	--	
Chromium	ug/L	100	2.5	1.9	1.8	--	2	2	1.9	2.4	2 J	1.6 J	--	2.4 J	1.5 J	1.6 J	1.8 J	1.6 J	1.6 J	
Cobalt	ug/L	6	0.095 J	<0.036 U	0.053 J	--	<0.036 U	<0.036 U	<0.036 U	<0.036 U	<0.085 U	<0.085 U	--	<0.085 U	<0.085 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	
Lead	ug/L	15	0.16 J	<0.04 U	0.39 J	--	0.049 J	0.11 J	<0.04 U	0.041 J	<0.2 U	<0.2 U	--	<0.2 U	--	<0.24 U	<0.24 U	<0.24 U	--	
Lithium	ug/L	40	0.72 J	0.44 J	0.5 J	--	0.56 J	0.56 J	0.56 J	0.55 J	0.46 J	0.58 J	--	0.5 J	0.4 J	0.49 J	0.56 J	0.52 J	0.58 J	
Mercury	ug/L	2	<0.1 U	<0.1 U	<0.13 U	--	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.13 U	--	<0.13 U	--	<0.084 U	<0.084 U	<0.084 U	--	
Molybdenum	ug/L	100	<0.07 U	<0.07 U	0.073 J	--	0.12 J	<0.07 U	<0.07 U	<0.07 U	<0.44 U	<0.44 U	--	<0.44 U	<0.44 U	<0.44 U	<0.44 U	<0.44 U	<0.44 U	
Selenium	ug/L	50	<0.21 U	<0.21 U	<0.21 U	--	<0.21 U	<0.21 U	<0.21 U	<0.21 U	<0.32 U	<0.32 U	--	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	<0.32 U	
Thallium	ug/L	2	<0.14 U	<0.14 U	<0.14 U	--	<0.14 U	<0.14 U	<0.14 U	<0.14 U	<0.14 U	<0.14 U	--	<0.14 U	<0.14 U	<0.14 U	<0.14 U	<0.14 U	<0.14 U	
Total Radium	pCi/L	5	0.593	0.0809	--	1.37	0.825	0.404	1.39	0.0929	0.676	0.509	--	0.526	0.529	0.62	0.681	0.247	0.1	
Radium-226	pCi/L	--	0.156	-0.088	--	-0.058	0.132	0.168	0.624	0.0768	0.27	0.242	--	0.155	-0.203	0.313	0.199	0.247	0.1	
Radium-228	pCi/L	--	0.437	0.0809	--	1.37	0.693	0.236	0.766	0.0161	0.406	0.267	--	0.371	0.529	0.307	0.482	-0.024	-0.153	
Field Specific Conductance	umhos/cm	--	599	427	574.8	579.3	1002	578.2	489	948	535.3	557.2	491	581.7	617.1	609	637.2	614.1	618.4	
Oxygen, Dissolved	mg/L	--	9.7	9.37	3.78	5.11	9.61	8.94	6.48	9.28	9.46	7.5	9.3	3.94	8.84	10.01	9.49	11.36	8.43	
Field Oxidation Potential	mV	--	154	165.1	139.9	138.3	82.7	87	192.9	102	123.6	204.7	210	53.3	142.7	71.5	103.4	181.7	121.5	
Groundwater Elevation	feet	--	785.31	786.3	785.89	785.61	787.22	786.63	786.7	787.16	787.63	786.68	785.32	785.88	786.55	788.32	787.35	787.79	786.5	
Temperature	deg C	--	10.4	10.2	11.3	11	11.5	10.8	10.9	10.6	11.3	11.2	11.1	10.2	12	11.6	10.2	11.8	10.3	
Turbidity	NTU	--	--	0.86	2.75	0.17	0.3	0.25	0.33	0.04	0.56	0.08	2.93	0.81	0.71	3.79	1.9	2.41	1.23	
pH at 25 Degrees C	Std. Units	--	7.5	7.4	7.4	--	7.3	7.4	7.3	7.7	7.6	7.4	7.6	7.6	7.4	7.5	7.4	7.5	7.4	

Location ID: MW-84A

Number of Sampling Dates: 19

Parameter Name	Units	GPS	5/29/2020	10/8/2020
Boron	ug/L	--	10	9.7 J
Calcium	ug/L	--	77600	69200
Chloride	mg/L	--	3.7	4.3
Fluoride	mg/L	4	<0.095 U	<0.095 U
Field pH	Std. Units	--	7.34	7.49
Sulfate	mg/L	--	1.5 J	1.3 J
Total Dissolved Solids	mg/L	--	340	320
Antimony	ug/L	6	<0.15 U	<0.15 U
Arsenic	ug/L	10	0.34 J	0.49 J
Barium	ug/L	2000	13.9	12.6
Beryllium	ug/L	4	<0.25 U	<0.25 U
Cadmium	ug/L	5	<0.15 U	<0.15 U
Chromium	ug/L	100	1.7 J	1.6 J
Cobalt	ug/L	6	<0.12 U	<0.12 U
Lead	ug/L	15	<0.24 U	<0.24 U
Lithium	ug/L	40	0.4 J	0.39 J
Mercury	ug/L	2	<0.084 U	<0.066 U
Molybdenum	ug/L	100	<0.44 U	<0.44 U
Selenium	ug/L	50	<0.32 U	<0.32 U
Thallium	ug/L	2	<0.14 U	<0.14 U
Total Radium	pCi/L	5	0.395	0.39
Radium-226	pCi/L	--	0.368	0
Radium-228	pCi/L	--	0.0273	0.39
Field Specific Conductance	umhos/cm	--	613.7	610.1
Oxygen, Dissolved	mg/L	--	9.81	9.39
Field Oxidation Potential	mV	--	135	153.2
Groundwater Elevation	feet	--	787.02	786.1
Temperature	deg C	--	10.6	11.9
Turbidity	NTU	--	2.15	0
pH at 25 Degrees C	Std. Units	--	7.6	7.6

Single Location

Name: WPL - Columbia

Location ID: MW-301		Number of Sampling Dates: 18																	
Parameter Name	Units	GPS	12/22/2015	4/5/2016	7/8/2016	10/13/2016	12/29/2016	1/25/2017	4/11/2017	6/6/2017	8/8/2017	10/23/2017	4/25/2018	8/8/2018	10/24/2018	4/2/2019	10/9/2019	2/3/2020	5/29/2020
Boron	ug/L	--	26.5	25.2	23.6	30.6	32.8	32.6	28.8	21.3	30.6	34.3	24.3	22.8	27.8	26.9	35.9	27.9	21.3
Calcium	ug/L	--	126000	115000	108000	118000	129000	124000	120000	111000	108000	87200	112000	105000	101000	126000	114000	113000	112000
Chloride	mg/L	--	3.7 J	4	3.5 J	2.2	2 J	1.5 J	2	3.5	5.5	4	2.3	5.2	3.2	0.79 J	1.7 J	1.3 J	2 J
Fluoride	mg/L	4	<0.2 U	<0.2 U	<0.2 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	--	<0.095 U
Field pH	Std. Units	--	6.85	7.01	6.87	7.28	6.63	7.1	7.11	6.7	6.75	7.37	6.76	6.91	6.79	6.62	6.67	6.89	6.73
Sulfate	mg/L	--	9.3	15.3	15	13.9	12.3 J	6.5	10.3	17.1	31.6	27.5	8.6	21.6	19.2	4.4	8.4	7.2	11.5
Total Dissolved Solids	mg/L	--	478	486	464	490	444	514	502	458	462	362	464	502	424	462	418	462	452
Antimony	ug/L	6	0.15 J	0.094 J	0.13 J	<0.073 U	0.4 J	<0.073 U	<0.073 U	<0.15 U	<0.15 U	--	<0.15 U	0.36 J	<0.15 U	0.32 J	<0.15 U	--	<0.15 U
Arsenic	ug/L	10	0.26 J	0.26 J	0.19 J	0.24 J	0.4 J	0.13 J	0.18 J	<0.28 U	<0.28 U	--	<0.28 U	0.45 J	<0.28 U	0.4 J	0.42 J	<0.28 U	0.33 J
Barium	ug/L	2000	20.2	11.1	11.6	15.6	15	13.5	13.2	11.3	11.8	--	9.3	10.2	11.5	11.8	10	10.9	9.8
Beryllium	ug/L	4	<0.13 U	<0.13 U	<0.13 U	<0.13 U	0.19 J	<0.13 U	<0.13 U	<0.18 U	<0.18 U	--	<0.18 U	0.37 J	<0.18 U	0.28 J	<0.25 U	--	<0.25 U
Cadmium	ug/L	5	<0.089 U	<0.089 U	<0.089 U	<0.089 U	0.32 J	<0.089 U	<0.089 U	<0.081 U	<0.081 U	--	<0.081 U	--	<0.15 U	0.21 J	<0.15 U	--	<0.15 U
Chromium	ug/L	100	2.1	0.58 J	0.59 J	<0.39 U	0.7 J	0.53 J	0.7 J	2.3 J	<1 U	--	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
Cobalt	ug/L	6	1.4	0.25 J	0.22 J	0.041 J	0.38 J	0.071 J	0.064 J	0.13 J	0.12 J	--	<0.085 U	0.28 J	<0.12 U	0.35 J	<0.12 U	0.17 J	<0.12 U
Lead	ug/L	15	0.9 J	0.077 J	0.48 J	<0.04 U	0.34 J	<0.04 U	<0.04 U	<0.2 U	<0.2 U	--	<0.2 U	--	<0.24 U	0.3 J	<0.24 U	--	<0.24 U
Lithium	ug/L	40	1.3	0.58 J	0.69 J	0.6 J	0.87 J	0.67 J	0.68 J	0.62 J	0.6 J	--	0.55 J	0.85 J	0.52 J	0.9 J	0.61 J	0.67 J	0.47 J
Mercury	ug/L	2	<0.1 U	<0.1 U	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.13 U	--	<0.13 U	--	<0.084 U	<0.084 U	<0.084 U	--	<0.084 U
Molybdenum	ug/L	100	0.35 J	0.15 J	0.14 J	0.12 J	0.38 J	<0.07 U	<0.07 U	<0.44 U	<0.44 U	--	<0.44 U	<0.44 U	<0.44 U	<0.44 U	<0.44 U	<0.44 U	<0.44 U
Selenium	ug/L	50	0.3 J	0.21 J	0.39 J	<0.21 U	0.26 J	<0.21 U	<0.21 U	<0.32 U	<0.32 U	--	<0.32 U	0.71 J	<0.32 U	0.49 J	<0.32 U	<0.32 U	<0.32 U
Thallium	ug/L	2	<0.14 U	<0.14 U	<0.14 U	<0.14 U	0.48 J	<0.14 U	<0.14 U	<0.14 U	<0.14 U	--	<0.14 U	0.3 J	<0.14 U	0.48 J	<0.14 U	<0.14 U	<0.14 U
Total Radium	pCi/L	5	1.31	1.11	0.89	0.631	1.01	2.42	1.35	1.3	1.74	--	0.882	0.0351	0.652	0.552	0.701	0.502	0.193
Radium-226	pCi/L	--	0.655	0.294	0.404	-0.067	0.108	1.46	0.513	0.287	1.09	--	0.122	-0.06	0.247	0	0.252	0.136	0
Radium-228	pCi/L	--	0.651	0.82	0.486	0.631	0.905	0.964	0.833	1.01	0.647	--	0.76	0.0351	0.405	0.552	0.449	0.366	0.193
Field Specific Conductance	umhos/cm	--	897	573	796	1464	859	1018	1354	698.4	691.7	561	774	799	767	883	801	868	797
Oxygen, Dissolved	mg/L	--	1.7	2.71	1.47	1.99	1.34	1.24	1.44	1.81	1.43	1.1	2.35	2.14	2.49	2.2	1.67	1.07	2
Field Oxidation Potential	mV	--	135	123.7	133.9	100.8	95.8	226.1	100.9	115.1	187.4	204	74.3	126.5	77.9	152.1	173	132.3	118.7
Groundwater Elevation	feet	--	785.56	768.12	786.31	787.64	787.37	787.27	787.89	788.25	787.34	785.89	785.29	787.06	788.98	787.04	788.47	787.24	787.77
Temperature	deg C	--	9.7	7.7	10	11.2	10.1	8.8	7.7	8.9	10.2	11.1	7.4	10.6	11.1	7.5	11.3	8.5	8.1
Turbidity	NTU	--	--	1.52	3.89	0.59	0.74	0.42	0.1	0.22	0.18	1.52	1.12	0.46	3.3	2.02	2.12	1.41	0
pH at 25 Degrees C	Std. Units	--	7	7	6.8	6.8	6.9	6.9	7.1	7	7	7.3	7	7	7.1	6.8	7	6.8	7

Location ID: MW-301

Number of Sampling Dates: 18

Parameter Name	Units	GPS	10/8/2020
Boron	ug/L	--	28.8
Calcium	ug/L	--	93000
Chloride	mg/L	--	3.4
Fluoride	mg/L	4	<0.095 U
Field pH	Std. Units	--	6.95
Sulfate	mg/L	--	25.1
Total Dissolved Solids	mg/L	--	412
Antimony	ug/L	6	0.33 J
Arsenic	ug/L	10	0.62 J
Barium	ug/L	2000	9.4
Beryllium	ug/L	4	<0.25 U
Cadmium	ug/L	5	0.19 J
Chromium	ug/L	100	<1 U
Cobalt	ug/L	6	0.29 J
Lead	ug/L	15	0.25 J
Lithium	ug/L	40	0.46 J
Mercury	ug/L	2	<0.066 U
Molybdenum	ug/L	100	<0.44 U
Selenium	ug/L	50	<0.32 U
Thallium	ug/L	2	0.3 J
Total Radium	pCi/L	5	0.38
Radium-226	pCi/L	--	0.0511
Radium-228	pCi/L	--	0.329
Field Specific Conductance	umhos/cm	--	760
Oxygen, Dissolved	mg/L	--	1.22
Field Oxidation Potential	mV	--	183.9
Groundwater Elevation	feet	--	786.53
Temperature	deg C	--	11
Turbidity	NTU	--	0
pH at 25 Degrees C	Std. Units	--	7.2

Single Location

Name: WPL - Columbia

Location ID: MW-309		Number of Sampling Dates: 16																	
Parameter Name	Units	GPS	2/21/2018	3/23/2018	4/23/2018	5/24/2018	6/23/2018	7/23/2018	8/22/2018	9/21/2018	10/22/2018	4/2/2019	10/8/2019	5/29/2020	6/30/2020	8/6/2020	10/8/2020	12/11/2020	
Boron	ug/L	--	31.4	31	30.4	28	26.6	35.5	40.5	30	--	37.4	33.4	54.6	50.7	55.3	57.7	65.9	
Calcium	ug/L	--	42700	41800	39600	52700	67600	63800	93600	55200	--	45300	46900	51600	--	--	65300	--	
Chloride	mg/L	--	147	157	157	141	203	557	811	329	--	145	43.2	350	--	--	575	--	
Fluoride	mg/L	4	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<1 U	<0.1 U	<0.1 U	--	<0.1 U	<0.1 U	<0.095 U	--	--	<0.095 U	--	
Field pH	Std. Units	--	7.84	8.08	7.71	7.59	7.5	7.55	7.53	7.83	7.56	7.49	7.75	7.35	7.33	7.72	7.33	7.42	
Sulfate	mg/L	--	12.2	12.2	12	17.5	24.1	33.1	43.3	35.9	--	35.2	21.9	28.6	--	--	21.8	--	
Total Dissolved Solids	mg/L	--	576	552	562	478	548	1210	1570	830	--	548	370	960	--	--	1160	--	
Antimony	ug/L	6	0.28 J	<0.15 U	0.36 J	0.24 J	0.76 J	0.31 J	0.57 J	<0.15 U	--	--	--	--	--	--	--	--	
Arsenic	ug/L	10	<0.28 U	0.35 J	0.77 J	<0.28 U	0.56 J	0.55 J	0.46 J	<0.28 U	--	--	--	--	--	--	--	--	
Barium	ug/L	2000	24.1	22.2	21.3	15.3	18.3	31.2	46.2	22.2	--	--	--	--	--	--	--	--	
Beryllium	ug/L	4	0.21 J	<0.18 U	0.2 J	<0.18 U	0.38 J	<0.18 U	<0.18 U	<0.18 U	--	--	--	--	--	--	--	--	
Cadmium	ug/L	5	0.11 J	<0.081 U	0.27 J	<0.081 U	0.58 J	0.23 J	0.3 J	<0.15 U	--	--	--	--	--	--	--	--	
Chromium	ug/L	100	2.3 J	1.9 J	2.3 J	1.9 J	2.2 J	<1 U	2.6 J	1.3 J	--	--	--	--	--	--	--	--	
Cobalt	ug/L	6	0.5 J	0.18 J	0.39 J	0.11 J	0.54 J	0.29 J	0.35 J	<0.12 U	--	--	--	--	--	--	--	--	
Lead	ug/L	15	0.66 J	<0.2 U	0.39 J	<0.2 U	0.76 J	0.34 J	0.39 J	<0.24 U	--	--	--	--	--	--	--	--	
Lithium	ug/L	40	1.4	0.88 J	1.1	0.77 J	1.1	0.88 J	1.1	0.76 J	--	--	--	--	--	--	--	--	
Mercury	ug/L	2	<0.13 U	--	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.084 U	<0.084 U	--	--	--	--	--	--	--	
Molybdenum	ug/L	100	2.1	2.6	2	<0.44 U	0.7 J	0.47 J	<0.44 U	<0.44 U	--	--	--	--	--	--	--	--	
Selenium	ug/L	50	0.39 J	0.37 J	0.6 J	0.41 J	1.1	0.51 J	0.39 J	0.33 J	--	--	--	--	--	--	--	--	
Thallium	ug/L	2	0.16 J	<0.14 U	0.83 J	<0.14 U	0.57 J	0.42 J	0.38 J	<0.14 U	--	--	--	--	--	--	--	--	
Total Radium	pCi/L	5	0.516	1.25	1.13	0.895	0.673	1.74	0.754	0.569	--	--	--	--	--	--	--	--	
Radium-226	pCi/L	--	0.486	0.815	0.539	0.0638	-0.208	0.334	0.232	0.569	--	--	--	--	--	--	--	--	
Radium-228	pCi/L	--	0.03	0.431	0.595	0.831	0.673	1.41	0.522	-0.304	--	--	--	--	--	--	--	--	
Field Specific Conductance	umhos/cm	--	983	1094	985	921	1057	2290	2948	1423	1424	1041	687	1785	1726	1656	2222	2227	
Oxygen, Dissolved	mg/L	--	11.4	6.74	5.43	8.76	9.93	9.27	7.26	10.75	10.23	9.79	11.52	9.83	9.71	9.05	9.4	8.08	
Field Oxidation Potential	mV	--	45.4	123	94.2	54.5	89.9	163.8	106.4	65.5	157.1	120.1	125.2	230.6	65.7	224.2	147.7	112.2	
Groundwater Elevation	feet	--	783.2	783.11	783.07	785.45	786.03	786.27	785.54	787.08	787.99	786.3	787.26	785.98	786.18	785.93	785.47	785.26	
Temperature	deg C	--	10.3	10.6	11	12.1	12	13.3	13.4	12.72	13.3	10.1	13	11	13.3	12.9	12.9	11.8	
Turbidity	NTU	--	4.84	28.88	4.76	3.35	1.94	2.73	2.09	3.18	2.81	1.25	4.89	1.74	3.74	3.56	0	0	
pH at 25 Degrees C	Std. Units	--	7.8	8	7.9	7.6	7.6	7.7	7.8	7.7	--	7.7	7.7	8	--	--	7.7	--	

Single Location

Name: WPL - Columbia

Location ID: MW-310		Number of Sampling Dates: 16																
Parameter Name	Units	GPS	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
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	--
Calcium	ug/L	--	32400	33400	32100	32100	34300	39700	38800	54100	--	38800	--	57600	55400	41100	62000	56800
Chloride	mg/L	--	19.8	21.7	22.1	68.6	59.8	118	139	152	--	76	--	190	--	128	310	227
Fluoride	mg/L	4	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	--	<0.1 U	--	<0.1 U	--	<0.095 U	<0.095 U	--
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
Sulfate	mg/L	--	31.6	33.1	32	28	30.4	60.2	32.8	118	--	58.4	--	85.9	--	68.2	60	--
Total Dissolved Solids	mg/L	--	406	398	396	436	438	532	526	736	--	470	--	650	--	582	846	700
Antimony	ug/L	6	0.15 J	<0.15 U	0.3 J	0.21 J	0.97 J	0.42 J	0.17 J	0.49 J	--	--	--	--	--	--	--	--
Arsenic	ug/L	10	<0.28 U	0.42 J	0.82 J	0.45 J	1.2	0.66 J	0.43 J	0.76 J	--	--	--	--	--	--	--	--
Barium	ug/L	2000	19.8	19.5	19	20.7	20.3	21.2	21	26.1	--	--	--	--	--	--	--	--
Beryllium	ug/L	4	<0.18 U	<0.18 U	0.72 J	<0.18 U	0.59 J	0.29 J	<0.18 U	<0.18 U	--	--	--	--	--	--	--	--
Cadmium	ug/L	5	<0.081 U	<0.081 U	0.14 J	0.11 J	0.78 J	0.31 J	<0.15 U	0.17 J	--	--	--	--	--	--	--	--
Chromium	ug/L	100	1.1 J	1.2 J	1.4 J	1.4 J	2.4 J	<1 U	1.3 J	<1 U	--	--	--	--	--	--	--	--
Cobalt	ug/L	6	0.18 J	0.13 J	0.26 J	0.15 J	0.75 J	0.32 J	0.13 J	0.24 J	--	--	--	--	--	--	--	--
Lead	ug/L	15	<0.2 U	<0.2 U	0.21 J	<0.2 U	0.77 J	0.45 J	<0.24 U	0.25 J	--	--	--	--	--	--	--	--
Lithium	ug/L	40	1	0.85 J	1.4	0.81 J	1.2	1.2	0.92 J	1.1	--	--	--	--	--	--	--	--
Mercury	ug/L	2	<0.13 U	--	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.084 U	<0.084 U	--	--	--	--	--	--	--
Molybdenum	ug/L	100	2.3	3.6	2.8	1.9	1.9	1.7	1.2 J	4.8	--	--	--	--	--	--	--	--
Selenium	ug/L	50	<0.32 U	<0.32 U	0.55 J	<0.32 U	0.96 J	0.75 J	<0.32 U	1.4	--	--	--	--	--	--	--	--
Thallium	ug/L	2	<0.14 U	<0.14 U	0.73 J	<0.14 U	0.9 J	0.44 J	<0.14 U	0.27 J	--	--	--	--	--	--	--	--
Total Radium	pCi/L	5	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
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
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
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
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
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
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	--

Single Location


Name: WPL - Columbia

Location ID: MW-311		Number of Sampling Dates: 13													
Parameter Name	Units	GPS	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
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
Calcium	ug/L	--	58000	61000	56600	62500	70700	76800	65700	75400	--	65600	63900	62200	73400
Chloride	mg/L	--	2.9	2.7	2.6	3.5	3	2 J	2 J	3.9	--	1.9 J	1.5 J	1.5 J	1.4 J
Fluoride	mg/L	4	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	--	<0.1 U	<0.1 U	<0.095 U	<0.095 U
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
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
Total Dissolved Solids	mg/L	--	260	274	262	304	352	372	332	424	--	276	272	326	380
Antimony	ug/L	6	0.15 J	<0.15 U	<0.15 U	<0.15 U	0.18 J	<0.15 U	0.43 J	<0.15 U	--	--	--	--	--
Arsenic	ug/L	10	<0.28 U	0.56 J	0.42 J	0.32 J	0.31 J	0.46 J	0.56 J	0.56 J	--	--	--	--	--
Barium	ug/L	2000	13.3	12.3	12.4	10.7	15.4	16.3	14.2	18.2	--	--	--	--	--
Beryllium	ug/L	4	<0.18 U	<0.18 U	<0.18 U	<0.18 U	<0.18 U	<0.18 U	0.19 J	<0.18 U	--	--	--	--	--
Cadmium	ug/L	5	<0.081 U	<0.081 U	<0.081 U	<0.081 U	<0.081 U	<0.081 U	0.29 J	<0.15 U	--	--	--	--	--
Chromium	ug/L	100	2.1 J	2.2 J	2.2 J	2.2 J	2.3 J	1.3 J	2.3 J	1.5 J	--	--	--	--	--
Cobalt	ug/L	6	0.24 J	0.11 J	<0.085 U	0.11 J	0.11 J	0.12 J	0.35 J	<0.12 U	--	--	--	--	--
Lead	ug/L	15	0.2 J	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	0.3 J	<0.24 U	--	--	--	--	--
Lithium	ug/L	40	0.75 J	0.62 J	0.58 J	0.52 J	0.72 J	0.67 J	0.83 J	0.82 J	--	--	--	--	--
Mercury	ug/L	2	<0.13 U	--	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.13 U	<0.084 U	<0.084 U	--	--	--	--
Molybdenum	ug/L	100	2.1	1.9	2.1	0.55 J	0.93 J	0.56 J	0.74 J	2.5	--	--	--	--	--
Selenium	ug/L	50	0.83 J	0.78 J	0.6 J	0.9 J	0.86 J	0.62 J	0.93 J	1.2	--	--	--	--	--
Thallium	ug/L	2	<0.14 U	<0.14 U	<0.14 U	<0.14 U	<0.14 U	<0.14 U	0.3 J	<0.14 U	--	--	--	--	--
Total Radium	pCi/L	5	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
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

Location ID: MW-311

Number of Sampling Dates: 13

Parameter Name	Units	GPS	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
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
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
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
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
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



Appendix E
Statistical Evaluation

January 10, 2020
File No. 25219067.00

TECHNICAL MEMORANDUM

SUBJECT: Statistical Evaluation of Groundwater Monitoring Results
COL 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



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.

- 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:

- 1) 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 Quantification rule applies, which says that a 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.

TECHNICAL MEMORANDUM

January 10, 2020

Page 4

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 quantification 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 quantification 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.

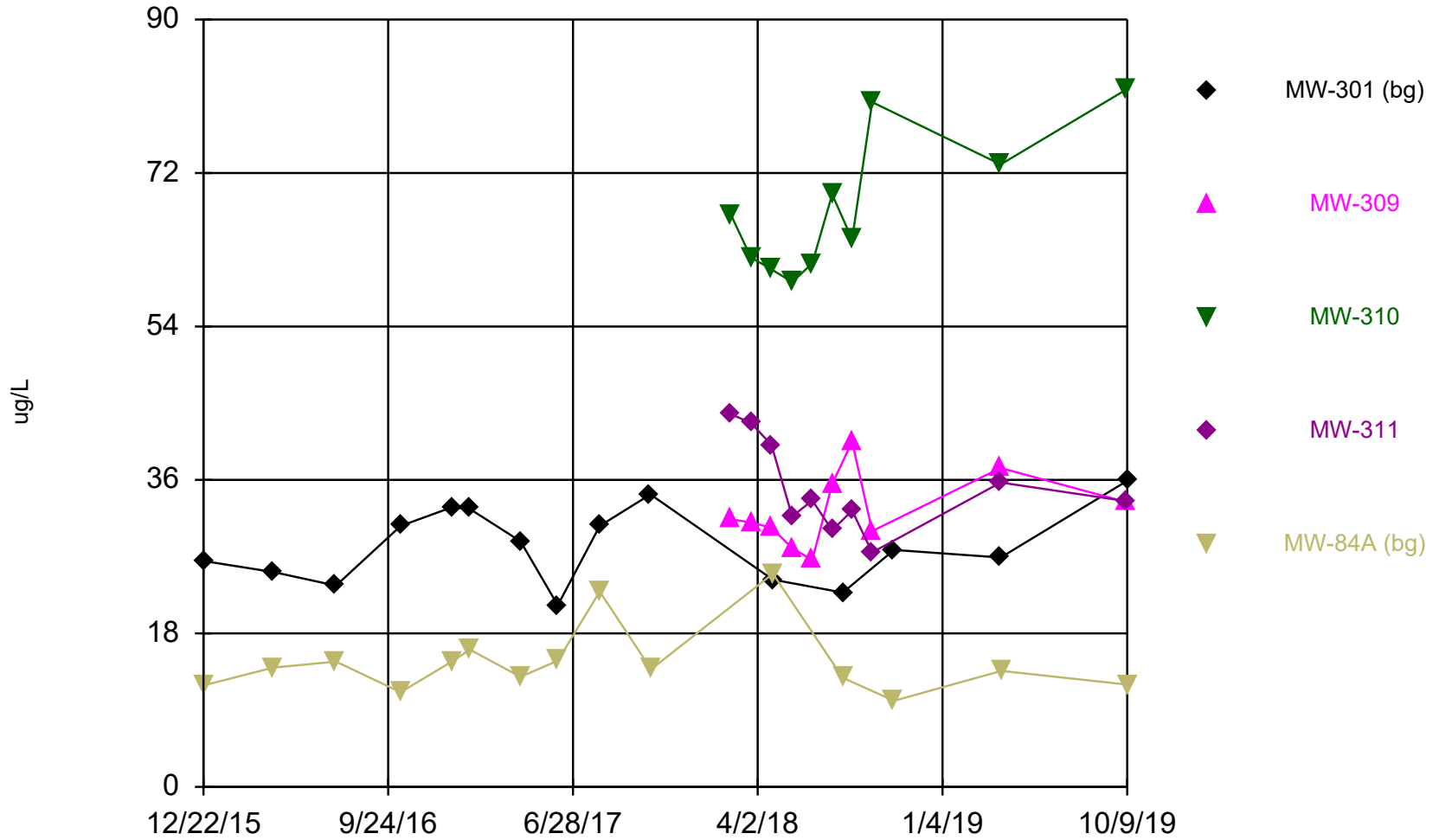
SCC/NDK/

I:\25219067.00\Data and Calculations\Sanitas\MOD 4 Intrawell\Oct 2019_Stats Memo to File\COL Mod 4_2019 Oct_Stats Memo.docx

Attachment A

Times Series Plots

Time Series



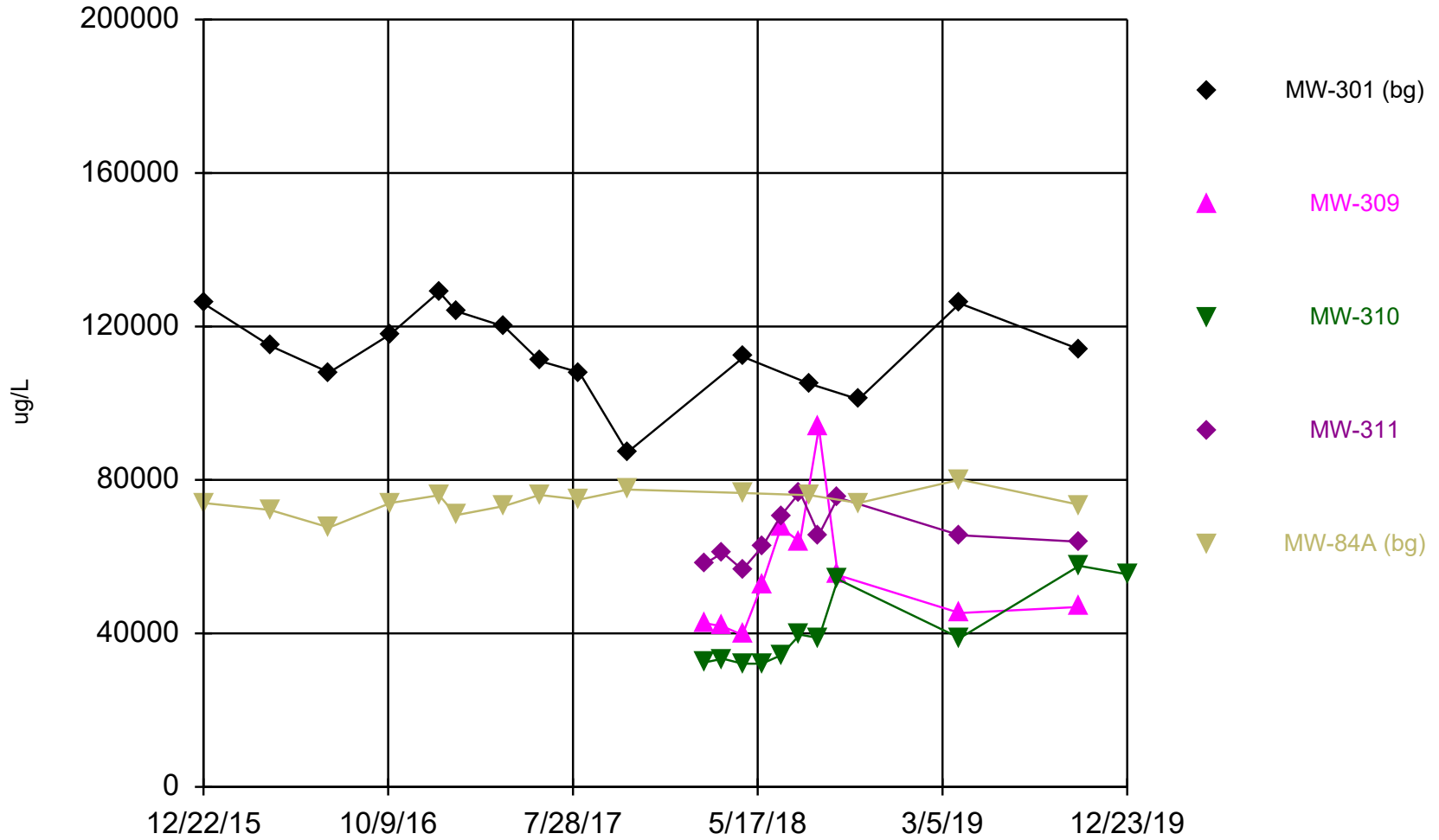
Constituent: Boron Analysis Run 1/8/2020 2:40 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

Time Series

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

Time Series



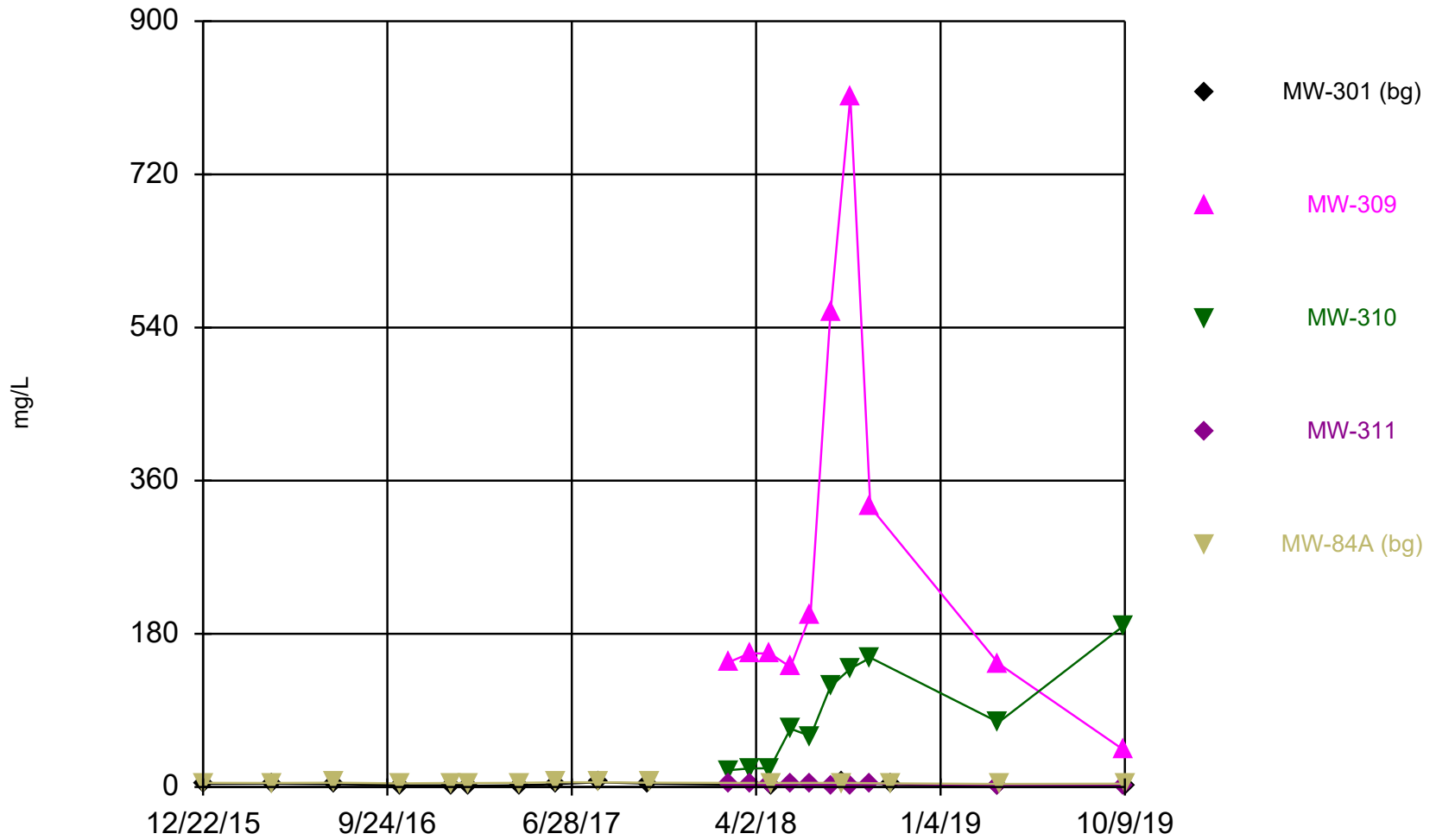
Constituent: Calcium Analysis Run 1/8/2020 2:40 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

Time Series

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)		

Time Series



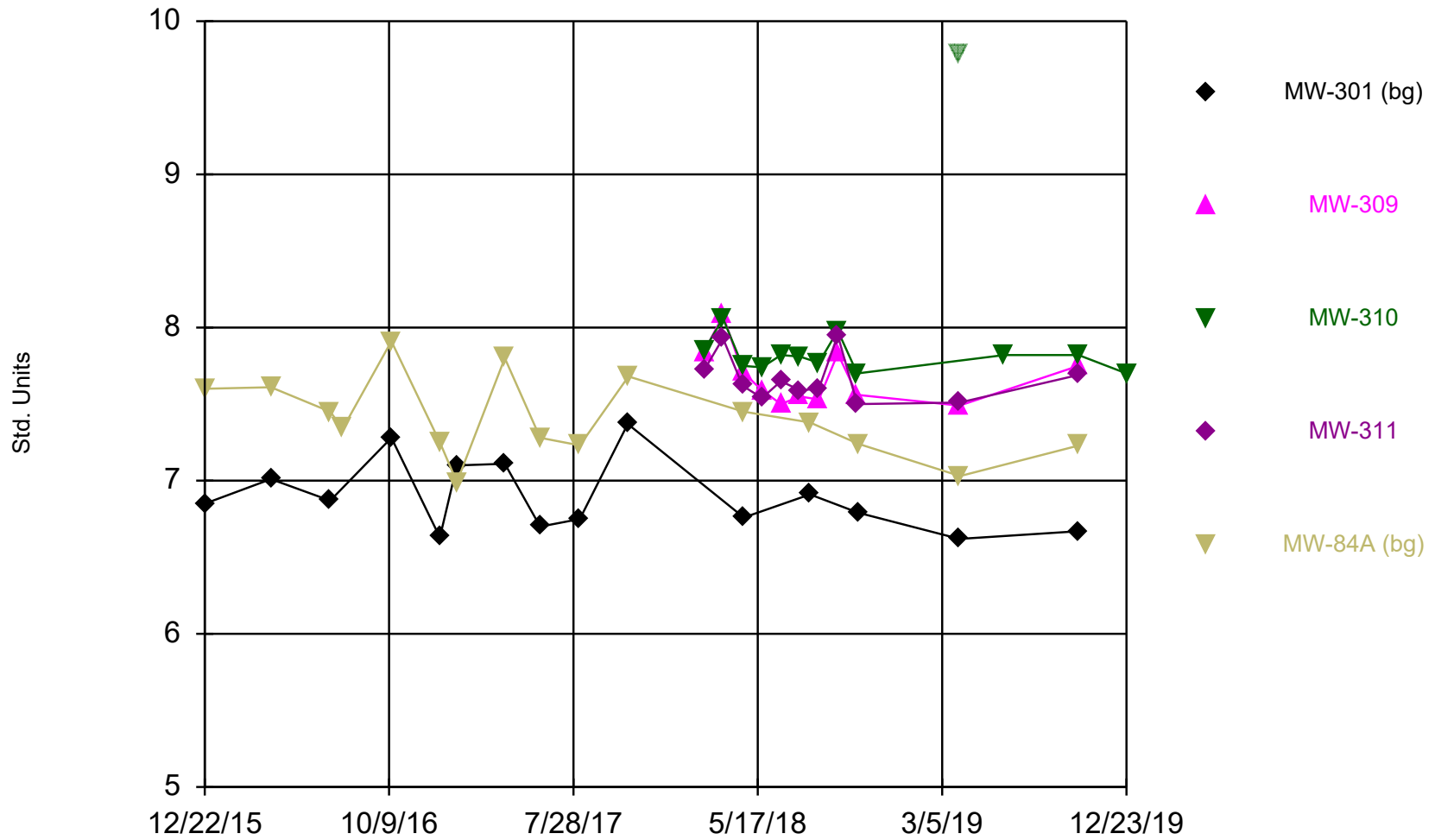
Constituent: Chloride Analysis Run 1/8/2020 2:40 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

Time Series

Constituent: Chloride (mg/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	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

Time Series



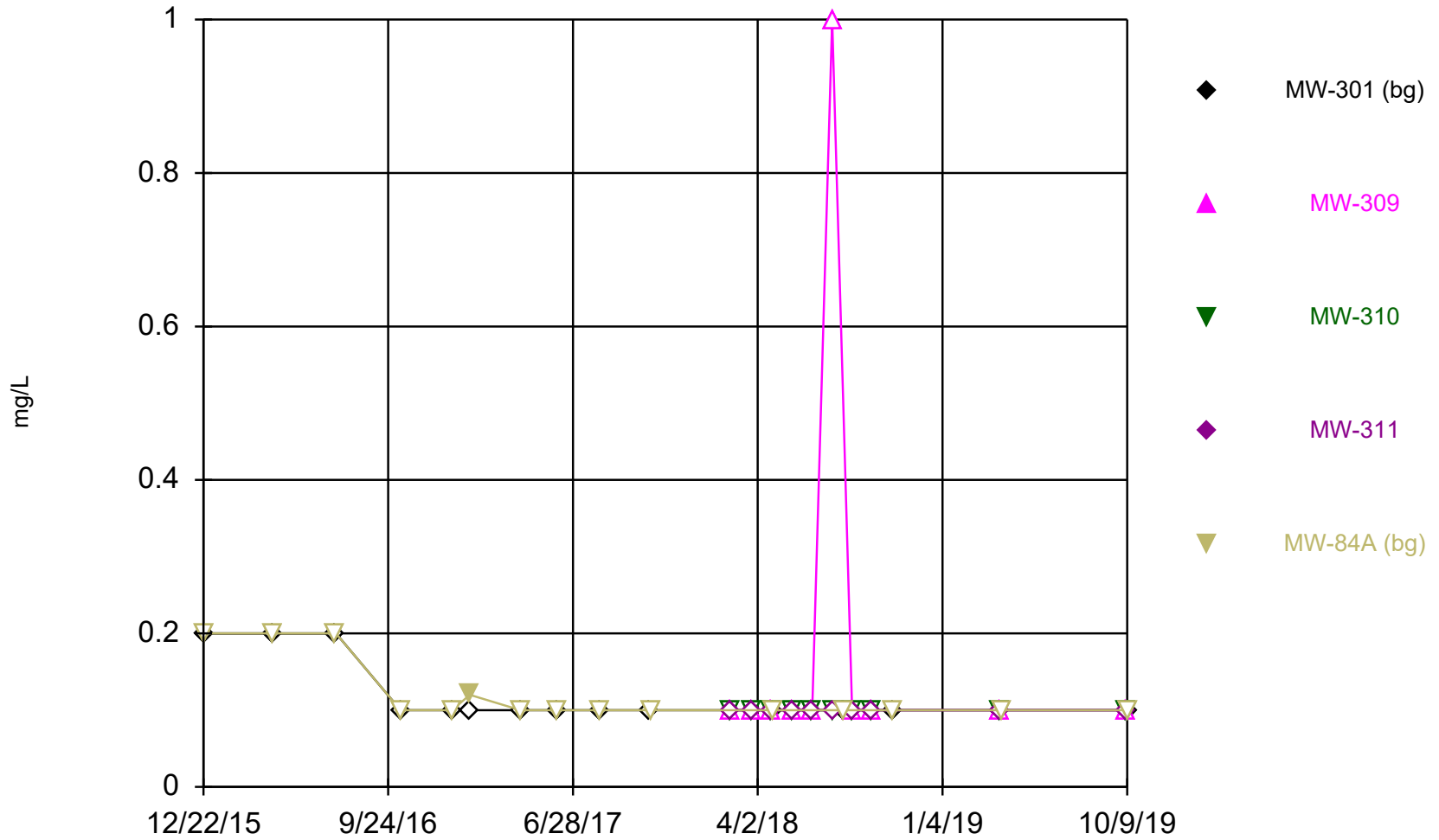
Constituent: Field pH Analysis Run 1/8/2020 2:40 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

Time Series

Constituent: Field pH (Std. Units) 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	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		

Time Series



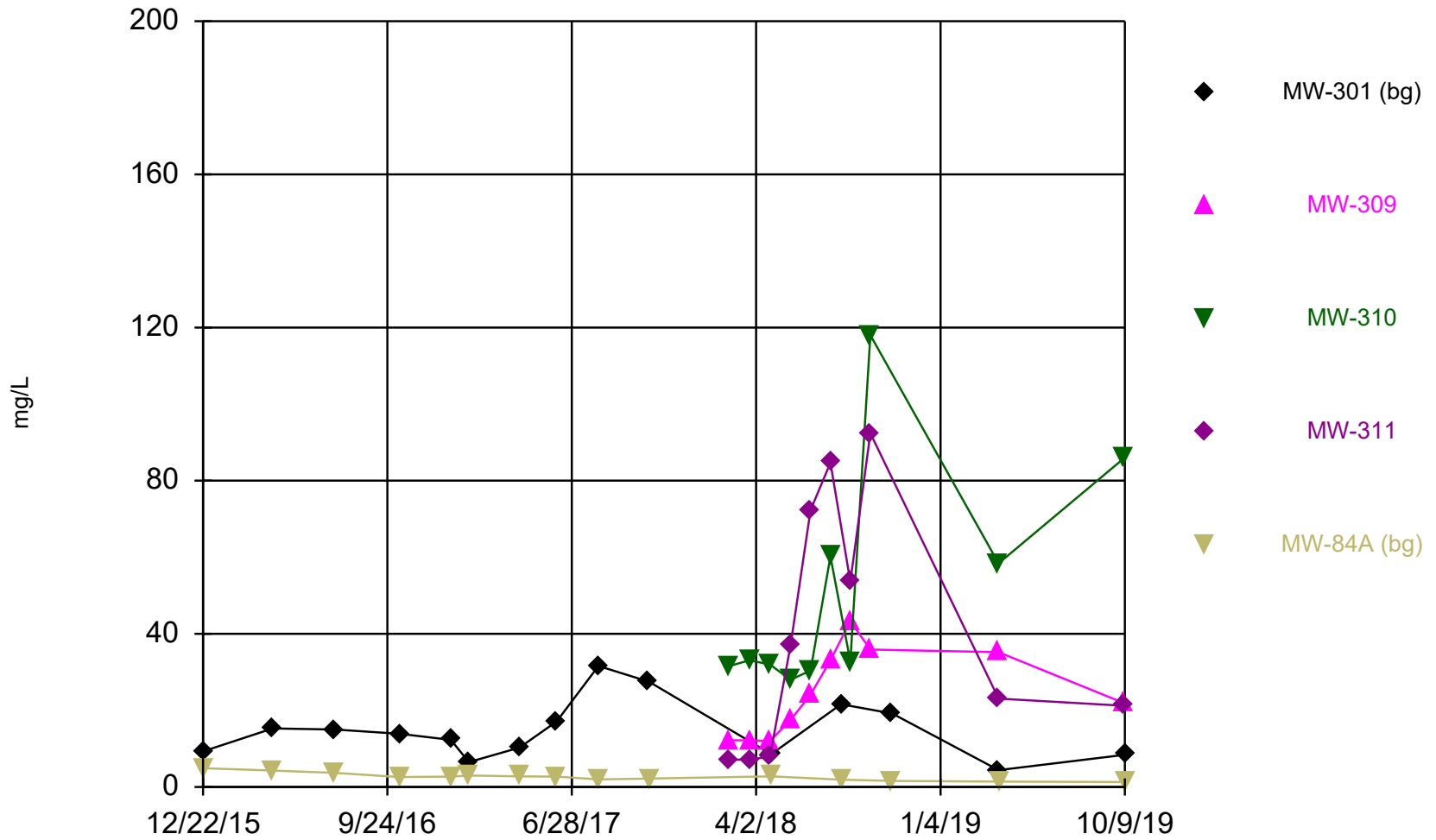
Constituent: Fluoride Analysis Run 1/8/2020 2:40 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

Time Series

Constituent: Fluoride (mg/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	<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

Time Series



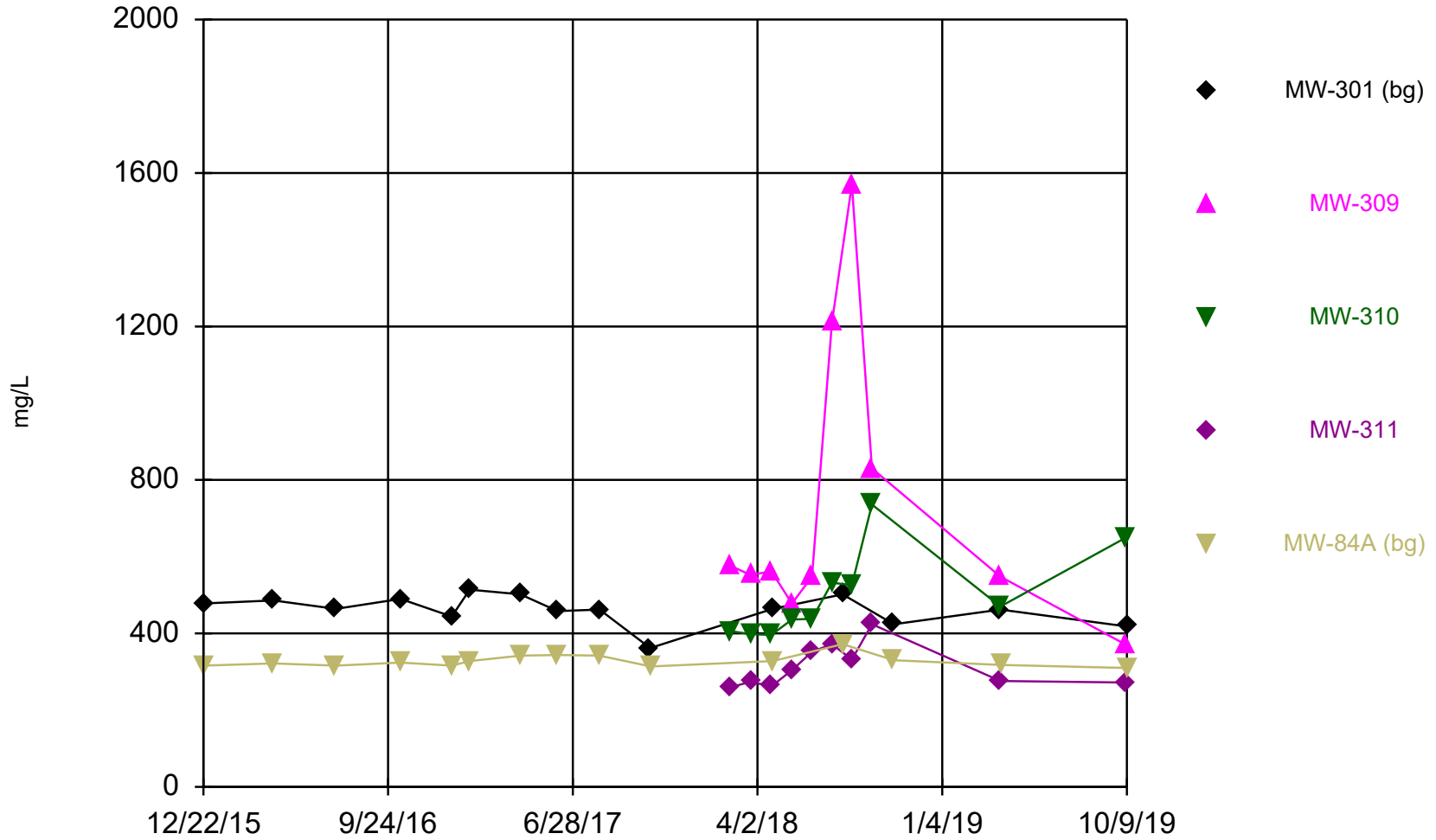
Constituent: Sulfate Analysis Run 1/8/2020 2:40 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

Time Series

Constituent: Sulfate (mg/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	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)

Time Series



Time Series

Constituent: Total Dissolved Solids (mg/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	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

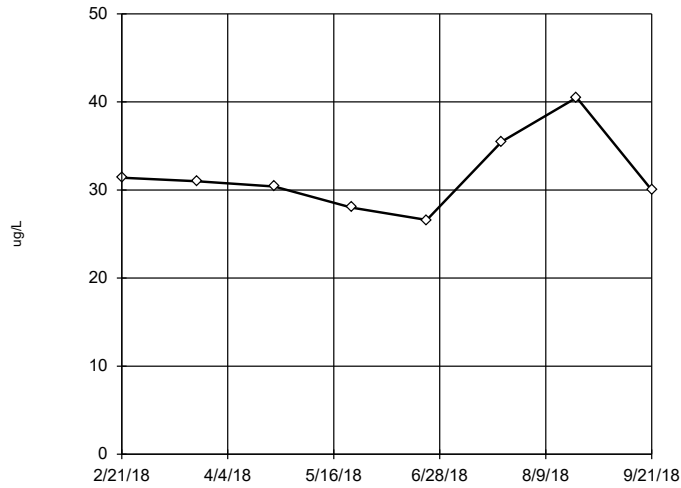
Outlier Analysis

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

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Date(s)</u>	<u>Method</u>	<u>Alpha</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
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

EPA Screening (suspected outliers for Dixon's Test)

MW-309

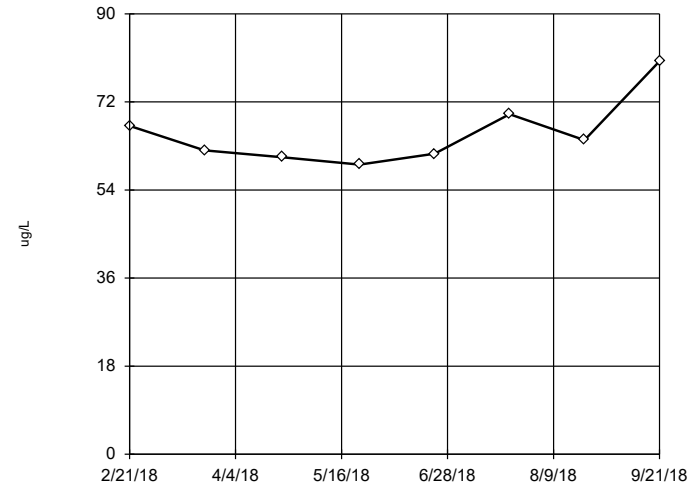


n = 8
 Dixon's will not be run.
 No suspect values identified or unable to establish suspect values.
 Mean 31.68, std. dev. 4.42, critical Tn 2.032
 Normality test used:
 Shapiro Wilk@alpha = 0.05
 Calculated = 0.8951
 Critical = 0.818
 The distribution was found to be normally distributed.

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

Dixon's Outlier Test

MW-310

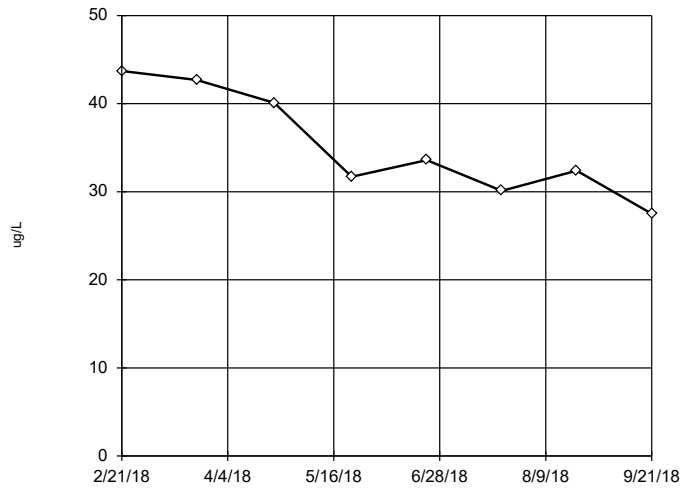


n = 8
 No statistical outliers.
 Testing for 1 high outlier.
 Mean = 65.56,
 Std. Dev. = 8.87,
 80.3; c = 0.551
 tab1 = 0.554,
 Alpha = 0.05.
 Normality test used:
 Shapiro Wilk@alpha = 0.05
 Calculated = 0.9326
 Critical = 0.803
 The distribution was found to be normally distributed.

Constituent: Boron 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)

MW-311

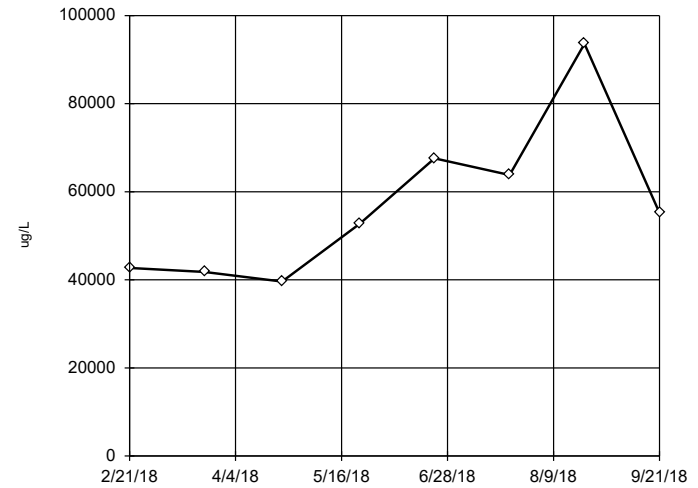


n = 8
 Dixon's will not be run.
 No suspect values identified or unable to establish suspect values.
 Mean 35.23, std. dev. 6.1, critical Tn 2.032
 Normality test used:
 Shapiro Wilk@alpha = 0.05
 Calculated = 0.9014
 Critical = 0.818
 The distribution was found to be normally distributed.

Constituent: Boron 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)

MW-309



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

EPA 1989 Outlier Screening

Constituent: Boron (ug/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

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

EPA 1989 Outlier Screening

Constituent: Boron (ug/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

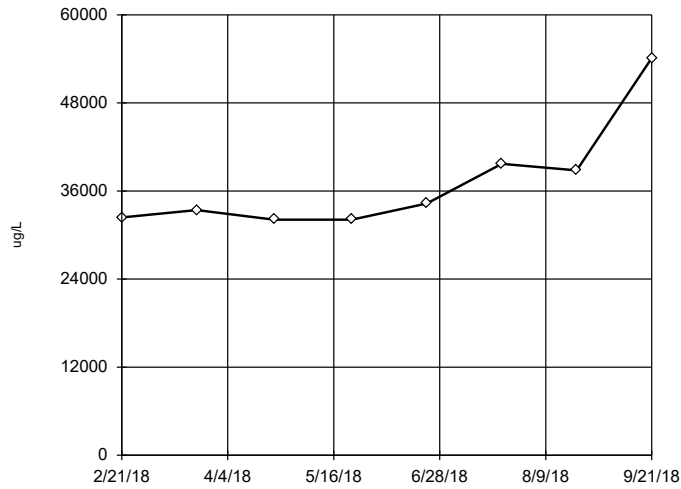
	MW-311
2/21/2018	43.7
3/23/2018	42.7
4/23/2018	40.1
5/24/2018	31.7
6/23/2018	33.6
7/23/2018	30.1
8/22/2018	32.4
9/21/2018	27.5

EPA 1989 Outlier Screening

Constituent: Calcium (ug/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

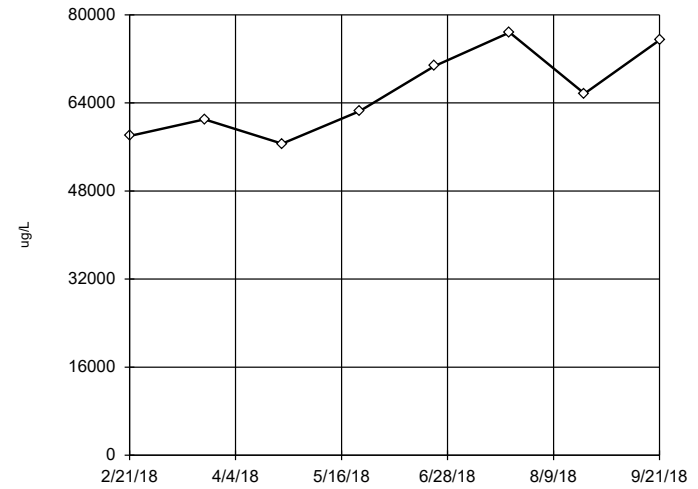
Tukey's Outlier Screening
MW-310



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.
High cutoff = 60250, low cutoff = 11250, based on IQR multiplier of 3.

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

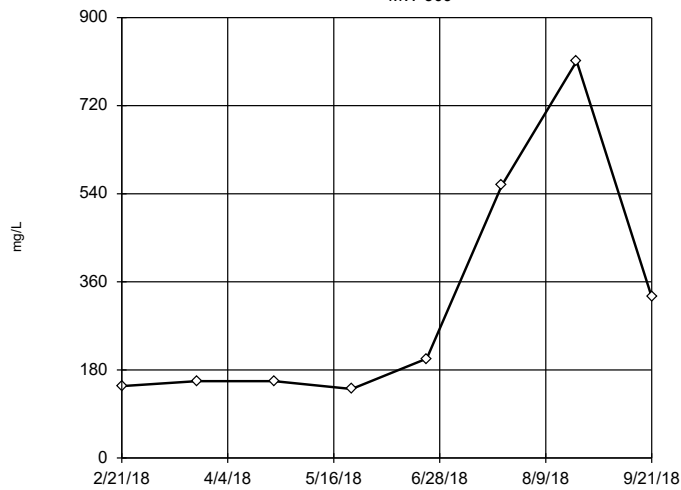
EPA Screening (suspected outliers for Dixon's Test)
MW-311



n = 8
Dixon's will not be run. No suspect values identified or unable to establish suspect values.
Mean 6539, std. dev. 7714, critical Tn 2.032
Normality test used: Shapiro Wilk@alpha = 0.05
Calculated = 0.9222
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

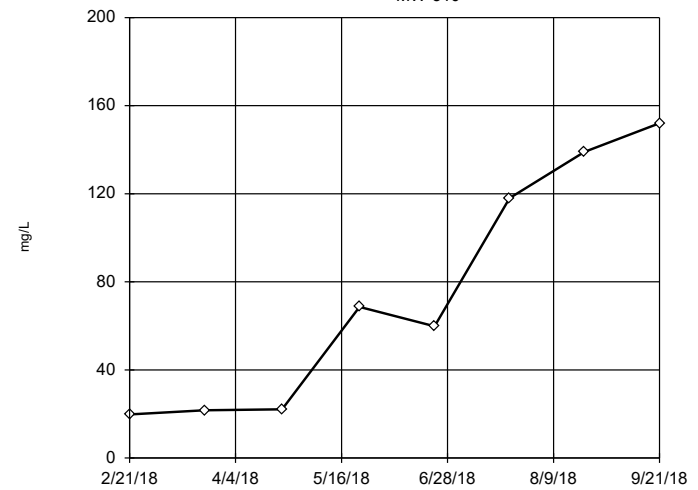
EPA Screening (suspected outliers for Dixon's Test)
MW-309



n = 8
Dixon's will not be run. No suspect values identified or unable to establish suspect values.
Mean 312.8, std. dev. 246.6, critical Tn 2.032
Normality test used: Shapiro Wilk@alpha = 0.05
Calculated = 0.8269
Critical = 0.818 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Chloride 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)
MW-310



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

Tukey's Outlier Screening

Constituent: Calcium (ug/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

EPA 1989 Outlier Screening

Constituent: Calcium (ug/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

EPA 1989 Outlier Screening

Constituent: Chloride (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

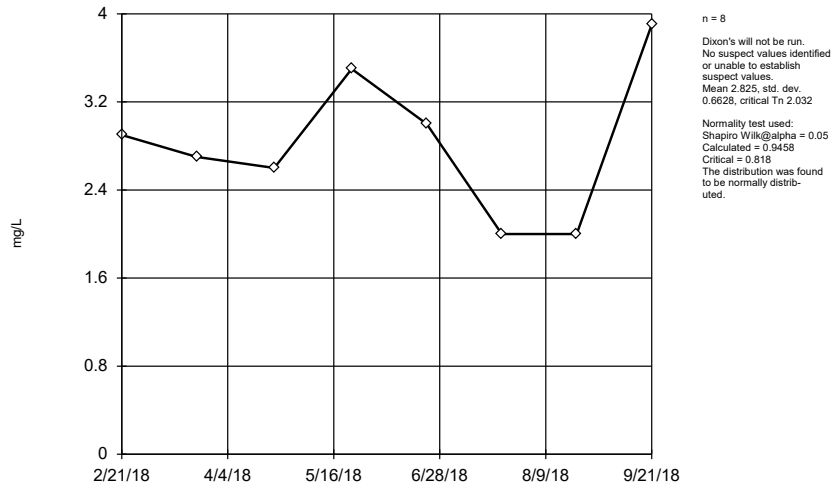
EPA 1989 Outlier Screening

Constituent: Chloride (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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)

MW-311

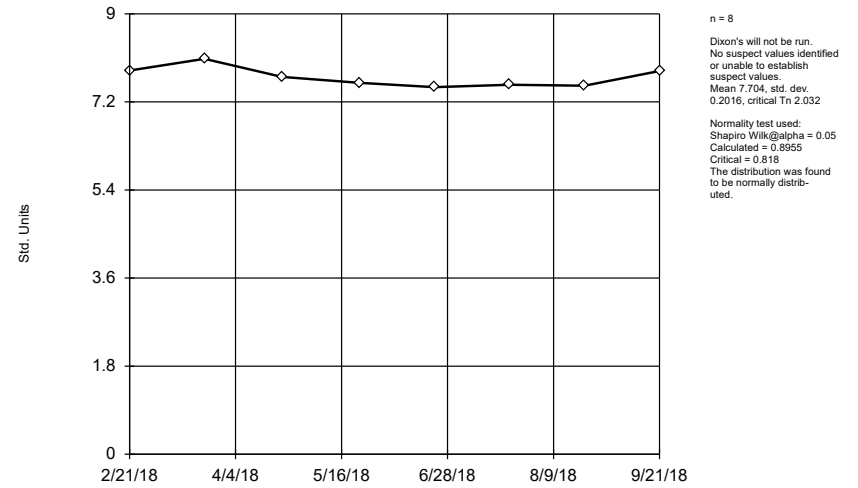


n = 8
 Dixon's will not be run.
 No suspect values identified or unable to establish suspect values.
 Mean 2.825, std. dev. 0.6628, critical Tn 2.032
 Normality test used:
 Shapiro Wilk@alpha = 0.05
 Calculated = 0.9458
 Critical = 0.818
 The distribution was found to be normally distributed.

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

EPA Screening (suspected outliers for Dixon's Test)

MW-309

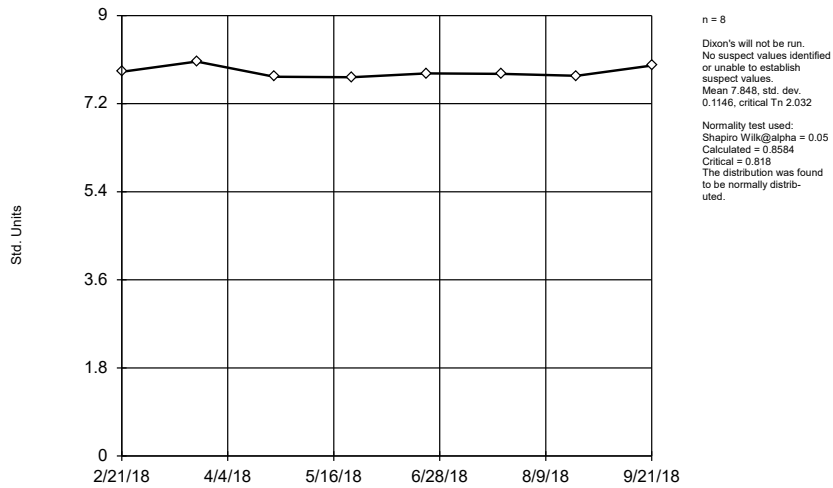


n = 8
 Dixon's will not be run.
 No suspect values identified or unable to establish suspect values.
 Mean 7.704, std. dev. 0.2016, critical Tn 2.032
 Normality test used:
 Shapiro Wilk@alpha = 0.05
 Calculated = 0.8955
 Critical = 0.818
 The distribution was found to be normally distributed.

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

EPA Screening (suspected outliers for Dixon's Test)

MW-310

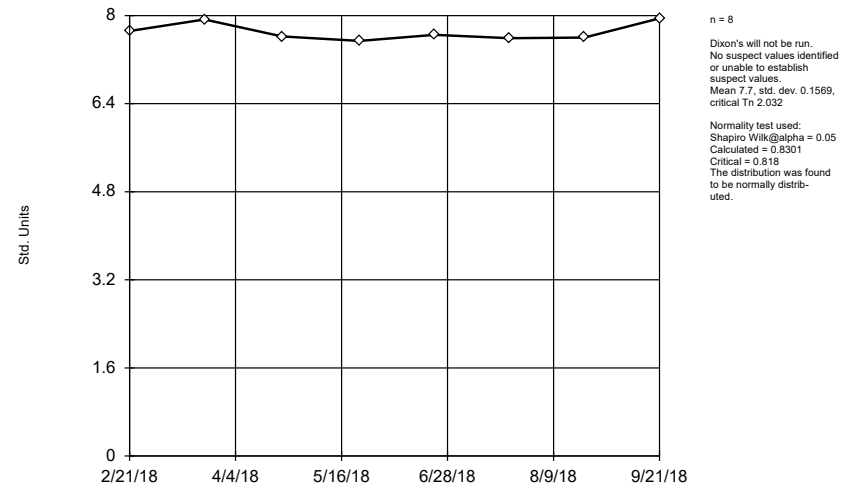


n = 8
 Dixon's will not be run.
 No suspect values identified or unable to establish suspect values.
 Mean 7.848, std. dev. 0.1146, critical Tn 2.032
 Normality test used:
 Shapiro Wilk@alpha = 0.05
 Calculated = 0.8584
 Critical = 0.818
 The distribution was found to be normally distributed.

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

EPA Screening (suspected outliers for Dixon's Test)

MW-311



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

EPA 1989 Outlier Screening

Constituent: Chloride (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

EPA 1989 Outlier Screening

Constituent: Field pH (Std. Units) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

EPA 1989 Outlier Screening

Constituent: Field pH (Std. Units) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

EPA 1989 Outlier Screening

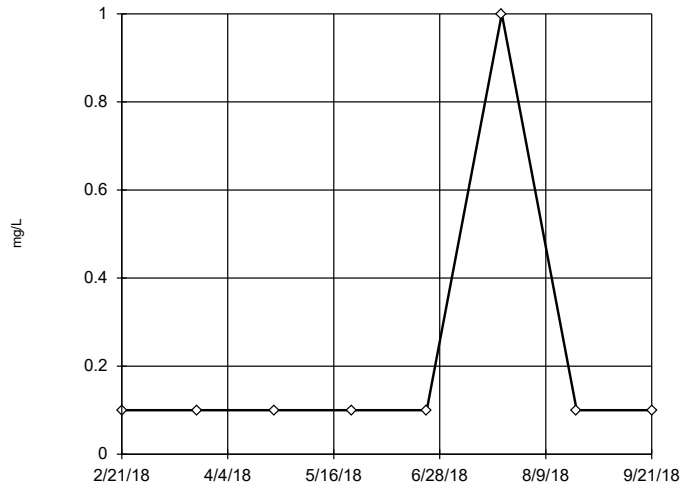
Constituent: Field pH (Std. Units) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

Tukey's Outlier Screening

MW-309

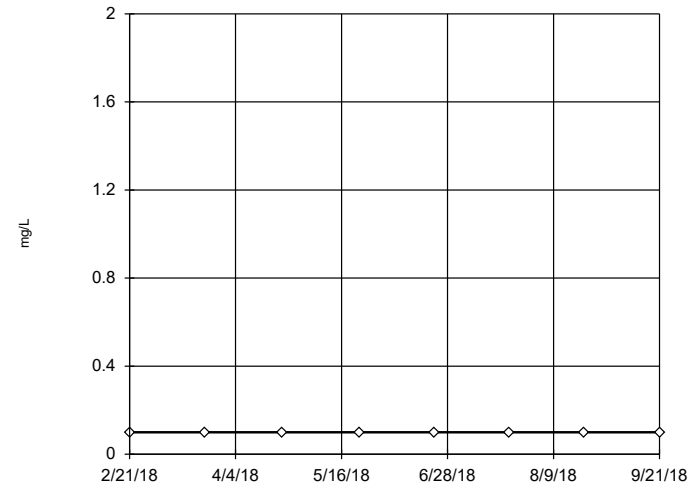


n = 8
 No outliers found.
 Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.
 The results were invalidated, because the lower and upper quartiles are equal.

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

Tukey's Outlier Screening

MW-310

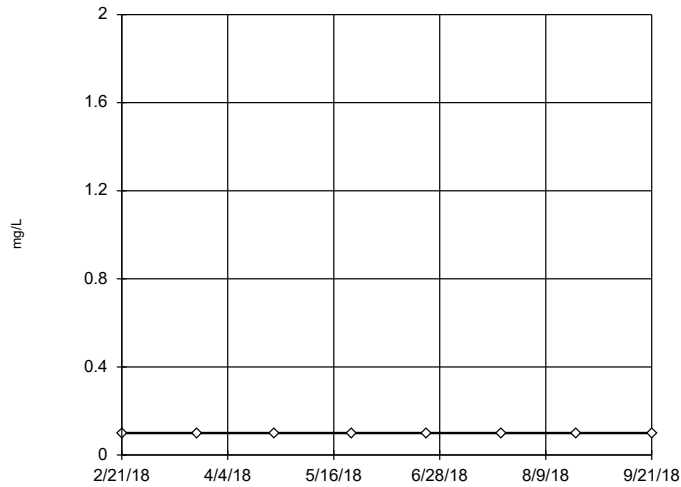


n = 8
 No outliers found.
 Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.
 The results were invalidated, because the lower and upper quartiles are equal.

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

Tukey's Outlier Screening

MW-311

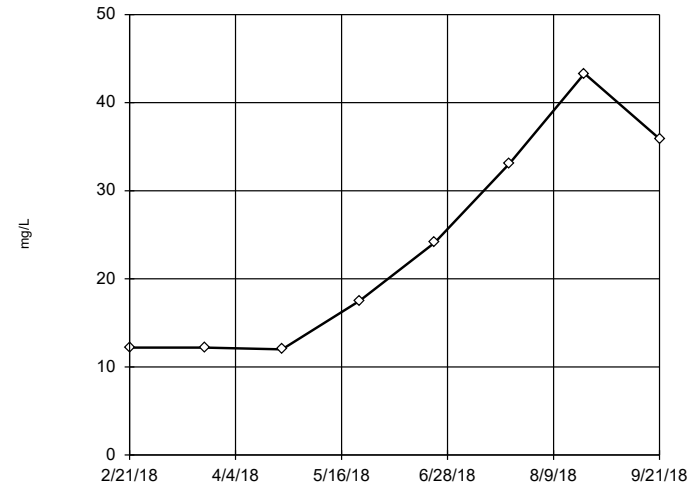


n = 8
 No outliers found.
 Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.
 The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Fluoride 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)

MW-309



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 = 0.818
 The distribution was found to be normally distributed.

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

Tukey's Outlier Screening

Constituent: Fluoride (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

Tukey's Outlier Screening

Constituent: Fluoride (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

Tukey's Outlier Screening

Constituent: Fluoride (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

MW-311

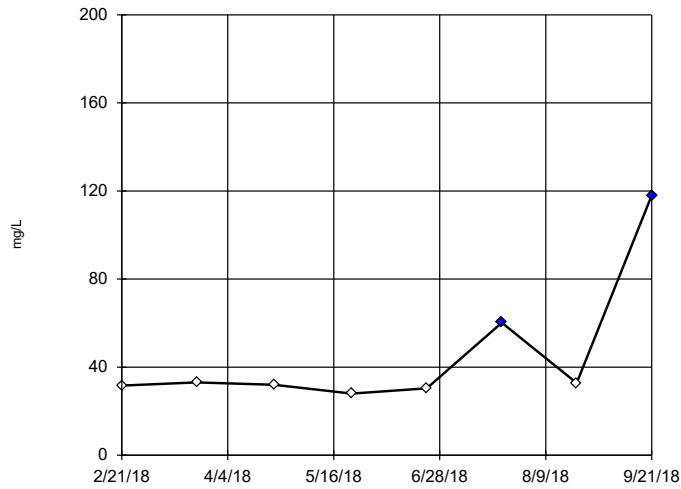
2/21/2018	<0.1
3/23/2018	<0.1
4/23/2018	<0.1
5/24/2018	<0.1
6/23/2018	<0.1
7/23/2018	<0.1
8/22/2018	<0.1
9/21/2018	<0.1

EPA 1989 Outlier Screening

Constituent: Sulfate (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

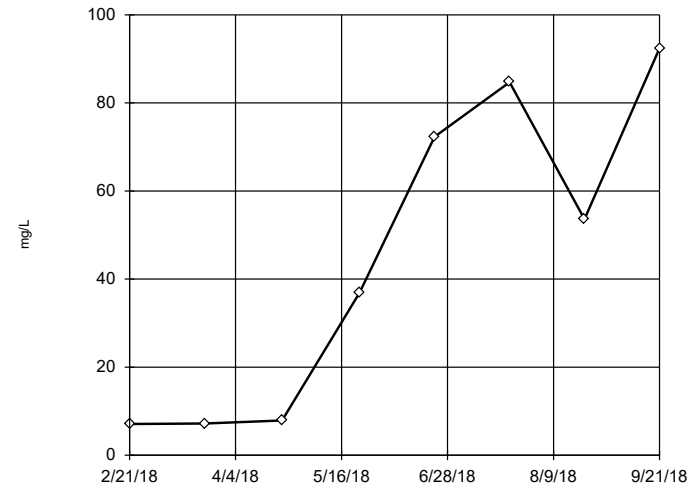
Dixon's Outlier Test
MW-310



n = 8
 Statistical outliers are drawn as solid.
 Testing for 2 high outliers.
 Mean = 45.76
 Std. Dev. = 30.93
 60.2; c = 0.9094
 tab1 = 0.554
 Alpha = 0.05.
 Normality test used:
 Shapiro Wilk@alpha = 0.05
 Calculated = 0.8952
 Critical = 0.788
 The distribution, after removal of suspect values, was found to be normally distributed.

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

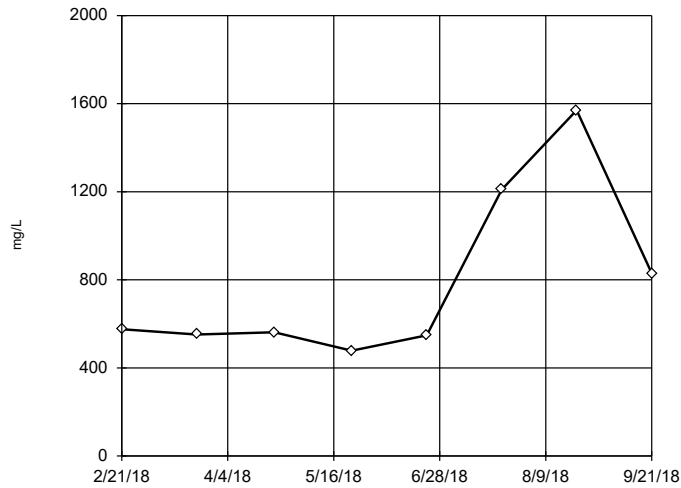
EPA Screening (suspected outliers for Dixon's Test)
MW-311



n = 8
 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
 Normality test used:
 Shapiro Wilk@alpha = 0.05
 Calculated = 0.8714
 Critical = 0.818
 The distribution was found to be normally distributed.

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

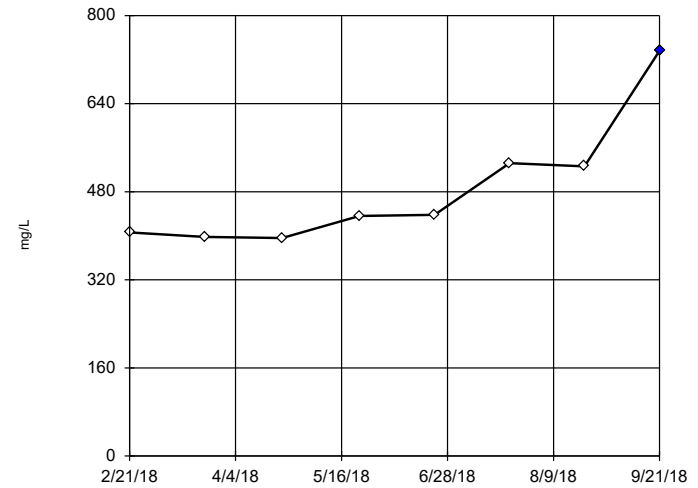
EPA Screening (suspected outliers for Dixon's Test)
MW-309



n = 8
 Dixon's will not be run.
 No suspect values identified or unable to establish suspect values.
 Mean = 790.8; std. dev. 395.8; critical Tn 2.032
 Normality test used:
 Shapiro Wilk@alpha = 0.05
 Calculated = 0.8229
 Critical = 0.818 (after natural log transformation)
 The distribution was found to be log-normal.

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
MW-310



n = 8
 Statistical outlier is drawn as solid.
 Testing for 1 high outlier.
 Mean = 483.5
 Std. Dev. = 115.4
 730; c = 0.6036
 tab1 = 0.554
 Alpha = 0.05.
 Normality test used:
 Shapiro Wilk@alpha = 0.05
 Calculated = 0.8057
 Critical = 0.803
 The distribution, after removal of suspect value, was found to be normally distributed.

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

	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)

EPA 1989 Outlier Screening

Constituent: Sulfate (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

EPA 1989 Outlier Screening

Constituent: Total Dissolved Solids (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

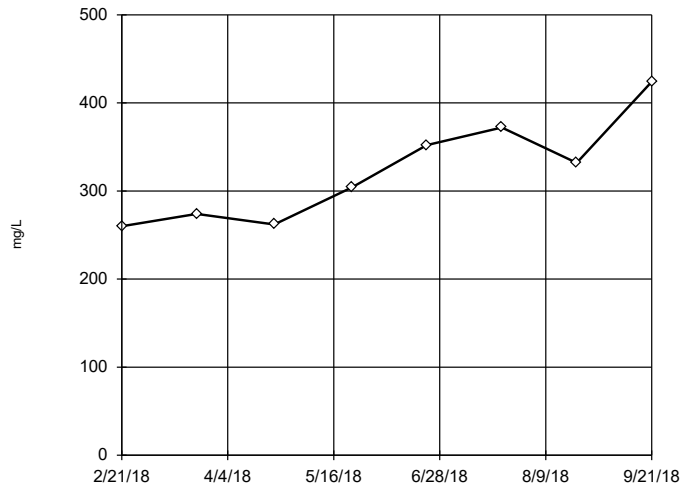
Dixon's Outlier Test

Constituent: Total Dissolved Solids (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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 (O)

EPA Screening (suspected outliers for Dixon's Test)

MW-311



n = 8
Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 322.5, std. dev.
58.52, critical Tr 2.032

Normality test used:
Shapiro Wilk@alpha = 0.05
Calculated = 0.9288
Critical = 0.818
The distribution was found
to be normally distrib-
uted.

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

EPA 1989 Outlier Screening

Constituent: Total Dissolved Solids (mg/L) Analysis Run 12/12/2019 4:31 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

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

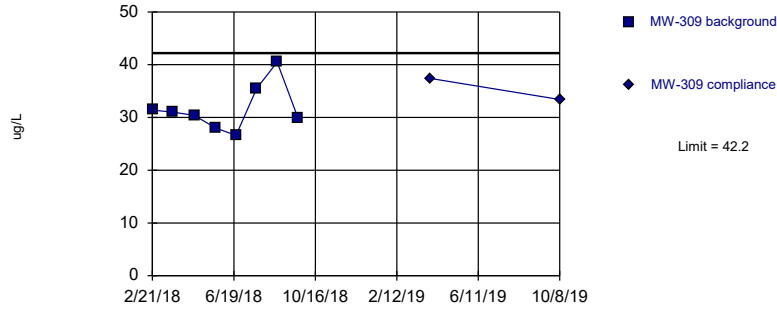
Intrawell Prediction Limit

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

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Wells</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Boron (ug/L)	MW-309	42.2	n/a	10/8/2019	33.4	No	8	n/a	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	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	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	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	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	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	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	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	2.825	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	7.704	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	7.848	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	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	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	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	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	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	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	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	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	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	322.5	58.52	0	None	No	0.002922	Param 1 of 2

Within Limit

Boron Intrawell Parametric

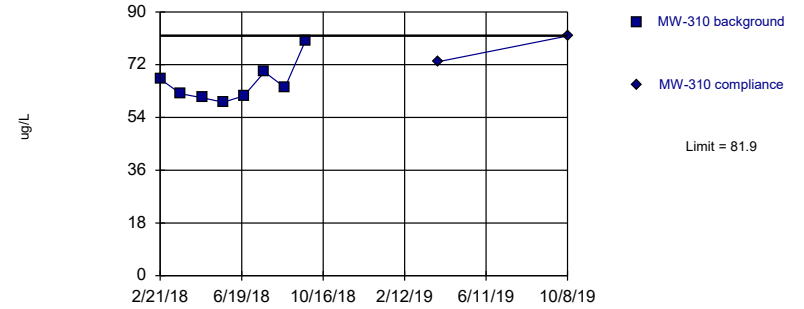


Background Data Summary: Mean=31.68, Std. Dev.=4.42, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8951, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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

Within Limit

Boron Intrawell Parametric

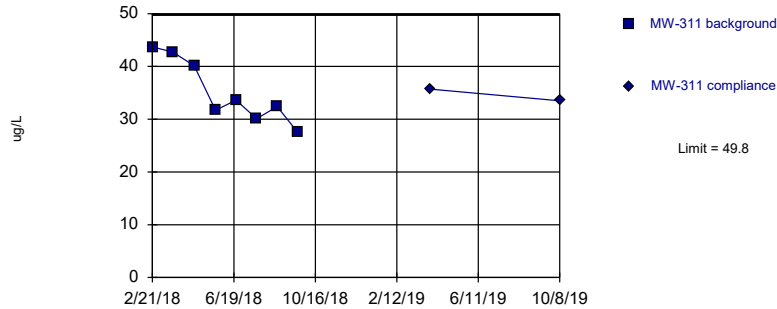


Background Data Summary: Mean=65.56, Std. Dev.=6.87, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8407, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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

Within Limit

Boron Intrawell Parametric

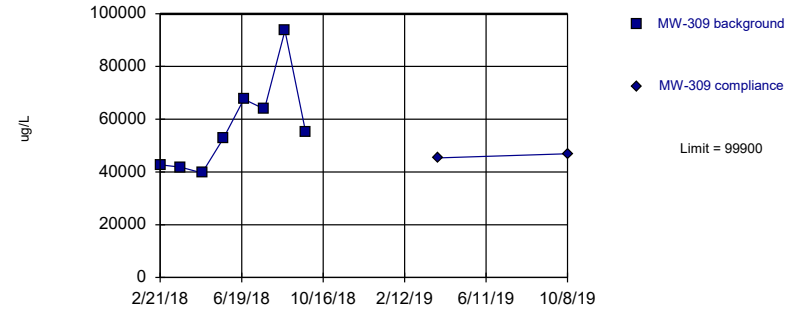


Background Data Summary: Mean=35.23, Std. Dev.=6.1, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9014, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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

Within Limit

Calcium Intrawell Parametric



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 = 0.002922.

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

Prediction Limit

Constituent: Boron (ug/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

Prediction Limit

Constituent: Boron (ug/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

Prediction Limit

Constituent: Boron (ug/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

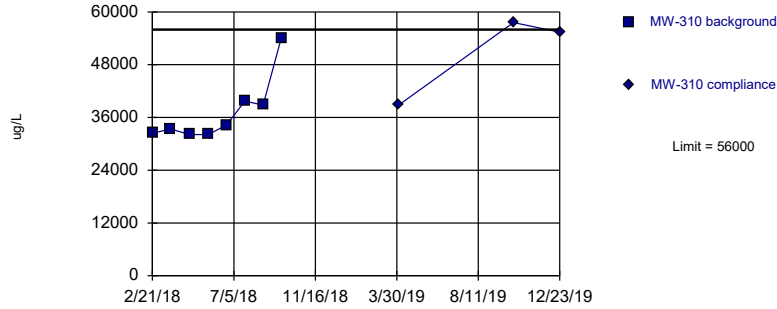
Prediction Limit

Constituent: Calcium (ug/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	MW-309	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

Within Limit

Calcium
Intrawell Parametric

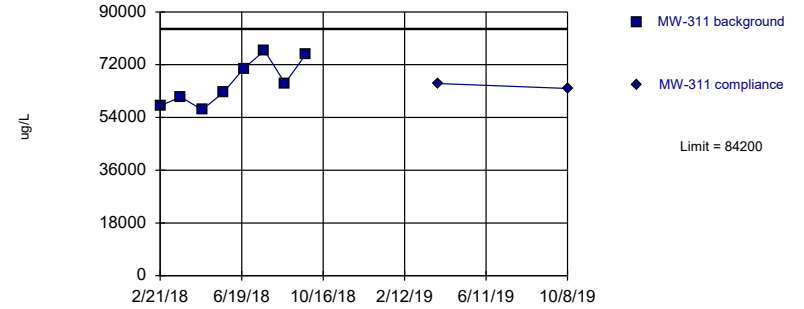


Background Data Summary (based on natural log transformation): Mean=10.51, Std. Dev.=0.1791, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7707, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha =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

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

Within Limit

Calcium
Intrawell Parametric

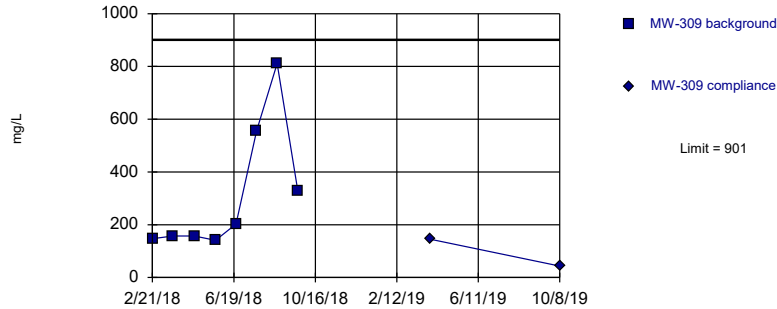


Background Data Summary: Mean=65838, Std. Dev.=7714, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9222, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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

Within Limit

Chloride
Intrawell Parametric

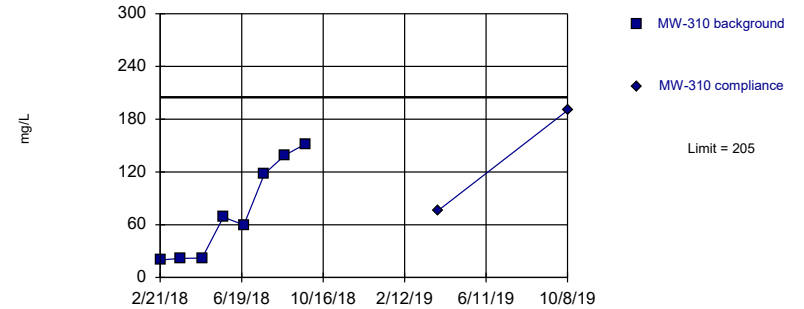


Background Data Summary: Mean=312.8, Std. Dev.=246.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7572, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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

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.

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

Prediction Limit

Constituent: Calcium (ug/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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)

Prediction Limit

Constituent: Calcium (ug/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

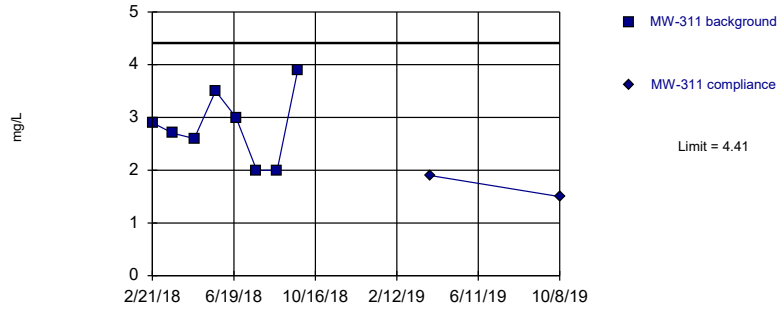
Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	MW-310	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	
4/2/2019		76
10/8/2019		190

Within Limit

Chloride Intrawell Parametric

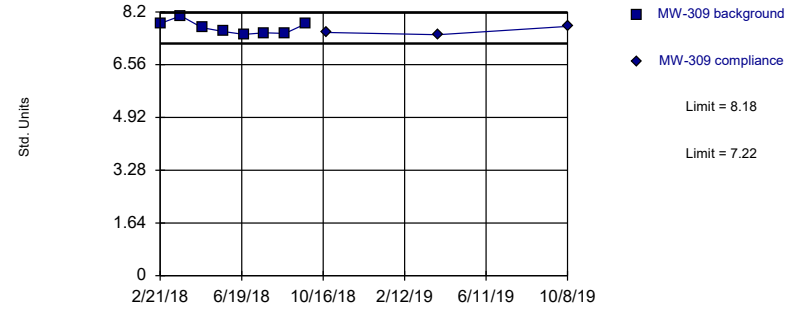


Background Data Summary: Mean=2.825, Std. Dev.=0.6628, n=8. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9458, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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

Within Limits

Field pH Intrawell Parametric

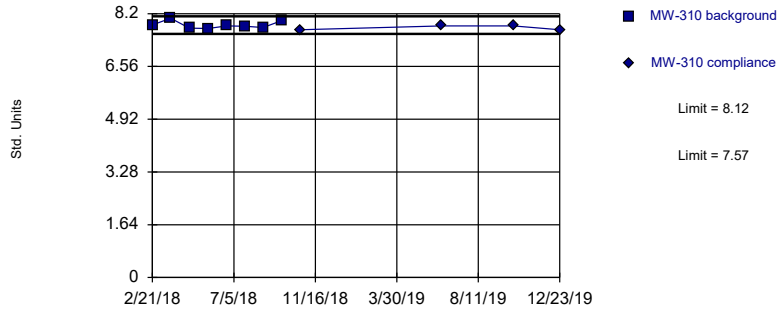


Background Data Summary: Mean=7.704, Std. Dev.=0.2016, n=8. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8955, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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

Within Limits

Field pH Intrawell Parametric

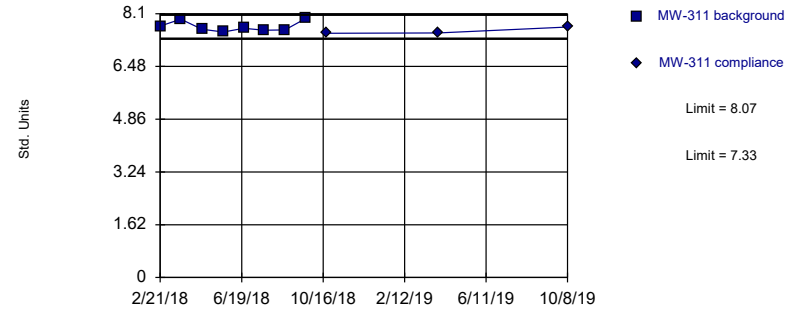


Background Data Summary: Mean=7.848, Std. Dev.=0.1146, n=8. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8584, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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

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.

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

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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)

Prediction Limit

Constituent: Field pH (Std. Units) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

Prediction Limit

Constituent: Field pH (Std. Units) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

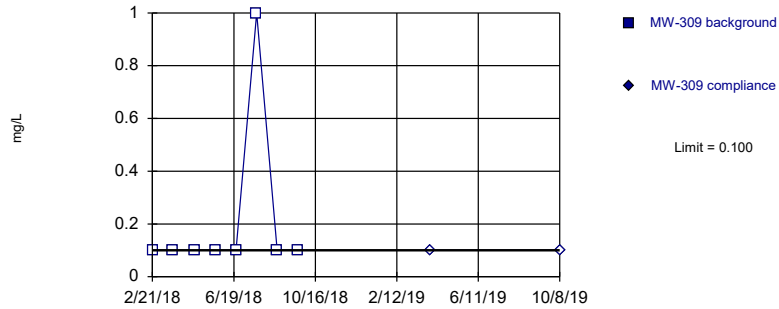
Prediction Limit

Constituent: Field pH (Std. Units) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

Within Limit

Fluoride
Intrawell Non-parametric

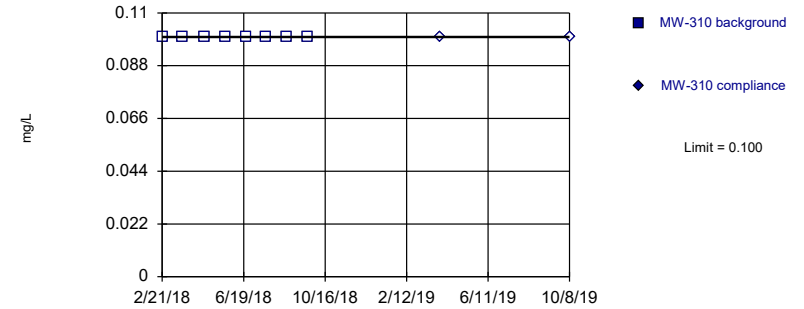


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test 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

Within Limit

Fluoride
Intrawell Non-parametric

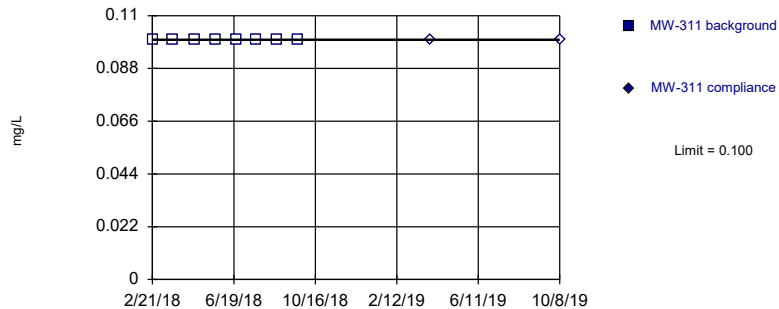


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test 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

Within Limit

Fluoride
Intrawell Non-parametric

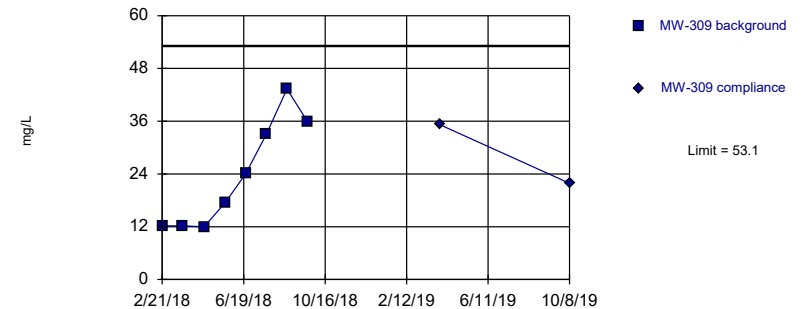


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient data to test 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

Within Limit

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.

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

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	MW-309	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	
4/2/2019		<0.1
10/8/2019		<0.1

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

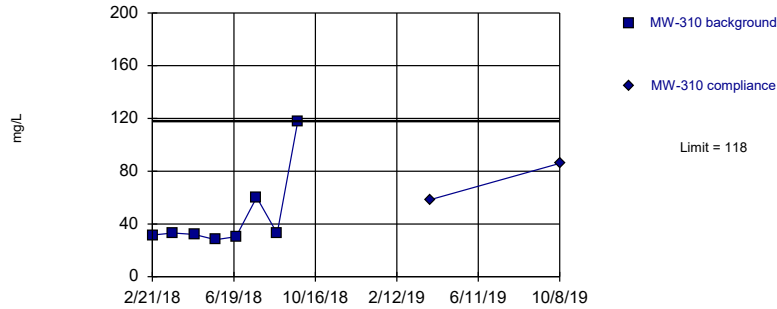
Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	MW-309	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	
4/2/2019		35.2
10/8/2019		21.9

Within Limit

Sulfate
Intrawell Non-parametric

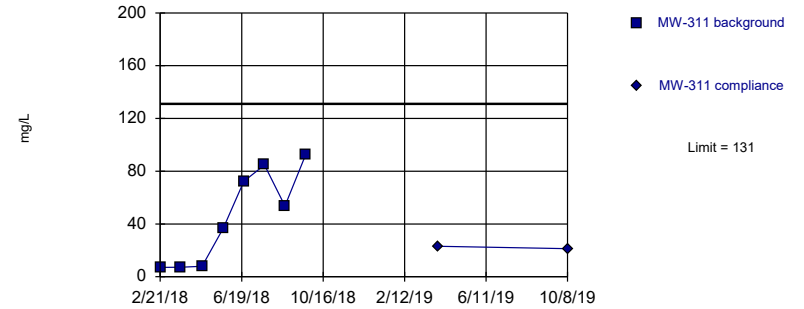


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Insufficient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

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

Within Limit

Sulfate
Intrawell Parametric

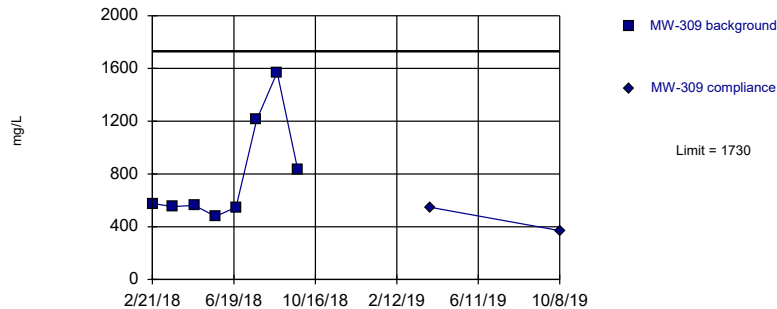


Background Data Summary: Mean=45.26, Std. Dev.=35.75, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8714, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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

Within Limit

Total Dissolved Solids
Intrawell Parametric

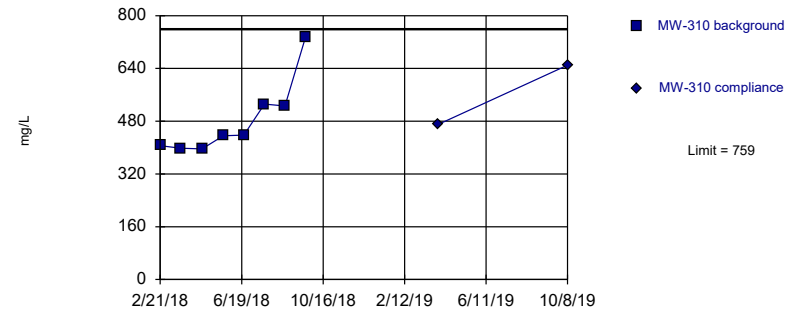


Background Data Summary: Mean=790.8, Std. Dev.=395.8, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.771, critical = 0.749. Kappa = 2.384 (c=6, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002922.

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

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

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

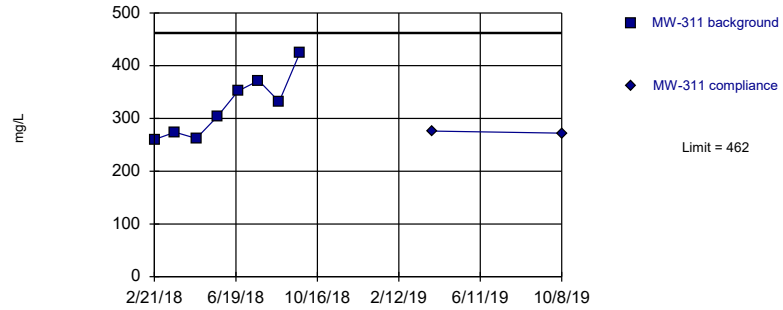
Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

Within Limit

Total Dissolved Solids Intrawell Parametric



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

Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 1/8/2020 2:08 PM
Columbia Energy Center Client: SCS Engineers Data: Input -191203

	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

Exclude data flags:

Observations with flags containing the following characters will be deselected: 'R', 'Y'.

Data Reading Options

- Individual Observations
- Mean of Each: Month
- Median of Each: Season

Automatically Process Resamples...

- Black and White Output
- Four Plots Per Page
 - Always Combine Data Pages...
 - Include Tick Marks on Data Page
 - Use Constituent Name for Graph Title
- Draw Border Around Text Reports and Data Pages
- Enlarge/Reduce Fonts (Graphs): %
- Enlarge/Reduce Fonts (Data/Text Reports): %
- Wide Margins (on reports without explicit setting)
- Use CAS# (Not Const. Name)
- Truncate File Names to Characters
- Include Limit Lines when found in Database...
- Show Deselected Data on Time Series ▾
- Show Deselected Data on all Data Pages ▾

- Prompt to Overwrite/Append Summary Tables
- Round Limits to Sig. Digits (when not set in data file)
- User-Set Scale
- Indicate Background Data
- Show Exact Dates
- Thick Plot Lines

Zoom Factor: ▾

- Output Decimal Precision
- Less Precision
 - Normal Precision
 - More Precision

Store Print Jobs in Multiple Constituent Mode

Printer: ▾

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)
- Dixon's at $\alpha=$ or if n > Rosner's at $\alpha=$ Use EPA Screening to establish Suspected Outliers
- Tukey's Outlier Screening, with IQR Multiplier = Use Ladder of Powers to achieve Best W Stat
- Test For Normality using Shapiro-Wilk/Francia at Alpha = 0.05
 - Stop if Non-Normal
 - Continue with Parametric Test if Non-Normal
 - Tukey's if Non-Normal, with IQR Multiplier = Use Ladder of Powers to achieve Best W Stat
- No Outlier If Less Than Times Median
- Apply Rules found in Ohio Guidance Document 0715
- Combine Background Wells on the Outlier Report...

Piper, Stiff Diagram

- Combine Wells Label Constituents
- Combine Dates Label Axes
- Use Default Constituent Names Note Cation-Anion Balance (Piper only)
- Use Constituent Definition File

Test for Normality using Shapiro-Wilk/Francia at Alpha = 0.01

Use Non-Parametric Test when Non-Detects Percent > 50

Use Aitchison's Adjustment when Non-Detects Percent > 15

Optional Further Refinement: Use when NDs % > 50

Use Poisson Prediction Limit when Non-Detects Percent > 0

Transformation

Use Ladder of Powers

Natural Log or No Transformation

Never Transform

Use Specific Transformation: Natural Log

Use Best W Statistic

Plot Transformed Values

Deseasonalize (Intra- and InterWell)

If Seasonality Is Detected

If Seasonality Is Detected Or Insufficient to Test

Always (When Sufficient Data) Never

Always Use Non-Parametric

Facility

Statistical Evaluations per Year:

Constituents Analyzed:

Downgradient (Compliance) Wells:

Sampling Plan

Comparing Individual Observations

1 of 1 1 of 2 1 of 3 1 of 4

2 of 4 ("Modified California")

IntraWell Other

Stop if Background Trend Detected at Alpha = 0.05

Plot Background Data

Override Standard Deviation:

Override DF: Override Kappa:

Automatically Remove Background Outliers

2-Tailed Test Mode...

Show Deselected Data Lighter

Non-Parametric Limit = Highest Background Value

Non-Parametric Limit when 100% Non-Detects:

Highest/Second Highest Background Value

Most Recent PQL if available, or MDL

Most Recent Background Value (subst. method)

Appendix F

Alternative Source Demonstration (ASD) - May 2020

Alternative Source Demonstration May 2020 Detection Monitoring

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

Prepared for:



SCS ENGINEERS

25220067.00 | November 12, 2020

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

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- Appendix B August 2020 Laboratory Report
- Appendix C Regional Geologic and Hydrogeologic Background Information
- Appendix D Boring Logs
- Appendix E Historical Groundwater Flow Maps

I:\25220067.00\Deliverables\2020 May ASD COL MOD 4 LF\201112_COL_4 LF_May20 ASD_DRAFT.docx

PE CERTIFICATION

	<p>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.</p>
	<p style="text-align: center;"><i>SC Clark</i> 11-12-2020</p>
	<p>(signature) (date)</p>
	<p style="text-align: center;">Sherren Clark</p>
	<p>(printed or typed name)</p>
<p>License number E-29863</p> <p>My license renewal date is January 31, 2021.</p>	
<p>Pages or sheets covered by this seal: Alternative Source Demonstration, May 2020 Detection Monitoring, Dry Ash Disposal Facility, Module 4</p>	
<p>Columbia Energy Center, Pardeeville, Wisconsin (Entire Document)</p>	

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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 August 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 SSI for boron that was observed in the statistical evaluation of the May 2020 detection monitoring event at the Columbia Energy Center (COL) Dry Ash Disposal Facility, Module 4 CCR Unit (COL MOD 4).

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 Module 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 coal combustion residual (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 Modules 1-3 of the COL ADF, for the primary ash pond and for 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 May 2020 and June 2020 sampling results, are summarized in the attached **Table 1**. Based on the May and June 2020 data, an SSI for boron occurred at MW-309 for the May semiannual detection monitoring event, because both results exceeded the intrawell UPL. A supplemental resample collected from MW-309 in August 2020 also had a boron concentration exceeding the UPL.

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**, and the concentrations trend is shown in **Appendix A**. Laboratory reports for the eight background monitoring events were included in the previous Annual Groundwater Monitoring and Corrective Action Reports. The laboratory reports for the May and June, 2020 detection monitoring event were previously transmitted to WPL, and the laboratory report for the August resampling is provided in **Appendix B**. All of the 2020 laboratory reports will be included in a 2020 Annual Groundwater Monitoring and Corrective Action Report to be submitted in January 2021.

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.

A summary of the regional hydrogeologic stratigraphy is presented in **Appendix C**. 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 C**.

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 C**.

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., 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. Boring logs for the downgradient monitoring wells used to evaluate the COL MOD 4, MW-309, MW-310, and MW-311, are included in **Appendix D**. Boring logs for background wells, MW-301 and MW-84A, were previously submitted in a separate ASD for the COL MOD 1-3 LF (SCS Engineers [SCS], 2018).

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.

2.4 GROUNDWATER FLOW DIRECTION

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 May 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**.

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.

The only potential sampling issue identified was the detection of boron in the field blank sample collected during the June resampling event. The resampling event was performed due to detection of boron above the UPL in the May 2020 sample from MW-309. In the resampling event, boron was again detected above the UPL, but the validity of the result was questioned due to the detection of boron in the field blank at 20.6 micrograms per liter, which is almost 40 percent of the result reporting for MW-309. SCS requested that the laboratory reanalyze both samples, and the reanalysis of the two samples was generally consistent with the initial analysis. Based on the reanalysis, the results were reported as usable results; however, a third sample was collected in August for additional confirmation. The August 2020 resample result for boron at MW-309 confirmed the UPL exceedance (**Table 1**), and boron was not detected in the associated field blank. The August 2020 laboratory report is provided in **Appendix B**.

SCS did not identify any other issues with the field analysis based on review of the data and field notes.

3.2 LABORATORY ANALYSIS REVIEW

The laboratory reports for the May 2020 detection monitoring event as well as the June and August 2020 retest events were reviewed to determine if any laboratory analysis error or issue may have caused or contributed to an observed SSI for boron. 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.

No other problems affecting data usability were identified during the review of the analytical reports.

The May 2020 sampling event as well as the June and August 2020 resampling events were completed in accordance with the Sampling and Analysis Plan for the monitoring system.

Other than the field blank issue discussed in **Section 3.1**, 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 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 May, June, and August 2020 sampling results, are summarized in the attached **Table 1**.

Based on the May sample and June retest results, an SSI for boron occurred for MW-309 for the May 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 at well MW-309. However, the small size of the intrawell background data set (8 samples per well) and the short timeframe over which they were collected (1) may have contributed to the identification of the May 2020 result as an SSI. 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 if it is confirmed that the 2020 results at MW-309 represent background conditions.

3.4 SUMMARY OF METHODOLOGY AND ANALYSIS REVIEW FINDINGS

In summary, besides an evaluation of the validity of the field blank detections, there were no other changes to the SSI determinations for the May, June, and August 2020 sampling events based on the methodology and analysis review. No errors causing or contributing to the reported SSIs were identified; however, the small background sample size may be a contributing factor if the variability in background conditions has not yet been adequately reflected in the UPLs.

4.0 ALTERNATIVE SOURCES

This section discusses the potential alternative sources for the boron 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 May 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, June, and August samples from MW-309 are lower than the 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. Because the background sampling at the three compliance wells was performed after other potential man-made sources of boron had been in operation for many years, it is difficult to determine how much of the variation in boron 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**. Regardless of the source, natural temporal variations in infiltration and groundwater flow direction may have contributed to the increase in boron concentration at MW-309 in 2020.

4.1.2 Man-Made Alternative Sources

Man-made alternative sources that could potentially contribute to the boron SSI 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, 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.

4.2 LINES OF EVIDENCE

The lines of evidence indicating that the SSI for boron in compliance well MW-309, relative to the intrawell background sampling, is due to an alternative source include:

1. The detected boron concentrations are lower than the background boron concentrations for nearby compliance well MW-310, indicating that concentrations in this range 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. 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 by April 2020.

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

4. When COL MOD 4 was constructed a composite liner was installed
5. Intrawell recalculation

4.2.1 MW-310 Background Concentrations

The detected boron concentrations at MW-309 are lower than the background boron concentrations for nearby compliance well MW-310, indicating that concentrations in this range were present in the groundwater in this area prior to initiation of CCR disposal in the Mod 4 CCR Unit. Historical boron 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 boron from natural and/or man-made alternative sources such as the ash ponds, has varied in concentration at MW-309 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 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 D**.

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 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 by April 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 in approximately 18 months. Based on the hydraulic conductivity of the liner clay (10^{-8}) and the slug test result from monitoring well MW-309 (2.1×10^{-4} cm/sec), it is very unlikely that changes in boron concentrations at MW-309 reflect a release from Mod 4.

5.0 ALTERNATIVE SOURCE DEMONSTRATION CONCLUSIONS

The lines of evidence discussed above regarding the SSI reported for boron concentrations in downgradient monitoring well MW-309 demonstrate that the SSIs are likely primarily due to sources other than the Mod 4 CCR Unit. Boron concentrations in the area were elevated prior to disposal of CCR in Mod 4 and are likely associated with historical discharges from the ash ponds via the effluent ditch located west of the landfill.

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 2020 Annual Report due January 31, 2021.

7.0 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.

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

SCS Engineers, 2018, Alternative Source Demonstration, April 2019 Detection Monitoring; Columbia Energy Center, Dry Ash Disposal Facility, Module 1-3, Pardeeville, Wisconsin. April 16, 2018.

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 – May, June, and August 2020 Events
- 2 Historical Analytical Results for Parameters with SSIs
- 3 Groundwater Elevations – State Monitoring Program and CCR Well Network

**Table 1. Groundwater Analytical Results Summary - May, June, and August 2020 Events
Columbia Dry Ash Disposal Facility - Module 4 / SCS Engineers Project #25220067.00**

Parameter Name	Background Wells		Compliance Wells							
	MW-84A	MW-301		MW-309				MW-310		MW-311
	5/29/2020	5/29/2020	Intrawell UPL	5/29/2020	6/30/2020	8/7/2020	Intrawell UPL	5/29/2020	Intrawell UPL	5/29/2020
Boron, µg/L	10.0	21.3	42.2	54.6	50.7	55.3	81.9	74.4	49.8	25.7
Calcium, µg/L	77,600	112,000	99,900	51,600	NA	NA	56,000	41,100	84,200	62,200
Chloride, mg/L	3.7	2 J	901	350	NA	NA	205	128	4.41	1.5 J
Fluoride, mg/L	<0.095	<0.095	DQ	<0.095	NA	NA	DQ	<0.095	DQ	<0.095
Field pH, Std. Units	7.34	6.73	8.18	7.35	7.33	7.72	8.12	7.54	8.07	7.37
Sulfate, mg/L	1.5 J	11.5 J	53.1	28.6	NA	NA	118	68.2	131	39.1
Total Dissolved Solids, mg/L	340	452	1,730	960	NA	NA	759	582	462	326

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:

- 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.
- Intrawell UPL for fluoride is based on the double quantification rule, because fluoride was not detected above the LOQ in the background samples.
- Intrawell UPLs calculated from background well results for February 2018 through October 2018.

Created by: <u>AJR</u>	Date: <u>1/21/2020</u>
Last revision by: <u>NDK</u>	Date: <u>8/21/2020</u>
Checked by: <u>JSN</u>	Date: <u>8/24/2020</u>
Scientist/PM QA/QC: <u>TK</u>	Date: <u>11/5/2020</u>

I:\25220067.00\Deliverables\2020 May ASD COL MOD 4 LF\Tables\[1_CCR GW Screening Summary_COL LF Mod 4.xlsx]Current Event Table

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

Well Group	Well	Collection Date	Boron (µg/L)
Background	MW-301	12/22/2015	26.5
		4/5/2016	25.2
		7/8/2016	23.6
		10/13/2016	30.6
		12/29/2016	32.8
		1/25/2017	32.6
		4/11/2017	28.8
		6/6/2017	21.3
		8/8/2017	30.6
		10/23/2017	34.3
		4/25/2018	24.3
		8/8/2018	22.8
		10/22/2018	27.8
		4/3/2019	26.9
		10/9/2019	35.9
		5/29/2020	21.3
	MW-84A	12/22/2015	11.9
		4/5/2016	14.0
		7/8/2016	14.7
		10/13/2016	11.1
		12/29/2016	14.7
		1/25/2017	16.1
		4/11/2017	12.9
		6/6/2017	14.8
		8/8/2017	22.9
		10/24/2017	13.8
		4/25/2018	25.0
		8/8/2018	12.8
10/22/2018	10.1 J		
4/3/2019	13.6		
10/9/2019	12.0		
5/29/2020	10.0		
Compliance	MW-309	2/21/2018	31.4
		3/23/2018	31.0
		4/23/2018	30.4
		5/24/2018	28.0
		6/23/2018	26.6
		7/23/2018	35.5
		8/22/2018	40.5
		9/21/2018	30.0
		4/2/2019	37.4
		10/8/2019	33.4
		5/29/2020	54.6
		6/30/2020	50.7
8/6/2020	55.3		

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

Well Group	Well	Collection Date	Boron (µg/L)
Compliance	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	73.0
		10/8/2019	81.8
		5/29/2020	74.4
	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
		5/29/2020	25.7

Abbreviations:

µg/L = micrograms per liter or parts per billion (ppb)

mg/l = milligrams per liter or parts per million (ppm)

-- = Not sampled

J = Estimated value below the laboratory's limit of quantitation

Notes:

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

Created by:	<u>RM</u>	Date:	<u>9/1/2020</u>
Last revision by:	<u>NDK</u>	Date:	<u>9/23/2020</u>
Checked by:	<u>LMH</u>	Date:	<u>9/23/2020</u>
Scientist Check:	<u>MDB</u>	Date:	<u>9/28/2020</u>

I:\25220067.00\Data and Calculations\Tables\CCR ASD COL MOD 4
Tables\[2_COL MOD 4 LF- ASD.xlsx]Table 2. Analy. Rslts- CCR

**Table 3. Groundwater Elevations - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25220067.00**

Dry Ash Facility (Facility ID #03025)	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	
	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	
	October 2-3, 2014	785.03	785.39	786.08	784.37	784.28	784.57	784.54	784.56	dry	785.24	785.18	785.19	785.47	785.28	785.75	785.33	
	April 13-14, 2015	783.96	783.63	785.25	783.01	782.74	783.65	783.95	782.87	dry	784.43	784.51	784.17	784.48	784.37	785.07	784.66	
	October 6-7, 2015	784.28	784.44	785.72	783.68	783.33	784.05	784.02	783.66	dry	784.80	784.76	784.66	784.89	784.70	785.20	784.76	
	April 4-6, 2016	785.82	aband	787.02	785.29	785.07	785.63	785.67	784.76	785.43	786.37	786.26	785.89	786.05	785.95	786.61	786.21	
	October 11-13, 2016	786.64	aband	788.00	787.36	786.46	786.45	786.32	786.40	786.81	787.22	787.11	786.96	787.17	786.81	787.68	787.25	
	April 10-13, 2017	786.96	aband	788.13	786.39	785.99	786.30	786.28	786.34	786.23	787.16	787.06	786.96	787.24	787.03	787.90	787.60	
	October 3-5, 2017	785.48	aband	786.66	784.51	784.22	784.67	784.63	784.86	784.29	NM	786.49	785.58	786.08	785.83	786.47	786.02	
	October 9-10, 2017	NM	aband	NM	NM	NM	NM	NM	NM	NM	785.56 ⁽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		
Ash Pond Facility (Facility ID #02325)	Well Number	M-3	M-4R	MW-39A	MW-39B	MW-48A	MW-48B	MW-57	MW-59	MW-216R	MW-217	MW-220RR	SG-1	SG-2	SG-3	SG-4		
	Top of Casing Elevation (feet amsl)	788.23	806.10	809.62	809.50	828.86	828.84	786.29	815.48	814.21	791.55	792.90	792.06	795.25	808.60	805.36		
	Screen Length (ft)																	
	Total Depth (ft from top of casing)	16.90	25.55	34.80	76.07	51.88	75.80	14.40	38.50	37.85	37.37	18.96	--	--	--	--		
	Top of Well Screen Elevation (ft)	771.33	780.55	774.82	733.43	776.98	753.04	771.89	776.98	776.36	754.18	773.94	--	--	--	--		
	Measurement Date																	
	October 2, 2012	780.13	786.76	781.49	781.34	782.03	781.93	780.58	779.88	781.91	780.95	780.55	789.14	793.85	dry	dry		
	April 15, 2013	785.16	788.39	783.97	784.00	783.77	783.78	784.69	783.66	784.09	784.75	785.02	789.5 ⁽¹⁾	NM	dry	dry		
	October 8, 2013	781.22	786.67	NM	NM	783.69	783.58	NM	NM	783.39	782.27	782.36	789.5 ⁽¹⁾	791.33	dry	dry		
	October 15, 2013	NM	NM	782.94	782.81	NM	NM	782.47	783.49	NM	NM	NM	NM	NM	NM	NM		
	April 14, 2014	786.04	788.96	783.57	783.68	783.56	783.57	785.51	783.41	783.73	785.25	785.87	788.90	dry	dry	dry		
	October 1-3, 2014	781.16	787.55	783.42	783.32	784.05	783.94	782.32	783.55	783.79	782.63	783.03	NM	dry	dry	dry		
	April 13-14, 2015	783.08	786.83	782.77	782.68	782.80	782.82	782.81	782.83	782.93	783.34	783.42	789.3	791.70	dry	dry		
	October 6-7, 2015	780.66	786.12	782.97	782.81	783.10	783.01	781.82	783.25	783.18	781.95	782.26	788.48	791.58	dry	dry		
	April 4-6, 2016	784.21	789.09	785.27	785.27	784.79	784.76	783.21	784.97	785.68	785.02	784.36	NM	793.40	dry	dry		
	October 11-13, 2016	781.88	787.88	785.75	785.52	785.73	785.61	783.12	786.51	786.16	783.75	784.09	788.32	792.52	dry	dry		
	April 10-13, 2017	782.94	787.95	785.44	785.20	785.82	785.69	782.77	786.09	785.95	784.29	784.09	788.31	793.85	dry	dry		
	October 3-5, 2017	780.93	787.04	783.35	783.18	784.30	784.19	782.37	784.23	783.89	782.48	782.61	788.3	793.45	dry	dry		
	April 23-25, 2018	782.89	790.43	782.86	782.87	783.14	783.09	783.04	783.02	783.23	783.26	783.45	788.38	>795.25	dry	dry		
	October 23-25, 2018	782.95	788.47	787.12	786.88	787.12	786.99	783.48	787.73	787.49	784.90	784.52	787.76	793.25	dry	dry		
April 1-4, 2019	785.68	789.44	786.28	786.31	786.56	786.45	785.27	787.39	786.53	786.33	785.46	--	794.60	dry	dry			
October 7-9, 2019	785.33	790.65	787.10	787.02	786.68	786.65	785.29	786.68	787.07	786.01	785.42	748.48	795.20	dry	dry			
May 27-29, 2020	781.80	787.73	785.12	784.92	785.74	785.59	783.11	785.89	785.60	783.41	783.89	748.48	>795.25	dry	dry			
Bottom of Well Elevation (ft)	771.33	780.55	774.82	733.43	776.98	753.04	771.89	776.98	776.36	754.18	773.94	--	--	--	--			

**Table 3. Groundwater Elevation - State Monitoring Program and CCR Well Network
Columbia Dry Ash and Ash Pond Disposal Facilities / SCS Engineers Project #25220067.00**

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	--	--	--	--	--	--
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
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

CCR Rule Wells

Notes:
NM = not measured

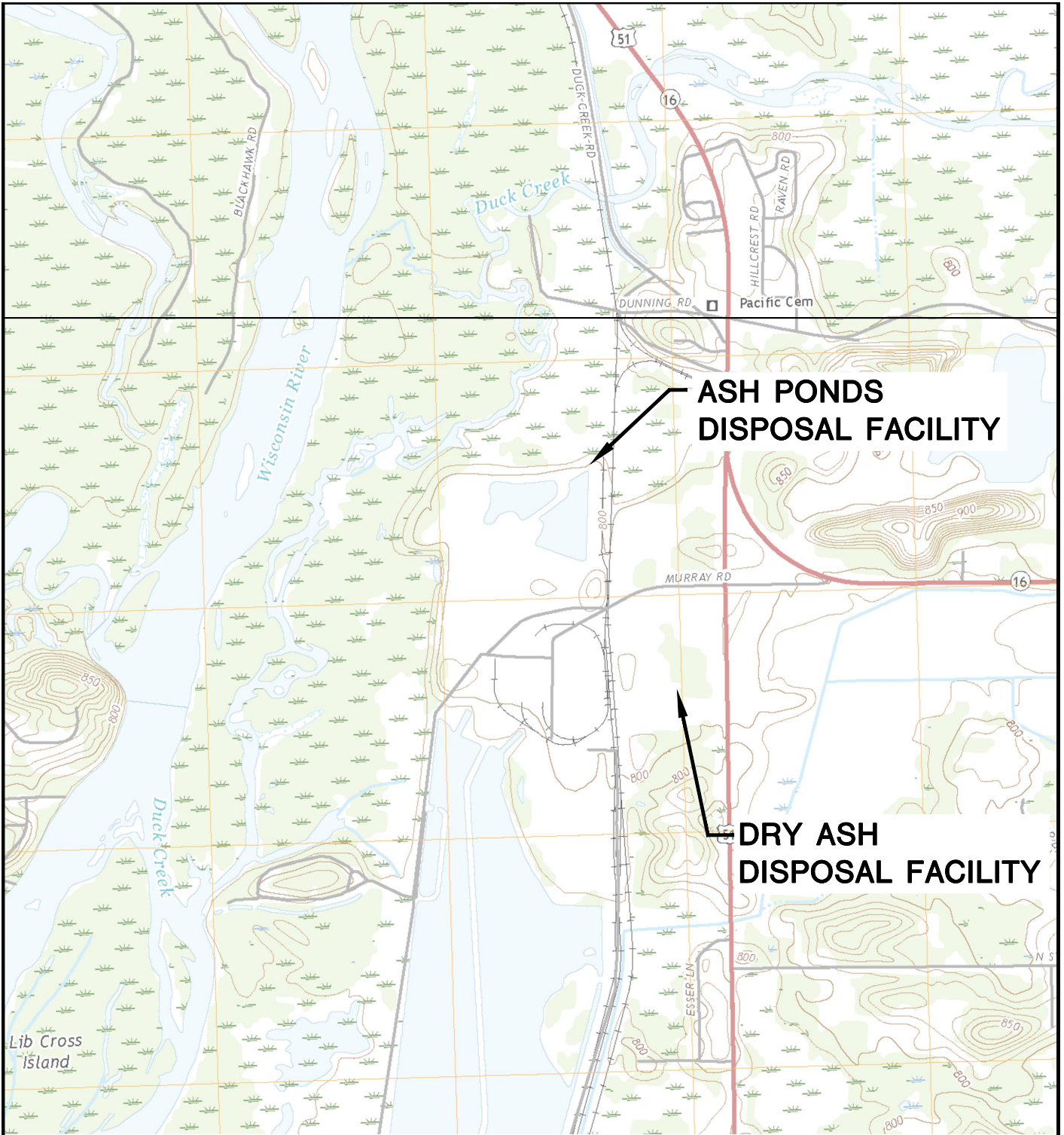
Created by: MDB Date: 5/6/2013
 Last revision by: RM Date: 8/7/2020
 Checked by: JSN Date: 8/7/2020
 Proj Mgr QA/QC: TK Date: 11/5/2020

- (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:\25220067.00\Data and Calculations\Tables\wlstat_Columbia.xls]levels

Figures

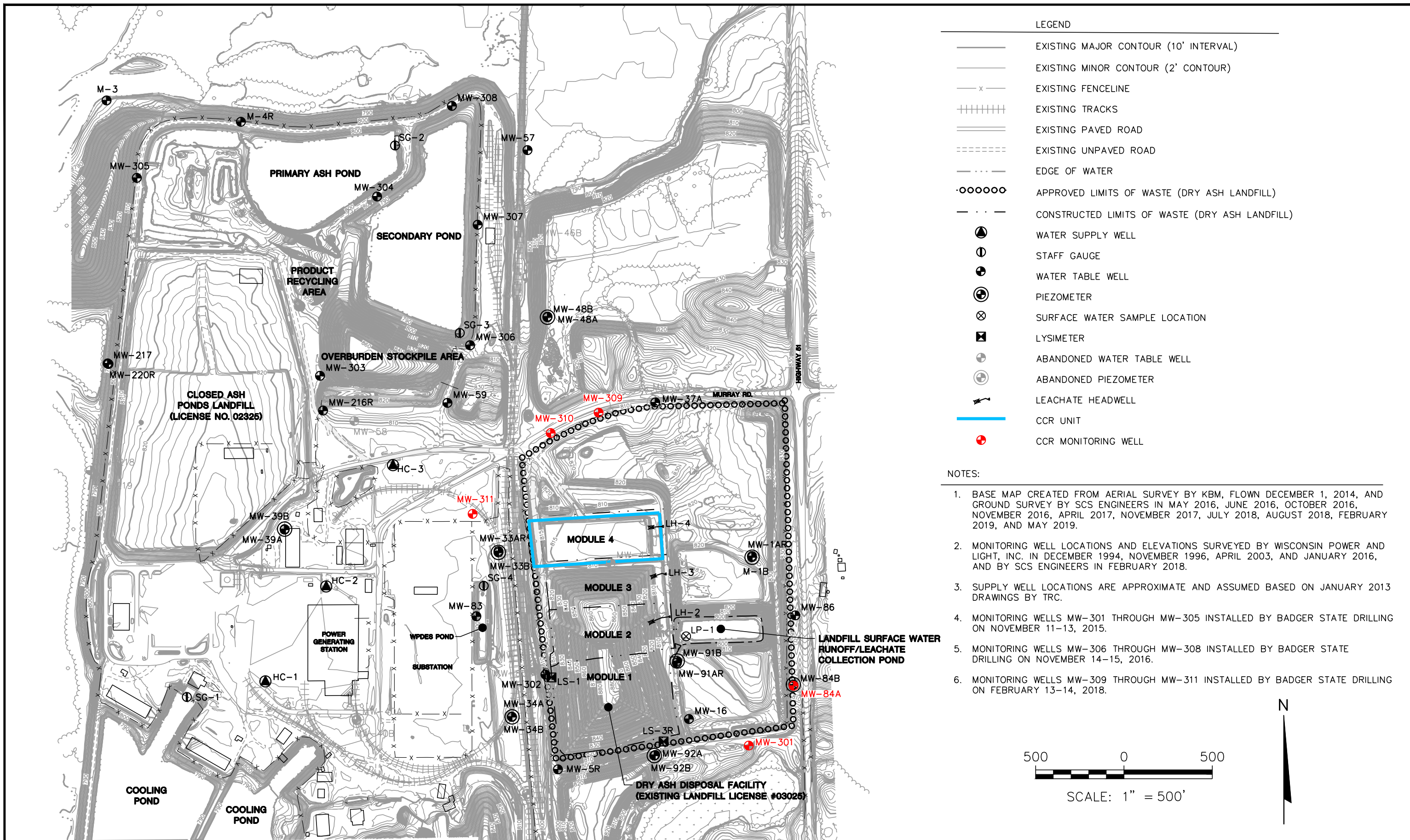
- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations
- 3 Water Table Map – May 2020



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



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



PROJECT NO.	25219067.00	DRAWN BY:	BSS
DRAWN:	12/02/2019	CHECKED BY:	MDB
REVISED:	01/13/2020	APPROVED BY:	TK 01/30/2020

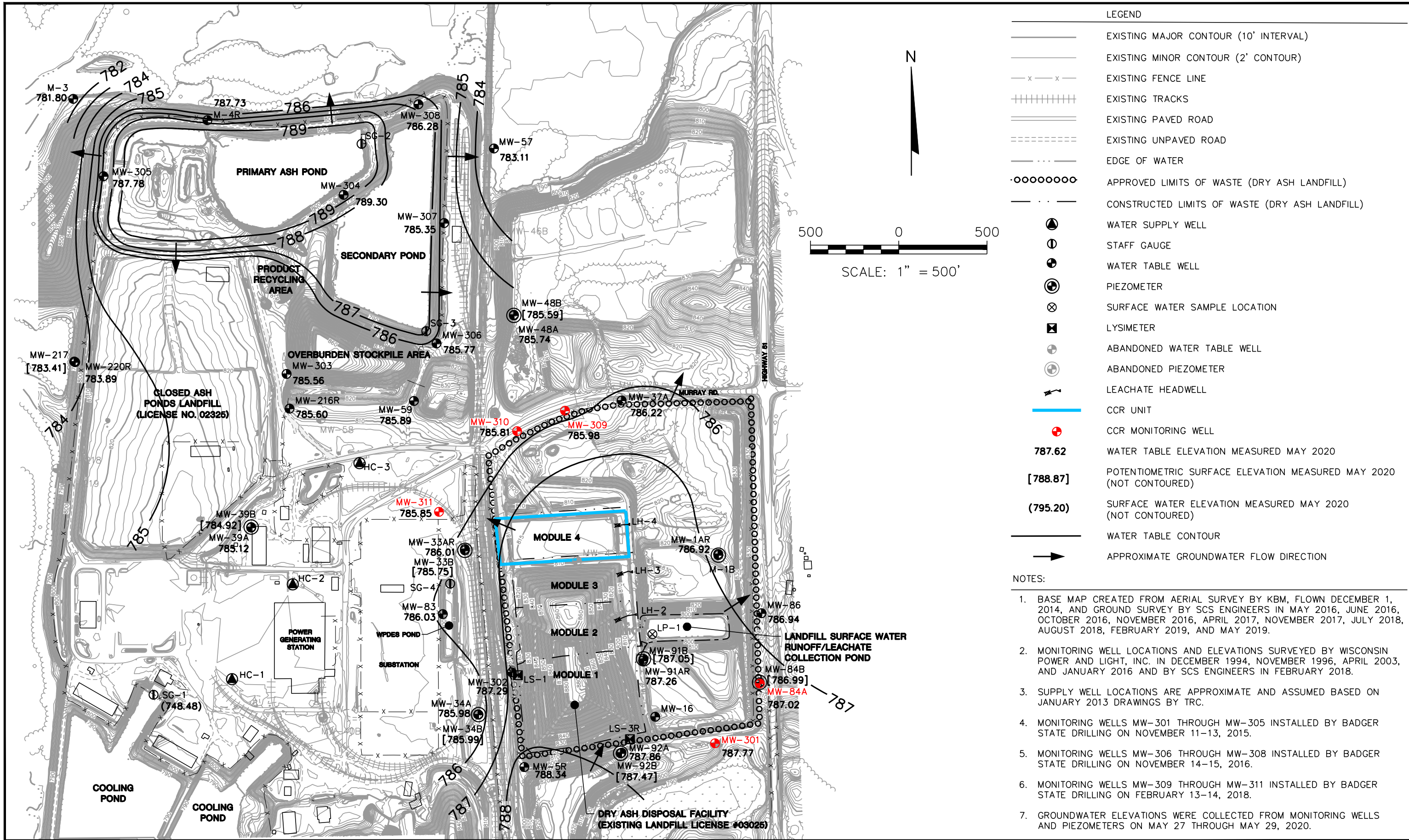
SCS ENGINEERS
 2830 DAIRY DRIVE MADISON, WI 53718-6751
 PHONE: (608) 224-2830

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

SITE
 ALLIANT ENERGY
 COLUMBIA ENERGY CENTER
 MODULE 4 DRY ASH DISPOSAL FACILITY
 PARDEEVILLE, WI

FIGURE
 SITE PLAN AND MONITORING
 WELL LOCATIONS
 2


I:\25219067.00\Drawings\CCR 2019 Annual Report\Mod 4 LFI\Site Plan and Monitoring Well Locations.dwg, 1/30/2020 3:40:32 PM



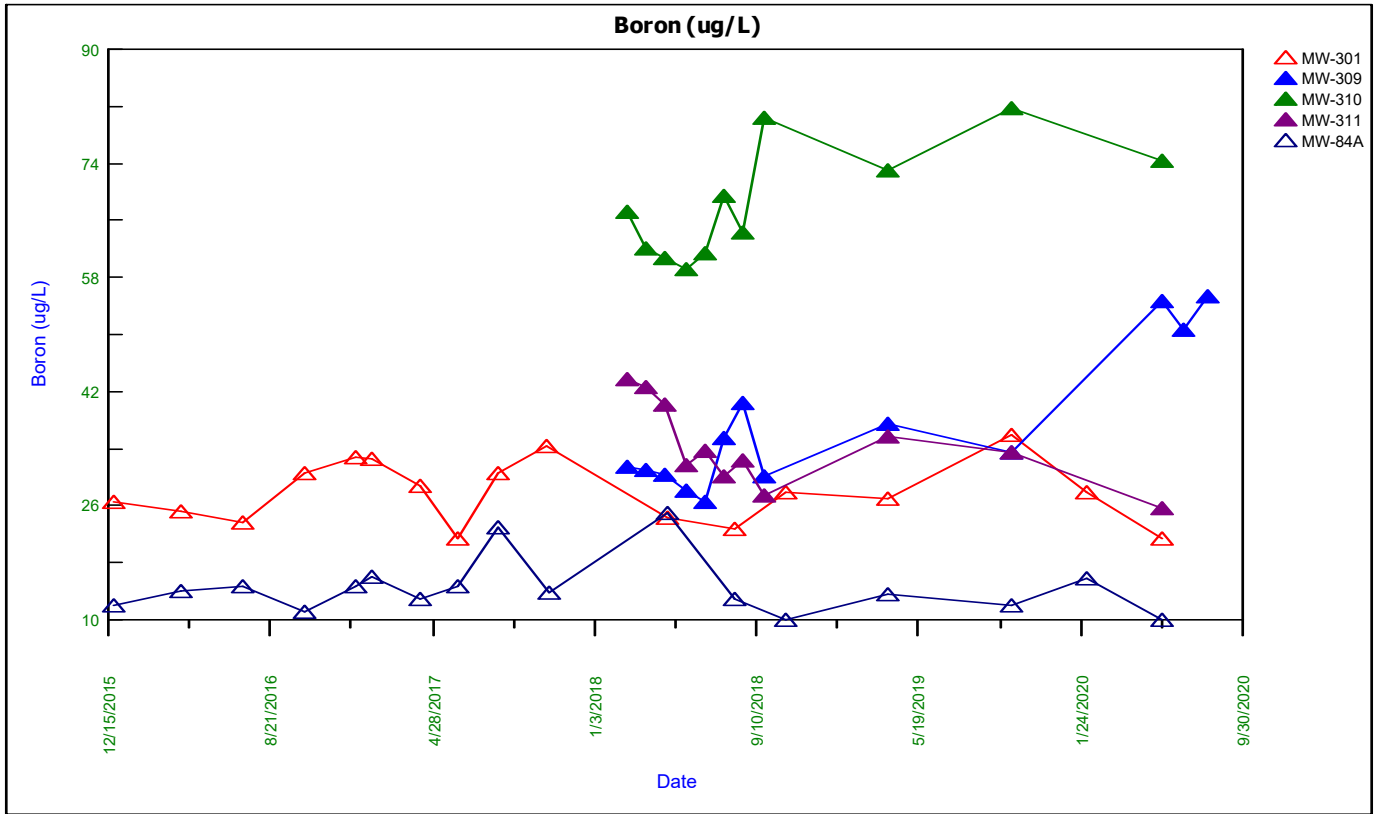
- LEGEND**
- EXISTING MAJOR CONTOUR (10' INTERVAL)
 - EXISTING MINOR CONTOUR (2' CONTOUR)
 - x - x - EXISTING FENCE LINE
 - ||||| EXISTING TRACKS
 - ==== EXISTING PAVED ROAD
 - EXISTING UNPAVED ROAD
 - . . . - EDGE OF WATER
 - APPROVED LIMITS OF WASTE (DRY ASH LANDFILL)
 - · · — CONSTRUCTED LIMITS OF WASTE (DRY ASH LANDFILL)
 - ⊕ WATER SUPPLY WELL
 - ⊖ STAFF GAUGE
 - ⊙ WATER TABLE WELL
 - ⊕⊖ PIEZOMETER
 - ⊗ SURFACE WATER SAMPLE LOCATION
 - ⊠ LYSIMETER
 - ⊕⊖ ABANDONED WATER TABLE WELL
 - ⊕⊖ ABANDONED PIEZOMETER
 - ↖ LEACHATE HEADWELL
 - CCR UNIT
 - ⊕ CCR MONITORING WELL
 - 787.62 WATER TABLE ELEVATION MEASURED MAY 2020
 - [788.87] POTENTIOMETRIC SURFACE ELEVATION MEASURED MAY 2020 (NOT CONTOURED)
 - (795.20) SURFACE WATER ELEVATION MEASURED MAY 2020 (NOT CONTOURED)
 - WATER TABLE CONTOUR
 - APPROXIMATE GROUNDWATER FLOW DIRECTION


- NOTES:**
1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014, AND GROUND SURVEY BY SCS ENGINEERS IN MAY 2016, JUNE 2016, OCTOBER 2016, NOVEMBER 2016, APRIL 2017, NOVEMBER 2017, JULY 2018, AUGUST 2018, FEBRUARY 2019, AND MAY 2019.
 2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND JANUARY 2016 AND BY SCS ENGINEERS IN FEBRUARY 2018.
 3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY TRC.
 4. MONITORING WELLS MW-301 THROUGH MW-305 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 11-13, 2015.
 5. MONITORING WELLS MW-306 THROUGH MW-308 INSTALLED BY BADGER STATE DRILLING ON NOVEMBER 14-15, 2016.
 6. MONITORING WELLS MW-309 THROUGH MW-311 INSTALLED BY BADGER STATE DRILLING ON FEBRUARY 13-14, 2018.
 7. GROUNDWATER ELEVATIONS WERE COLLECTED FROM MONITORING WELLS AND PIEZOMETERS ON MAY 27 THROUGH MAY 29, 2020.

PROJECT NO. 25220067.00	DRAWN BY: BSS	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT ALLIANT ENERGY COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WI 53954	SITE ALLIANT ENERGY COLUMBIA ENERGY CENTER MODULE 4 DRY ASH DISPOSAL FACILITY PARDEEVILLE, WI	WATER TABLE MAP MAY 2020	FIGURE
DRAWN: 08/26/2020	CHECKED BY: NDK					3
REVISED: 08/26/2020	APPROVED BY: SCC 09/25/2020					



Appendix A
Trend Plots for CCR Wells





Appendix B
August 2020 Laboratory Report

August 18, 2020

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25220067.00 ALLIANT-COLUMBIA
Pace Project No.: 40212500

Dear Meghan Blodgett:

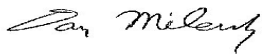
Enclosed are the analytical results for sample(s) received by the laboratory on August 07, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Green Bay

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

Sincerely,



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

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky UST Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 12064

North Dakota Certification #: R-150

Virginia VELAP ID: 460263

South Carolina Certification #: 83006001

Texas Certification #: T104704529-14-1

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

USDA Soil Permit #: P330-16-00157

Federal Fish & Wildlife Permit #: LE51774A-0

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 25220067.00 ALLIANT-COLUMBIA
Pace Project No.: 40212500

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40212500001	FIELD BLANK	Water	08/06/20 09:25	08/07/20 07:50
40212500002	MW-309	Water	08/06/20 09:45	08/07/20 07:50

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SAMPLE ANALYTE COUNT

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40212500001	FIELD BLANK	EPA 6020	KXS	1
40212500002	MW-309	EPA 6020	KXS	1
			AXL	7

PASI-G = Pace Analytical Services - Green Bay

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SUMMARY OF DETECTION

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Lab Sample ID	Client Sample ID					
Method	Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40212500002	MW-309					
EPA 6020	Boron	55.3	ug/L	10.0	08/18/20 01:45	
	Field pH	7.72	Std. Units		08/06/20 09:45	
	Field Specific Conductance	1656	umhos/cm		08/06/20 09:45	
	Oxygen, Dissolved	9.05	mg/L		08/06/20 09:45	
	REDOX	224.2	mV		08/06/20 09:45	
	Turbidity	3.56	NTU		08/06/20 09:45	
	Static Water Level	785.93	feet		08/06/20 09:45	
	Temperature, Water (C)	12.9	deg C		08/06/20 09:45	

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ANALYTICAL RESULTS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Sample: FIELD BLANK **Lab ID: 40212500001** Collected: 08/06/20 09:25 Received: 08/07/20 07:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS									
Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay									
Boron	<3.0	ug/L	10.0	3.0	1	08/11/20 05:17	08/18/20 00:10	7440-42-8	

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ANALYTICAL RESULTS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Sample: MW-309 **Lab ID: 40212500002** Collected: 08/06/20 09:45 Received: 08/07/20 07:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3010 Pace Analytical Services - Green Bay							
Boron	55.3	ug/L	10.0	3.0	1	08/11/20 05:17	08/18/20 01:45	7440-42-8	
Field Data		Analytical Method: Pace Analytical Services - Green Bay							
Field pH	7.72	Std. Units			1		08/06/20 09:45		
Field Specific Conductance	1656	umhos/cm			1		08/06/20 09:45		
Oxygen, Dissolved	9.05	mg/L			1		08/06/20 09:45	7782-44-7	
REDOX	224.2	mV			1		08/06/20 09:45		
Turbidity	3.56	NTU			1		08/06/20 09:45		
Static Water Level	785.93	feet			1		08/06/20 09:45		
Temperature, Water (C)	12.9	deg C			1		08/06/20 09:45		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

QC Batch: 362581

Analysis Method: EPA 6020

QC Batch Method: EPA 3010

Analysis Description: 6020 MET

Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40212500001, 40212500002

METHOD BLANK: 2095707

Matrix: Water

Associated Lab Samples: 40212500001, 40212500002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.0	10.0	08/18/20 00:03	

LABORATORY CONTROL SAMPLE: 2095708

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	500	474	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2095709 2095710

Parameter	Units	2095709		2095710		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40212421001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
Boron	ug/L	11.2	500	500	506	493	99	96	75-125	3	20

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

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.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25220067.00 ALLIANT-COLUMBIA

Pace Project No.: 40212500

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40212500001	FIELD BLANK	EPA 3010	362581	EPA 6020	362665
40212500002	MW-309	EPA 3010	362581	EPA 6020	362665
40212500002	MW-309				

REPORT OF LABORATORY ANALYSIS

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(Please Print Clearly)



UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

4022500

CHAIN OF CUSTODY

A=None B=HCl C=H2SO4 D=HNO3 E=D Water F=Methanol G=NaOH
 H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

Company Name: **SCS**
 Branch/location: **Madison WI**
 Project Contact: **Max Biedert**
 Phone: **(608) 218-7362**
 Project Number: **2520067.00**
 Project Name: **Alliant-Columbia**
 Project State: **WI**
 Sampled By (Print): **Paul A. Smoller**
 Sampled By (Sign): *Paul A. Smoller*
 PO #: _____
 Regulatory Program: _____

Data Package Options (billable)
 EPA Level III
 EPA Level IV
MS/MSD
 On your sample (billable)
 NOT needed on your sample

Matrix Codes
 A= Air B= Biota C= Charcoal O= Oil S= Soil SI= Sludge
 W= Water DW= Drinking Water GW= Ground Water SW= Surface Water WW= Waste Water WP= Wipe

DATE	TIME	MATRIX	ANALYSES REQUESTED
001	Field Blank		
002	MW-389	Y 9:45 GW	X Boron

Quote #: _____
 Mail To Contact: _____
 Mail To Company: _____
 Mail To Address: _____
 Invoice To Contact: _____
 Invoice To Company: _____
 Invoice To Address: _____
 Invoice To Phone: _____
 CLIENT COMMENTS: _____
 LAB COMMENTS (Lab Use Only): _____
 Profile #: _____

Rush Turnaround Time Requested - Prelims
 (Rush TAT subject to approval/surcharge)
 Date Needed: _____
 Transmit Prelim Rush Results by (complete what you want): _____
 Email #1: _____
 Email #2: _____
 Telephone: _____
 Fax: _____
 Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
<i>Paul A. Smoller</i>	8-22-20 11:30	<i>Michelle J. Pae</i>	8/24/20 0750
<i>C. S. Logistics</i>	8/24/20 0750		
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

PACE Project No. **4022500**
 Receipt Temp = **18** °C
 Sample Receipt pH **6.2** Adjusted
 Cooler Custody Seal **Present / Not Present**
 Intact / Not Intact

Sample Preservation Receipt Form

Client Name: SCS Project # 40212500

All containers needing preservation have been checked and noted below. Yes No N/A
 Lab Lot# of pH paper: 1052791 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: MP Date/Time:

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

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


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

AG1U	1 liter amber glass
BG1U	1 liter clear glass
AG1H	1 liter amber glass HCL
AG4S	125 mL amber glass H2SO4
AG4U	120 mL amber glass unpres
AG5U	100 mL amber glass unpres
AG2S	500 mL amber glass H2SO4
BG3U	250 mL clear glass unpres

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

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

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

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

Sample Condition Upon Receipt Form (SCUR)

Project #: _____

Client Name: SCS

WO#: 40212500

Courier: CS Logistics Fed Ex Speedee UPS Walto
 Client Pace Other: _____



Tracking #: 1299 080 620

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

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

Packing Material: Bubble Wrap Bubble Bags None Other

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

Cooler Temperature Uncorr: POF / Corr: _____

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

Person examining contents:	
Date: <u>8/7/20</u>	Initials: <u>JP</u>
Labeled By Initials: <u>EMW</u>	

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


Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2. <u>Mail, Invoice, pg#</u> <u>8/7/20</u>
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3. <u>JP</u>
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume:		8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12. <u>"8/7/20" date on both samples</u> <u>EMW</u>
-Includes date/time/ID/Analysis Matrix: <u>W</u>		<u>8/7/20</u>
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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



Appendix C
Regional Geologic and Hydrogeologic Background Information

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

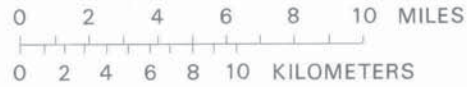
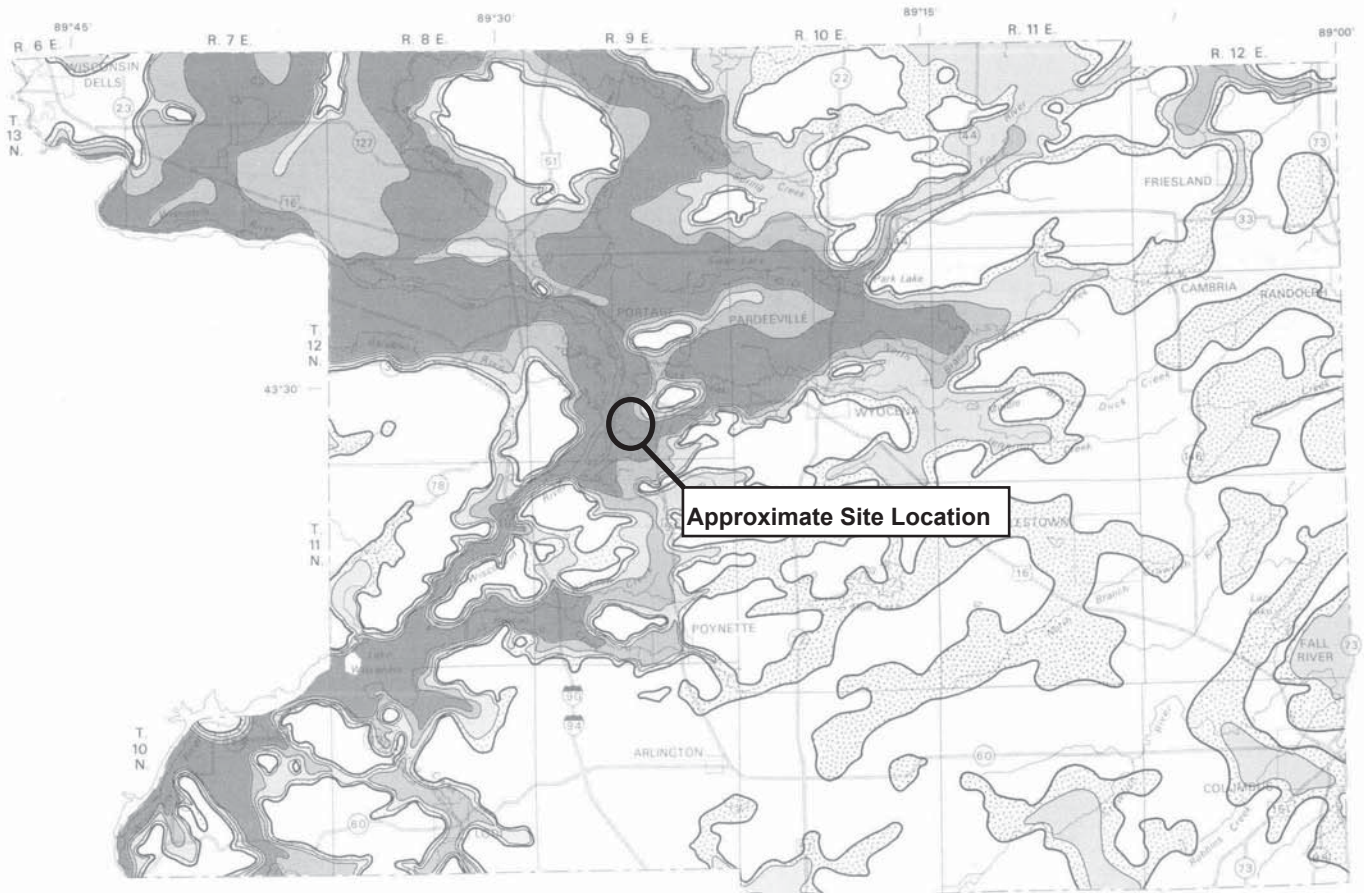
Approximate Age	Hydrogeologic Unit	General Thickness (feet)	Name of Rock Unit*	Predominant Lithology
Quaternary (0-1 million years old)	Surficial Aquifer	0 to 300+	Holocene & Pleistocene Deposits	<ul style="list-style-type: none"> • Unconsolidated clay, silt, sand, gravel, cobbles, boulders, and organic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

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

Sources:

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

I:\25215053\Reports\Report 3 - Columbia\Tables\Table_2_Regional_Hydrogeologic_Stratigraphy.doc



EXPLANATION

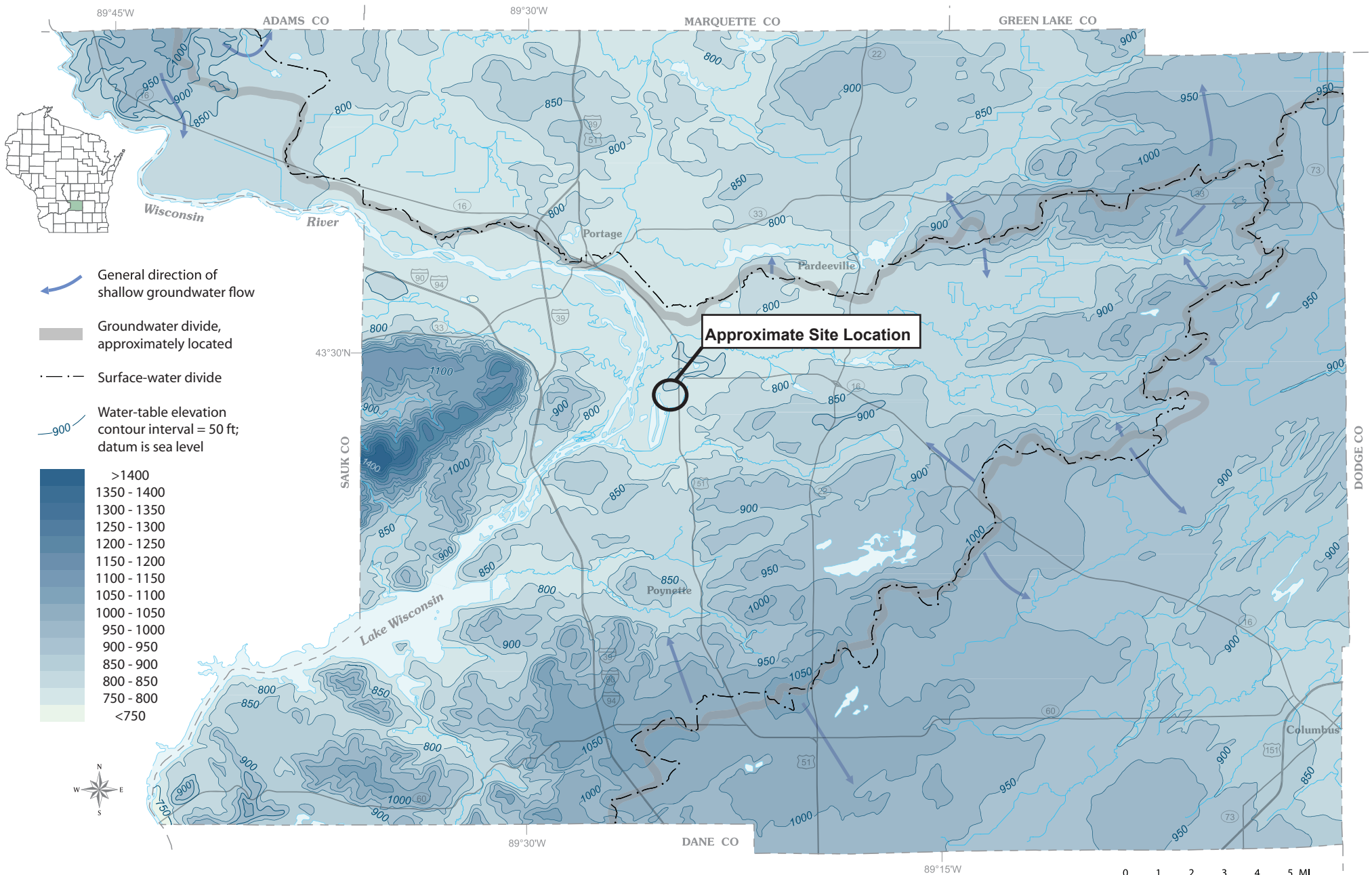
Probable well yields



Boundary of saturated sand-and-gravel aquifer

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

Generalized water-table elevation in Columbia County, Wisconsin



Appendix D

Boring Logs

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

Facility/Project Name WPL - Alliant Columbia Generating Station SCS#: 25217156.01		License/Permit/Monitoring Number		Boring Number MW-309	
Boring Drilled By: Name of crew chief (first, last) and Firm Mark Crampton Badger State Drilling, Co.		Date Drilling Started 2/13/2018		Date Drilling Completed 2/14/2018	
Drilling Method hollow stem auger		WI Unique Well No. VR111		DNR Well ID No.	
Common Well Name MW-309		Final Static Water Level 26.7 Feet MSL		Surface Elevation 809.88 Feet MSL	
Borehole Diameter 8.5 in.		Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/>		Local Grid Location	
State Plane 543,448 N, 2,124,151 E S/C/N		Lat _____ "		Feet <input type="checkbox"/> N <input type="checkbox"/> E	
NW 1/4 of SE 1/4 of Section 27, T 12 N, R 9 E		Long _____ "		Feet <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County Columbia		County Code 11	
				Civil Town/City/ or Village Town of Pacific	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties						RQD/Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200			
			1	Hydrovaced boring to 8.5 below ground surface; open hole.												
			2													
			3													
			4													
			5													
			6													
			7													
			8													
S1	20	11 14 18	9		POORLY GRADED SAND, fine to coarse, yellow, (10YR 7/6), rounded grains.					N/A	M					
S2	20	12 15 20 28	12	Same but with trace gravel.	SP				N/A	M						
S3	24	16 20 26	14	Same as above but with no gravel.					N/A	M						

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

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

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

Boring Number **MW-309**

Use only as an attachment to Form 4400-122.

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

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
S4	22	11 17 32 41	16 17	POORLY GRADED SAND, fine to coarse, yellow, (10YR 7/6), rounded grains, trace silt.				N/A	M						
S5		22 29 36	19 20					N/A	M						
S6	24	18 20 28 36	22 23					N/A	M						
S7		18 24 32	24 25					N/A	M						
S8	22	14 18 30 40	27 28					SP	N/A	W				Depth to water at ~ 26 feet.	
S9	22	22 32 34	29 30					N/A	W						
			31 32 33 34 35 36												
								End of Boring at 36.5 feet bgs.							

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

Facility/Project Name WPL - Alliant Columbia Generating Station SCS#: 25217156.01		License/Permit/Monitoring Number		Boring Number MW-310	
Boring Drilled By: Name of crew chief (first, last) and Firm Dave Cruise Badger State Drilling, Co.		Date Drilling Started 2/13/2018		Date Drilling Completed 2/13/2018	
Drilling Method hollow stem auger		WI Unique Well No. VR110		DNR Well ID No.	
Common Well Name MW-310		Final Static Water Level 27.9 Feet MSL		Surface Elevation 810.96 Feet MSL	
Borehole Diameter 8.5 in.		Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/>		Local Grid Location	
State Plane 543,332 N, 2,123,880 E S/C/N		Lat _____ ° _____ ' _____ "		Feet <input type="checkbox"/> N <input type="checkbox"/> E	
NW 1/4 of SE 1/4 of Section 27, T 12 N, R 9 E		Long _____ ° _____ ' _____ "		Feet <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County Columbia		County Code 11	
				Civil Town/City/ or Village Town of Pacific	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			1	Hydrovaced boring to 8 feet below ground surface; open hole.										
			2											
			3											
			4											
			5											
			6											
			7											
			8											
S1	18	46 88	9	POORLY GRADED SAND AND GRAVEL, fine to medium sand, coarse gravel, brownish yellow, (10YR 6/6), angular gravel, round sand.					N/A	M				
			10											
			11	Same as above but trace gravel.	SP									
S2	24	1827 3840	12						N/A	M				
			13											
			14											
S3	24	2632 4038	15						N/A	M				

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

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

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

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


Facility/Project Name WPL - Alliant Columbia Generating Station SCS#: 25217156.01		License/Permit/Monitoring Number		Boring Number MW-311	
Boring Drilled By: Name of crew chief (first, last) and Firm Mark Crampton Badger State Drilling, Co.			Date Drilling Started 2/14/2018	Date Drilling Completed 2/14/2018	Drilling Method hollow stem auger
WI Unique Well No. VR112	DNR Well ID No.	Common Well Name MW-311	Final Static Water Level 23.5 Feet MSL	Surface Elevation 806.53 Feet MSL	Borehole Diameter 8.5 in.
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane 542,874 N, 2,123,437 E S/C/N NE 1/4 of SW 1/4 of Section 27, T 12 N, R 9 E			Lat _____ ° _____ ' _____ " _____" Long _____ ° _____ ' _____ " _____"		Local Grid Location Feet <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W
Facility ID	County Columbia	County Code 11	Civil Town/City/ or Village Town of Pacific		

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
			1-8	Hydrovaced boring to 8 feet below ground surface; open hole.											
S1	24	12 16 20 24	9-10	POORLY GRADED SAND AND GRAVEL, fine to coarse sand, coarse gravel, yellow, (10YR 7/6), rounded sand, angular gravel.					N/A	M					
S2	24	17 27 30 38	12	Same as above but with trace silt.	SP				N/A	M					
S3	24	18 26 31	14						N/A	M					

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

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

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



Appendix E
Historical Groundwater Flow Maps

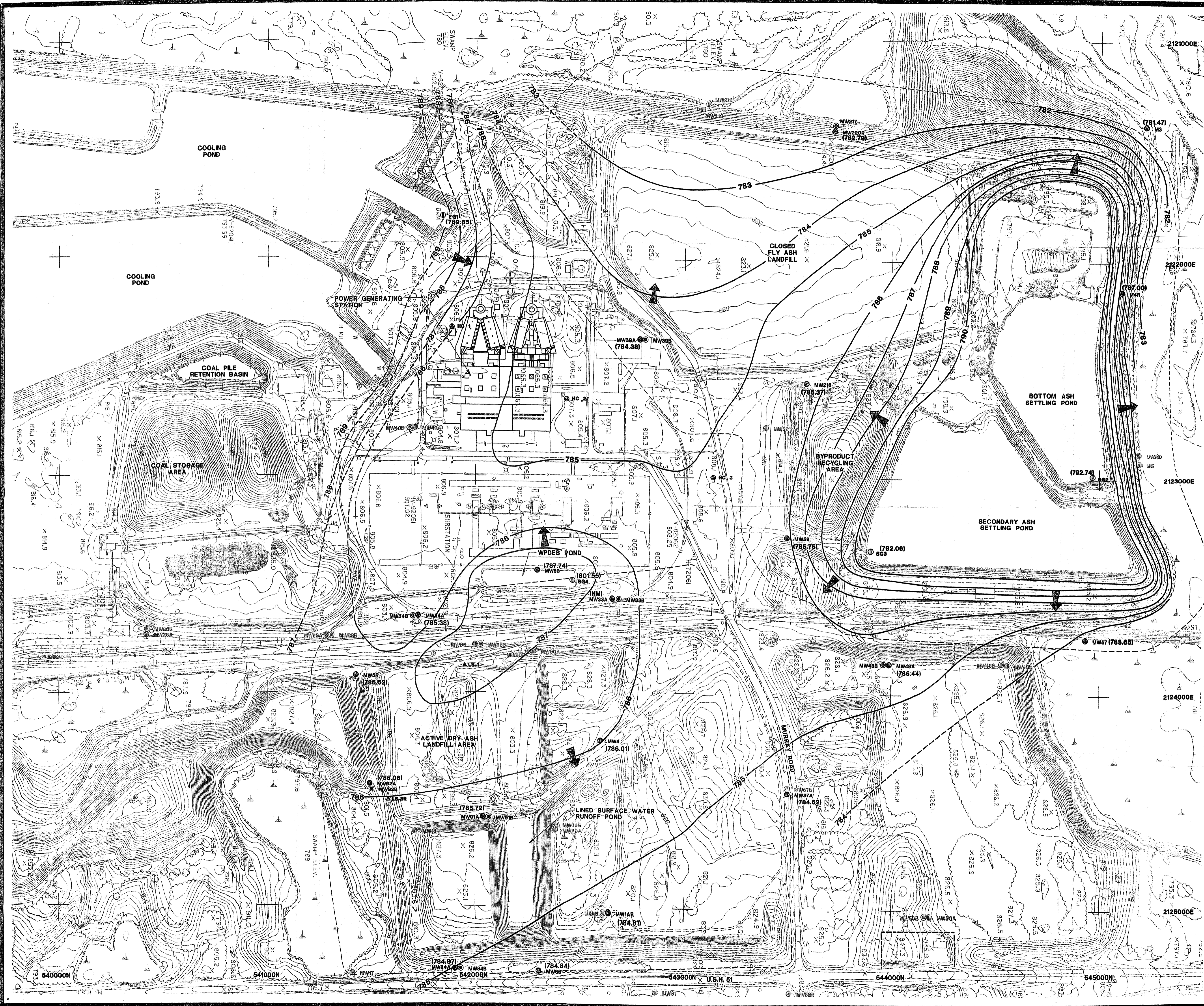


LEGEND

- PROPOSED PROJECT AREA
- ⊕ 720.29 OBSERVATION WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- ⊕ BORING LOCATION AND NUMBER
- WETLANDS
- 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, BARN, ETC.)
- ⊕ HIGH CAPACITY WELLS
- 790- WATER TABLE CONTOURS (CONTOUR INTERVAL: 1 FT.)
- ➔ DIRECTION OF GROUNDWATER FLOW

NO.	BY	DATE	REVISION	APPD.
WATER TABLE CONTOUR MAP 2/4/81				
PLAN OF OPERATION - ASH DISPOSAL FACILITY COLUMBIA SITE WISCONSIN POWER & LIGHT COMPANY PART OF SECTIONS 27 & 34, T12N, R9E TOWN OF PACIFIC COLUMBIA CO. WISCONSIN				
DRAWN TDH		SCALE 1"=300'	SHEET 39 OF 39	
CHECKED RJK		DATE 2/10/81	DRAWING NO.	
APPROVED			C7134-94	
REFERENCE			PRINTED 8/3/88	





- LEGEND**
- PROPERTY LINE
 - EXISTING RAILROAD TRACKS
 - EXISTING GROUND CONTOUR
 - CONTOUR DEPRESSION
 - EXISTING PAVED ROAD
 - EXISTING UNPAVED ROAD
 - EXISTING FENCE
 - EXISTING BUILDING
 - EXISTING SPOT ELEVATION
 - TREES AND/OR BRUSH
 - WETLAND AREA
 - EDGE OF WATER
 - HC 1 WATER SUPPLY WELL
 - MW61A WATER TABLE WELL
 - MW61B PIEZOMETER
 - ABANDONED WATER TABLE WELL
 - ABANDONED PIEZOMETER
 - 801 STAFF GAUGE
 - ALS-1 LYSEMETER
 - DESIGN MANAGEMENT ZONE
 - PROPERTY LINE
 - O.S. OPEN STORAGE
 - O.H. OVERHEAD STRUCTURE
 - E.P.S. ELECTRICAL POWER STATION
 - T TANK
 - W WALL
 - (785.31) WATER TABLE ELEVATION (FT.-MSL)
(N.M. = NOT MEASURED)
 - 786 GROUNDWATER CONTOUR LINE
(FT. INTERVAL - FT. M.S.L.)
(DASHED WHERE INFERRED)
 - ➔ GROUNDWATER FLOW DIRECTION

- NOTES**
1. BASE MAP IS PROVIDED BY WISCONSIN POWER & LIGHT CO. AND IS BASED ON PHOTOS TAKEN ON APRIL 6, 1995 BY AERO-METRIC ENGINEERING, SHEBOYGAN, WI.
 2. HORIZONTAL DATUM IS BASED ON THE WISCONSIN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE - DATUM NAD 83/01.
 3. VERTICAL DATUM IS REFERENCED TO U.S.G.S. MEAN SEA LEVEL (MSL). TOPOGRAPHIC CONTOUR INTERVAL IS TWO FEET.
 4. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER & LIGHT CO. IN DECEMBER 1994 & NOVEMBER 1996.
 5. THE LOCATION OF THE DESIGN MANAGEMENT ZONE DEMARCATION LINE IS APPROXIMATE.
 6. WATER ELEVATION USED TO PREPARE THIS MAP WERE MEASURED ON OCTOBER 24, 2002.
 7. THE WATER LEVEL AT MW 33A AND MW 33B COULD NOT BE MEASURED DURING OCTOBER 2002 DUE TO AN OBSTRUCTION IN THE WELL CASING.

PROJECT: ALLIANT ENERGY - WP&L COLUMBIA ASH PONDS & DRY ASH DISPOSAL FACILITY
 SHEET TITLE: WATER TABLE MAP (OCTOBER 2002)
 DRAWN BY: defoe | SCALE: 1"=200'
 CHECKED BY: JMR | PROJ. NO. 3024.28
 APPROVED BY: JCD | DATE PRINTED: FILE NO. WATERTBL.PLT
 DATE: JANUARY 2003 | FIGURE 3
 144 Heartland Trail
 Madison, WI 53717-1934
 P.O. Box 8923
 Madison, WI 53708-8923
 Phone: 608-831-4444

3.			
2.			
1.			
NO. BY DATE	REVISION		APP'D.
PROJECT: ALLIANT ENERGY - WP&L COLUMBIA ASH PONDS & DRY ASH DISPOSAL FACILITY			
SHEET TITLE: WATER TABLE MAP (OCTOBER 2002)			
DRAWN BY: defoe	SCALE: 1"=200'	PROJ. NO. 3024.28	
CHECKED BY: JMR		FILE NO. WATERTBL.PLT	
APPROVED BY: JCD	DATE PRINTED:		FIGURE 3
DATE: JANUARY 2003			