2018 Annual Groundwater Monitoring and Corrective Action Report

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

Prepared for:

Alliant Energy

SCS ENGINEERS

25217156.00 | January 31, 2019

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1.0 INTRODUCTION

This 2018 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 2018 Annual Groundwater Monitoring and Corrective Action Report for the CCR Units.

This report covers the period of groundwater monitoring from January 1, 2018, through December 31, 2018.

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 (new CCR landfill)

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.

A separate multi-unit groundwater monitoring system evaluates conditions for Modules 1 through 3 of the Dry Ash Disposal Facility. The two background (upgradient) monitoring wells are shared by both systems.

2.0 § 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:*

2.1 § 257.90(E)(1) SITE MAP

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

A map showing the 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 1**. Other CCR units are also shown on **Figure 1**.

2.2 § 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;

All three downgradient monitoring wells were installed in 2018 to establish the groundwater monitoring system for Dry Ash Disposal Facility Module 4. Upgradient monitoring well MW-301 was installed on November 11 and 12, 2015, and upgradient monitoring well MW-84A was installed prior to October 2015. No monitoring wells were decommissioned in 2018.

2.3 § 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;

Nine groundwater samples were collected from each Module 4 downgradient monitoring well for the establishment of background. Background sampling began in February 2018 and concluded in October 2018. Background samples were analyzed for both Appendix III and Appendix IV constituents. Only mercury was analyzed from the groundwater samples collected in the October 2018 groundwater sampling event (Round 9), because it was inadvertently omitted from the March 2018 sampling event. With the ninth event, a total of eight background samples for each well-constituent pair was collected.

Background monitoring for the upgradient monitoring wells, MW-301 and MW-84A, was completed in 2015 through 2017 under the background sampling program for both the COL Ash Disposal Module 1 through 3 and for the Primary Pond at the Columbia Energy Center. For more information on the background groundwater data collected at the upgradient wells, see the 2017 Annual Report for the COL Ash Disposal Facility Modules 1 through 3 (SCS, 2018). The background wells have also been monitored in 2018 as part of the detection monitoring program for Modules 1 through 3.

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 is included in **Table 1**. The results of the analytical laboratory analyses are provided in the laboratory reports in **Appendix A1** through **Appendix A9**.

2.4 § 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);

Following completion of the required background groundwater monitoring events, detection monitoring was initiated in late October 2018. The first semiannual detection monitoring compliance sampling event will be completed in April 2019.

2.5 § 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 2018 Annual Groundwater Monitoring and Corrective Action Report for the CCR Units.

2.5.1 § 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 entered detection monitoring in late October 2018.

Summary of Key Actions Completed. Collection of background groundwater quality data was completed in 2018.

Description of Any Problems Encountered: Mercury was inadvertently not analyzed in the samples collected for the March 2018 background sampling event.

Discussion of Actions to Resolve the Problems. An additional sampling event was completed in October 2018 to collect groundwater samples for analysis of the eighth mercury background sample from the downgradient wells at the COL Module 4.

Projection of Key Activities for the Upcoming Year (2019):

- Two semi-annual groundwater sampling and analysis events (April and October 2019)
- Statistical evaluation and determination of any statistically significant increases (SSIs) each monitoring event
- If an SSI is determined, then within 90 days either:
  - Complete alternative source demonstration (if applicable), or
  - Establish an assessment monitoring program.

2.5.2 § 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.

2.5.3 § 257.94(e)(2) Alternative Source Demonstration for Detection Monitoring

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

Not applicable. No alternative source demonstration was completed in 2018.

2.5.4 § 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.

2.5.5 § 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.

2.5.6 § 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.

2.5.7 § 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.

3.0 REFERENCES

SCS Engineers, 2018, 2017 Annual Groundwater Monitoring and Corrective Action Report, Dry Ash Disposal Facility, Columbia Energy Center, January 2018.

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Table 1

CCR Rule Groundwater Samples Summary

Table 1. CCR Rule Groundwater Samples Summary
Columbia Energy Center-Dry Ash Disposal Facility MOD 4 / SCS Engineers Project #25217156

Sample Dates	Downgradient Wells			Background Wells	
	MW-309	MW-310	MW-311	MW-84A	MW-301
2/21/2018	B	B	B	--	--
3/23/2018	B	B	B	--	--
4/23-24/2018	B	B	B	D*	D*
5/24/2018	B	B	B	--	--
6/23/2018	B	B	B	--	--
7/23/2018	B	B	B	--	--
8/22/2018	B	B	B	--	--
9/21/2018	B	B	B	--	--
10/22-24/2018	B-M	B-M	B-M	D*	D*
Total Samples	9	9	9	2	2

Abbreviations:
B = Background Sample
D* = Detection Monitoring Program for the Dry Ash Disposal Facility Module 1-3 (shared wells, background previously completed).
B-M = Background sample for mercury only

Created by:	NDK	Date:	1/3/2019
Last revision by:	NDK	Date:	1/3/2019
Checked by:	MDB	Date:	1/3/2019

I:\25217156.00\Deliverables\2018 Mod 4 Fed. Annual Report\Table\[GW_Samples_Summary_Table_COL MOD 4.xlsx]GW Summary

Figure 1

Site Plan and Well Location Map

PRIMARY ASH POND

SECONDARY ASH POND

CLOSED ASH PONDS LANDFILL (LICENSE NO. 02325)

PRODUCT RECYCLING AREA

MODULE 4

MODULE 3

MODULE 2

MODULE 1

LANDFILL SURFACE WATER RUNOFF/ LEACHATE COLLECTION POND

DRY ASH DISPOSAL FACILITY (EXISTING LANDFILL LICENSE #03025)

POWER GENERATING STATION

WPDES POND

SUBSTATION

COOLING POND

COOLING POND

HIGHWAY 51

MURRAY RD.

M-3, M-4R, M-5, MW-308, TW-02, SG-2, MW-57, MW-305, MW-304, MW-307, MW-48B, MW-48A, SG-3, MW-306, MW-217, MW-220R, MW-303, MW-216R, MW-59B, MW-58, MW-309, MW-310, MW-311, HC-3, MW-39B, MW-39A, MW-33AR, MW-33B, SG-4, HC-2, MW-83, HC-1, SG-1, MW-34A, MW-34B, LH-4, LH-3, LH-2, LP-1, LS-1, MW-302, MW-91B, MW-91AR, MW-1AR, M-1R, MW-86, MW-84B, MW-84A, MW-16, LS-3R, MW-301, MW-92A, MW-92B, MW-58, BM5, BM19

LEGEND

- EXISTING MAJOR CONTOUR (10' INTERVAL)
- EXISTING MINOR CONTOUR (2' CONTOUR)
- EXISTING FENCELINE
- EXISTING TRACKS
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EDGE OF WATER
- DESIGN MANAGEMENT ZONE
- APPROVED LIMITS OF WASTE
- CONSTRUCTED LIMITS OF WASTE
- WATER SUPPLY WELL
- STAFF GAUGE
- WATER TABLE WELL
- PIEZOMETER
- SURFACE WATER SAMPLE LOCATION
- LYSIMETER
- ABANDONED WATER TABLE WELL
- ABANDONED PIEZOMETER
- LEACHATE HEADWELL
- MOD 4 CCR UNIT
- CCR 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, AND AUGUST 2018.
2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND AUGUST 2012.
3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY TRC.
4. THE LOCATIONS OF THE ASH PONDS FACILITY DESIGN MANAGEMENT ZONE DEMARCATION LINES ARE APPROXIMATE AND BASED ON THE WATER TABLE MAP (OCTOBER 2012) FIGURE BY RMT.
5. THE LOCATION OF THE ACTIVE DRY ASH LANDFILL DESIGN MANAGEMENT ZONE DEMARCATION LINE IS BASED ON A 300 FOOT OFFSET FROM THE DESIGN LIMITS OF ASH EXCEPT WHERE OFFSET WOULD EXTEND LINE BEYOND PROPERTY LINE.

N

200 0 200

SCALE: 1" = 200'

FIGURE 1

SITE PLAN AND WELL LOCATION MAP

COLUMBIA ASH PONDS AND DRY ASH DISPOSAL FACILITIES

SITE

ALLIANT ENERGY
4902 NORTH BILTMORE LN. #1000
MADISON, WI 53718

CLIENT

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

ENGINEER

DRAWN BY:	KP		
CHECKED BY:	NK		
APPROVED BY:	TK	01/09/19	
PROJECT NO.	25217156.00		
DRAWN:	01/06/19		
REVISED:	01/09/19		

I:\25217156.00\Drawings\Mod 4 CCR Wells.dwg, 1/9/2019 8:54:45 AM

Appendix A

Laboratory Reports

A1 Round 1 Background Sampling, Analytical Laboratory Report

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

March 13, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on February 22, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

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

Enclosures

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

REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
L-A-B DOD-ELAP Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH-0694
Delaware Certification
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana DHH/TNI Certification #: LA140008
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: PA00091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nebraska Certification #: NE-05-29-14
Nevada Certification #: PA014572015-1
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Certification
Wyoming Certification #: 8TMS-L

Green Bay Certification IDs

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

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

SAMPLE SUMMARY

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40164990001	**MW-309**	Water	02/21/18 15:30	02/22/18 10:50
40164990002	**MW-310**	Water	02/21/18 14:50	02/22/18 10:50
40164990003	**FIELD BLANK**	Water	02/21/18 15:05	02/22/18 10:50
40164990004	**MW-311**	Water	02/21/18 14:15	02/22/18 10:50

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

SAMPLE ANALYTE COUNT

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40164990001	**MW-309**	EPA 6020	SDW	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			RMW	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40164990002	**MW-310**	EPA 6020	SDW	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			RMW	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40164990003	**FIELD BLANK**	EPA 6020	SDW	14	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40164990004	**MW-311**	EPA 6020	SDW	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			RMW	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

Sample: MW-309 **Lab ID: 40164990001** Collected: 02/21/18 15:30 Received: 02/22/18 10:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.28J**	ug/L	1.0	0.15	1	02/26/18 07:50	03/06/18 00:47	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	02/26/18 07:50	03/06/18 00:47	7440-38-2	1q
Barium	**24.1**	ug/L	1.1	0.34	1	02/26/18 07:50	03/06/18 00:47	7440-39-3	
Beryllium	**0.21J**	ug/L	1.0	0.18	1	02/26/18 07:50	03/06/18 00:47	7440-41-7	
Boron	**31.4**	ug/L	11.0	3.3	1	02/26/18 07:50	03/06/18 00:47	7440-42-8	
Cadmium	**0.11J**	ug/L	1.0	0.081	1	02/26/18 07:50	03/06/18 00:47	7440-43-9	
Calcium	**42700**	ug/L	2500	698	10	02/26/18 07:50	03/06/18 00:21	7440-70-2	P6
Chromium	**2.3J**	ug/L	3.4	1.0	1	02/26/18 07:50	03/06/18 00:47	7440-47-3	
Cobalt	**0.50J**	ug/L	1.0	0.085	1	02/26/18 07:50	03/06/18 00:47	7440-48-4	
Lead	**0.66J**	ug/L	1.0	0.20	1	02/26/18 07:50	03/06/18 00:47	7439-92-1	
Lithium	**1.4**	ug/L	1.0	0.14	1	02/26/18 07:50	03/06/18 00:47	7439-93-2	
Molybdenum	**2.1**	ug/L	1.5	0.44	1	02/26/18 07:50	03/06/18 00:47	7439-98-7	
Selenium	**0.39J**	ug/L	1.1	0.32	1	02/26/18 07:50	03/06/18 00:47	7782-49-2	
Thallium	**0.16J**	ug/L	1.0	0.14	1	02/26/18 07:50	03/06/18 00:47	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	02/27/18 11:10	02/28/18 08:37	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.84**	Std. Units			1		02/21/18 15:30		
Field Specific Conductance	**983**	umhos/cm			1		02/21/18 15:30		
Oxygen, Dissolved	**11.4**	mg/L			1		02/21/18 15:30	7782-44-7	
REDOX	**45.4**	mV			1		02/21/18 15:30		
Turbidity	**4.84**	NTU			1		02/21/18 15:30		
Static Water Level	**783.20**	feet			1		02/21/18 15:30		
Temperature, Water (C)	**10.3**	deg C			1		02/21/18 15:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**576**	mg/L	20.0	8.7	1		02/26/18 14:11		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.010	1		02/26/18 11:09		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**147**	mg/L	10.0	2.5	5		03/01/18 21:42	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		03/01/18 15:02	16984-48-8	
Sulfate	**12.2**	mg/L	3.0	1.0	1		03/01/18 15:02	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

Sample: MW-310 **Lab ID: 40164990002** Collected: 02/21/18 14:50 Received: 02/22/18 10:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.15J**	ug/L	1.0	0.15	1	02/26/18 07:50	03/06/18 02:37	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	02/26/18 07:50	03/06/18 02:37	7440-38-2	1q
Barium	**19.8**	ug/L	1.1	0.34	1	02/26/18 07:50	03/06/18 02:37	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	02/26/18 07:50	03/06/18 02:37	7440-41-7	
Boron	**67.1**	ug/L	11.0	3.3	1	02/26/18 07:50	03/06/18 02:37	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	02/26/18 07:50	03/06/18 02:37	7440-43-9	
Calcium	**32400**	ug/L	250	69.8	1	02/26/18 07:50	03/06/18 02:37	7440-70-2	
Chromium	**1.1J**	ug/L	3.4	1.0	1	02/26/18 07:50	03/06/18 02:37	7440-47-3	
Cobalt	**0.18J**	ug/L	1.0	0.085	1	02/26/18 07:50	03/06/18 02:37	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	02/26/18 07:50	03/06/18 02:37	7439-92-1	
Lithium	**1.0**	ug/L	1.0	0.14	1	02/26/18 07:50	03/06/18 02:37	7439-93-2	
Molybdenum	**2.3**	ug/L	1.5	0.44	1	02/26/18 07:50	03/06/18 02:37	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	02/26/18 07:50	03/06/18 02:37	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	02/26/18 07:50	03/06/18 02:37	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	02/27/18 11:10	02/28/18 08:44	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.85**	Std. Units			1		02/21/18 14:50		
Field Specific Conductance	**684**	umhos/cm			1		02/21/18 14:50		
Oxygen, Dissolved	**11.02**	mg/L			1		02/21/18 14:50	7782-44-7	
REDOX	**25**	mV			1		02/21/18 14:50		
Turbidity	**0.94**	NTU			1		02/21/18 14:50		
Static Water Level	**783.05**	feet			1		02/21/18 14:50		
Temperature, Water (C)	**11.04**	deg C			1		02/21/18 14:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**406**	mg/L	20.0	8.7	1		02/26/18 14:11		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.010	1		02/26/18 11:10		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**19.8**	mg/L	2.0	0.50	1		03/01/18 15:12	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		03/01/18 15:12	16984-48-8	
Sulfate	**31.6**	mg/L	3.0	1.0	1		03/01/18 15:12	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

Sample: FIELD BLANK **Lab ID: 40164990003** Collected: 02/21/18 15:05 Received: 02/22/18 10:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.16J**	ug/L	1.0	0.15	1	02/26/18 07:50	03/06/18 00:08	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	02/26/18 07:50	03/06/18 00:08	7440-38-2	
Barium	**<0.34**	ug/L	1.1	0.34	1	02/26/18 07:50	03/06/18 00:08	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	02/26/18 07:50	03/06/18 00:08	7440-41-7	
Boron	**<3.3**	ug/L	11.0	3.3	1	02/26/18 07:50	03/06/18 00:08	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	02/26/18 07:50	03/06/18 00:08	7440-43-9	
Calcium	**<69.8**	ug/L	250	69.8	1	02/26/18 07:50	03/06/18 00:08	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	02/26/18 07:50	03/06/18 00:08	7440-47-3	
Cobalt	**<0.085**	ug/L	1.0	0.085	1	02/26/18 07:50	03/06/18 00:08	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	02/26/18 07:50	03/06/18 00:08	7439-92-1	
Lithium	**<0.14**	ug/L	1.0	0.14	1	02/26/18 07:50	03/06/18 00:08	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	02/26/18 07:50	03/06/18 00:08	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	02/26/18 07:50	03/06/18 00:08	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	02/26/18 07:50	03/06/18 00:08	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	02/27/18 11:10	02/28/18 08:46	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		02/26/18 14:11		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**6.4**	Std. Units	0.10	0.010	1		02/26/18 11:14		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	2.0	0.50	1		03/01/18 15:23	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		03/01/18 15:23	16984-48-8	
Sulfate	**<1.0**	mg/L	3.0	1.0	1		03/01/18 15:23	14808-79-8	

Sample: MW-311 **Lab ID: 40164990004** Collected: 02/21/18 14:15 Received: 02/22/18 10:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.15J**	ug/L	1.0	0.15	1	02/26/18 07:50	03/06/18 02:43	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	02/26/18 07:50	03/06/18 02:43	7440-38-2	1q
Barium	**13.3**	ug/L	1.1	0.34	1	02/26/18 07:50	03/06/18 02:43	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	02/26/18 07:50	03/06/18 02:43	7440-41-7	
Boron	**43.7**	ug/L	11.0	3.3	1	02/26/18 07:50	03/06/18 02:43	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	02/26/18 07:50	03/06/18 02:43	7440-43-9	
Calcium	**58000**	ug/L	250	69.8	1	02/26/18 07:50	03/06/18 02:43	7440-70-2	
Chromium	**2.1J**	ug/L	3.4	1.0	1	02/26/18 07:50	03/06/18 02:43	7440-47-3	
Cobalt	**0.24J**	ug/L	1.0	0.085	1	02/26/18 07:50	03/06/18 02:43	7440-48-4	
Lead	**0.20J**	ug/L	1.0	0.20	1	02/26/18 07:50	03/06/18 02:43	7439-92-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

Sample: MW-311 **Lab ID: 40164990004** Collected: 02/21/18 14:15 Received: 02/22/18 10:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Lithium	**0.75J**	ug/L	1.0	0.14	1	02/26/18 07:50	03/06/18 02:43	7439-93-2	
Molybdenum	**2.1**	ug/L	1.5	0.44	1	02/26/18 07:50	03/06/18 02:43	7439-98-7	
Selenium	**0.83J**	ug/L	1.1	0.32	1	02/26/18 07:50	03/06/18 02:43	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	02/26/18 07:50	03/06/18 02:43	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	02/27/18 11:10	02/28/18 08:53	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.72**	Std. Units			1		02/21/18 14:15		
Field Specific Conductance	**455**	umhos/cm			1		02/21/18 14:15		
Oxygen, Dissolved	**11.74**	mg/L			1		02/21/18 14:15	7782-44-7	
REDOX	**31**	mV			1		02/21/18 14:15		
Turbidity	**2.56**	NTU			1		02/21/18 14:15		
Static Water Level	**783.02**	feet			1		02/21/18 14:15		
Temperature, Water (C)	**10.3**	deg C			1		02/21/18 14:15		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**260**	mg/L	20.0	8.7	1		02/26/18 14:11		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.010	1		02/26/18 11:17		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2.9**	mg/L	2.0	0.50	1		03/01/18 15:33	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		03/01/18 15:33	16984-48-8	
Sulfate	**7.1**	mg/L	3.0	1.0	1		03/01/18 15:33	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

QC Batch: 281954 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

METHOD BLANK: 1652384 Matrix: Water
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.13	0.42	02/28/18 08:32	

LABORATORY CONTROL SAMPLE: 1652385

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1652386 1652387

Parameter	Units	40164990001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.13	5	5	5.1	5.1	102	102	85-115	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

QC Batch: 281844 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

METHOD BLANK: 1652041 Matrix: Water
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	03/06/18 00:02	
Arsenic	ug/L	<0.28	1.0	03/06/18 00:02	
Barium	ug/L	<0.34	1.1	03/06/18 00:02	
Beryllium	ug/L	<0.18	1.0	03/06/18 00:02	
Boron	ug/L	<3.3	11.0	03/06/18 00:02	
Cadmium	ug/L	<0.081	1.0	03/06/18 00:02	
Calcium	ug/L	<69.8	250	03/06/18 00:02	
Chromium	ug/L	<1.0	3.4	03/06/18 00:02	
Cobalt	ug/L	<0.085	1.0	03/06/18 00:02	
Lead	ug/L	<0.20	1.0	03/06/18 00:02	
Lithium	ug/L	<0.14	1.0	03/06/18 00:02	
Molybdenum	ug/L	<0.44	1.5	03/06/18 00:02	
Selenium	ug/L	<0.32	1.1	03/06/18 00:02	
Thallium	ug/L	<0.14	1.0	03/06/18 00:02	

LABORATORY CONTROL SAMPLE: 1652042

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	518	104	80-120	
Arsenic	ug/L	500	515	103	80-120	
Barium	ug/L	500	500	100	80-120	
Beryllium	ug/L	500	496	99	80-120	
Boron	ug/L	500	473	95	80-120	
Cadmium	ug/L	500	519	104	80-120	
Calcium	ug/L	5000	4990	100	80-120	
Chromium	ug/L	500	495	99	80-120	
Cobalt	ug/L	500	490	98	80-120	
Lead	ug/L	500	484	97	80-120	
Lithium	ug/L	500	476	95	80-120	
Molybdenum	ug/L	500	498	100	80-120	
Selenium	ug/L	500	535	107	80-120	
Thallium	ug/L	500	482	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1652043 1652044

Parameter	Units	40164990001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.28J	500	500	520	528	104	106	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1652043 1652044

Parameter	Units	40164990001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	<0.28	500	500	519	522	104	104	75-125	1	20	
Barium	ug/L	24.1	500	500	529	535	101	102	75-125	1	20	
Beryllium	ug/L	0.21J	500	500	473	475	95	95	75-125	0	20	
Boron	ug/L	31.4	500	500	473	469	88	87	75-125	1	20	
Cadmium	ug/L	0.11J	500	500	507	518	101	103	75-125	2	20	
Calcium	ug/L	42700	5000	5000	44700	46100	40	67	75-125	3	20	P6
Chromium	ug/L	2.3J	500	500	490	498	98	99	75-125	2	20	
Cobalt	ug/L	0.50J	500	500	478	485	95	97	75-125	1	20	
Lead	ug/L	0.66J	500	500	491	495	98	99	75-125	1	20	
Lithium	ug/L	1.4	500	500	456	452	91	90	75-125	1	20	
Molybdenum	ug/L	2.1	500	500	503	512	100	102	75-125	2	20	
Selenium	ug/L	0.39J	500	500	536	538	107	108	75-125	0	20	
Thallium	ug/L	0.16J	500	500	489	492	98	98	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

QC Batch: 281896 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

METHOD BLANK: 1652206 Matrix: Water
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	02/26/18 14:07	

LABORATORY CONTROL SAMPLE: 1652207

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	604	554	92	80-120	

SAMPLE DUPLICATE: 1652208

Parameter	Units	40165008001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	744	766	3	5	

SAMPLE DUPLICATE: 1652209

Parameter	Units	40165017001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	446	450	1	5	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

QC Batch: 281863 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

SAMPLE DUPLICATE: 1652106

Parameter	Units	40165048003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.2	7.3	1	20	H6

SAMPLE DUPLICATE: 1652107

Parameter	Units	40164962001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	9.5	9.5	0	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

QC Batch: 282230 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

METHOD BLANK: 1653628 Matrix: Water
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	03/01/18 13:58	
Fluoride	mg/L	<0.10	0.30	03/01/18 13:58	
Sulfate	mg/L	<1.0	3.0	03/01/18 13:58	

LABORATORY CONTROL SAMPLE: 1653629

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1653630 1653631

Parameter	Units	40164990004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2.9	20	20	22.9	23.0	100	100	90-110	0	15	
Fluoride	mg/L	<0.10	2	2	2.1	2.1	103	103	90-110	0	15	
Sulfate	mg/L	7.1	20	20	27.4	27.5	102	102	90-110	0	15	

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REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

Sample: MW-309 **Lab ID: 40164990001** Collected: 02/21/18 15:30 Received: 02/22/18 10:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.486 ± 0.479 (0.729) C:NA T:88%**	pCi/L	03/12/18 18:38	13982-63-3	
Radium-228	EPA 904.0	**0.0300 ± 0.299 (0.692) C:71% T:89%**	pCi/L	03/09/18 11:20	15262-20-1	
Total Radium	Total Radium Calculation	**0.516 ± 0.778 (1.42)**	pCi/L	03/13/18 13:15	7440-14-4	

Sample: MW-310 **Lab ID: 40164990002** Collected: 02/21/18 14:50 Received: 02/22/18 10:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.053 ± 0.277 (0.642) C:NA T:96%**	pCi/L	03/12/18 18:51	13982-63-3	
Radium-228	EPA 904.0	**0.114 ± 0.290 (0.650) C:73% T:92%**	pCi/L	03/09/18 11:20	15262-20-1	
Total Radium	Total Radium Calculation	**0.114 ± 0.567 (1.29)**	pCi/L	03/13/18 13:15	7440-14-4	

Sample: FIELD BLANK **Lab ID: 40164990003** Collected: 02/21/18 15:05 Received: 02/22/18 10:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.335 ± 0.543 (0.945) C:NA T:86%**	pCi/L	03/12/18 18:51	13982-63-3	
Radium-228	EPA 904.0	**0.268 ± 0.300 (0.625) C:77% T:79%**	pCi/L	03/09/18 11:20	15262-20-1	
Total Radium	Total Radium Calculation	**0.603 ± 0.843 (1.57)**	pCi/L	03/13/18 13:15	7440-14-4	

Sample: MW-311 **Lab ID: 40164990004** Collected: 02/21/18 14:15 Received: 02/22/18 10:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.205 ± 0.445 (0.822) C:NA T:81%**	pCi/L	03/12/18 18:51	13982-63-3	
Radium-228	EPA 904.0	**0.403 ± 0.307 (0.597) C:80% T:86%**	pCi/L	03/09/18 11:21	15262-20-1	
Total Radium	Total Radium Calculation	**0.608 ± 0.752 (1.42)**	pCi/L	03/13/18 13:15	7440-14-4	

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

QC Batch: 289579 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

METHOD BLANK: 1418497 Matrix: Water
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.290 ± 0.270 (0.683) C:84% T:88%	pCi/L	03/09/18 11:18	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

QC Batch: 289343 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

METHOD BLANK: 1417587 Matrix: Water
Associated Lab Samples: 40164990001, 40164990002, 40164990003, 40164990004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.161 ± 0.317 (0.579) C:NA T:94%	pCi/L	03/12/18 18:09	

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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Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

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 and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

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.

LABORATORIES

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

ANALYTE QUALIFIERS

1q	Analyte was measured in the associated method blank at -0.40 ug/L.
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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25217156.01 COLUMBIA
Pace Project No.: 40164990

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40164990001	**MW-309**	EPA 3010	281844	EPA 6020	281911
40164990002	**MW-310**	EPA 3010	281844	EPA 6020	281911
40164990003	**FIELD BLANK**	EPA 3010	281844	EPA 6020	281911
40164990004	**MW-311**	EPA 3010	281844	EPA 6020	281911
40164990001	**MW-309**	EPA 7470	281954	EPA 7470	282045
40164990002	**MW-310**	EPA 7470	281954	EPA 7470	282045
40164990003	**FIELD BLANK**	EPA 7470	281954	EPA 7470	282045
40164990004	**MW-311**	EPA 7470	281954	EPA 7470	282045
40164990001	**MW-309**				
40164990002	**MW-310**				
40164990004	**MW-311**				
40164990001	**MW-309**	EPA 903.1	289343		
40164990002	**MW-310**	EPA 903.1	289343		
40164990003	**FIELD BLANK**	EPA 903.1	289343		
40164990004	**MW-311**	EPA 903.1	289343		
40164990001	**MW-309**	EPA 904.0	289579		
40164990002	**MW-310**	EPA 904.0	289579		
40164990003	**FIELD BLANK**	EPA 904.0	289579		
40164990004	**MW-311**	EPA 904.0	289579		
40164990001	**MW-309**	Total Radium Calculation	291087		
40164990002	**MW-310**	Total Radium Calculation	291087		
40164990003	**FIELD BLANK**	Total Radium Calculation	291087		
40164990004	**MW-311**	Total Radium Calculation	291087		
40164990001	**MW-309**	SM 2540C	281896		
40164990002	**MW-310**	SM 2540C	281896		
40164990003	**FIELD BLANK**	SM 2540C	281896		
40164990004	**MW-311**	SM 2540C	281896		
40164990001	**MW-309**	EPA 9040	281863		
40164990002	**MW-310**	EPA 9040	281863		
40164990003	**FIELD BLANK**	EPA 9040	281863		
40164990004	**MW-311**	EPA 9040	281863		
40164990001	**MW-309**	EPA 300.0	282230		
40164990002	**MW-310**	EPA 300.0	282230		
40164990003	**FIELD BLANK**	EPA 300.0	282230		
40164990004	**MW-311**	EPA 300.0	282230		

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www.pacelabs.com

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

401649 90

CHAIN OF CUSTODY

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

(Please Print Clearly)	
Company Name:	SCS Engineers
Branch/Location:	Madison WI
Project Contact:	Tom Karwoski
Phone:	608-216-7367
Project Number:	25217156.01
Project Name:	Columbia
Project State:	WI
Sampled By (Print):	Kyle Kramer
Sampled By (Sign):	
PO #:	25217156.01
Regulatory Program:	

Quote #:	
Mail To Contact:	Tom Karwoski
Mail To Company:	SCS Engineers
Mail To Address:	2830 Dairy Drive Madison, WI
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

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

FILTERED? (YES/NO)
PRESERVATION (CODE)*

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	Y/N	Pick Letter	Analyses Requested: Appendix IV	Appendix III	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
001	MW-309	2-21-18	1530	GW			X	X			
002	MW-310		1450	GW			X	X			
003	Field Blank		1505	W			X	X			
004	MW-311	↓	1415	GW			X	X			

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed: today turnaround

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:
	2-21-18 1630		
Fed Ex	2-22-18 1050		

PACE Project No.: 40164990
Receipt Temp = RO I°C
Sample Receipt pH: OK / Adjusted
Cooler Custody Seal: Present / Not Present
Intact / Not Intact

C019a(27Jun2006)

Version 6.0 06/14/06

ORIGINAL

40164990

Table 2. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Columbia Dry Ash and Ash Ponds Disposal Facilities / SCS Engineers Project #25216067

	Parameter	MW-309	MW-310	MW-311	Field Blank	TOTAL
Appendix III Parameters	Boron	x	x	x	x	4
	Calcium	x	x	x	x	4
	Chloride	x	x	x	x	4
	Fluoride	x	x	x	x	4
	pH	x	x	x	x	4
	Sulfate	x	x	x	x	4
	TDS	x	x	x	x	4
Appendix IV Parameters	Antimony	x	x	x	x	4
	Arsenic	x	x	x	x	4
	Barium	x	x	x	x	4
	Beryllium	x	x	x	x	4
	Cadmium	x	x	x	x	4
	Chromium	x	x	x	x	4
	Cobalt	x	x	x	x	4
	Fluoride	x	x	x	x	4
	Lead	x	x	x	x	4
	Lithium	x	x	x	x	4
	Mercury	x	x	x	x	4
	Molybdenum	x	x	x	x	4
	Selenium	x	x	x	x	4
	Thallium	x	x	x	x	4
	Radium	x	x	x	x	4
Field Parameters	Groundwater Elevation	x	x	x		4
	Well Depth	x	x	x		4
	pH (field)	x	x	x		4
	Specific Conductance	x	x	x		4
	Dissolved Oxygen	x	x	x		4
	ORP	x	x	x		4
	Temperature	x	x	x		4
	Turbidity	x	x	x		4
	Color	x	x	x		4
	Odor	x	x	x		4

Notes:

I:\25216067.00\Data and Calculations\Tables\Old sampling spreadsheets\[WPL_COL_CCR_Rule_Sampling_1802.xls]Sheet1

Pace Container Order #332552

40164990

Addresses

Order By :

Company SCS ENGINEERS
Contact Kramer, Kyle
Email kkramer@scsengineers.com
Address 2830 Dairy Drive
Address 2
City Madison
State WI Zip 53718
Phone 608-630-1329

Ship To :

Company SCS ENGINEERS (Pace Analytical
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 CCR Rule Alliant Columbia (25216067)
Due Date 02/16/2018
Profile
Quote
Project Manager Milewsky, Dan
Return
Carrier Most Economical
Location

Trip Blanks

- [ ] Include Trip Blanks

Bottle Labels

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

Bottles

- [ ] Boxed Cases
- [ ] Individually Wrapped
- [X] Grouped By Sample

Return Shipping Labels

- [ ] No Shipper Number
- [ ] With Shipper Number

Misc

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

COC Options

- [X] Number of Blanks 1
- [ ] Pre-Printed

# of Samples	Matrix	Test	Container	Total	# of QC	Lot #	Notes
4	WT	Radium 226	2-500 ml Plastic w/ HNO3	8	0	L-7-104-03BB	
4	WT	Radium 228	2-500 ml Plastic w/ HNO3	8	0	L-7-104-03BB	
4	WT	Metals	250mL plastic w/HNO3	4	0	M-7-314-03BB	
4	WT	TDS, Cl, F, SO4, pH	1-1L plastic unpres	4	0	C-7-307-01BB	

Hazard Shipping Placard In Place : NA

*Sample receiving hours are Monday through Friday 8:00 am to 6:00 pm and Saturday from 9:00 am to 12:00 pm unless special arrangements are made with your 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 and disposal.

*Payment term are net 30 days.

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

Sample Notes

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

Ship Date : 02/14/2018
Prepared By: Mai Yer Her
Verified By:

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

Sample Preservation Receipt Form

Client Name: SCS Engineers Project # 40164990

Initial when completed: SKW Date/ Time:

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

Pace Lab #	Glass							Plastic							Vials						Jars			General			VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN							
001								1	4				1																			2.5 / 5 / 10
002								1	4				1																			2.5 / 5 / 10
003								1	4				1																			2.5 / 5 / 10
004								1	4				1																			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	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	

Pace Analytical 1241 Bellevue Street, Green Bay, WI 54302	Document Name: **Sample Condition Upon Receipt (SCUR)**	Document Revised: 31Jan2018
	Document No.: **F-GB-C-031-rev.06**	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Client Name: SCS Engineers Project #: **WO#: 40164990**

Courier: ☐ CS Logistics ☒ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco
☐ Client ☐ Pace Other: _____

Tracking #: 7898 3313 3333

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: ROI /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.

Person examining contents:
Date: 2-22-18
Initials: SW

Chain of Custody Present:	☒Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☒Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☒Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☒Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☒Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☒No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☒No ☐N/A	7.
Sufficient Volume: ☐Yes ☒No ☐N/A MS/MSD	☐Yes ☒No ☐N/A	8.
Correct Containers Used:	☒Yes ☐No ☐N/A	9.
-Pace Containers Used:	☒Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☒N/A	
Containers Intact:	☒Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☒N/A	11.
Sample Labels match COC:	☐Yes ☒No ☐N/A	12. 001- all HNO3 preserved Label ID 308- Client wrote 309 on bottle - bagged with 14p 2-22-18 SW
-Includes date/time/ID/Analysis Matrix: W		
Trip Blank Present:	☐Yes ☐No ☒N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☒N/A	
Pace Trip Blank Lot # (if purchased): _____		

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

Project Manager Review: AL for DM **Date:** 2/22/18

A2 Round 2 Background Sampling, Analytical Laboratory Report

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

April 11, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on March 24, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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
Kyle Kramer, SCS ENGINEERS
Nicole Kron, SCS ENGINEERS
Jeff Maxted, ALLIANT ENERGY
Marc Morandi, ALLIANT ENERGY

REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

Green Bay Certification IDs

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40166435001	**MW-309**	Water	03/23/18 11:25	03/24/18 09:30
40166435002	**MW-310**	Water	03/23/18 12:05	03/24/18 09:30
40166435003	**FIELD BLANK**	Water	03/23/18 12:45	03/24/18 09:30
40166435004	**MW-311**	Water	03/23/18 13:00	03/24/18 09:30

REPORT OF LABORATORY ANALYSIS

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Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40166435001	**MW-309**	EPA 6020	DS1	14
			RMW	7
		SM 2540C	TMK	1
		EPA 9040	DEY	1
		EPA 300.0	TMK	3
40166435002	**MW-310**	EPA 6020	DS1	14
			RMW	7
		SM 2540C	TMK	1
		EPA 9040	DEY	1
		EPA 300.0	TMK	3
40166435003	**FIELD BLANK**	EPA 6020	DS1	14
		SM 2540C	TMK	1
		EPA 9040	DEY	1
		EPA 300.0	TMK	3
40166435004	**MW-311**	EPA 6020	DS1	14
			RMW	7
		SM 2540C	TMK	1
		EPA 9040	DEY	1
		EPA 300.0	TMK	3

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ANALYTICAL RESULTS

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

Sample: MW-309 **Lab ID: 40166435001** Collected: 03/23/18 11:25 Received: 03/24/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	03/28/18 06:28	03/29/18 21:23	7440-36-0	
Arsenic	**0.35J**	ug/L	1.0	0.28	1	03/28/18 06:28	03/29/18 21:23	7440-38-2	
Barium	**22.2**	ug/L	1.1	0.34	1	03/28/18 06:28	03/29/18 21:23	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	03/28/18 06:28	03/29/18 21:23	7440-41-7	
Boron	**31.0**	ug/L	11.0	3.3	1	03/28/18 06:28	03/29/18 21:23	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	03/28/18 06:28	03/29/18 21:23	7440-43-9	
Calcium	**41800**	ug/L	250	69.8	1	03/28/18 06:28	03/29/18 21:23	7440-70-2	
Chromium	**1.9J**	ug/L	3.4	1.0	1	03/28/18 06:28	03/29/18 21:23	7440-47-3	
Cobalt	**0.18J**	ug/L	1.0	0.085	1	03/28/18 06:28	03/29/18 21:23	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	03/28/18 06:28	03/29/18 21:23	7439-92-1	
Lithium	**0.88J**	ug/L	1.0	0.14	1	03/28/18 06:28	03/29/18 21:23	7439-93-2	
Molybdenum	**2.6**	ug/L	1.5	0.44	1	03/28/18 06:28	03/29/18 21:23	7439-98-7	
Selenium	**0.37J**	ug/L	1.1	0.32	1	03/28/18 06:28	03/29/18 21:23	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	03/28/18 06:28	03/29/18 21:23	7440-28-0	
Field Data	Analytical Method:								
Field pH	**8.08**	Std. Units			1		03/23/18 11:25		
Field Specific Conductance	**1094**	umhos/cm			1		03/23/18 11:25		
Oxygen, Dissolved	**6.74**	mg/L			1		03/23/18 11:25	7782-44-7	
REDOX	**123**	mV			1		03/23/18 11:25		
Turbidity	**28.88**	NTU			1		03/23/18 11:25		
Static Water Level	**783.11**	feet			1		03/23/18 11:25		
Temperature, Water (C)	**10.6**	deg C			1		03/23/18 11:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**552**	mg/L	20.0	8.7	1		03/27/18 14:36		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.010	1		03/27/18 11:06		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**157**	mg/L	10.0	2.5	5		04/03/18 20:09	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		04/03/18 19:55	16984-48-8	
Sulfate	**12.2**	mg/L	3.0	1.0	1		04/03/18 19:55	14808-79-8	

Sample: MW-310 **Lab ID: 40166435002** Collected: 03/23/18 12:05 Received: 03/24/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	03/28/18 06:28	03/29/18 21:29	7440-36-0	
Arsenic	**0.42J**	ug/L	1.0	0.28	1	03/28/18 06:28	03/29/18 21:29	7440-38-2	
Barium	**19.5**	ug/L	1.1	0.34	1	03/28/18 06:28	03/29/18 21:29	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	03/28/18 06:28	03/29/18 21:29	7440-41-7	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

Sample: MW-310 **Lab ID: 40166435002** Collected: 03/23/18 12:05 Received: 03/24/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Boron	**62.1**	ug/L	11.0	3.3	1	03/28/18 06:28	03/29/18 21:29	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	03/28/18 06:28	03/29/18 21:29	7440-43-9	
Calcium	**33400**	ug/L	250	69.8	1	03/28/18 06:28	03/29/18 21:29	7440-70-2	
Chromium	**1.2J**	ug/L	3.4	1.0	1	03/28/18 06:28	03/29/18 21:29	7440-47-3	
Cobalt	**0.13J**	ug/L	1.0	0.085	1	03/28/18 06:28	03/29/18 21:29	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	03/28/18 06:28	03/29/18 21:29	7439-92-1	
Lithium	**0.85J**	ug/L	1.0	0.14	1	03/28/18 06:28	03/29/18 21:29	7439-93-2	
Molybdenum	**3.6**	ug/L	1.5	0.44	1	03/28/18 06:28	03/29/18 21:29	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	03/28/18 06:28	03/29/18 21:29	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	03/28/18 06:28	03/29/18 21:29	7440-28-0	
Field Data	Analytical Method:								
Field pH	**8.06**	Std. Units			1		03/23/18 12:05		
Field Specific Conductance	**765**	umhos/cm			1		03/23/18 12:05		
Oxygen, Dissolved	**5.83**	mg/L			1		03/23/18 12:05	7782-44-7	
REDOX	**64.2**	mV			1		03/23/18 12:05		
Turbidity	**1.7**	NTU			1		03/23/18 12:05		
Static Water Level	**783.10**	feet			1		03/23/18 12:05		
Temperature, Water (C)	**11.2**	deg C			1		03/23/18 12:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**398**	mg/L	20.0	8.7	1		03/27/18 14:36		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.010	1		03/27/18 11:08		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21.7**	mg/L	2.0	0.50	1		04/03/18 20:22	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		04/03/18 20:22	16984-48-8	
Sulfate	**33.1**	mg/L	3.0	1.0	1		04/03/18 20:22	14808-79-8	

Sample: FIELD BLANK **Lab ID: 40166435003** Collected: 03/23/18 12:45 Received: 03/24/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	03/28/18 06:28	03/29/18 21:36	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	03/28/18 06:28	03/29/18 21:36	7440-38-2	
Barium	**<0.34**	ug/L	1.1	0.34	1	03/28/18 06:28	03/29/18 21:36	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	03/28/18 06:28	03/29/18 21:36	7440-41-7	
Boron	**<3.3**	ug/L	11.0	3.3	1	03/28/18 06:28	03/29/18 21:36	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	03/28/18 06:28	03/29/18 21:36	7440-43-9	
Calcium	**<69.8**	ug/L	250	69.8	1	03/28/18 06:28	03/29/18 21:36	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	03/28/18 06:28	03/29/18 21:36	7440-47-3	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

Sample: FIELD BLANK **Lab ID: 40166435003** Collected: 03/23/18 12:45 Received: 03/24/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Cobalt	**<0.085**	ug/L	1.0	0.085	1	03/28/18 06:28	03/29/18 21:36	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	03/28/18 06:28	03/29/18 21:36	7439-92-1	
Lithium	**<0.14**	ug/L	1.0	0.14	1	03/28/18 06:28	03/29/18 21:36	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	03/28/18 06:28	03/29/18 21:36	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	03/28/18 06:28	03/29/18 21:36	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	03/28/18 06:28	03/29/18 21:36	7440-28-0	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		03/27/18 14:36		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**5.4**	Std. Units	0.10	0.010	1		03/27/18 11:15		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	2.0	0.50	1		04/03/18 20:35	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		04/03/18 20:35	16984-48-8	
Sulfate	**<1.0**	mg/L	3.0	1.0	1		04/03/18 20:35	14808-79-8	

Sample: MW-311 **Lab ID: 40166435004** Collected: 03/23/18 13:00 Received: 03/24/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	03/28/18 06:28	03/29/18 21:42	7440-36-0	
Arsenic	**0.56J**	ug/L	1.0	0.28	1	03/28/18 06:28	03/29/18 21:42	7440-38-2	
Barium	**12.3**	ug/L	1.1	0.34	1	03/28/18 06:28	03/29/18 21:42	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	03/28/18 06:28	03/29/18 21:42	7440-41-7	
Boron	**42.7**	ug/L	11.0	3.3	1	03/28/18 06:28	03/29/18 21:42	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	03/28/18 06:28	03/29/18 21:42	7440-43-9	
Calcium	**61000**	ug/L	250	69.8	1	03/28/18 06:28	03/29/18 21:42	7440-70-2	
Chromium	**2.2J**	ug/L	3.4	1.0	1	03/28/18 06:28	03/29/18 21:42	7440-47-3	
Cobalt	**0.11J**	ug/L	1.0	0.085	1	03/28/18 06:28	03/29/18 21:42	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	03/28/18 06:28	03/29/18 21:42	7439-92-1	
Lithium	**0.62J**	ug/L	1.0	0.14	1	03/28/18 06:28	03/29/18 21:42	7439-93-2	
Molybdenum	**1.9**	ug/L	1.5	0.44	1	03/28/18 06:28	03/29/18 21:42	7439-98-7	
Selenium	**0.78J**	ug/L	1.1	0.32	1	03/28/18 06:28	03/29/18 21:42	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	03/28/18 06:28	03/29/18 21:42	7440-28-0	
Field Data	Analytical Method:								
Field pH	**7.93**	Std. Units			1		03/23/18 13:00		
Field Specific Conductance	**508.1**	umhos/cm			1		03/23/18 13:00		
Oxygen, Dissolved	**4.77**	mg/L			1		03/23/18 13:00	7782-44-7	
REDOX	**74**	mV			1		03/23/18 13:00		
Turbidity	**9.12**	NTU			1		03/23/18 13:00		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

Sample: MW-311 **Lab ID: 40166435004** Collected: 03/23/18 13:00 Received: 03/24/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method:								
Static Water Level	**783.00**	feet			1		03/23/18 13:00		
Temperature, Water (C)	**10.5**	deg C			1		03/23/18 13:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**274**	mg/L	20.0	8.7	1		03/29/18 15:41		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.010	1		03/27/18 11:22		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2.7**	mg/L	2.0	0.50	1		04/03/18 20:49	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		04/03/18 20:49	16984-48-8	
Sulfate	**7.2**	mg/L	3.0	1.0	1		04/03/18 20:49	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

QC Batch: 284455 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40166435001, 40166435002, 40166435003, 40166435004

METHOD BLANK: 1664797 Matrix: Water
Associated Lab Samples: 40166435001, 40166435002, 40166435003, 40166435004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	03/29/18 19:33	
Arsenic	ug/L	<0.28	1.0	03/29/18 19:33	
Barium	ug/L	<0.34	1.1	03/29/18 19:33	
Beryllium	ug/L	<0.18	1.0	03/29/18 19:33	
Boron	ug/L	<3.3	11.0	03/29/18 19:33	
Cadmium	ug/L	<0.081	1.0	03/29/18 19:33	
Calcium	ug/L	<69.8	250	03/29/18 19:33	
Chromium	ug/L	<1.0	3.4	03/29/18 19:33	
Cobalt	ug/L	<0.085	1.0	03/29/18 19:33	
Lead	ug/L	<0.20	1.0	03/29/18 19:33	
Lithium	ug/L	<0.14	1.0	03/29/18 19:33	
Molybdenum	ug/L	<0.44	1.5	03/29/18 19:33	
Selenium	ug/L	<0.32	1.1	03/29/18 19:33	
Thallium	ug/L	<0.14	1.0	03/29/18 19:33	

LABORATORY CONTROL SAMPLE: 1664798

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	523	105	80-120	
Arsenic	ug/L	500	501	100	80-120	
Barium	ug/L	500	496	99	80-120	
Beryllium	ug/L	500	479	96	80-120	
Boron	ug/L	500	468	94	80-120	
Cadmium	ug/L	500	515	103	80-120	
Calcium	ug/L	5000	4990	100	80-120	
Chromium	ug/L	500	502	100	80-120	
Cobalt	ug/L	500	452	90	80-120	
Lead	ug/L	500	488	98	80-120	
Lithium	ug/L	500	473	95	80-120	
Molybdenum	ug/L	500	507	101	80-120	
Selenium	ug/L	500	528	106	80-120	
Thallium	ug/L	500	483	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1664799 1664800

Parameter	Units	40166091001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.15	500	500	540	552	108	110	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1664799 1664800

Parameter	Units	40166091001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	<0.28	500	500	519	539	104	108	75-125	4	20	
Barium	ug/L	73.0	500	500	587	596	103	104	75-125	1	20	
Beryllium	ug/L	<0.18	500	500	441	447	88	89	75-125	1	20	
Boron	ug/L	177	500	500	609	601	86	85	75-125	1	20	
Cadmium	ug/L	0.20J	500	500	516	526	103	105	75-125	2	20	
Calcium	ug/L	75600	5000	5000	87000	87100	227	230	75-125	0	20	P6
Chromium	ug/L	<1.0	500	500	498	502	99	100	75-125	1	20	
Cobalt	ug/L	1.4	500	500	444	479	89	95	75-125	7	20	
Lead	ug/L	0.28J	500	500	507	505	101	101	75-125	0	20	
Lithium	ug/L	1.2	500	500	437	437	87	87	75-125	0	20	
Molybdenum	ug/L	4.2	500	500	522	524	104	104	75-125	0	20	
Selenium	ug/L	<0.32	500	500	538	567	108	113	75-125	5	20	
Thallium	ug/L	<0.14	500	500	506	503	101	101	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

QC Batch: 284418 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40166435001, 40166435002, 40166435003

METHOD BLANK: 1664580 Matrix: Water
Associated Lab Samples: 40166435001, 40166435002, 40166435003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	03/27/18 14:31	

LABORATORY CONTROL SAMPLE: 1664581

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	610	556	91	80-120	

SAMPLE DUPLICATE: 1664582

Parameter	Units	40166355002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	404	410	1	5	

SAMPLE DUPLICATE: 1664583

Parameter	Units	40166351002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	382	388	2	5	

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: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

QC Batch: 284679 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40166435004

METHOD BLANK: 1666017 Matrix: Water
Associated Lab Samples: 40166435004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	03/29/18 15:40	

LABORATORY CONTROL SAMPLE: 1666018

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	610	572	94	80-120	

SAMPLE DUPLICATE: 1666019

Parameter	Units	40166435004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	274	260	5	5	

SAMPLE DUPLICATE: 1666020

Parameter	Units	40166537001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	7790	7670	1	5	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

QC Batch: 284365 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40166435001, 40166435002, 40166435003, 40166435004

SAMPLE DUPLICATE: 1664327

Parameter	Units	40166207002 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.9	9.0	1	20	1q,H6

SAMPLE DUPLICATE: 1664343

Parameter	Units	40166250009 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.8	7.8	0	20	H6

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

QC Batch: 284658 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40166435001, 40166435002, 40166435003, 40166435004

METHOD BLANK: 1665875 Matrix: Water
Associated Lab Samples: 40166435001, 40166435002, 40166435003, 40166435004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	04/03/18 15:45	
Fluoride	mg/L	<0.10	0.30	04/03/18 15:45	
Sulfate	mg/L	<1.0	3.0	04/03/18 15:45	

LABORATORY CONTROL SAMPLE: 1665876

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	18.3	92	90-110	
Fluoride	mg/L	2	1.8	91	90-110	
Sulfate	mg/L	20	18.3	91	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1665877 1665878

Parameter	Units	40166290002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.2	20	20	27.4	27.5	111	112	90-110	1	15	M0
Fluoride	mg/L	<0.10	2	2	2.2	2.2	111	111	90-110	0	15	M0
Sulfate	mg/L	2.6J	20	20	24.4	24.6	109	110	90-110	1	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1665879 1665880

Parameter	Units	40166505001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	4.8	20	20	26.8	26.7	110	110	90-110	0	15	
Fluoride	mg/L	<0.10	2	2	2.2	2.2	107	107	90-110	0	15	
Sulfate	mg/L	18.2	20	20	41.5	41.5	116	117	90-110	0	15	M0

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

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 and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

1q	Due to the sample matrix, DI water was added to this sample on a one to one basis and the sample was stirred before analysis.
H6	Analysis initiated outside of the 15 minute EPA required holding time.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166435

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40166435001	**MW-309**	EPA 3010	284455	EPA 6020	284565
40166435002	**MW-310**	EPA 3010	284455	EPA 6020	284565
40166435003	**FIELD BLANK**	EPA 3010	284455	EPA 6020	284565
40166435004	**MW-311**	EPA 3010	284455	EPA 6020	284565
40166435001	**MW-309**				
40166435002	**MW-310**				
40166435004	**MW-311**				
40166435001	**MW-309**	SM 2540C	284418		
40166435002	**MW-310**	SM 2540C	284418		
40166435003	**FIELD BLANK**	SM 2540C	284418		
40166435004	**MW-311**	SM 2540C	284679		
40166435001	**MW-309**	EPA 9040	284365		
40166435002	**MW-310**	EPA 9040	284365		
40166435003	**FIELD BLANK**	EPA 9040	284365		
40166435004	**MW-311**	EPA 9040	284365		
40166435001	**MW-309**	EPA 300.0	284658		
40166435002	**MW-310**	EPA 300.0	284658		
40166435003	**FIELD BLANK**	EPA 300.0	284658		
40166435004	**MW-311**	EPA 300.0	284658		

401064435

Pace Analytical®
www.pacelabs.com

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

CHAIN OF CUSTODY

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

(Please Print Clearly)	
Company Name:	SCS Engineers
Branch/Location:	25-Madison
Project Contact:	Tom Karwoski
Phone:	608-216-7369
Project Number:	25217156
Project Name:	Alliant Energy-Columbia
Project State:	WI
Sampled By (Print):	Mary Hanna
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	Tom Karwoski
Mail To Company:	SCS Engineers
Mail To Address:	2830 Dairy Drive Madison, WI 53718
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	SAME
Invoice To Phone:	

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	W = Water
B = Biota	DW = Drinking Water
C = Charcoal	GW = Ground Water
O = Oil	SW = Surface Water
S = Soil	WW = Waste Water
Sl = Sludge	WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	Analyses Requested: Y/N	Pick Letter	Metals TDS, Cl, F, SO4	pH	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
					N	D					
					N	A					
001	MW-309	3-7-18	1125	GW	X	X	X				
002	MW-310		1205		X	X	X				
003	Field Blank		1245		X	X	X				
004	MW-311		1300		X	X	X				

FILTERED? (YES/NO)
PRESERVATION (CODE)*

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:
Mary Hanna	3/23/18 1450		
Fedex	3/24/18 0830	DSells pace	3/24/18 0930

PACE Project No.: 401064435

Receipt Temp = 4.0 °C

Sample Receipt pH OK / Adjusted

Cooler Custody Seal: Present / Not Present
Intact / Not Intact

C019a(27Jun2006)

Version 6.0 06/14/06

ORIGINAL

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

Client Name: SCS

Sample Preservation Receipt Form

Project # 401666435

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

Initial when completed: [illegible] Date/ Time:

Pace Lab #	Glass							Plastic							Vials						Jars			General			VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN							
001											3		1																			2.5 / 5 / 10
002											2		1																			2.5 / 5 / 10
003											3		1																			2.5 / 5 / 10
004											2		1																			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	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	

Pace Analytical™ 1241 Bellevue Street, Green Bay, WI 54302	Document Name: **Sample Condition Upon Receipt (SCUR)**	Document Revised: 31Jan2018
	Document No.: **F-GB-C-031-rev.06**	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Client Name: SCS

Project # WO# : 40166435

40166435

Courier: ☐ CS Logistics ☑ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other:

Tracking #: 5061 7064 9202

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: ROT /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.

Person examining contents:
Date: 3/24/18
Initials: RB

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

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: ATordm **Date:** 3-24-18

Table 2. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Columbia Dry Ash and Ash Ponds Disposal Facilities / SCS Engineers Project #25216067

	Parameter	MW-301	MW-309	MW-310	MW-311	MW-84A	Field Blank	TOTAL
Appendix III Parameters	Boron	x	x	x	x	x	x	6
	Calcium	x	x	x	x	x	x	6
	Chloride	x	x	x	x	x	x	6
	Fluoride	x	x	x	x	x	x	6
	pH	x	x	x	x	x	x	6
	Sulfate	x	x	x	x	x	x	6
	TDS	x	x	x	x	x	x	6
Appendix IV Parameters	Antimony	x	x	x	x	x	x	6
	Arsenic	x	x	x	x	x	x	6
	Barium	x	x	x	x	x	x	6
	Beryllium	x	x	x	x	x	x	6
	Cadmium	x	x	x	x	x	x	6
	Chromium	x	x	x	x	x	x	6
	Cobalt	x	x	x	x	x	x	6
	Fluoride	x	x	x	x	x	x	6
	Lead	x	x	x	x	x	x	6
	Lithium	x	x	x	x	x	x	6
	Mercury	x	x	x	x	x	x	6
	Molybdenum	x	x	x	x	x	x	6
	Selenium	x	x	x	x	x	x	6
	Thallium	x	x	x	x	x	x	6
	Radium	x	x	x	x	x	x	6
Field Parameters	Groundwater Elevation	x	x	x	x	x		5
	Well Depth	x	x	x	x	x		5
	pH (field)	x	x	x	x	x		5
	Specific Conductance	x	x	x	x	x		5
	Dissolved Oxygen	x	x	x	x	x		5
	ORP	x	x	x	x	x		5
	Temperature	x	x	x	x	x		5
	Turbidity	x	x	x	x	x		5
	Color	x	x	x	x	x		5
	Odor	x	x	x	x	x		5

Notes:

X:\ereports\40166h\40166435\[metals list.xls]Sheet1

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

April 19, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166431

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on March 24, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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
Kyle Kramer, SCS ENGINEERS
Nicole Kron, SCS ENGINEERS
Jeff Maxted, ALLIANT ENERGY
Marc Morandi, ALLIANT ENERGY

REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166431

Pennsylvania Certification IDs

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

SAMPLE SUMMARY

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166431

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40166431001	**MW-309**	Water	03/23/18 11:25	03/24/18 09:30
40166431002	**MW-310**	Water	03/23/18 12:05	03/24/18 09:30
40166431003	**FIELD BLANK**	Water	03/23/18 12:45	03/24/18 09:30
40166431004	**MW-311**	Water	03/23/18 13:00	03/24/18 09:30

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

SAMPLE ANALYTE COUNT

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166431

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40166431001	**MW-309**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
40166431002	**MW-310**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
40166431003	**FIELD BLANK**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
40166431004	**MW-311**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166431

Sample: MW-309 **Lab ID: 40166431001** Collected: 03/23/18 11:25 Received: 03/24/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.815 ± 0.543 (0.699) C:NA T:89%**	pCi/L	04/12/18 18:52	13982-63-3	
Radium-228	EPA 904.0	**0.431 ± 0.346 (0.675) C:70% T:83%**	pCi/L	04/11/18 15:50	15262-20-1	
Total Radium	Total Radium Calculation	**1.25 ± 0.889 (1.37)**	pCi/L	04/19/18 11:02	7440-14-4	

Sample: MW-310 **Lab ID: 40166431002** Collected: 03/23/18 12:05 Received: 03/24/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.423 ± 0.488 (0.793) C:NA T:92%**	pCi/L	04/12/18 18:52	13982-63-3	
Radium-228	EPA 904.0	**0.286 ± 0.353 (0.744) C:68% T:84%**	pCi/L	04/11/18 15:50	15262-20-1	
Total Radium	Total Radium Calculation	**0.709 ± 0.841 (1.54)**	pCi/L	04/19/18 11:02	7440-14-4	

Sample: FIELD BLANK **Lab ID: 40166431003** Collected: 03/23/18 12:45 Received: 03/24/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.000 ± 0.266 (0.576) C:NA T:99%**	pCi/L	04/12/18 18:52	13982-63-3	
Radium-228	EPA 904.0	**0.248 ± 0.337 (0.721) C:70% T:90%**	pCi/L	04/11/18 15:50	15262-20-1	
Total Radium	Total Radium Calculation	**0.248 ± 0.603 (1.30)**	pCi/L	04/19/18 11:02	7440-14-4	

Sample: MW-311 **Lab ID: 40166431004** Collected: 03/23/18 13:00 Received: 03/24/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.569 ± 0.528 (0.803) C:NA T:85%**	pCi/L	04/12/18 18:52	13982-63-3	
Radium-228	EPA 904.0	**0.571 ± 0.373 (0.706) C:74% T:93%**	pCi/L	04/11/18 15:50	15262-20-1	
Total Radium	Total Radium Calculation	**1.14 ± 0.901 (1.51)**	pCi/L	04/19/18 11:02	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166431

QC Batch: 293169 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40166431001, 40166431002, 40166431003, 40166431004

METHOD BLANK: 1434622 Matrix: Water
Associated Lab Samples: 40166431001, 40166431002, 40166431003, 40166431004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.240 ± 0.275 (0.163) C:NA T:84%	pCi/L	04/12/18 18:39	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166431

QC Batch: 293167 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 40166431001, 40166431002, 40166431003, 40166431004

METHOD BLANK: 1434620 Matrix: Water
Associated Lab Samples: 40166431001, 40166431002, 40166431003, 40166431004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.00166 ± 0.257 (0.607) C:79% T:81%	pCi/L	04/11/18 12:01	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166431

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 and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

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.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25217156 ALLIANT ENERGY-COLUMB
Pace Project No.: 40166431

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40166431001	**MW-309**	EPA 903.1	293169		
40166431002	**MW-310**	EPA 903.1	293169		
40166431003	**FIELD BLANK**	EPA 903.1	293169		
40166431004	**MW-311**	EPA 903.1	293169		
40166431001	**MW-309**	EPA 904.0	293167		
40166431002	**MW-310**	EPA 904.0	293167		
40166431003	**FIELD BLANK**	EPA 904.0	293167		
40166431004	**MW-311**	EPA 904.0	293167		
40166431001	**MW-309**	Total Radium Calculation	295020		
40166431002	**MW-310**	Total Radium Calculation	295020		
40166431003	**FIELD BLANK**	Total Radium Calculation	295020		
40166431004	**MW-311**	Total Radium Calculation	295020		

Pace Analytical®
www.pacelabs.com

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

CHAIN OF CUSTODY

40166431

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

(Please Print Clearly)	
Company Name:	SCS Engineers
Branch/Location:	25-Madison
Project Contact:	Tom Karwoski
Phone:	608-216-7369
Project Number:	25217152
Project Name:	Alliant Energy-Columbia
Project State:	WI
Sampled By (Print):	Matt Harms
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	Tom Karwoski
Mail To Company:	SCS Engineers
Mail To Address:	2830 Dairy Drive Madison, WI 53718
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	Same
Invoice To Phone:	

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

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested: Radium 226	Analyses Requested: Radium 228	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
001	MW-309	3/23/18	1125	GW	N	D	X	X			
002	MW-310		1205				X	X			
003	Field Blank		1245				X	X			
004	MW-311		1300				X	X			

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:
Matt Harms	3/23/18 1430		
Fed Ex	3/24/18 0930		

Received By:	Date/Time:
	3/24/18 0930

PACE Project No.
40166431

Receipt Temp = N/A °C

Sample Receipt pH
OK / Adjusted

Cooler Custody Seal
Present / Not Present
Intact / Not Intact

C019a(27Jun2006)

Version 6.0 06/14/06

ORIGINAL

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

Sample Preservation Receipt Form

Client Name: SCS Engineers Project # 40166431

All containers needing preservation have been checked and noted below: ☒Yes ☐No ☐N/A Lab Std #ID of preservation (if pH adjusted): Initial when completed: Date/ Time:

	Glass							Plastic							Vials						Jars			General									
Pace Lab #	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN	VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001																										2							2.5 / 5 / 10
002																										2							2.5 / 5 / 10
003																										2							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
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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	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	1L poly HNO_3

Pace Analytical™ 1241 Bellevue Street, Green Bay, WI 54302	Document Name: **Sample Condition Upon Receipt (SCUR)**	Document Revised: 31Jan2018
	Document No.: **F-GB-C-031-rev.06**	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40166431

40166431

Client Name: SCS Engineers

Courier: ☐ CS Logistics ☒ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other:

Tracking #: 8102 8960 0255

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: N/A /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.

Person examining contents:
Date: 3/24/18
Initials: BH

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

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: AL for DM **Date:** 3/24/18

A3 Round 3 Background Sampling, Analytical Laboratory Report

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

June 21, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on April 24, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Revised Report: The field pH value has been corrected for MW-311.

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

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

CERTIFICATIONS

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

Pennsylvania Certification IDs

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
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

Green Bay Certification IDs

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40167914001	**MW309**	Water	04/23/18 11:10	04/24/18 09:00
40167914002	**MW310**	Water	04/23/18 12:15	04/24/18 09:00
40167914003	**MW311**	Water	04/23/18 13:35	04/24/18 09:00
40167914004	**FIELD BLANK**	Water	04/23/18 12:00	04/24/18 09:00

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SAMPLE ANALYTE COUNT

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40167914001	**MW309**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			RMW	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40167914002	**MW310**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			RMW	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40167914003	**MW311**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			RMW	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40167914004	**FIELD BLANK**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

Sample: MW309 **Lab ID: 40167914001** Collected: 04/23/18 11:10 Received: 04/24/18 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.36J**	ug/L	1.0	0.15	1	04/27/18 07:54	05/02/18 03:09	7440-36-0	
Arsenic	**0.77J**	ug/L	1.0	0.28	1	04/27/18 07:54	05/02/18 03:09	7440-38-2	
Barium	**21.3**	ug/L	1.1	0.34	1	04/27/18 07:54	05/02/18 03:09	7440-39-3	
Beryllium	**0.20J**	ug/L	1.0	0.18	1	04/27/18 07:54	05/02/18 03:09	7440-41-7	
Boron	**30.4**	ug/L	11.0	3.3	1	04/27/18 07:54	05/02/18 03:09	7440-42-8	
Cadmium	**0.27J**	ug/L	1.0	0.081	1	04/27/18 07:54	05/02/18 03:09	7440-43-9	1q
Calcium	**39600**	ug/L	250	69.8	1	04/27/18 07:54	05/02/18 03:09	7440-70-2	
Chromium	**2.3J**	ug/L	3.4	1.0	1	04/27/18 07:54	05/02/18 03:09	7440-47-3	
Cobalt	**0.39J**	ug/L	1.0	0.085	1	04/27/18 07:54	05/02/18 03:09	7440-48-4	
Lead	**0.39J**	ug/L	1.0	0.20	1	04/27/18 07:54	05/02/18 03:09	7439-92-1	
Lithium	**1.1**	ug/L	1.0	0.14	1	04/27/18 07:54	05/02/18 03:09	7439-93-2	
Molybdenum	**2.0**	ug/L	1.5	0.44	1	04/27/18 07:54	05/02/18 03:09	7439-98-7	
Selenium	**0.60J**	ug/L	1.1	0.32	1	04/27/18 07:54	05/02/18 03:09	7782-49-2	
Thallium	**0.83J**	ug/L	1.0	0.14	1	04/27/18 07:54	05/02/18 03:09	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	04/27/18 09:15	04/30/18 07:37	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.71**	Std. Units			1		04/23/18 11:10		
Field Specific Conductance	**985**	umhos/cm			1		04/23/18 11:10		
Oxygen, Dissolved	**5.43**	mg/L			1		04/23/18 11:10	7782-44-7	
REDOX	**94.2**	mV			1		04/23/18 11:10		
Turbidity	**4.76**	NTU			1		04/23/18 11:10		
Static Water Level	**783.07**	feet			1		04/23/18 11:10		
Temperature, Water (C)	**11.0**	deg C			1		04/23/18 11:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**562**	mg/L	20.0	8.7	1		04/25/18 14:56		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.010	1		04/30/18 09:59		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**157**	mg/L	10.0	2.5	5		05/03/18 13:10	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		05/02/18 17:18	16984-48-8	
Sulfate	**12.0**	mg/L	3.0	1.0	1		05/02/18 17:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

Sample: MW310 **Lab ID: 40167914002** Collected: 04/23/18 12:15 Received: 04/24/18 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.30J**	ug/L	1.0	0.15	1	04/27/18 07:54	05/02/18 03:55	7440-36-0	
Arsenic	**0.82J**	ug/L	1.0	0.28	1	04/27/18 07:54	05/02/18 03:55	7440-38-2	
Barium	**19.0**	ug/L	1.1	0.34	1	04/27/18 07:54	05/02/18 03:55	7440-39-3	
Beryllium	**0.72J**	ug/L	1.0	0.18	1	04/27/18 07:54	05/02/18 03:55	7440-41-7	
Boron	**60.7**	ug/L	11.0	3.3	1	04/27/18 07:54	05/02/18 03:55	7440-42-8	
Cadmium	**0.14J**	ug/L	1.0	0.081	1	04/27/18 07:54	05/02/18 03:55	7440-43-9	1q
Calcium	**32100**	ug/L	250	69.8	1	04/27/18 07:54	05/02/18 03:55	7440-70-2	
Chromium	**1.4J**	ug/L	3.4	1.0	1	04/27/18 07:54	05/02/18 03:55	7440-47-3	
Cobalt	**0.26J**	ug/L	1.0	0.085	1	04/27/18 07:54	05/02/18 03:55	7440-48-4	
Lead	**0.21J**	ug/L	1.0	0.20	1	04/27/18 07:54	05/02/18 03:55	7439-92-1	
Lithium	**1.4**	ug/L	1.0	0.14	1	04/27/18 07:54	05/02/18 03:55	7439-93-2	
Molybdenum	**2.8**	ug/L	1.5	0.44	1	04/27/18 07:54	05/02/18 03:55	7439-98-7	
Selenium	**0.55J**	ug/L	1.1	0.32	1	04/27/18 07:54	05/02/18 03:55	7782-49-2	
Thallium	**0.73J**	ug/L	1.0	0.14	1	04/27/18 07:54	05/02/18 03:55	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	04/27/18 09:15	04/30/18 07:39	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.75**	Std. Units			1		04/23/18 12:15		
Field Specific Conductance	**688**	umhos/cm			1		04/23/18 12:15		
Oxygen, Dissolved	**2.87**	mg/L			1		04/23/18 12:15	7782-44-7	
REDOX	**68.2**	mV			1		04/23/18 12:15		
Turbidity	**1.35**	NTU			1		04/23/18 12:15		
Static Water Level	**782.97**	feet			1		04/23/18 12:15		
Temperature, Water (C)	**11.2**	deg C			1		04/23/18 12:15		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**396**	mg/L	20.0	8.7	1		04/25/18 14:57		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.010	1		04/30/18 10:05		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**22.1**	mg/L	2.0	0.50	1		05/02/18 18:00	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		05/02/18 18:00	16984-48-8	
Sulfate	**32.0**	mg/L	3.0	1.0	1		05/02/18 18:00	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

Sample: MW311 **Lab ID: 40167914003** Collected: 04/23/18 13:35 Received: 04/24/18 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	04/27/18 07:54	05/02/18 02:16	7440-36-0	
Arsenic	**0.42J**	ug/L	1.0	0.28	1	04/27/18 07:54	05/02/18 02:16	7440-38-2	
Barium	**12.4**	ug/L	1.1	0.34	1	04/27/18 07:54	05/02/18 02:16	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	04/27/18 07:54	05/02/18 02:16	7440-41-7	
Boron	**40.1**	ug/L	11.0	3.3	1	04/27/18 07:54	05/02/18 02:16	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	04/27/18 07:54	05/02/18 02:16	7440-43-9	1q
Calcium	**56600**	ug/L	250	69.8	1	04/27/18 07:54	05/02/18 02:16	7440-70-2	
Chromium	**2.2J**	ug/L	3.4	1.0	1	04/27/18 07:54	05/02/18 02:16	7440-47-3	
Cobalt	**<0.085**	ug/L	1.0	0.085	1	04/27/18 07:54	05/02/18 02:16	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	04/27/18 07:54	05/02/18 02:16	7439-92-1	
Lithium	**0.58J**	ug/L	1.0	0.14	1	04/27/18 07:54	05/02/18 02:16	7439-93-2	
Molybdenum	**2.1**	ug/L	1.5	0.44	1	04/27/18 07:54	05/02/18 02:16	7439-98-7	
Selenium	**0.60J**	ug/L	1.1	0.32	1	04/27/18 07:54	05/02/18 02:16	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	04/27/18 07:54	05/02/18 02:16	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	04/27/18 09:15	04/30/18 07:46	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.62**	Std. Units			1		04/23/18 13:35		
Field Specific Conductance	**459.1**	umhos/cm			1		04/23/18 13:35		
Oxygen, Dissolved	**0.87**	mg/L			1		04/23/18 13:35	7782-44-7	
REDOX	**65.3**	mV			1		04/23/18 13:35		
Turbidity	**2.58**	NTU			1		04/23/18 13:35		
Static Water Level	**781.83**	feet			1		04/23/18 13:35		
Temperature, Water (C)	**10.5**	deg C			1		04/23/18 13:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**262**	mg/L	20.0	8.7	1		04/25/18 14:57		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.010	1		04/30/18 10:06		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2.6**	mg/L	2.0	0.50	1		05/02/18 18:11	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		05/02/18 18:11	16984-48-8	
Sulfate	**7.9**	mg/L	3.0	1.0	1		05/02/18 18:11	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(920)469-2436

ANALYTICAL RESULTS

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

Sample: FIELD BLANK **Lab ID: 40167914004** Collected: 04/23/18 12:00 Received: 04/24/18 09:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	04/27/18 07:54	05/02/18 04:10	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	04/27/18 07:54	05/02/18 04:10	7440-38-2	
Barium	**<0.34**	ug/L	1.1	0.34	1	04/27/18 07:54	05/02/18 04:10	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	04/27/18 07:54	05/02/18 04:10	7440-41-7	
Boron	**<3.3**	ug/L	11.0	3.3	1	04/27/18 07:54	05/02/18 04:10	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	04/27/18 07:54	05/02/18 04:10	7440-43-9	1q
Calcium	**<69.8**	ug/L	250	69.8	1	04/27/18 07:54	05/02/18 04:10	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	04/27/18 07:54	05/02/18 04:10	7440-47-3	
Cobalt	**<0.085**	ug/L	1.0	0.085	1	04/27/18 07:54	05/02/18 04:10	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	04/27/18 07:54	05/02/18 04:10	7439-92-1	
Lithium	**0.16J**	ug/L	1.0	0.14	1	04/27/18 07:54	05/02/18 04:10	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	04/27/18 07:54	05/02/18 04:10	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	04/27/18 07:54	05/02/18 04:10	7782-49-2	
Thallium	**0.26J**	ug/L	1.0	0.14	1	04/27/18 07:54	05/02/18 04:10	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	04/27/18 09:15	04/30/18 07:48	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		04/25/18 14:57		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**6.6**	Std. Units	0.10	0.010	1		04/30/18 10:08		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	2.0	0.50	1		05/02/18 18:21	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		05/02/18 18:21	16984-48-8	
Sulfate	**<1.0**	mg/L	3.0	1.0	1		05/02/18 18:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(920)469-2436

QUALITY CONTROL DATA

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

QC Batch: 287189 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

METHOD BLANK: 1679980 Matrix: Water
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.13	0.42	04/30/18 07:18	

LABORATORY CONTROL SAMPLE: 1679981

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1679982 1679983

Parameter	Units	40167766001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.20	5	5	5.0	4.9	100	99	85-115	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

QC Batch: 287177 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

METHOD BLANK: 1679947 Matrix: Water
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	05/02/18 02:08	
Arsenic	ug/L	<0.28	1.0	05/02/18 02:08	
Barium	ug/L	<0.34	1.1	05/02/18 02:08	
Beryllium	ug/L	<0.18	1.0	05/02/18 02:08	
Boron	ug/L	<3.3	11.0	05/02/18 02:08	
Cadmium	ug/L	<0.081	1.0	05/02/18 02:08	
Calcium	ug/L	<69.8	250	05/02/18 02:08	
Chromium	ug/L	<1.0	3.4	05/02/18 02:08	
Cobalt	ug/L	<0.085	1.0	05/02/18 02:08	
Lead	ug/L	<0.20	1.0	05/02/18 02:08	
Lithium	ug/L	<0.14	1.0	05/02/18 02:08	
Molybdenum	ug/L	<0.44	1.5	05/02/18 02:08	
Selenium	ug/L	<0.32	1.1	05/02/18 02:08	
Thallium	ug/L	<0.14	1.0	05/02/18 02:08	

LABORATORY CONTROL SAMPLE: 1679948

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	516	103	80-120	
Arsenic	ug/L	500	504	101	80-120	
Barium	ug/L	500	487	97	80-120	
Beryllium	ug/L	500	512	102	80-120	
Boron	ug/L	500	493	99	80-120	
Cadmium	ug/L	500	518	104	80-120	
Calcium	ug/L	5000	4960	99	80-120	
Chromium	ug/L	500	493	99	80-120	
Cobalt	ug/L	500	484	97	80-120	
Lead	ug/L	500	487	97	80-120	
Lithium	ug/L	500	486	97	80-120	
Molybdenum	ug/L	500	502	100	80-120	
Selenium	ug/L	500	531	106	80-120	
Thallium	ug/L	500	506	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1679949 1679950

Parameter	Units	40167914001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.36J	500	500	518	509	103	102	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1679949 1679950

Parameter	Units	40167914001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.77J	500	500	511	499	102	100	75-125	2	20	
Barium	ug/L	21.3	500	500	512	505	98	97	75-125	1	20	
Beryllium	ug/L	0.20J	500	500	479	478	96	96	75-125	0	20	
Boron	ug/L	30.4	500	500	473	496	89	93	75-125	5	20	
Cadmium	ug/L	0.27J	500	500	504	496	101	99	75-125	2	20	
Calcium	ug/L	39600	5000	5000	44500	44900	98	105	75-125	1	20	
Chromium	ug/L	2.3J	500	500	484	475	96	95	75-125	2	20	
Cobalt	ug/L	0.39J	500	500	466	460	93	92	75-125	1	20	
Lead	ug/L	0.39J	500	500	491	485	98	97	75-125	1	20	
Lithium	ug/L	1.1	500	500	455	455	91	91	75-125	0	20	
Molybdenum	ug/L	2.0	500	500	510	501	102	100	75-125	2	20	
Selenium	ug/L	0.60J	500	500	528	517	105	103	75-125	2	20	
Thallium	ug/L	0.83J	500	500	513	508	102	101	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

QC Batch: 286998 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

METHOD BLANK: 1678720 Matrix: Water
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	04/25/18 14:53	

LABORATORY CONTROL SAMPLE: 1678721

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	531	562	106	80-120	

SAMPLE DUPLICATE: 1678722

Parameter	Units	40167901003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	370	372	1	5	

SAMPLE DUPLICATE: 1678723

Parameter	Units	40167904001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	402	394	2	5	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

QC Batch: 287352 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

SAMPLE DUPLICATE: 1681498

Parameter	Units	40167862001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	9.9	9.9	0	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

QC Batch: 287136 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

METHOD BLANK: 1679636 Matrix: Water
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	05/02/18 15:54	
Fluoride	mg/L	<0.10	0.30	05/02/18 15:54	
Sulfate	mg/L	<1.0	3.0	05/02/18 15:54	

LABORATORY CONTROL SAMPLE: 1679637

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	20.9	105	90-110	
Fluoride	mg/L	2	2.1	107	90-110	
Sulfate	mg/L	20	20.8	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1679638 1679639

Parameter	Units	40167944004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1130	2000	2000	3330	3130	110	100	90-110	6	15	
Fluoride	mg/L	532	1000	1000	1600	1580	106	105	90-110	1	15	
Sulfate	mg/L	<100	2000	2000	2160	2010	107	100	90-110	7	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1679640 1679641

Parameter	Units	40167942008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	46.9	100	100	155	155	108	108	90-110	0	15	
Fluoride	mg/L	<0.50	10	10	11.2	11.1	112	111	90-110	1	15	M0
Sulfate	mg/L	<5.0	100	100	108	107	108	107	90-110	1	15	

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

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

Sample: MW309 **Lab ID: 40167914001** Collected: 04/23/18 11:10 Received: 04/24/18 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.539 ± 0.622 (1.01) C:NA T:84%**	pCi/L	05/14/18 19:04	13982-63-3	
Radium-228	EPA 904.0	**0.595 ± 0.389 (0.742) C:79% T:88%**	pCi/L	05/15/18 15:46	15262-20-1	
Total Radium	Total Radium Calculation	**1.13 ± 1.01 (1.75)**	pCi/L	05/17/18 13:42	7440-14-4	

Sample: MW310 **Lab ID: 40167914002** Collected: 04/23/18 12:15 Received: 04/24/18 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.261 ± 0.406 (0.980) C:NA T:86%**	pCi/L	05/14/18 19:04	13982-63-3	
Radium-228	EPA 904.0	**0.969 ± 0.509 (0.910) C:63% T:91%**	pCi/L	05/15/18 15:47	15262-20-1	
Total Radium	Total Radium Calculation	**0.969 ± 0.915 (1.89)**	pCi/L	05/17/18 13:42	7440-14-4	

Sample: MW311 **Lab ID: 40167914003** Collected: 04/23/18 13:35 Received: 04/24/18 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.502 ± 0.583 (0.941) C:NA T:90%**	pCi/L	05/14/18 19:04	13982-63-3	
Radium-228	EPA 904.0	**0.396 ± 0.394 (0.816) C:73% T:95%**	pCi/L	05/15/18 15:46	15262-20-1	
Total Radium	Total Radium Calculation	**0.898 ± 0.977 (1.76)**	pCi/L	05/17/18 13:42	7440-14-4	

Sample: FIELD BLANK **Lab ID: 40167914004** Collected: 04/23/18 12:00 Received: 04/24/18 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.000 ± 0.413 (0.874) C:NA T:89%**	pCi/L	05/14/18 19:18	13982-63-3	
Radium-228	EPA 904.0	**0.0498 ± 0.388 (0.888) C:73% T:86%**	pCi/L	05/15/18 15:47	15262-20-1	
Total Radium	Total Radium Calculation	**0.0498 ± 0.801 (1.76)**	pCi/L	05/17/18 13:42	7440-14-4	

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

QC Batch: 296667 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

METHOD BLANK: 1452109 Matrix: Water
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.691 ± 0.373 (0.663) C:81% T:89%	pCi/L	05/15/18 15:48	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

QC Batch: 296642 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

METHOD BLANK: 1452074 Matrix: Water
Associated Lab Samples: 40167914001, 40167914002, 40167914003, 40167914004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.294 ± 0.271 (0.159) C:NA T:98%	pCi/L	05/14/18 18:51	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

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 and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

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.

LABORATORIES

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

ANALYTE QUALIFIERS

1q	Analyte was measured in the associated method blank at -0.13 ug/L.
H6	Analysis initiated outside of the 15 minute EPA required holding time.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25217156-01 WPL-COLUMBIA CCR
Pace Project No.: 40167914

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40167914001	**MW309**	EPA 3010	287177	EPA 6020	287295
40167914002	**MW310**	EPA 3010	287177	EPA 6020	287295
40167914003	**MW311**	EPA 3010	287177	EPA 6020	287295
40167914004	**FIELD BLANK**	EPA 3010	287177	EPA 6020	287295
40167914001	**MW309**	EPA 7470	287189	EPA 7470	287232
40167914002	**MW310**	EPA 7470	287189	EPA 7470	287232
40167914003	**MW311**	EPA 7470	287189	EPA 7470	287232
40167914004	**FIELD BLANK**	EPA 7470	287189	EPA 7470	287232
40167914001	**MW309**				
40167914002	**MW310**				
40167914003	**MW311**				
40167914001	**MW309**	EPA 903.1	296642		
40167914002	**MW310**	EPA 903.1	296642		
40167914003	**MW311**	EPA 903.1	296642		
40167914004	**FIELD BLANK**	EPA 903.1	296642		
40167914001	**MW309**	EPA 904.0	296667		
40167914002	**MW310**	EPA 904.0	296667		
40167914003	**MW311**	EPA 904.0	296667		
40167914004	**FIELD BLANK**	EPA 904.0	296667		
40167914001	**MW309**	Total Radium Calculation	298862		
40167914002	**MW310**	Total Radium Calculation	298862		
40167914003	**MW311**	Total Radium Calculation	298862		
40167914004	**FIELD BLANK**	Total Radium Calculation	298862		
40167914001	**MW309**	SM 2540C	286998		
40167914002	**MW310**	SM 2540C	286998		
40167914003	**MW311**	SM 2540C	286998		
40167914004	**FIELD BLANK**	SM 2540C	286998		
40167914001	**MW309**	EPA 9040	287352		
40167914002	**MW310**	EPA 9040	287352		
40167914003	**MW311**	EPA 9040	287352		
40167914004	**FIELD BLANK**	EPA 9040	287352		
40167914001	**MW309**	EPA 300.0	287136		
40167914002	**MW310**	EPA 300.0	287136		
40167914003	**MW311**	EPA 300.0	287136		
40167914004	**FIELD BLANK**	EPA 300.0	287136		

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www.pacelabs.com

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

CHAIN OF CUSTODY

401679 14

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

(Please Print Clearly)	
Company Name:	SCS Engineers
Branch/Location:	Madison, WI
Project Contact:	Meg Blodgett
Phone:	608 216 7326
Project Number:	25217156-01
Project Name:	WPL-Columbia
Project State:	WI
Sampled By (Print):	Jackie DeBrugne +
Sampled By (Sign):	Paul Grove
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	Meg Blodgett
Mail To Company:	SCS Engineers
Mail To Address:	2830 Dairy Dr. Madison, WI 53718
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

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

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	Y/N	Pick Letter	Analyses Requested: Metals	TDS, Cl, F, SO4	pH	Radium 226	Radium 228	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
					N	D								
001	MW 309	4.23	1110	GW			x	x	x	x	x			
002	MW 310	4.23	1215	GW			x	x	x	x	x			
003	MW 311	4.23	1335	GW			x	x	x	x	x			
004	Field Blank	4.23	1200	DI			x	x	x	x	x			
												take out MW 310		

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:
	4-23-18 1730		
Fed Ex	4/24/18 0900		4/24/18 0900

PACE Project No.: 401679 14

Receipt Temp = 4.0 °C

Sample Receipt pH OK / Adjusted

Cooler Custody Seal: Present / Not Present; Intact / Not Intact

Version 6.0 06/14/06

C019a(27Jun2006)

ORIGINAL

Pace Container Order #346977

40167914

Addresses

Order By :		Ship To :		Return To:	
Company	SCS ENGINEERS	Company	SCS ENGINEERS (Pace Analytical	Company	Pace Analytical Green Bay
Contact	Blodgett, Meghan	Contact	Kyle Kramer	Contact	Milewsky, Dan
Email	mblodgett@scsengineers.com	Email	kkramer@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	CCR Rule Alliant Columbia MOD 4 (25216067)	**Due Date**	03/29/2018	**Profile**		**Quote**	
Project Manager	Milewsky, Dan	**Return**		**Carrier**	Most Economical	**Location**	

Trip Blanks

- [ ] Include Trip Blanks

Bottle Labels

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

Bottles

- [ ] Boxed Cases
- [ ] Individually Wrapped
- [X] Grouped By Sample

Return Shipping Labels

- [ ] No Shipper Number
- [ ] With Shipper Number

COC Options

- [X] Number of Blanks 1
- [ ] Pre-Printed

Misc

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

# of Samples	Matrix	Test	Container	Total	# of QC	Lot #	Notes
4	WT	Radium 226	1-1L Plastic w/ HNO3	4	0		
4	WT	Radium 228	1-1L Plastic w/ HNO3	4	0		
4	WT	Metals	250mL plastic w/HNO3	4	0	M-8-054-04BB	
4	WT	pH	250mL plastic unpres	4	0	M-8-039-06BB	
4	WT	TDS, Cl, F, SO4	250mL plastic unpres	4	0	M-8-039-06BB	

Hazard Shipping Placard In Place : NA

*Sample receiving hours are Monday through Friday 8:00 am to 6:00 pm and Saturday from 9:00 am to 12:00 pm unless special arrangements are made with your 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 and disposal.

*Payment term are net 30 days.

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

Sample Notes

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

Ship Date :	03/27/2018
Prepared By:	Mai Yer Her
Verified By:	

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

Sample Preservation Receipt Form

Client Name: SCS Engineers Project # 40167914

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

Lab Lot# of pH paper: 10054771 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: SM Date/ Time:

Pace Lab #	Glass							Plastic							Vials						Jars			General			VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN							
001											2		1													2*				X		2.5 / 5 / 10
002											2		1													2				X		2.5 / 5 / 10
003											2		1													2				X		2.5 / 5 / 10
004											2		1													2				X		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 ~~X~~N/A ***If yes look in headspace column**

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	HNO3

Pace Analytical™ 1241 Bellevue Street, Green Bay, WI 54302	Document Name: Sample Condition Upon Receipt (SCUR)	Document Revised: 31Jan2018
	Document No.: F-GB-C-031-rev.06	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Project #: WO#: 40167914

40167914

Client Name: SCS Engineers

Courier: ☐ CS Logistics ☒ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other:

Tracking #: 8130 2340 4455

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: 2.3 /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.

Person examining contents:
Date: 4/24/18
Initials: SSM

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

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: AL for DM **Date:** 4/24/18

A4 Round 4 Background Sampling, Analytical Laboratory Report

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

June 19, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on May 25, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

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

CERTIFICATIONS

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Pennsylvania Certification IDs

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
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

Green Bay Certification IDs

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

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

SAMPLE SUMMARY

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40169796003	**MW 309**	Water	05/24/18 13:20	05/25/18 09:45
40169796004	**MW 310**	Water	05/24/18 14:20	05/25/18 09:45
40169796005	**MW 311**	Water	05/24/18 15:15	05/25/18 09:45
40169796006	**FIELD BLANK**	Water	05/24/18 11:40	05/25/18 09:45

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

SAMPLE ANALYTE COUNT

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40169796003	**MW 309**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			RMW	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40169796004	**MW 310**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			RMW	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40169796005	**MW 311**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			RMW	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40169796006	**FIELD BLANK**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40169796003	**MW 309**					
EPA 6020	Antimony	0.24J	ug/L	1.0	06/07/18 03:30	
EPA 6020	Barium	15.3	ug/L	1.1	06/07/18 03:30	
EPA 6020	Boron	28.0	ug/L	11.0	06/07/18 03:30	
EPA 6020	Calcium	52700	ug/L	250	06/07/18 15:10	
EPA 6020	Chromium	1.9J	ug/L	3.4	06/07/18 03:30	
EPA 6020	Cobalt	0.11J	ug/L	1.0	06/07/18 03:30	
EPA 6020	Lithium	0.77J	ug/L	1.0	06/07/18 03:30	
EPA 6020	Selenium	0.41J	ug/L	1.1	06/07/18 03:30	
	Field pH	7.59	Std. Units		05/24/18 13:20	
	Field Specific Conductance	921	umhos/cm		05/24/18 13:20	
	Oxygen, Dissolved	8.76	mg/L		05/24/18 13:20	
	REDOX	54.5	mV		05/24/18 13:20	
	Turbidity	3.35	NTU		05/24/18 13:20	
	Static Water Level	785.45	feet		05/24/18 13:20	
	Temperature, Water (C)	12.1	deg C		05/24/18 13:20	
EPA 903.1	Radium-226	0.0638 ± 0.451 (0.900) C:NA T:86%	pCi/L		06/18/18 19:19	
EPA 904.0	Radium-228	0.831 ± 0.439 (0.771) C:73% T:80%	pCi/L		06/15/18 15:56	
Total Radium Calculation	Total Radium	0.895 ± 0.890 (1.67)	pCi/L		06/19/18 12:56	
SM 2540C	Total Dissolved Solids	478	mg/L	20.0	05/30/18 14:31	
EPA 9040	pH at 25 Degrees C	7.6	Std. Units	0.10	05/29/18 11:05	H6
EPA 300.0	Chloride	141	mg/L	10.0	06/08/18 10:54	
EPA 300.0	Sulfate	17.5	mg/L	3.0	06/07/18 17:22	
40169796004	**MW 310**					
EPA 6020	Antimony	0.21J	ug/L	1.0	06/07/18 03:37	
EPA 6020	Arsenic	0.45J	ug/L	1.0	06/07/18 03:37	
EPA 6020	Barium	20.7	ug/L	1.1	06/07/18 03:37	
EPA 6020	Boron	59.2	ug/L	11.0	06/07/18 03:37	
EPA 6020	Cadmium	0.11J	ug/L	1.0	06/07/18 03:37	
EPA 6020	Calcium	32100	ug/L	250	06/07/18 15:16	
EPA 6020	Chromium	1.4J	ug/L	3.4	06/07/18 03:37	
EPA 6020	Cobalt	0.15J	ug/L	1.0	06/07/18 03:37	
EPA 6020	Lithium	0.81J	ug/L	1.0	06/07/18 03:37	
EPA 6020	Molybdenum	1.9	ug/L	1.5	06/07/18 03:37	
	Field pH	7.74	Std. Units		05/24/18 14:20	
	Field Specific Conductance	840	umhos/cm		05/24/18 14:20	
	Oxygen, Dissolved	8.85	mg/L		05/24/18 14:20	
	REDOX	63.5	mV		05/24/18 14:20	
	Turbidity	0.04	NTU		05/24/18 14:20	
	Static Water Level	785.97	feet		05/24/18 14:20	
	Temperature, Water (C)	11.7	deg C		05/24/18 14:20	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40169796004	**MW 310**					
EPA 903.1	Radium-226	-0.115 ± 0.355 (0.807) C:NA T:92%	pCi/L		06/18/18 19:36	
EPA 904.0	Radium-228	0.346 ± 0.399 (0.838) C:74% T:80%	pCi/L		06/15/18 15:56	
Total Radium Calculation	Total Radium	0.346 ± 0.754 (1.65)	pCi/L		06/19/18 12:56	
SM 2540C	Total Dissolved Solids	436	mg/L	20.0	05/30/18 14:31	
EPA 9040	pH at 25 Degrees C	7.8	Std. Units	0.10	05/29/18 11:06	H6
EPA 300.0	Chloride	68.6	mg/L	10.0	06/08/18 11:05	
EPA 300.0	Sulfate	28.0	mg/L	3.0	06/07/18 17:33	
40169796005	**MW 311**					
EPA 6020	Arsenic	0.32J	ug/L	1.0	06/07/18 03:44	
EPA 6020	Barium	10.7	ug/L	1.1	06/07/18 03:44	
EPA 6020	Boron	31.7	ug/L	11.0	06/07/18 03:44	
EPA 6020	Calcium	62500	ug/L	250	06/07/18 15:35	
EPA 6020	Chromium	2.2J	ug/L	3.4	06/07/18 03:44	
EPA 6020	Cobalt	0.11J	ug/L	1.0	06/07/18 03:44	
EPA 6020	Lithium	0.52J	ug/L	1.0	06/07/18 03:44	
EPA 6020	Molybdenum	0.55J	ug/L	1.5	06/07/18 03:44	
EPA 6020	Selenium	0.90J	ug/L	1.1	06/07/18 03:44	
	Field pH	7.54	Std. Units		05/24/18 15:15	
	Field Specific Conductance	539	umhos/cm		05/24/18 15:15	
	Oxygen, Dissolved	8.91	mg/L		05/24/18 15:15	
	REDOX	70.1	mV		05/24/18 15:15	
	Turbidity	0.59	NTU		05/24/18 15:15	
	Static Water Level	786.11	feet		05/24/18 15:15	
	Temperature, Water (C)	11.0	deg C		05/24/18 15:15	
EPA 903.1	Radium-226	0.000 ± 0.302 (0.655) C:NA T:92%	pCi/L		06/18/18 19:36	
EPA 904.0	Radium-228	0.162 ± 0.371 (0.825) C:70% T:76%	pCi/L		06/15/18 15:56	
Total Radium Calculation	Total Radium	0.162 ± 0.673 (1.48)	pCi/L		06/19/18 12:56	
SM 2540C	Total Dissolved Solids	304	mg/L	20.0	05/30/18 14:31	
EPA 9040	pH at 25 Degrees C	7.6	Std. Units	0.10	05/29/18 11:07	H6
EPA 300.0	Chloride	3.5	mg/L	2.0	06/07/18 17:43	
EPA 300.0	Sulfate	36.9	mg/L	3.0	06/07/18 17:43	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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SUMMARY OF DETECTION

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40169796006	**FIELD BLANK**					
EPA 903.1	Radium-226	-0.159 ± 0.376 (0.843) C:NA T:93%	pCi/L		06/18/18 19:36	
EPA 904.0	Radium-228	0.513 ± 0.362 (0.680) C:73% T:77%	pCi/L		06/15/18 15:56	
Total Radium Calculation	Total Radium	0.513 ± 0.738 (1.52)	pCi/L		06/19/18 12:56	
EPA 9040	pH at 25 Degrees C	6.8	Std. Units	0.10	05/29/18 11:09	H6

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Sample: MW 309 **Lab ID: 40169796003** Collected: 05/24/18 13:20 Received: 05/25/18 09:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.24J**	ug/L	1.0	0.15	1	05/31/18 07:24	06/07/18 03:30	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	05/31/18 07:24	06/07/18 03:30	7440-38-2	
Barium	**15.3**	ug/L	1.1	0.34	1	05/31/18 07:24	06/07/18 03:30	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	05/31/18 07:24	06/07/18 03:30	7440-41-7	
Boron	**28.0**	ug/L	11.0	3.3	1	05/31/18 07:24	06/07/18 03:30	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	05/31/18 07:24	06/07/18 03:30	7440-43-9	
Calcium	**52700**	ug/L	250	69.8	1	05/31/18 07:24	06/07/18 15:10	7440-70-2	
Chromium	**1.9J**	ug/L	3.4	1.0	1	05/31/18 07:24	06/07/18 03:30	7440-47-3	
Cobalt	**0.11J**	ug/L	1.0	0.085	1	05/31/18 07:24	06/07/18 03:30	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	05/31/18 07:24	06/07/18 03:30	7439-92-1	
Lithium	**0.77J**	ug/L	1.0	0.14	1	05/31/18 07:24	06/07/18 03:30	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	05/31/18 07:24	06/07/18 03:30	7439-98-7	
Selenium	**0.41J**	ug/L	1.1	0.32	1	05/31/18 07:24	06/07/18 03:30	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	05/31/18 07:24	06/07/18 03:30	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	06/01/18 08:55	06/04/18 09:41	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.59**	Std. Units			1		05/24/18 13:20		
Field Specific Conductance	**921**	umhos/cm			1		05/24/18 13:20		
Oxygen, Dissolved	**8.76**	mg/L			1		05/24/18 13:20	7782-44-7	
REDOX	**54.5**	mV			1		05/24/18 13:20		
Turbidity	**3.35**	NTU			1		05/24/18 13:20		
Static Water Level	**785.45**	feet			1		05/24/18 13:20		
Temperature, Water (C)	**12.1**	deg C			1		05/24/18 13:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**478**	mg/L	20.0	8.7	1		05/30/18 14:31		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.010	1		05/29/18 11:05		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**141**	mg/L	10.0	2.5	5		06/08/18 10:54	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		06/07/18 17:22	16984-48-8	
Sulfate	**17.5**	mg/L	3.0	1.0	1		06/07/18 17:22	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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ANALYTICAL RESULTS

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Sample: MW 310 **Lab ID: 40169796004** Collected: 05/24/18 14:20 Received: 05/25/18 09:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.21J**	ug/L	1.0	0.15	1	05/31/18 07:24	06/07/18 03:37	7440-36-0	
Arsenic	**0.45J**	ug/L	1.0	0.28	1	05/31/18 07:24	06/07/18 03:37	7440-38-2	
Barium	**20.7**	ug/L	1.1	0.34	1	05/31/18 07:24	06/07/18 03:37	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	05/31/18 07:24	06/07/18 03:37	7440-41-7	
Boron	**59.2**	ug/L	11.0	3.3	1	05/31/18 07:24	06/07/18 03:37	7440-42-8	
Cadmium	**0.11J**	ug/L	1.0	0.081	1	05/31/18 07:24	06/07/18 03:37	7440-43-9	
Calcium	**32100**	ug/L	250	69.8	1	05/31/18 07:24	06/07/18 15:16	7440-70-2	
Chromium	**1.4J**	ug/L	3.4	1.0	1	05/31/18 07:24	06/07/18 03:37	7440-47-3	
Cobalt	**0.15J**	ug/L	1.0	0.085	1	05/31/18 07:24	06/07/18 03:37	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	05/31/18 07:24	06/07/18 03:37	7439-92-1	
Lithium	**0.81J**	ug/L	1.0	0.14	1	05/31/18 07:24	06/07/18 03:37	7439-93-2	
Molybdenum	**1.9**	ug/L	1.5	0.44	1	05/31/18 07:24	06/07/18 03:37	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	05/31/18 07:24	06/07/18 03:37	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	05/31/18 07:24	06/07/18 03:37	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	06/01/18 08:55	06/04/18 09:43	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.74**	Std. Units			1		05/24/18 14:20		
Field Specific Conductance	**840**	umhos/cm			1		05/24/18 14:20		
Oxygen, Dissolved	**8.85**	mg/L			1		05/24/18 14:20	7782-44-7	
REDOX	**63.5**	mV			1		05/24/18 14:20		
Turbidity	**0.04**	NTU			1		05/24/18 14:20		
Static Water Level	**785.97**	feet			1		05/24/18 14:20		
Temperature, Water (C)	**11.7**	deg C			1		05/24/18 14:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**436**	mg/L	20.0	8.7	1		05/30/18 14:31		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.010	1		05/29/18 11:06		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**68.6**	mg/L	10.0	2.5	5		06/08/18 11:05	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		06/07/18 17:33	16984-48-8	
Sulfate	**28.0**	mg/L	3.0	1.0	1		06/07/18 17:33	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Sample: MW 311 **Lab ID: 40169796005** Collected: 05/24/18 15:15 Received: 05/25/18 09:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	05/31/18 07:24	06/07/18 03:44	7440-36-0	
Arsenic	**0.32J**	ug/L	1.0	0.28	1	05/31/18 07:24	06/07/18 03:44	7440-38-2	
Barium	**10.7**	ug/L	1.1	0.34	1	05/31/18 07:24	06/07/18 03:44	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	05/31/18 07:24	06/07/18 03:44	7440-41-7	
Boron	**31.7**	ug/L	11.0	3.3	1	05/31/18 07:24	06/07/18 03:44	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	05/31/18 07:24	06/07/18 03:44	7440-43-9	
Calcium	**62500**	ug/L	250	69.8	1	05/31/18 07:24	06/07/18 15:35	7440-70-2	
Chromium	**2.2J**	ug/L	3.4	1.0	1	05/31/18 07:24	06/07/18 03:44	7440-47-3	
Cobalt	**0.11J**	ug/L	1.0	0.085	1	05/31/18 07:24	06/07/18 03:44	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	05/31/18 07:24	06/07/18 03:44	7439-92-1	
Lithium	**0.52J**	ug/L	1.0	0.14	1	05/31/18 07:24	06/07/18 03:44	7439-93-2	
Molybdenum	**0.55J**	ug/L	1.5	0.44	1	05/31/18 07:24	06/07/18 03:44	7439-98-7	
Selenium	**0.90J**	ug/L	1.1	0.32	1	05/31/18 07:24	06/07/18 03:44	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	05/31/18 07:24	06/07/18 03:44	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	06/01/18 08:55	06/04/18 09:46	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.54**	Std. Units			1		05/24/18 15:15		
Field Specific Conductance	**539**	umhos/cm			1		05/24/18 15:15		
Oxygen, Dissolved	**8.91**	mg/L			1		05/24/18 15:15	7782-44-7	
REDOX	**70.1**	mV			1		05/24/18 15:15		
Turbidity	**0.59**	NTU			1		05/24/18 15:15		
Static Water Level	**786.11**	feet			1		05/24/18 15:15		
Temperature, Water (C)	**11.0**	deg C			1		05/24/18 15:15		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**304**	mg/L	20.0	8.7	1		05/30/18 14:31		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.010	1		05/29/18 11:07		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**3.5**	mg/L	2.0	0.50	1		06/07/18 17:43	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		06/07/18 17:43	16984-48-8	
Sulfate	**36.9**	mg/L	3.0	1.0	1		06/07/18 17:43	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Sample: FIELD BLANK **Lab ID: 40169796006** Collected: 05/24/18 11:40 Received: 05/25/18 09:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	05/31/18 07:24	06/07/18 01:46	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	05/31/18 07:24	06/07/18 01:46	7440-38-2	
Barium	**<0.34**	ug/L	1.1	0.34	1	05/31/18 07:24	06/07/18 01:46	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	05/31/18 07:24	06/07/18 01:46	7440-41-7	
Boron	**<3.3**	ug/L	11.0	3.3	1	05/31/18 07:24	06/07/18 01:46	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	05/31/18 07:24	06/07/18 01:46	7440-43-9	
Calcium	**<69.8**	ug/L	250	69.8	1	05/31/18 07:24	06/07/18 15:42	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	05/31/18 07:24	06/07/18 01:46	7440-47-3	
Cobalt	**<0.085**	ug/L	1.0	0.085	1	05/31/18 07:24	06/07/18 01:46	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	05/31/18 07:24	06/07/18 01:46	7439-92-1	
Lithium	**<0.14**	ug/L	1.0	0.14	1	05/31/18 07:24	06/07/18 01:46	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	05/31/18 07:24	06/07/18 01:46	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	05/31/18 07:24	06/07/18 01:46	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	05/31/18 07:24	06/07/18 01:46	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	06/01/18 08:55	06/04/18 09:48	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		05/30/18 14:32		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**6.8**	Std. Units	0.10	0.010	1		05/29/18 11:09		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	2.0	0.50	1		06/07/18 17:54	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		06/07/18 17:54	16984-48-8	
Sulfate	**<1.0**	mg/L	3.0	1.0	1		06/07/18 17:54	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

QC Batch: 290652 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

METHOD BLANK: 1700161 Matrix: Water
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.13	0.42	06/04/18 09:22	

LABORATORY CONTROL SAMPLE: 1700162

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.8	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1700163 1700164

Parameter	Units	40169796001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.13	5	5	4.7	4.6	94	92	85-115	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

QC Batch: 290500 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

METHOD BLANK: 1699477 Matrix: Water
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	06/07/18 01:39	
Arsenic	ug/L	<0.28	1.0	06/07/18 01:39	
Barium	ug/L	<0.34	1.1	06/07/18 01:39	
Beryllium	ug/L	<0.18	1.0	06/07/18 01:39	
Boron	ug/L	<3.3	11.0	06/07/18 01:39	
Cadmium	ug/L	<0.081	1.0	06/07/18 01:39	
Calcium	ug/L	<69.8	250	06/07/18 14:19	
Chromium	ug/L	<1.0	3.4	06/07/18 01:39	
Cobalt	ug/L	<0.085	1.0	06/07/18 01:39	
Lead	ug/L	<0.20	1.0	06/07/18 01:39	
Lithium	ug/L	<0.14	1.0	06/07/18 01:39	
Molybdenum	ug/L	<0.44	1.5	06/07/18 01:39	
Selenium	ug/L	<0.32	1.1	06/07/18 01:39	
Thallium	ug/L	<0.14	1.0	06/07/18 01:39	

LABORATORY CONTROL SAMPLE: 1699478

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	505	101	80-120	
Arsenic	ug/L	500	496	99	80-120	
Barium	ug/L	500	485	97	80-120	
Beryllium	ug/L	500	497	99	80-120	
Boron	ug/L	500	466	93	80-120	
Cadmium	ug/L	500	502	100	80-120	
Calcium	ug/L	5000	4760	95	80-120	
Chromium	ug/L	500	485	97	80-120	
Cobalt	ug/L	500	477	95	80-120	
Lead	ug/L	500	463	93	80-120	
Lithium	ug/L	500	476	95	80-120	
Molybdenum	ug/L	500	488	98	80-120	
Selenium	ug/L	500	536	107	80-120	
Thallium	ug/L	500	461	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1699479 1699480

Parameter	Units	40169796001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.15	500	500	498	511	100	102	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1699479 1699480

Parameter	Units	40169796001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	<0.28	500	500	488	500	98	100	75-125	2	20	
Barium	ug/L	11.3	500	500	496	507	97	99	75-125	2	20	
Beryllium	ug/L	<0.18	500	500	487	536	97	107	75-125	10	20	
Boron	ug/L	92.0	500	500	563	653	94	112	75-125	15	20	
Cadmium	ug/L	<0.081	500	500	489	501	98	100	75-125	2	20	
Calcium	ug/L	78400	5000	5000	85900	80800	149	46	75-125	6	20	P6
Chromium	ug/L	2.2J	500	500	478	493	95	98	75-125	3	20	
Cobalt	ug/L	<0.085	500	500	463	477	93	95	75-125	3	20	
Lead	ug/L	<0.20	500	500	466	477	93	95	75-125	2	20	
Lithium	ug/L	3.8	500	500	472	524	94	104	75-125	11	20	
Molybdenum	ug/L	7.2	500	500	498	513	98	101	75-125	3	20	
Selenium	ug/L	0.58J	500	500	529	540	106	108	75-125	2	20	
Thallium	ug/L	<0.14	500	500	466	480	93	96	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

QC Batch: 290444 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

METHOD BLANK: 1699202 Matrix: Water
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	05/30/18 14:28	

LABORATORY CONTROL SAMPLE: 1699203

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	615	590	96	80-120	

SAMPLE DUPLICATE: 1699204

Parameter	Units	40169693003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	414	398	4	5	

SAMPLE DUPLICATE: 1699205

Parameter	Units	40169865001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	250	248	1	5	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

QC Batch: 290200 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

SAMPLE DUPLICATE: 1698516

Parameter	Units	40169613002 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.5	7.5	0	20	H6

SAMPLE DUPLICATE: 1698517

Parameter	Units	40169697001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.2	8.1	0	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

QC Batch: 290551 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

METHOD BLANK: 1699663 Matrix: Water
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	06/07/18 14:23	
Fluoride	mg/L	<0.10	0.30	06/07/18 14:23	
Sulfate	mg/L	<1.0	3.0	06/07/18 14:23	

LABORATORY CONTROL SAMPLE: 1699664

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	20.5	102	90-110	
Fluoride	mg/L	2	2.1	103	90-110	
Sulfate	mg/L	20	20.5	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1699665 1699666

Parameter	Units	40169781002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	173	400	400	598	596	106	106	90-110	0	15	
Fluoride	mg/L	<2.0	40	40	42.2	42.1	106	105	90-110	0	15	
Sulfate	mg/L	47.5J	400	400	460	464	103	104	90-110	1	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1699667 1699668

Parameter	Units	40169797003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	44.3	200	200	256	256	106	106	90-110	0	15	
Fluoride	mg/L	<0.10	2	2	2.4	2.4	118	118	90-110	0	15	M0
Sulfate	mg/L	221	200	200	430	427	104	103	90-110	1	15	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Sample: MW 309 **Lab ID: 40169796003** Collected: 05/24/18 13:20 Received: 05/25/18 09:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0638 ± 0.451 (0.900) C:NA T:86%**	pCi/L	06/18/18 19:19	13982-63-3	
Radium-228	EPA 904.0	**0.831 ± 0.439 (0.771) C:73% T:80%**	pCi/L	06/15/18 15:56	15262-20-1	
Total Radium	Total Radium Calculation	**0.895 ± 0.890 (1.67)**	pCi/L	06/19/18 12:56	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Sample: MW 310 **Lab ID: 40169796004** Collected: 05/24/18 14:20 Received: 05/25/18 09:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.115 ± 0.355 (0.807) C:NA T:92%**	pCi/L	06/18/18 19:36	13982-63-3	
Radium-228	EPA 904.0	**0.346 ± 0.399 (0.838) C:74% T:80%**	pCi/L	06/15/18 15:56	15262-20-1	
Total Radium	Total Radium Calculation	**0.346 ± 0.754 (1.65)**	pCi/L	06/19/18 12:56	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Sample: MW 311 **Lab ID: 40169796005** Collected: 05/24/18 15:15 Received: 05/25/18 09:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.000 ± 0.302 (0.655) C:NA T:92%**	pCi/L	06/18/18 19:36	13982-63-3	
Radium-228	EPA 904.0	**0.162 ± 0.371 (0.825) C:70% T:76%**	pCi/L	06/15/18 15:56	15262-20-1	
Total Radium	Total Radium Calculation	**0.162 ± 0.673 (1.48)**	pCi/L	06/19/18 12:56	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Sample: FIELD BLANK **Lab ID: 40169796006** Collected: 05/24/18 11:40 Received: 05/25/18 09:45 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.159 ± 0.376 (0.843) C:NA T:93%**	pCi/L	06/18/18 19:36	13982-63-3	
Radium-228	EPA 904.0	**0.513 ± 0.362 (0.680) C:73% T:77%**	pCi/L	06/15/18 15:56	15262-20-1	
Total Radium	Total Radium Calculation	**0.513 ± 0.738 (1.52)**	pCi/L	06/19/18 12:56	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

QC Batch: 300868 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

METHOD BLANK: 1472493 Matrix: Water
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.780 ± 0.478 (0.873) C:57% T:79%	pCi/L	06/15/18 12:48	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

QC Batch: 300533 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

METHOD BLANK: 1470785 Matrix: Water
Associated Lab Samples: 40169796003, 40169796004, 40169796005, 40169796006

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.000 ± 0.267 (0.431) C:NA T:88%	pCi/L	06/18/18 19:19	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

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 and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

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.

LABORATORIES

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

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25217156.01 WPL COLUMBIA CCR
Pace Project No.: 40171010

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40169796003	**MW 309**	EPA 3010	290500	EPA 6020	290624
40169796004	**MW 310**	EPA 3010	290500	EPA 6020	290624
40169796005	**MW 311**	EPA 3010	290500	EPA 6020	290624
40169796006	**FIELD BLANK**	EPA 3010	290500	EPA 6020	290624
40169796003	**MW 309**	EPA 7470	290652	EPA 7470	290751
40169796004	**MW 310**	EPA 7470	290652	EPA 7470	290751
40169796005	**MW 311**	EPA 7470	290652	EPA 7470	290751
40169796006	**FIELD BLANK**	EPA 7470	290652	EPA 7470	290751
40169796003	**MW 309**				
40169796004	**MW 310**				
40169796005	**MW 311**				
40169796003	**MW 309**	EPA 903.1	300533		
40169796004	**MW 310**	EPA 903.1	300533		
40169796005	**MW 311**	EPA 903.1	300533		
40169796006	**FIELD BLANK**	EPA 903.1	300533		
40169796003	**MW 309**	EPA 904.0	300868		
40169796004	**MW 310**	EPA 904.0	300868		
40169796005	**MW 311**	EPA 904.0	300868		
40169796006	**FIELD BLANK**	EPA 904.0	300868		
40169796003	**MW 309**	Total Radium Calculation	302718		
40169796004	**MW 310**	Total Radium Calculation	302718		
40169796005	**MW 311**	Total Radium Calculation	302718		
40169796006	**FIELD BLANK**	Total Radium Calculation	302718		
40169796003	**MW 309**	SM 2540C	290444		
40169796004	**MW 310**	SM 2540C	290444		
40169796005	**MW 311**	SM 2540C	290444		
40169796006	**FIELD BLANK**	SM 2540C	290444		
40169796003	**MW 309**	EPA 9040	290200		
40169796004	**MW 310**	EPA 9040	290200		
40169796005	**MW 311**	EPA 9040	290200		
40169796006	**FIELD BLANK**	EPA 9040	290200		
40169796003	**MW 309**	EPA 300.0	290551		
40169796004	**MW 310**	EPA 300.0	290551		
40169796005	**MW 311**	EPA 300.0	290551		
40169796006	**FIELD BLANK**	EPA 300.0	290551		

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

Pace Analytical®
www.pacelabs.com

SSM

40169796

CHAIN OF CUSTODY

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

(Please Print Clearly)	
Company Name:	SCS
Branch/Location:	Madison
Project Contact:	Meg Blodgett
Phone:	608 216-7362
Project Number:	25217156.01
Project Name:	Columbia
Project State:	WI
Sampled By (Print):	Paul A. Grover
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

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

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested: pH, Cl, TDS, F, SO4	Metals	Radium 226+228 (See Attached List)	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
					N	A						
					N	D						
					N	D						
001	MW 306	5/24/18	11:10	GW			X	X	X			
002	MW 307		12:15									
003	MW 309		13:20									
004	MW 310		14:20									
005	MW 311		15:15									
006	Field Blank		11:40	DI								

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	5/24/18 16:30		
CS Logistics	5/25/18 0945		

PACE Project No.: 40169796

Receipt Temp = R01 °C

Sample Receipt pH: OK / Adjusted

Cooler Custody Seal: Present / Not Present; Intact / Not Intact

Version 6.0 06/14/06

C019a(27Jun2006)

ORIGINAL

40169796

Sampling Points and Parameters - CCR Rule Sampling Program, May 2018 Secondary Pond Resampling Event
Groundwater Monitoring - Columbia Dry Ash and Ash Ponds Disposal Facilities / SCS Engineers Project #25216067

	Parameter	MW-301	MW-302	MW-303	MW-304	MW-305	M-4R	MW-33AR	MW-34A	MW-84A	MW-306	MW-307	MW-308	Field Blank	TOTAL
Appendix III Parameters	Boron										x	x		x	3
	Calcium										x	x		x	3
	Chloride										x	x		x	3
	Fluoride										x	x		x	3
	pH										x	x		x	3
	Sulfate										x	x		x	3
	TDS										x	x		x	3
Appendix IV Parameters	Antimony										x	x		x	3
	Arsenic										x	x		x	3
	Barium										x	x		x	3
	Beryllium										x	x		x	3
	Cadmium										x	x		x	3
	Chromium										x	x		x	3
	Cobalt										x	x		x	3
	Fluoride										x	x		x	3
	Lead										x	x		x	3
	Lithium										x	x		x	3
	Mercury										x	x		x	3
	Molybdenum										x	x		x	3
	Selenium										x	x		x	3
	Thallium										x	x		x	3
	Radium										x	x		x	3
Field Parameters	Groundwater Elevation										x	x			2
	Well Depth										x	x			2
	pH (field)										x	x			2
	Specific Conductance										x	x			2
	Dissolved Oxygen										x	x			2
	ORP										x	x			2
	Temperature										x	x			2
	Turbidity										x	x			2
	Color										x	x			2
	Odor										x	x			2

Notes:

I:\25216067.00\Data and Calculations\Field Work Requests\[WPL_COL_CCR_Rule_Sampling_Secondary Pond_1805.xls]Sheet1

40169796

Table 2. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Columbia Dry Ash and Ash Ponds Disposal Facilities / SCS Engineers Project #25216067

	Parameter	MW-301	MW-309	MW-310	MW-311	MW-84A	Field Blank	TOTAL
Appendix III Parameters	Boron	x	x	x	x	x	x	6
	Calcium	x	x	x	x	x	x	6
	Chloride	x	x	x	x	x	x	6
	Fluoride	x	x	x	x	x	x	6
	pH	x	x	x	x	x	x	6
	Sulfate	x	x	x	x	x	x	6
	TDS	x	x	x	x	x	x	6
Appendix IV Parameters	Antimony	x	x	x	x	x	x	6
	Arsenic	x	x	x	x	x	x	6
	Barium	x	x	x	x	x	x	6
	Beryllium	x	x	x	x	x	x	6
	Cadmium	x	x	x	x	x	x	6
	Chromium	x	x	x	x	x	x	6
	Cobalt	x	x	x	x	x	x	6
	Fluoride	x	x	x	x	x	x	6
	Lead	x	x	x	x	x	x	6
	Lithium	x	x	x	x	x	x	6
	Mercury	x	x	x	x	x	x	6
	Molybdenum	x	x	x	x	x	x	6
	Selenium	x	x	x	x	x	x	6
	Thallium	x	x	x	x	x	x	6
	Radium	x	x	x	x	x	x	6
Field Parameters	Groundwater Elevation	x	x	x	x	x		5
	Well Depth	x	x	x	x	x		5
	pH (field)	x	x	x	x	x		5
	Specific Conductance	x	x	x	x	x		5
	Dissolved Oxygen	x	x	x	x	x		5
	ORP	x	x	x	x	x		5
	Temperature	x	x	x	x	x		5
	Turbidity	x	x	x	x	x		5
	Color	x	x	x	x	x		5
	Odor	x	x	x	x	x		5

Notes:

C:\Users\3510med\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\1WB99N1

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

Sample Preservation Receipt Form

Client Name: SCS Project # 40169796

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

Lab Lot# of pH paper: 10454701 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: AB Date/ Time:

Pace Lab #	Glass							Plastic							Vials						Jars			General			VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN							
001											2		1													2				✓		2.5 / 5 / 10
002											2		1													2				✓		2.5 / 5 / 10
003											2		1													2				✓		2.5 / 5 / 10
004											2		1													2				✓		2.5 / 5 / 10
005											2		1													2				✓		2.5 / 5 / 10
006											2		1													2				✓		2.5 / 5 / 10
007																										2				✓		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	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	1 L poly HNO3

Pace Analytical™ 1241 Bellevue Street, Green Bay, WI 54302	Document Name: **Sample Condition Upon Receipt (SCUR)**	Document Revised: 25Apr2018
	Document No.: **F-GB-C-031-Rev.07**	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Project #: WO#: 40169796

Client Name: SCS

Courier: ☑ CS Logistics ☐ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other: _____

Tracking #: _____

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

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

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other _____

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

Cooler Temperature Uncorr: _____ /Corr: R07

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.

Person examining contents:
Date: 5/25/18
Initials: CML

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: RMR for DM **Date:** 5/25/18

A5 Round 5 Background Sampling, Analytical Laboratory Report

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

July 20, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on June 26, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

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

CERTIFICATIONS

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

Pennsylvania Certification IDs

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
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

Green Bay Certification IDs

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

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

SAMPLE SUMMARY

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40171430001	**MW309**	Water	06/23/18 10:30	06/26/18 09:30
40171430002	**MW310**	Water	06/23/18 11:35	06/26/18 09:30
40171430003	**MW311**	Water	06/23/18 12:35	06/26/18 09:30
40171430004	**FIELD BLANK**	Water	06/23/18 12:40	06/26/18 09:30

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

SAMPLE ANALYTE COUNT

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40171430001	**MW309**	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40171430002	**MW310**	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40171430003	**MW311**	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40171430004	**FIELD BLANK**	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

Sample: MW309 **Lab ID: 40171430001** Collected: 06/23/18 10:30 Received: 06/26/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.76J**	ug/L	1.0	0.15	1	07/03/18 08:29	07/09/18 19:33	7440-36-0	
Arsenic	**0.56J**	ug/L	1.0	0.28	1	07/03/18 08:29	07/09/18 19:33	7440-38-2	
Barium	**18.3**	ug/L	1.1	0.34	1	07/03/18 08:29	07/09/18 19:33	7440-39-3	
Beryllium	**0.38J**	ug/L	1.0	0.18	1	07/03/18 08:29	07/09/18 19:33	7440-41-7	
Boron	**26.6**	ug/L	11.0	3.3	1	07/03/18 08:29	07/10/18 13:43	7440-42-8	
Cadmium	**0.58J**	ug/L	1.0	0.081	1	07/03/18 08:29	07/09/18 19:33	7440-43-9	
Calcium	**67600**	ug/L	250	69.8	1	07/03/18 08:29	07/09/18 19:33	7440-70-2	P6
Chromium	**2.2J**	ug/L	3.4	1.0	1	07/03/18 08:29	07/09/18 19:33	7440-47-3	
Cobalt	**0.54J**	ug/L	1.0	0.085	1	07/03/18 08:29	07/09/18 19:33	7440-48-4	
Lead	**0.76J**	ug/L	1.0	0.20	1	07/03/18 08:29	07/09/18 19:33	7439-92-1	
Lithium	**1.1**	ug/L	1.0	0.14	1	07/03/18 08:29	07/09/18 19:33	7439-93-2	
Molybdenum	**0.70J**	ug/L	1.5	0.44	1	07/03/18 08:29	07/09/18 19:33	7439-98-7	
Selenium	**1.1**	ug/L	1.1	0.32	1	07/03/18 08:29	07/09/18 19:33	7782-49-2	
Thallium	**0.57J**	ug/L	1.0	0.14	1	07/03/18 08:29	07/09/18 19:33	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	06/27/18 10:00	06/28/18 08:25	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.50**	Std. Units			1		06/23/18 10:30		
Field Specific Conductance	**1057**	umhos/cm			1		06/23/18 10:30		
Oxygen, Dissolved	**9.93**	mg/L			1		06/23/18 10:30	7782-44-7	
REDOX	**89.9**	mV			1		06/23/18 10:30		
Turbidity	**1.94**	NTU			1		06/23/18 10:30		
Static Water Level	**786.03**	feet			1		06/23/18 10:30		
Temperature, Water (C)	**12.0**	deg C			1		06/23/18 10:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**548**	mg/L	20.0	8.7	1		06/26/18 16:06		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.010	1		07/02/18 09:55		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**203**	mg/L	20.0	5.0	10		07/05/18 17:39	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		07/05/18 15:31	16984-48-8	
Sulfate	**24.1**	mg/L	3.0	1.0	1		07/05/18 15:31	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

Sample: MW310 **Lab ID: 40171430002** Collected: 06/23/18 11:35 Received: 06/26/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.97J**	ug/L	1.0	0.15	1	07/03/18 08:29	07/09/18 20:07	7440-36-0	
Arsenic	**1.2**	ug/L	1.0	0.28	1	07/03/18 08:29	07/09/18 20:07	7440-38-2	
Barium	**20.3**	ug/L	1.1	0.34	1	07/03/18 08:29	07/09/18 20:07	7440-39-3	
Beryllium	**0.59J**	ug/L	1.0	0.18	1	07/03/18 08:29	07/09/18 20:07	7440-41-7	
Boron	**61.4**	ug/L	11.0	3.3	1	07/03/18 08:29	07/10/18 14:10	7440-42-8	
Cadmium	**0.78J**	ug/L	1.0	0.081	1	07/03/18 08:29	07/09/18 20:07	7440-43-9	
Calcium	**34300**	ug/L	250	69.8	1	07/03/18 08:29	07/09/18 20:07	7440-70-2	
Chromium	**2.4J**	ug/L	3.4	1.0	1	07/03/18 08:29	07/09/18 20:07	7440-47-3	
Cobalt	**0.75J**	ug/L	1.0	0.085	1	07/03/18 08:29	07/09/18 20:07	7440-48-4	
Lead	**0.77J**	ug/L	1.0	0.20	1	07/03/18 08:29	07/09/18 20:07	7439-92-1	
Lithium	**1.2**	ug/L	1.0	0.14	1	07/03/18 08:29	07/09/18 20:07	7439-93-2	
Molybdenum	**1.9**	ug/L	1.5	0.44	1	07/03/18 08:29	07/09/18 20:07	7439-98-7	
Selenium	**0.96J**	ug/L	1.1	0.32	1	07/03/18 08:29	07/09/18 20:07	7782-49-2	
Thallium	**0.90J**	ug/L	1.0	0.14	1	07/03/18 08:29	07/09/18 20:07	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	06/27/18 10:00	06/28/18 08:27	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.82**	Std. Units			1		06/23/18 11:35		
Field Specific Conductance	**791**	umhos/cm			1		06/23/18 11:35		
Oxygen, Dissolved	**10.09**	mg/L			1		06/23/18 11:35	7782-44-7	
REDOX	**74.5**	mV			1		06/23/18 11:35		
Turbidity	**1.12**	NTU			1		06/23/18 11:35		
Static Water Level	**786.64**	feet			1		06/23/18 11:35		
Temperature, Water (C)	**12**	deg C			1		06/23/18 11:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**438**	mg/L	20.0	8.7	1		06/27/18 15:23		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.010	1		07/02/18 09:58		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**59.8**	mg/L	2.0	0.50	1		07/05/18 15:45	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		07/05/18 15:45	16984-48-8	
Sulfate	**30.4**	mg/L	3.0	1.0	1		07/05/18 15:45	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(920)469-2436

ANALYTICAL RESULTS

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

Sample: MW311 **Lab ID: 40171430003** Collected: 06/23/18 12:35 Received: 06/26/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.18J**	ug/L	1.0	0.15	1	07/03/18 08:29	07/09/18 20:21	7440-36-0	
Arsenic	**0.31J**	ug/L	1.0	0.28	1	07/03/18 08:29	07/09/18 20:21	7440-38-2	
Barium	**15.4**	ug/L	1.1	0.34	1	07/03/18 08:29	07/09/18 20:21	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	07/03/18 08:29	07/09/18 20:21	7440-41-7	
Boron	**33.6**	ug/L	11.0	3.3	1	07/03/18 08:29	07/10/18 14:24	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	07/03/18 08:29	07/09/18 20:21	7440-43-9	
Calcium	**70700**	ug/L	250	69.8	1	07/03/18 08:29	07/09/18 20:21	7440-70-2	
Chromium	**2.3J**	ug/L	3.4	1.0	1	07/03/18 08:29	07/09/18 20:21	7440-47-3	
Cobalt	**0.11J**	ug/L	1.0	0.085	1	07/03/18 08:29	07/09/18 20:21	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	07/03/18 08:29	07/09/18 20:21	7439-92-1	
Lithium	**0.72J**	ug/L	1.0	0.14	1	07/03/18 08:29	07/09/18 20:21	7439-93-2	
Molybdenum	**0.93J**	ug/L	1.5	0.44	1	07/03/18 08:29	07/09/18 20:21	7439-98-7	
Selenium	**0.86J**	ug/L	1.1	0.32	1	07/03/18 08:29	07/09/18 20:21	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	07/03/18 08:29	07/09/18 20:21	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	06/27/18 10:00	06/28/18 08:29	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.65**	Std. Units			1		06/23/18 12:35		
Field Specific Conductance	**596**	umhos/cm			1		06/23/18 12:35		
Oxygen, Dissolved	**9.75**	mg/L			1		06/23/18 12:35	7782-44-7	
REDOX	**82.6**	mV			1		06/23/18 12:35		
Turbidity	**0.58**	NTU			1		06/23/18 12:35		
Static Water Level	**786.47**	feet			1		06/23/18 12:35		
Temperature, Water (C)	**11**	deg C			1		06/23/18 12:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**352**	mg/L	20.0	8.7	1		06/27/18 15:23		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.010	1		07/02/18 09:59		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**3.0**	mg/L	2.0	0.50	1		07/05/18 16:43	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		07/05/18 16:43	16984-48-8	
Sulfate	**72.3**	mg/L	15.0	5.0	5		07/09/18 12:14	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

Sample: FIELD BLANK **Lab ID: 40171430004** Collected: 06/23/18 12:40 Received: 06/26/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	07/03/18 08:29	07/09/18 18:46	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	07/03/18 08:29	07/09/18 18:46	7440-38-2	
Barium	**<0.34**	ug/L	1.1	0.34	1	07/03/18 08:29	07/09/18 18:46	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	07/03/18 08:29	07/09/18 18:46	7440-41-7	
Boron	**<3.3**	ug/L	11.0	3.3	1	07/03/18 08:29	07/10/18 13:29	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	07/03/18 08:29	07/09/18 18:46	7440-43-9	
Calcium	**<69.8**	ug/L	250	69.8	1	07/03/18 08:29	07/09/18 18:46	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	07/03/18 08:29	07/09/18 18:46	7440-47-3	
Cobalt	**<0.085**	ug/L	1.0	0.085	1	07/03/18 08:29	07/09/18 18:46	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	07/03/18 08:29	07/09/18 18:46	7439-92-1	
Lithium	**<0.14**	ug/L	1.0	0.14	1	07/03/18 08:29	07/09/18 18:46	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	07/03/18 08:29	07/09/18 18:46	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	07/03/18 08:29	07/09/18 18:46	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	07/03/18 08:29	07/09/18 18:46	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	06/27/18 10:00	06/28/18 08:32	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		06/27/18 15:23		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**5.9**	Std. Units	0.10	0.010	1		07/02/18 10:01		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	2.0	0.50	1		07/05/18 16:57	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		07/05/18 16:57	16984-48-8	
Sulfate	**<1.0**	mg/L	3.0	1.0	1		07/05/18 16:57	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

QC Batch: 292986 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

METHOD BLANK: 1713099 Matrix: Water
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.13	0.42	06/28/18 07:57	

LABORATORY CONTROL SAMPLE: 1713100

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.2	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1713101 1713102

Parameter	Units	40171367001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.13	5	5	4.8	5.0	97	99	85-115	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

QC Batch: 293542 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

METHOD BLANK: 1716853 Matrix: Water
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	07/09/18 18:53	
Arsenic	ug/L	<0.28	1.0	07/09/18 18:53	
Barium	ug/L	<0.34	1.1	07/09/18 18:53	
Beryllium	ug/L	<0.18	1.0	07/09/18 18:53	
Boron	ug/L	<3.3	11.0	07/10/18 13:23	
Cadmium	ug/L	<0.081	1.0	07/09/18 18:53	
Calcium	ug/L	<69.8	250	07/09/18 18:53	
Chromium	ug/L	<1.0	3.4	07/09/18 18:53	
Cobalt	ug/L	<0.085	1.0	07/09/18 18:53	
Lead	ug/L	<0.20	1.0	07/09/18 18:53	
Lithium	ug/L	<0.14	1.0	07/09/18 18:53	
Molybdenum	ug/L	<0.44	1.5	07/09/18 18:53	
Selenium	ug/L	<0.32	1.1	07/09/18 18:53	
Thallium	ug/L	<0.14	1.0	07/09/18 18:53	

LABORATORY CONTROL SAMPLE: 1716854

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	540	108	80-120	
Arsenic	ug/L	500	523	105	80-120	
Barium	ug/L	500	505	101	80-120	
Beryllium	ug/L	500	527	105	80-120	
Boron	ug/L	500	496	99	80-120	
Cadmium	ug/L	500	536	107	80-120	
Calcium	ug/L	5000	5030	101	80-120	
Chromium	ug/L	500	494	99	80-120	
Cobalt	ug/L	500	488	98	80-120	
Lead	ug/L	500	490	98	80-120	
Lithium	ug/L	500	489	98	80-120	
Molybdenum	ug/L	500	505	101	80-120	
Selenium	ug/L	500	560	112	80-120	
Thallium	ug/L	500	481	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1716855 1716856

Parameter	Units	40171430001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.76J	500	500	552	541	110	108	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1716855 1716856

Parameter	Units	40171430001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.56J	500	500	535	526	107	105	75-125	2	20	
Barium	ug/L	18.3	500	500	540	532	104	103	75-125	1	20	
Beryllium	ug/L	0.38J	500	500	529	512	106	102	75-125	3	20	
Boron	ug/L	26.6	500	500	503	511	95	97	75-125	1	20	
Cadmium	ug/L	0.58J	500	500	532	527	106	105	75-125	1	20	
Calcium	ug/L	67600	5000	5000	75700	74400	163	136	75-125	2	20	P6
Chromium	ug/L	2.2J	500	500	510	501	102	100	75-125	2	20	
Cobalt	ug/L	0.54J	500	500	499	490	100	98	75-125	2	20	
Lead	ug/L	0.76J	500	500	518	507	103	101	75-125	2	20	
Lithium	ug/L	1.1	500	500	501	488	100	97	75-125	3	20	
Molybdenum	ug/L	0.70J	500	500	528	523	106	105	75-125	1	20	
Selenium	ug/L	1.1	500	500	560	546	112	109	75-125	2	20	
Thallium	ug/L	0.57J	500	500	515	503	103	100	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

QC Batch: 292944 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40171430001

METHOD BLANK: 1712789 Matrix: Water
Associated Lab Samples: 40171430001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	06/26/18 16:01	

LABORATORY CONTROL SAMPLE: 1712790

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	615	594	97	80-120	

SAMPLE DUPLICATE: 1712791

Parameter	Units	40171288005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	366000 ug/L	382	4	5	

SAMPLE DUPLICATE: 1712792

Parameter	Units	40171278001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	122	122	0	5	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

QC Batch: 293042 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40171430002, 40171430003, 40171430004

METHOD BLANK: 1713418 Matrix: Water
Associated Lab Samples: 40171430002, 40171430003, 40171430004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	06/27/18 15:22	

LABORATORY CONTROL SAMPLE: 1713419

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	615	596	97	80-120	

SAMPLE DUPLICATE: 1713420

Parameter	Units	40171442001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	396	416	5	5	

SAMPLE DUPLICATE: 1713421

Parameter	Units	40171541001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1140	1110	2	5	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

QC Batch: 293394 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

SAMPLE DUPLICATE: 1716308

Parameter	Units	40171430001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.6	7.7	0	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

QC Batch: 293549 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

METHOD BLANK: 1716868 Matrix: Water
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	07/05/18 13:40	
Fluoride	mg/L	<0.10	0.30	07/05/18 13:40	
Sulfate	mg/L	<1.0	3.0	07/05/18 13:40	

LABORATORY CONTROL SAMPLE: 1716869

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	20.4	102	90-110	
Fluoride	mg/L	2	2.0	101	90-110	
Sulfate	mg/L	20	20.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1716870 1716871

Parameter	Units	10436663001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	270	400	400	694	708	106	109	90-110	2	15	
Fluoride	mg/L	<0.50	10	10	11.4	11.2	114	112	90-110	2	15	M0
Sulfate	mg/L	10.7J	100	100	126	123	115	112	90-110	2	15	M0

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

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

Sample: MW309 **Lab ID: 40171430001** Collected: 06/23/18 10:30 Received: 06/26/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.208 ± 0.360 (0.908) C:NA T:74%**	pCi/L	07/12/18 19:58	13982-63-3	
Radium-228	EPA 904.0	**0.673 ± 0.485 (0.942) C:72% T:69%**	pCi/L	07/17/18 11:46	15262-20-1	
Total Radium	Total Radium Calculation	**0.673 ± 0.845 (1.85)**	pCi/L	07/19/18 14:28	7440-14-4	

Sample: MW310 **Lab ID: 40171430002** Collected: 06/23/18 11:35 Received: 06/26/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.120 ± 0.371 (0.718) C:NA T:86%**	pCi/L	07/12/18 19:58	13982-63-3	
Radium-228	EPA 904.0	**-0.00299 ± 0.301 (0.702) C:76% T:88%**	pCi/L	07/17/18 11:46	15262-20-1	
Total Radium	Total Radium Calculation	**0.120 ± 0.672 (1.42)**	pCi/L	07/19/18 14:28	7440-14-4	

Sample: MW311 **Lab ID: 40171430003** Collected: 06/23/18 12:35 Received: 06/26/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.058 ± 0.302 (0.699) C:NA T:87%**	pCi/L	07/12/18 19:58	13982-63-3	
Radium-228	EPA 904.0	**0.0331 ± 0.351 (0.811) C:77% T:77%**	pCi/L	07/17/18 11:46	15262-20-1	
Total Radium	Total Radium Calculation	**0.0331 ± 0.653 (1.51)**	pCi/L	07/19/18 14:28	7440-14-4	

Sample: FIELD BLANK **Lab ID: 40171430004** Collected: 06/23/18 12:40 Received: 06/26/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**-0.124 ± 0.297 (0.743) C:NA T:86%**	pCi/L	07/12/18 20:13	13982-63-3	
Radium-228	EPA 904.0	**0.000772 ± 0.336 (0.787) C:73% T:79%**	pCi/L	07/17/18 11:46	15262-20-1	
Total Radium	Total Radium Calculation	**0.000772 ± 0.633 (1.53)**	pCi/L	07/19/18 14:28	7440-14-4	

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

QC Batch: 304056 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

METHOD BLANK: 1487497 Matrix: Water
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.063 ± 0.285 (0.673) C:NA T:83%	pCi/L	07/12/18 19:23	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

QC Batch: 304061 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

METHOD BLANK: 1487506 Matrix: Water
Associated Lab Samples: 40171430001, 40171430002, 40171430003, 40171430004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.135 ± 0.302 (0.669) C:81% T:87%	pCi/L	07/17/18 11:44	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(920)469-2436

QUALIFIERS

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

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 and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

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.

LABORATORIES

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

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25217056.01 COLUMBIA-MOD4
Pace Project No.: 40171430

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40171430001	**MW309**	EPA 3010	293542	EPA 6020	293734
40171430002	**MW310**	EPA 3010	293542	EPA 6020	293734
40171430003	**MW311**	EPA 3010	293542	EPA 6020	293734
40171430004	**FIELD BLANK**	EPA 3010	293542	EPA 6020	293734
40171430001	**MW309**	EPA 7470	292986	EPA 7470	293044
40171430002	**MW310**	EPA 7470	292986	EPA 7470	293044
40171430003	**MW311**	EPA 7470	292986	EPA 7470	293044
40171430004	**FIELD BLANK**	EPA 7470	292986	EPA 7470	293044
40171430001	**MW309**				
40171430002	**MW310**				
40171430003	**MW311**				
40171430001	**MW309**	EPA 903.1	304056		
40171430002	**MW310**	EPA 903.1	304056		
40171430003	**MW311**	EPA 903.1	304056		
40171430004	**FIELD BLANK**	EPA 903.1	304056		
40171430001	**MW309**	EPA 904.0	304061		
40171430002	**MW310**	EPA 904.0	304061		
40171430003	**MW311**	EPA 904.0	304061		
40171430004	**FIELD BLANK**	EPA 904.0	304061		
40171430001	**MW309**	Total Radium Calculation	306465		
40171430002	**MW310**	Total Radium Calculation	306465		
40171430003	**MW311**	Total Radium Calculation	306465		
40171430004	**FIELD BLANK**	Total Radium Calculation	306465		
40171430001	**MW309**	SM 2540C	292944		
40171430002	**MW310**	SM 2540C	293042		
40171430003	**MW311**	SM 2540C	293042		
40171430004	**FIELD BLANK**	SM 2540C	293042		
40171430001	**MW309**	EPA 9040	293394		
40171430002	**MW310**	EPA 9040	293394		
40171430003	**MW311**	EPA 9040	293394		
40171430004	**FIELD BLANK**	EPA 9040	293394		
40171430001	**MW309**	EPA 300.0	293549		
40171430002	**MW310**	EPA 300.0	293549		
40171430003	**MW311**	EPA 300.0	293549		
40171430004	**FIELD BLANK**	EPA 300.0	293549		

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

Pace Analytical®
www.pacelabs.com

SM

40171430

CHAIN OF CUSTODY

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

(Please Print Clearly)	
Company Name:	SCS
Branch/Location:	Madison, WI
Project Contact:	Meg Blodgett
Phone:	608-216-7362
Project Number:	25214056.01
Project Name:	Columbia - Mod 4
Project State:	WI
Sampled By (Print):	Paul A. Grover
Sampled By (Sign):	Paul A Grover
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

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

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested: Ph	TDS, Cl, F, SO4	Metals	Radium 226	Radium 228	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
					N	A	A	D	D	D				
001	MW309	6/23/18	10:30	GW			X	X	X	X	X			
002	MW310		11:35											
003	MW311		12:35											
004	Field Blank		12:40	DI										

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	6/25/18 18:00		
Fedex	6/26/18 0930		

Received By:	Date/Time:
Paul	6/26/18 0830

PACE Project No.
40171430

Receipt Temp = RT °C

Sample Receipt pH
OK / Adjusted

Cooler Custody Seal
Present / Not Present
Intact / Not Intact

C019a(27Jun2006)

Version 6.0 06/14/06

ORIGINAL

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

Sample Preservation Receipt Form

Client Name: SCS Project # 40171430

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

Lab Lot# of pH paper: 176547 Lab Std #ID of preservation (if pH adjusted):

	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)
Pace Lab #	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN						
001													1													N				X		2.5 / 5 / 10
002											N		1													N				X		2.5 / 5 / 10
003											N		1													N				X		2.5 / 5 / 10
004											N		1													N				X		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	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	1L poly HNO3

Pace Analytical™ 1241 Bellevue Street, Green Bay, WI 54302	Document Name: Sample Condition Upon Receipt (SCUR)	Document Revised: 25Apr2018
	Document No.: F-GB-C-031-Rev.07	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Client Name: SCS

Project #: WO#: 40171430

40171430

Courier: ☐ CS Logistics ☑ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other:

Tracking #: 7815 5112 3552

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: RDT /Corr:

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

Person examining contents: 6/26/18
Date: 6/26/18 6/26/18
Initials:

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C.

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☐Yes ☑No ☐N/A	2. Page # mailto, invoice 6/26/18
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☑Yes ☐No	6.
Rush Turn Around Time Requested:	☐Yes ☑No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD:	☐Yes ☑No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: W	☑Yes ☐No ☐N/A	12.
Trip Blank Present:	☐Yes ☐No ☑N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: AL for DM **Date:** 6/26/18

A6 Round 6 Background Sampling, Analytical Laboratory Report

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

August 14, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on July 25, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Pace Analytical Services, LLC
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Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

Pennsylvania Certification IDs

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
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

Green Bay Certification IDs

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40173018001	**MW 309**	Water	07/23/18 14:50	07/25/18 09:50
40173018002	**MW 310**	Water	07/23/18 16:15	07/25/18 09:50
40173018003	**MW 311**	Water	07/23/18 17:00	07/25/18 09:50
40173018004	**FIELD BLANK**	Water	07/23/18 16:50	07/25/18 09:50

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SAMPLE ANALYTE COUNT

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40173018001	**MW 309**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40173018002	**MW 310**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40173018003	**MW 311**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40173018004	**FIELD BLANK**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

Sample: MW 309 **Lab ID: 40173018001** Collected: 07/23/18 14:50 Received: 07/25/18 09:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.31J**	ug/L	1.0	0.15	1	07/30/18 07:07	08/01/18 06:41	7440-36-0	
Arsenic	**0.55J**	ug/L	1.0	0.28	1	07/30/18 07:07	08/01/18 06:41	7440-38-2	
Barium	**31.2**	ug/L	1.1	0.34	1	07/30/18 07:07	08/01/18 06:41	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	07/30/18 07:07	08/01/18 06:41	7440-41-7	
Boron	**35.5**	ug/L	11.0	3.3	1	07/30/18 07:07	08/01/18 06:41	7440-42-8	
Cadmium	**0.23J**	ug/L	1.0	0.081	1	07/30/18 07:07	08/01/18 06:41	7440-43-9	
Calcium	**63800**	ug/L	2500	698	10	07/30/18 07:07	08/01/18 06:13	7440-70-2	P6
Chromium	**<1.0**	ug/L	3.4	1.0	1	07/30/18 07:07	08/01/18 06:41	7440-47-3	
Cobalt	**0.29J**	ug/L	1.0	0.085	1	07/30/18 07:07	08/01/18 06:41	7440-48-4	
Lead	**0.34J**	ug/L	1.0	0.20	1	07/30/18 07:07	08/01/18 06:41	7439-92-1	
Lithium	**0.88J**	ug/L	1.0	0.14	1	07/30/18 07:07	08/01/18 06:41	7439-93-2	
Molybdenum	**0.47J**	ug/L	1.5	0.44	1	07/30/18 07:07	08/01/18 06:41	7439-98-7	
Selenium	**0.51J**	ug/L	1.1	0.32	1	07/30/18 07:07	08/01/18 06:41	7782-49-2	
Thallium	**0.42J**	ug/L	1.0	0.14	1	07/30/18 07:07	08/01/18 06:41	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	07/26/18 09:35	07/27/18 08:50	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.55**	Std. Units			1		07/23/18 14:50		
Field Specific Conductance	**2290**	umhos/cm			1		07/23/18 14:50		
Oxygen, Dissolved	**9.27**	mg/L			1		07/23/18 14:50	7782-44-7	
REDOX	**163.8**	mV			1		07/23/18 14:50		
Turbidity	**2.73**	NTU			1		07/23/18 14:50		
Static Water Level	**786.27**	feet			1		07/23/18 14:50		
Temperature, Water (C)	**13.3**	deg C			1		07/23/18 14:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1210**	mg/L	20.0	8.7	1		07/26/18 15:28		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.010	1		07/26/18 08:32		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**557**	mg/L	100	25.0	50		07/31/18 17:54	16887-00-6	M0
Fluoride	**<1.0**	mg/L	3.0	1.0	10		07/31/18 12:35	16984-48-8	D3
Sulfate	**33.1**	mg/L	30.0	10.0	10		07/31/18 12:35	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

Sample: MW 310 **Lab ID: 40173018002** Collected: 07/23/18 16:15 Received: 07/25/18 09:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.42J**	ug/L	1.0	0.15	1	07/30/18 07:07	08/01/18 07:21	7440-36-0	
Arsenic	**0.66J**	ug/L	1.0	0.28	1	07/30/18 07:07	08/01/18 07:21	7440-38-2	
Barium	**21.2**	ug/L	1.1	0.34	1	07/30/18 07:07	08/01/18 07:21	7440-39-3	
Beryllium	**0.29J**	ug/L	1.0	0.18	1	07/30/18 07:07	08/01/18 07:21	7440-41-7	
Boron	**69.5**	ug/L	11.0	3.3	1	07/30/18 07:07	08/01/18 07:21	7440-42-8	
Cadmium	**0.31J**	ug/L	1.0	0.081	1	07/30/18 07:07	08/01/18 07:21	7440-43-9	
Calcium	**39700**	ug/L	250	69.8	1	07/30/18 07:07	08/01/18 07:21	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	07/30/18 07:07	08/01/18 07:21	7440-47-3	
Cobalt	**0.32J**	ug/L	1.0	0.085	1	07/30/18 07:07	08/01/18 07:21	7440-48-4	
Lead	**0.45J**	ug/L	1.0	0.20	1	07/30/18 07:07	08/01/18 07:21	7439-92-1	
Lithium	**1.2**	ug/L	1.0	0.14	1	07/30/18 07:07	08/01/18 07:21	7439-93-2	
Molybdenum	**1.7**	ug/L	1.5	0.44	1	07/30/18 07:07	08/01/18 07:21	7439-98-7	
Selenium	**0.75J**	ug/L	1.1	0.32	1	07/30/18 07:07	08/01/18 07:21	7782-49-2	
Thallium	**0.44J**	ug/L	1.0	0.14	1	07/30/18 07:07	08/01/18 07:21	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	07/26/18 09:35	07/27/18 08:57	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.81**	Std. Units			1		07/23/18 16:15		
Field Specific Conductance	**998**	umhos/cm			1		07/23/18 16:15		
Oxygen, Dissolved	**8.32**	mg/L			1		07/23/18 16:15	7782-44-7	
REDOX	**165.7**	mV			1		07/23/18 16:15		
Turbidity	**0.41**	NTU			1		07/23/18 16:15		
Static Water Level	**786.35**	feet			1		07/23/18 16:15		
Temperature, Water (C)	**13.2**	deg C			1		07/23/18 16:15		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**532**	mg/L	20.0	8.7	1		07/26/18 15:28		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.010	1		07/26/18 08:33		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**118**	mg/L	20.0	5.0	10		07/31/18 00:40	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		07/30/18 18:25	16984-48-8	
Sulfate	**60.2**	mg/L	30.0	10.0	10		07/31/18 00:40	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(920)469-2436

ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

Sample: MW 311 **Lab ID: 40173018003** Collected: 07/23/18 17:00 Received: 07/25/18 09:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	07/30/18 07:07	08/01/18 07:35	7440-36-0	
Arsenic	**0.46J**	ug/L	1.0	0.28	1	07/30/18 07:07	08/01/18 07:35	7440-38-2	
Barium	**16.3**	ug/L	1.1	0.34	1	07/30/18 07:07	08/01/18 07:35	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	07/30/18 07:07	08/01/18 07:35	7440-41-7	
Boron	**30.1**	ug/L	11.0	3.3	1	07/30/18 07:07	08/01/18 07:35	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	07/30/18 07:07	08/01/18 07:35	7440-43-9	
Calcium	**76800**	ug/L	250	69.8	1	07/30/18 07:07	08/01/18 07:35	7440-70-2	
Chromium	**1.3J**	ug/L	3.4	1.0	1	07/30/18 07:07	08/01/18 07:35	7440-47-3	
Cobalt	**0.12J**	ug/L	1.0	0.085	1	07/30/18 07:07	08/01/18 07:35	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	07/30/18 07:07	08/01/18 07:35	7439-92-1	
Lithium	**0.67J**	ug/L	1.0	0.14	1	07/30/18 07:07	08/01/18 07:35	7439-93-2	
Molybdenum	**0.56J**	ug/L	1.5	0.44	1	07/30/18 07:07	08/01/18 07:35	7439-98-7	
Selenium	**0.62J**	ug/L	1.1	0.32	1	07/30/18 07:07	08/01/18 07:35	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	07/30/18 07:07	08/01/18 07:35	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	07/26/18 09:35	07/27/18 08:59	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.59**	Std. Units			1		07/23/18 17:00		
Field Specific Conductance	**606.8**	umhos/cm			1		07/23/18 17:00		
Oxygen, Dissolved	**7.91**	mg/L			1		07/23/18 17:00	7782-44-7	
REDOX	**157.0**	mV			1		07/23/18 17:00		
Turbidity	**1.13**	NTU			1		07/23/18 17:00		
Static Water Level	**786.55**	feet			1		07/23/18 17:00		
Temperature, Water (C)	**12.1**	deg C			1		07/23/18 17:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**372**	mg/L	20.0	8.7	1		07/26/18 15:28		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.010	1		07/26/18 08:34		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2.0J**	mg/L	2.0	0.50	1		07/30/18 18:39	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		07/30/18 18:39	16984-48-8	
Sulfate	**84.7**	mg/L	15.0	5.0	5		07/31/18 00:53	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

Sample: FIELD BLANK **Lab ID: 40173018004** Collected: 07/23/18 16:50 Received: 07/25/18 09:50 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	07/30/18 07:07	08/01/18 06:00	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	07/30/18 07:07	08/01/18 06:00	7440-38-2	
Barium	**<0.34**	ug/L	1.1	0.34	1	07/30/18 07:07	08/01/18 06:00	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	07/30/18 07:07	08/01/18 06:00	7440-41-7	
Boron	**<3.3**	ug/L	11.0	3.3	1	07/30/18 07:07	08/01/18 06:00	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	07/30/18 07:07	08/01/18 06:00	7440-43-9	
Calcium	**<69.8**	ug/L	250	69.8	1	07/30/18 07:07	08/01/18 06:00	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	07/30/18 07:07	08/01/18 06:00	7440-47-3	
Cobalt	**<0.085**	ug/L	1.0	0.085	1	07/30/18 07:07	08/01/18 06:00	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	07/30/18 07:07	08/01/18 06:00	7439-92-1	
Lithium	**<0.14**	ug/L	1.0	0.14	1	07/30/18 07:07	08/01/18 06:00	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	07/30/18 07:07	08/01/18 06:00	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	07/30/18 07:07	08/01/18 06:00	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	07/30/18 07:07	08/01/18 06:00	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	07/26/18 09:35	07/27/18 09:01	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		07/26/18 15:29		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**6.3**	Std. Units	0.10	0.010	1		07/26/18 08:37		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	2.0	0.50	1		07/30/18 18:52	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		07/30/18 18:52	16984-48-8	
Sulfate	**<1.0**	mg/L	3.0	1.0	1		07/30/18 18:52	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(920)469-2436

QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

QC Batch: 295545 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

METHOD BLANK: 1727582 Matrix: Water
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.13	0.42	07/27/18 08:29	

LABORATORY CONTROL SAMPLE: 1727583

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: 1727584 1727585

Parameter	Units	40173019001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.00013 mg/L	5	5	4.8	4.9	97	98	85-115	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

QC Batch: 295768 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

METHOD BLANK: 1728847 Matrix: Water
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	08/01/18 05:53	
Arsenic	ug/L	<0.28	1.0	08/01/18 05:53	
Barium	ug/L	<0.34	1.1	08/01/18 05:53	
Beryllium	ug/L	<0.18	1.0	08/01/18 05:53	
Boron	ug/L	<3.3	11.0	08/01/18 05:53	
Cadmium	ug/L	<0.081	1.0	08/01/18 05:53	
Calcium	ug/L	<69.8	250	08/01/18 05:53	
Chromium	ug/L	<1.0	3.4	08/01/18 05:53	
Cobalt	ug/L	<0.085	1.0	08/01/18 05:53	
Lead	ug/L	<0.20	1.0	08/01/18 05:53	
Lithium	ug/L	<0.14	1.0	08/01/18 05:53	
Molybdenum	ug/L	<0.44	1.5	08/01/18 05:53	
Selenium	ug/L	<0.32	1.1	08/01/18 05:53	
Thallium	ug/L	<0.14	1.0	08/01/18 05:53	

LABORATORY CONTROL SAMPLE: 1728848

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	542	108	80-120	
Arsenic	ug/L	500	509	102	80-120	
Barium	ug/L	500	498	100	80-120	
Beryllium	ug/L	500	500	100	80-120	
Boron	ug/L	500	480	96	80-120	
Cadmium	ug/L	500	528	106	80-120	
Calcium	ug/L	5000	5280	106	80-120	
Chromium	ug/L	500	490	98	80-120	
Cobalt	ug/L	500	494	99	80-120	
Lead	ug/L	500	482	96	80-120	
Lithium	ug/L	500	457	91	80-120	
Molybdenum	ug/L	500	525	105	80-120	
Selenium	ug/L	500	539	108	80-120	
Thallium	ug/L	500	477	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1728849 1728850

Parameter	Units	40173018001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.31J	500	500	532	526	106	105	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1728849 1728850

Parameter	Units	40173018001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.55J	500	500	507	498	101	100	75-125	2	20	
Barium	ug/L	31.2	500	500	522	509	98	96	75-125	2	20	
Beryllium	ug/L	<0.18	500	500	465	468	93	94	75-125	1	20	
Boron	ug/L	35.5	500	500	475	469	88	87	75-125	1	20	
Cadmium	ug/L	0.23J	500	500	496	491	99	98	75-125	1	20	
Calcium	ug/L	63800	5000	5000	71400	68100	152	86	75-125	5	20	P6
Chromium	ug/L	<1.0	500	500	472	467	94	93	75-125	1	20	
Cobalt	ug/L	0.29J	500	500	470	460	94	92	75-125	2	20	
Lead	ug/L	0.34J	500	500	484	469	97	94	75-125	3	20	
Lithium	ug/L	0.88J	500	500	435	434	87	87	75-125	0	20	
Molybdenum	ug/L	0.47J	500	500	524	515	105	103	75-125	2	20	
Selenium	ug/L	0.51J	500	500	520	515	104	103	75-125	1	20	
Thallium	ug/L	0.42J	500	500	482	463	96	92	75-125	4	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

QC Batch: 295599 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

METHOD BLANK: 1727924 Matrix: Water
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	07/26/18 15:26	

LABORATORY CONTROL SAMPLE: 1727925

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	615	586	95	80-120	

SAMPLE DUPLICATE: 1727926

Parameter	Units	40173018001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1210	1210	0	5	

SAMPLE DUPLICATE: 1727927

Parameter	Units	40172995001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	496	482	3	5	

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: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

QC Batch: 295510 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

SAMPLE DUPLICATE: 1727495

Parameter	Units	40172813010 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.6	7.7	1	20	H6

SAMPLE DUPLICATE: 1727496

Parameter	Units	40172943001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.5	6.5	0	20	H6

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

QC Batch: 295617 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

METHOD BLANK: 1728005 Matrix: Water
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	07/30/18 16:34	
Fluoride	mg/L	<0.10	0.30	07/30/18 16:34	
Sulfate	mg/L	<1.0	3.0	07/30/18 16:34	

LABORATORY CONTROL SAMPLE: 1728006

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	18.4	92	90-110	
Fluoride	mg/L	2	1.8	90	90-110	
Sulfate	mg/L	20	18.2	91	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1728007 1728008

Parameter	Units	40173018001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	557	1000	1000	1650	1750	109	120	90-110	6	15	M0
Fluoride	mg/L	<1.0	20	20	21.1	20.9	105	104	90-110	1	15	
Sulfate	mg/L	33.1	200	200	251	248	109	107	90-110	1	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1729291 1729292

Parameter	Units	40173101001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	16.1	20	20	38.6	39.0	112	114	90-110	1	15	M0
Fluoride	mg/L	0.31	2	2	2.4	2.4	104	107	90-110	2	15	
Sulfate	mg/L	170	200	200	395	392	113	111	90-110	1	15	M0

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

Sample: MW 309 **Lab ID: 40173018001** Collected: 07/23/18 14:50 Received: 07/25/18 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.334 ± 0.349 (0.492) C:NA T:81%**	pCi/L	08/07/18 21:47	13982-63-3	
Radium-228	EPA 904.0	**1.41 ± 0.591 (0.962) C:65% T:83%**	pCi/L	08/08/18 16:23	15262-20-1	
Total Radium	Total Radium Calculation	**1.74 ± 0.940 (1.45)**	pCi/L	08/13/18 15:57	7440-14-4	

Sample: MW 310 **Lab ID: 40173018002** Collected: 07/23/18 16:15 Received: 07/25/18 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0705 ± 0.366 (0.759) C:NA T:75%**	pCi/L	08/07/18 21:47	13982-63-3	
Radium-228	EPA 904.0	**0.186 ± 0.394 (0.870) C:67% T:88%**	pCi/L	08/08/18 16:23	15262-20-1	
Total Radium	Total Radium Calculation	**0.257 ± 0.760 (1.63)**	pCi/L	08/13/18 15:57	7440-14-4	

Sample: MW 311 **Lab ID: 40173018003** Collected: 07/23/18 17:00 Received: 07/25/18 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.338 ± 0.400 (0.628) C:NA T:74%**	pCi/L	08/07/18 21:47	13982-63-3	
Radium-228	EPA 904.0	**-0.0845 ± 0.483 (1.13) C:66% T:79%**	pCi/L	08/08/18 16:23	15262-20-1	
Total Radium	Total Radium Calculation	**0.338 ± 0.883 (1.76)**	pCi/L	08/13/18 15:57	7440-14-4	

Sample: FIELD BLANK **Lab ID: 40173018004** Collected: 07/23/18 16:50 Received: 07/25/18 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.317 ± 0.414 (0.683) C:NA T:90%**	pCi/L	08/08/18 10:07	13982-63-3	
Radium-228	EPA 904.0	**0.589 ± 0.451 (0.891) C:70% T:81%**	pCi/L	08/08/18 16:23	15262-20-1	
Total Radium	Total Radium Calculation	**0.906 ± 0.865 (1.57)**	pCi/L	08/13/18 15:57	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

QC Batch: 307461 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40173018001, 40173018002, 40173018003

METHOD BLANK: 1502931 Matrix: Water
Associated Lab Samples: 40173018001, 40173018002, 40173018003

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.107 ± 0.298 (0.578) C:NA T:95%	pCi/L	08/07/18 21:00	

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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(920)469-2436

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

QC Batch: 307463 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40173018004

METHOD BLANK: 1502933 Matrix: Water
Associated Lab Samples: 40173018004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.125 ± 0.346 (0.672) C:NA T:91%	pCi/L	08/08/18 09:47	

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

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

QC Batch: 307467 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

METHOD BLANK: 1502940 Matrix: Water
Associated Lab Samples: 40173018001, 40173018002, 40173018003, 40173018004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.329 ± 0.348 (0.714) C:70% T:75%	pCi/L	08/08/18 16:24	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALIFIERS

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

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 and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

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.

LABORATORIES

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

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
H6	Analysis initiated outside of the 15 minute EPA required holding time.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25217156.01 COLUMBIA-MOD4 CCR
Pace Project No.: 40173018

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40173018001	**MW 309**	EPA 3010	295768	EPA 6020	295852
40173018002	**MW 310**	EPA 3010	295768	EPA 6020	295852
40173018003	**MW 311**	EPA 3010	295768	EPA 6020	295852
40173018004	**FIELD BLANK**	EPA 3010	295768	EPA 6020	295852
40173018001	**MW 309**	EPA 7470	295545	EPA 7470	295608
40173018002	**MW 310**	EPA 7470	295545	EPA 7470	295608
40173018003	**MW 311**	EPA 7470	295545	EPA 7470	295608
40173018004	**FIELD BLANK**	EPA 7470	295545	EPA 7470	295608
40173018001	**MW 309**				
40173018002	**MW 310**				
40173018003	**MW 311**				
40173018001	**MW 309**	EPA 903.1	307461		
40173018002	**MW 310**	EPA 903.1	307461		
40173018003	**MW 311**	EPA 903.1	307461		
40173018004	**FIELD BLANK**	EPA 903.1	307463		
40173018001	**MW 309**	EPA 904.0	307467		
40173018002	**MW 310**	EPA 904.0	307467		
40173018003	**MW 311**	EPA 904.0	307467		
40173018004	**FIELD BLANK**	EPA 904.0	307467		
40173018001	**MW 309**	Total Radium Calculation	309394		
40173018002	**MW 310**	Total Radium Calculation	309394		
40173018003	**MW 311**	Total Radium Calculation	309394		
40173018004	**FIELD BLANK**	Total Radium Calculation	309394		
40173018001	**MW 309**	SM 2540C	295599		
40173018002	**MW 310**	SM 2540C	295599		
40173018003	**MW 311**	SM 2540C	295599		
40173018004	**FIELD BLANK**	SM 2540C	295599		
40173018001	**MW 309**	EPA 9040	295510		
40173018002	**MW 310**	EPA 9040	295510		
40173018003	**MW 311**	EPA 9040	295510		
40173018004	**FIELD BLANK**	EPA 9040	295510		
40173018001	**MW 309**	EPA 300.0	295617		
40173018002	**MW 310**	EPA 300.0	295617		
40173018003	**MW 311**	EPA 300.0	295617		
40173018004	**FIELD BLANK**	EPA 300.0	295617		

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

Pace Analytical®
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CHAIN OF CUSTODY

40173018

(Please Print Clearly)	
Company Name:	SCS
Branch/Location:	Madison, WI
Project Contact:	Meg Blodgett
Phone:	608 216-7362
Project Number:	252/7156.01
Project Name:	Columbia - Mod 4
Project State:	WI
Sampled By (Print):	Paul A. Grover
Sampled By (Sign):	Paul A. Grover
PO #:	Regulatory Program:

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

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

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

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO)	PRESERVATION (CODE)*	Analyses Requested: Ph, 4	TDS, SO4, Cl	Metals	Radium 226	Radium 228	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
					Y/N	Pick Letter								
					No	A								
					No	A								
					No	D								
					No	D								
					No	D								
001	MW 309	7/23/18	14:50	GW			X	X	X	X	X			
002	MW 310		16:15											
003	MW 311		17:00											
004	Field Blank		16:50	OI										

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	7/24/18 14:00		
CS Logistics	7/25/18 0950	[signature]	7/25/18 0950

PACE Project No.: 40163018
Receipt Temp = R01 °C
Sample Receipt pH: OK / Adjusted
Cooler Custody Seal: Present / Not Present; Intact / Not Intact

Pace Container Order #383489

40173018

Addresses

Order By :		Ship To :		Return To:	
Company	SCS ENGINEERS	Company	SCS ENGINEERS (Pace Analytical	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	Alliant Columbia Dry Ash CCR (25216067)	**Due Date**	07/20/2018	**Profile**		**Quote**	
Project Manager	Milewsky, Dan	**Return**		**Carrier**	Most Economical	**Location**	

Trip Blanks

- [ ] Include Trip Blanks

Bottle Labels

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

Bottles

- [ ] Boxed Cases
- [ ] Individually Wrapped
- [X] Grouped By Sample

Return Shipping Labels

- [ ] No Shipper Number
- [ ] With Shipper Number

Misc

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

COC Options

- [X] Number of Blanks 1
- [ ] Pre-Printed

# of Samples	Matrix	Test	Container	Total	# of QC	Lot #	Notes
4	WT	Radium 226	1-1L Plastic w/ HNO3	4	0		
4	WT	Radium 228	1-1L Plastic w/ HNO3	4	0		
4	WT	Metals	250mL plastic w/HNO3	4	0	M-8-103-04BB	
4	WT	pH	250mL plastic unpres	4	0	B-7-318-01VB	
4	WT	TDS, Cl, F, SO4	250mL plastic unpres	4	0	B-7-318-01VB	

Hazard Shipping Placard In Place : NA

*Sample receiving hours are Monday through Friday 8:00 am to 6:00 pm and Saturday from 9:00 am to 12:00 pm unless special arrangements are made with your 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 and disposal.

*Payment term are net 30 days.

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

Sample Notes

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

Ship Date : 07/18/2018

Prepared By: Mai Yer Her

Verified By:

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

Sample Preservation Receipt Form

Client Name: SLS Project # 40173018

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

Lab Lot# of pH paper: 1015477 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: TL Date/ Time:

Pace Lab #	Glass							Plastic							Vials						Jars			General			VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN							
001											2		1													2				X		2.5 / 5 / 10
002											2		1													2				X		2.5 / 5 / 10
003											2		1													2				X		2.5 / 5 / 10
004											2		1													2				X		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	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	1L poly nitric acid

Pace Analytical 1241 Bellevue Street, Green Bay, WI 54302	Document Name: **Sample Condition Upon Receipt (SCUR)**	Document Revised: 25Apr2018
	Document No.: **F-GB-C-031-Rev.07**	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40173018

40173018

Client Name: GLS

Courier: ☒ CS Logistics ☐ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other:

Tracking #:

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

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

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other

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

Cooler Temperature Uncorr: /Corr: RO

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.

Person examining contents:
Date: 7/25/18
Initials: RL

Chain of Custody Present:	☒Yes ☐No ☐N/A	1. Original + copy 7/25/18 RL
Chain of Custody Filled Out:	☐Yes ☒No ☐N/A	2. no mailto/invoiceinfo, pg # 7/25/18 RL
Chain of Custody Relinquished:	☒Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☒Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☒Yes ☐No	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☒Yes ☐No	6.
Rush Turn Around Time Requested:	☐Yes ☒No	7.
Sufficient Volume:		8.
For Analysis: ☒Yes ☐No MS/MSD:	☐Yes ☒No ☐N/A	
Correct Containers Used:	☒Yes ☐No	9.
-Pace Containers Used:	☒Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☒N/A	
Containers Intact:	☒Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☒N/A	11.
Sample Labels match COC:	☐Yes ☒No ☐N/A	12. 002 1 250ml poly unpreserved no collect date 7/25/18 RL
-Includes date/time/ID/Analysis Matrix:	W	
Trip Blank Present:	☐Yes ☐No ☒N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☒N/A	
Pace Trip Blank Lot # (if purchased):		

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: AL for DM **Date:** 7/25/18

A7 Round 7 Background Sampling, Analytical Laboratory Report

Pace Analytical Services, LLC
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Green Bay, WI 54302
(920)469-2436

September 13, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on August 24, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

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

CERTIFICATIONS

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

Pennsylvania Certification IDs

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
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

Green Bay Certification IDs

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40174560001	**MW-309**	Water	08/22/18 14:40	08/24/18 09:20
40174560002	**MW-310**	Water	08/22/18 15:40	08/24/18 09:20
40174560003	**MW-311**	Water	08/22/18 16:40	08/24/18 09:20
40174560004	**FIELD BLANK**	Water	08/22/18 16:50	08/24/18 09:20

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SAMPLE ANALYTE COUNT

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40174560001	**MW-309**	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40174560002	**MW-310**	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40174560003	**MW-311**	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40174560004	**FIELD BLANK**	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G

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ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

Sample: MW-309 **Lab ID: 40174560001** Collected: 08/22/18 14:40 Received: 08/24/18 09:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.57J**	ug/L	1.0	0.15	1	09/05/18 07:36	09/05/18 18:01	7440-36-0	
Arsenic	**0.46J**	ug/L	1.0	0.28	1	09/05/18 07:36	09/05/18 18:01	7440-38-2	
Barium	**46.2**	ug/L	4.9	1.5	1	09/05/18 07:36	09/05/18 18:01	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	09/05/18 07:36	09/05/18 18:01	7440-41-7	
Boron	**40.5**	ug/L	11.0	3.3	1	09/05/18 07:36	09/07/18 01:08	7440-42-8	
Cadmium	**0.30J**	ug/L	1.0	0.15	1	09/05/18 07:36	09/05/18 18:01	7440-43-9	
Calcium	**93600**	ug/L	250	69.8	1	09/05/18 07:36	09/05/18 18:01	7440-70-2	
Chromium	**2.6J**	ug/L	3.4	1.0	1	09/05/18 07:36	09/05/18 18:01	7440-47-3	
Cobalt	**0.35J**	ug/L	1.0	0.12	1	09/05/18 07:36	09/05/18 18:01	7440-48-4	
Lead	**0.39J**	ug/L	1.0	0.24	1	09/05/18 07:36	09/05/18 18:01	7439-92-1	
Lithium	**1.1**	ug/L	1.0	0.19	1	09/05/18 07:36	09/05/18 18:01	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	09/05/18 07:36	09/05/18 18:01	7439-98-7	
Selenium	**0.39J**	ug/L	1.1	0.32	1	09/05/18 07:36	09/05/18 18:01	7782-49-2	
Thallium	**0.38J**	ug/L	1.0	0.14	1	09/05/18 07:36	09/05/18 18:01	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	08/30/18 10:20	08/30/18 13:59	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.53**	Std. Units			1		08/22/18 14:40		
Field Specific Conductance	**2948**	umhos/cm			1		08/22/18 14:40		
Oxygen, Dissolved	**7.26**	mg/L			1		08/22/18 14:40	7782-44-7	
REDOX	**106.4**	mV			1		08/22/18 14:40		
Turbidity	**2.09**	NTU			1		08/22/18 14:40		
Static Water Level	**785.54**	feet			1		08/22/18 14:40		
Temperature, Water (C)	**13.4**	deg C			1		08/22/18 14:40		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1570**	mg/L	20.0	8.7	1		08/29/18 13:56		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.010	1		08/28/18 11:00		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**811**	mg/L	40.0	10.0	20		08/28/18 11:39	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		08/27/18 14:23	16984-48-8	
Sulfate	**43.3**	mg/L	3.0	1.0	1		08/27/18 14:23	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Green Bay, WI 54302
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ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

Sample: MW-310 **Lab ID: 40174560002** Collected: 08/22/18 15:40 Received: 08/24/18 09:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.17J**	ug/L	1.0	0.15	1	09/05/18 07:36	09/05/18 18:15	7440-36-0	
Arsenic	**0.43J**	ug/L	1.0	0.28	1	09/05/18 07:36	09/05/18 18:15	7440-38-2	
Barium	**21.0**	ug/L	4.9	1.5	1	09/05/18 07:36	09/05/18 18:15	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	09/05/18 07:36	09/05/18 18:15	7440-41-7	
Boron	**64.2**	ug/L	11.0	3.3	1	09/05/18 07:36	09/07/18 01:22	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	09/05/18 07:36	09/05/18 18:15	7440-43-9	
Calcium	**38800**	ug/L	250	69.8	1	09/05/18 07:36	09/05/18 18:15	7440-70-2	
Chromium	**1.3J**	ug/L	3.4	1.0	1	09/05/18 07:36	09/05/18 18:15	7440-47-3	
Cobalt	**0.13J**	ug/L	1.0	0.12	1	09/05/18 07:36	09/05/18 18:15	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	09/05/18 07:36	09/05/18 18:15	7439-92-1	
Lithium	**0.92J**	ug/L	1.0	0.19	1	09/05/18 07:36	09/05/18 18:15	7439-93-2	
Molybdenum	**1.2J**	ug/L	1.5	0.44	1	09/05/18 07:36	09/05/18 18:15	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	09/05/18 07:36	09/05/18 18:15	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	09/05/18 07:36	09/05/18 18:15	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	08/30/18 10:20	08/30/18 14:06	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.77**	Std. Units			1		08/22/18 15:40		
Field Specific Conductance	**1016**	umhos/cm			1		08/22/18 15:40		
Oxygen, Dissolved	**3.43**	mg/L			1		08/22/18 15:40	7782-44-7	
REDOX	**137.0**	mV			1		08/22/18 15:40		
Turbidity	**0.32**	NTU			1		08/22/18 15:40		
Static Water Level	**785.40**	feet			1		08/22/18 15:40		
Temperature, Water (C)	**13.4**	deg C			1		08/22/18 15:40		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**526**	mg/L	20.0	8.7	1		08/29/18 13:56		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.010	1		08/28/18 11:05		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**139**	mg/L	10.0	2.5	5		08/27/18 19:20	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		08/27/18 14:35	16984-48-8	
Sulfate	**32.8**	mg/L	3.0	1.0	1		08/27/18 14:35	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

Sample: MW-311 **Lab ID: 40174560003** Collected: 08/22/18 16:40 Received: 08/24/18 09:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.43J**	ug/L	1.0	0.15	1	09/05/18 07:36	09/05/18 17:20	7440-36-0	
Arsenic	**0.56J**	ug/L	1.0	0.28	1	09/05/18 07:36	09/05/18 17:20	7440-38-2	
Barium	**14.2**	ug/L	4.9	1.5	1	09/05/18 07:36	09/05/18 17:20	7440-39-3	
Beryllium	**0.19J**	ug/L	1.0	0.18	1	09/05/18 07:36	09/05/18 17:20	7440-41-7	
Boron	**32.4**	ug/L	11.0	3.3	1	09/05/18 07:36	09/07/18 00:41	7440-42-8	
Cadmium	**0.29J**	ug/L	1.0	0.15	1	09/05/18 07:36	09/05/18 17:20	7440-43-9	
Calcium	**65700**	ug/L	2500	698	10	09/05/18 07:36	09/05/18 16:52	7440-70-2	P6
Chromium	**2.3J**	ug/L	3.4	1.0	1	09/05/18 07:36	09/05/18 17:20	7440-47-3	
Cobalt	**0.35J**	ug/L	1.0	0.12	1	09/05/18 07:36	09/05/18 17:20	7440-48-4	
Lead	**0.30J**	ug/L	1.0	0.24	1	09/05/18 07:36	09/05/18 17:20	7439-92-1	
Lithium	**0.83J**	ug/L	1.0	0.19	1	09/05/18 07:36	09/05/18 17:20	7439-93-2	
Molybdenum	**0.74J**	ug/L	1.5	0.44	1	09/05/18 07:36	09/05/18 17:20	7439-98-7	
Selenium	**0.93J**	ug/L	1.1	0.32	1	09/05/18 07:36	09/05/18 17:20	7782-49-2	
Thallium	**0.30J**	ug/L	1.0	0.14	1	09/05/18 07:36	09/05/18 17:20	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	08/30/18 10:20	08/30/18 14:08	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.6**	Std. Units			1		08/22/18 16:40		
Field Specific Conductance	**573.2**	umhos/cm			1		08/22/18 16:40		
Oxygen, Dissolved	**1.97**	mg/L			1		08/22/18 16:40	7782-44-7	
REDOX	**150.3**	mV			1		08/22/18 16:40		
Turbidity	**0.65**	NTU			1		08/22/18 16:40		
Static Water Level	**785.46**	feet			1		08/22/18 16:40		
Temperature, Water (C)	**12.6**	deg C			1		08/22/18 16:40		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**332**	mg/L	20.0	8.7	1		08/29/18 13:56		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.010	1		08/28/18 11:06		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**2.0J**	mg/L	2.0	0.50	1		08/27/18 14:47	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		08/27/18 14:47	16984-48-8	
Sulfate	**53.6**	mg/L	3.0	1.0	1		08/27/18 14:47	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

Sample: FIELD BLANK **Lab ID: 40174560004** Collected: 08/22/18 16:50 Received: 08/24/18 09:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	09/05/18 07:36	09/05/18 16:38	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	09/05/18 07:36	09/05/18 16:38	7440-38-2	
Barium	**<1.5**	ug/L	4.9	1.5	1	09/05/18 07:36	09/05/18 16:38	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	09/05/18 07:36	09/05/18 16:38	7440-41-7	
Boron	**<3.3**	ug/L	11.0	3.3	1	09/05/18 07:36	09/07/18 00:27	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	09/05/18 07:36	09/05/18 16:38	7440-43-9	
Calcium	**<69.8**	ug/L	250	69.8	1	09/05/18 07:36	09/05/18 16:38	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	09/05/18 07:36	09/05/18 16:38	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	09/05/18 07:36	09/05/18 16:38	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	09/05/18 07:36	09/05/18 16:38	7439-92-1	
Lithium	**<0.19**	ug/L	1.0	0.19	1	09/05/18 07:36	09/05/18 16:38	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	09/05/18 07:36	09/05/18 16:38	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	09/05/18 07:36	09/05/18 16:38	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	09/05/18 07:36	09/05/18 16:38	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	08/30/18 10:20	08/30/18 14:10	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		08/29/18 13:56		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**6.5**	Std. Units	0.10	0.010	1		08/28/18 11:08		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**0.54J**	mg/L	2.0	0.50	1		08/27/18 15:00	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		08/27/18 15:00	16984-48-8	
Sulfate	**<1.0**	mg/L	3.0	1.0	1		08/27/18 15:00	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

QC Batch: 298753 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

METHOD BLANK: 1744676 Matrix: Water
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.13	0.42	08/30/18 13:54	

LABORATORY CONTROL SAMPLE: 1744677

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1744678 1744679

Parameter	Units	40174560001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.13	5	5	5.0	4.9	99	98	85-115	1	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

QC Batch: 299158 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

METHOD BLANK: 1747079 Matrix: Water
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	09/05/18 16:32	
Arsenic	ug/L	<0.28	1.0	09/05/18 16:32	
Barium	ug/L	<1.5	4.9	09/05/18 16:32	
Beryllium	ug/L	<0.18	1.0	09/05/18 16:32	
Boron	ug/L	<3.3	11.0	09/07/18 00:20	
Cadmium	ug/L	<0.15	1.0	09/05/18 16:32	
Calcium	ug/L	<69.8	250	09/05/18 16:32	
Chromium	ug/L	<1.0	3.4	09/05/18 16:32	
Cobalt	ug/L	<0.12	1.0	09/05/18 16:32	
Lead	ug/L	<0.24	1.0	09/05/18 16:32	
Lithium	ug/L	<0.19	1.0	09/05/18 16:32	
Molybdenum	ug/L	<0.44	1.5	09/05/18 16:32	
Selenium	ug/L	<0.32	1.1	09/05/18 16:32	
Thallium	ug/L	<0.14	1.0	09/05/18 16:32	

LABORATORY CONTROL SAMPLE: 1747080

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	528	106	80-120	
Arsenic	ug/L	500	498	100	80-120	
Barium	ug/L	500	492	98	80-120	
Beryllium	ug/L	500	512	102	80-120	
Boron	ug/L	500	492	98	80-120	
Cadmium	ug/L	500	508	102	80-120	
Calcium	ug/L	5000	4850	97	80-120	
Chromium	ug/L	500	496	99	80-120	
Cobalt	ug/L	500	480	96	80-120	
Lead	ug/L	500	480	96	80-120	
Lithium	ug/L	500	468	94	80-120	
Molybdenum	ug/L	500	512	102	80-120	
Selenium	ug/L	500	521	104	80-120	
Thallium	ug/L	500	480	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1747081 1747082

Parameter	Units	40174560003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.43J	500	500	521	524	104	105	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1747081 1747082

Parameter	Units	40174560003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	0.56J	500	500	493	496	98	99	75-125	1	20	
Barium	ug/L	14.2	500	500	500	504	97	98	75-125	1	20	
Beryllium	ug/L	0.19J	500	500	491	498	98	100	75-125	1	20	
Boron	ug/L	32.4	500	500	516	523	97	98	75-125	1	20	
Cadmium	ug/L	0.29J	500	500	498	500	100	100	75-125	0	20	
Calcium	ug/L	65700	5000	5000	71000	76000	106	206	75-125	7	20	P6
Chromium	ug/L	2.3J	500	500	485	489	96	97	75-125	1	20	
Cobalt	ug/L	0.35J	500	500	468	474	94	95	75-125	1	20	
Lead	ug/L	0.30J	500	500	482	484	96	97	75-125	0	20	
Lithium	ug/L	0.83J	500	500	460	469	92	94	75-125	2	20	
Molybdenum	ug/L	0.74J	500	500	512	515	102	103	75-125	1	20	
Selenium	ug/L	0.93J	500	500	505	505	101	101	75-125	0	20	
Thallium	ug/L	0.30J	500	500	488	488	98	98	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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(920)469-2436

QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

QC Batch: 298658 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

METHOD BLANK: 1743901 Matrix: Water
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	08/29/18 13:54	

LABORATORY CONTROL SAMPLE: 1743902

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	622	582	94	80-120	

SAMPLE DUPLICATE: 1743903

Parameter	Units	40174518001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2260000 ug/L	2240	1	5	

SAMPLE DUPLICATE: 1743904

Parameter	Units	40174686002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	3220	3190	1	5	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

QC Batch: 298430 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

SAMPLE DUPLICATE: 1742930

Parameter	Units	40174381001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.6	8.5	0	20	H6

SAMPLE DUPLICATE: 1742931

Parameter	Units	40174560001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.8	7.7	1	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

QC Batch: 298308 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

METHOD BLANK: 1742415 Matrix: Water
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	08/27/18 10:31	
Fluoride	mg/L	<0.10	0.30	08/27/18 10:31	
Sulfate	mg/L	<1.0	3.0	08/27/18 10:31	

LABORATORY CONTROL SAMPLE: 1742416

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	20.1	101	90-110	
Fluoride	mg/L	2	1.9	97	90-110	
Sulfate	mg/L	20	20.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1742417 1742418

Parameter	Units	40174630001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	468	400	400	858	868	97	100	90-110	1	15	
Fluoride	mg/L	<2.0	40	40	45.9	48.8	115	122	90-110	6	15	M0
Sulfate	mg/L	<20.0	400	400	362	396	87	95	90-110	9	15	M0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1742419 1742420

Parameter	Units	40174578013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	22.6	100	100	127	124	104	101	90-110	2	15	
Fluoride	mg/L	<0.50	10	10	10.4	10.2	104	102	90-110	2	15	
Sulfate	mg/L	38.8	100	100	142	139	104	100	90-110	2	15	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(920)469-2436

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

Sample: MW-309 **Lab ID: 40174560001** Collected: 08/22/18 14:40 Received: 08/24/18 09:20 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.232 ± 0.426 (0.759) C:NA T:87%**	pCi/L	09/07/18 19:39	13982-63-3	
Radium-228	EPA 904.0	**0.522 ± 0.357 (0.688) C:76% T:89%**	pCi/L	09/12/18 14:36	15262-20-1	
Total Radium	Total Radium Calculation	**0.754 ± 0.783 (1.45)**	pCi/L	09/13/18 12:26	7440-14-4	

Sample: MW-310 **Lab ID: 40174560002** Collected: 08/22/18 15:40 Received: 08/24/18 09:20 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.247 ± 0.455 (0.811) C:NA T:85%**	pCi/L	09/07/18 19:39	13982-63-3	
Radium-228	EPA 904.0	**0.0614 ± 0.312 (0.713) C:75% T:84%**	pCi/L	09/12/18 14:37	15262-20-1	
Total Radium	Total Radium Calculation	**0.308 ± 0.767 (1.52)**	pCi/L	09/13/18 12:26	7440-14-4	

Sample: MW-311 **Lab ID: 40174560003** Collected: 08/22/18 16:40 Received: 08/24/18 09:20 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0614 ± 0.466 (0.922) C:NA T:84%**	pCi/L	09/07/18 19:54	13982-63-3	
Radium-228	EPA 904.0	**-0.253 ± 0.334 (0.834) C:76% T:74%**	pCi/L	09/12/18 14:37	15262-20-1	
Total Radium	Total Radium Calculation	**0.0614 ± 0.800 (1.76)**	pCi/L	09/13/18 12:26	7440-14-4	

Sample: FIELD BLANK **Lab ID: 40174560004** Collected: 08/22/18 16:50 Received: 08/24/18 09:20 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.486 ± 0.563 (0.909) C:NA T:77%**	pCi/L	09/07/18 19:54	13982-63-3	
Radium-228	EPA 904.0	**-0.0772 ± 0.317 (0.757) C:77% T:80%**	pCi/L	09/12/18 14:37	15262-20-1	
Total Radium	Total Radium Calculation	**0.486 ± 0.880 (1.67)**	pCi/L	09/13/18 12:26	7440-14-4	

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(920)469-2436

QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

QC Batch: 311276 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

METHOD BLANK: 1520237 Matrix: Water
Associated Lab Samples:

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.150 ± 0.342 (0.606) C:NA T:95%	pCi/L	09/07/18 12:37	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

QC Batch: 311279 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 40174560001, 40174560002, 40174560003, 40174560004

METHOD BLANK: 1520241 Matrix: Water
Associated Lab Samples:

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.380 ± 0.325 (0.654) C:81% T:88%	pCi/L	09/12/18 14:35	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALIFIERS

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

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 and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

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.

LABORATORIES

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

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25217156.01 COLUMBIA-MOD 4
Pace Project No.: 40174560

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40174560001	**MW-309**	EPA 3010	299158	EPA 6020	299232
40174560002	**MW-310**	EPA 3010	299158	EPA 6020	299232
40174560003	**MW-311**	EPA 3010	299158	EPA 6020	299232
40174560004	**FIELD BLANK**	EPA 3010	299158	EPA 6020	299232
40174560001	**MW-309**	EPA 7470	298753	EPA 7470	298814
40174560002	**MW-310**	EPA 7470	298753	EPA 7470	298814
40174560003	**MW-311**	EPA 7470	298753	EPA 7470	298814
40174560004	**FIELD BLANK**	EPA 7470	298753	EPA 7470	298814
40174560001	**MW-309**				
40174560002	**MW-310**				
40174560003	**MW-311**				
40174560001	**MW-309**	EPA 903.1	311276		
40174560002	**MW-310**	EPA 903.1	311276		
40174560003	**MW-311**	EPA 903.1	311276		
40174560004	**FIELD BLANK**	EPA 903.1	311276		
40174560001	**MW-309**	EPA 904.0	311279		
40174560002	**MW-310**	EPA 904.0	311279		
40174560003	**MW-311**	EPA 904.0	311279		
40174560004	**FIELD BLANK**	EPA 904.0	311279		
40174560001	**MW-309**	Total Radium Calculation	312877		
40174560002	**MW-310**	Total Radium Calculation	312877		
40174560003	**MW-311**	Total Radium Calculation	312877		
40174560004	**FIELD BLANK**	Total Radium Calculation	312877		
40174560001	**MW-309**	SM 2540C	298658		
40174560002	**MW-310**	SM 2540C	298658		
40174560003	**MW-311**	SM 2540C	298658		
40174560004	**FIELD BLANK**	SM 2540C	298658		
40174560001	**MW-309**	EPA 9040	298430		
40174560002	**MW-310**	EPA 9040	298430		
40174560003	**MW-311**	EPA 9040	298430		
40174560004	**FIELD BLANK**	EPA 9040	298430		
40174560001	**MW-309**	EPA 300.0	298308		
40174560002	**MW-310**	EPA 300.0	298308		
40174560003	**MW-311**	EPA 300.0	298308		
40174560004	**FIELD BLANK**	EPA 300.0	298308		

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

40174560

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CHAIN OF CUSTODY

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

(Please Print Clearly)	
Company Name:	SCS
Branch/Location:	Madison, WI
Project Contact:	Meg Blodgett
Phone:	608 216-7362
Project Number:	25217156.01
Project Name:	Columbia, Mod-4
Project State:	WI
Sampled By (Print):	Paul A. Grover
Sampled By (Sign):	Paul A. Grover
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

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

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested: Ph, TDS, Cl, F, SO4	Metals	Radium 226	Radium 228
001	MW-309	8/22/18	14:40	GW	No		X	X	X	X
002	MW-310		15:40		No					
003	MW-311		16:40		No					
004	Field Blank		16:50	DI	No					

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:
Paul A. Grover	8/23/18 9:30		
CS Logistics	8/24/18 0920	[signature]	8/24/18 0920

PACE Project No.
40174560

Receipt Temp = R7 °C

Sample Receipt pH
OK / Adjusted

Cooler Custody Seal
Present / Not Present
Intact / Not Intact

Version 6.0 06/14/06

C019a(27Jun2006)

ORIGINAL

Pace Container Order #394058

40174560

Addresses

Order By :		Ship To :		Return To:	
Company	SCS ENGINEERS	Company	SCS ENGINEERS (Pace Analytical	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	Alliant Columbia Dry Ash CCR (25217156)	**Due Date**	08/21/2018	**Profile**		**Quote**	
Project Manager	Milewsky, Dan	**Return**		**Carrier**	Most Economical	**Location**	

Trip Blanks

- [ ] Include Trip Blanks

Bottle Labels

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

Bottles

- [ ] Boxed Cases
- [ ] Individually Wrapped
- [X] Grouped By Sample

Return Shipping Labels

- [ ] No Shipper Number
- [ ] With Shipper Number

Misc

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

COC Options

- [X] Number of Blanks 2
- [ ] Pre-Printed

# of Samples	Matrix	Test	Container	Total	# of QC	Lot #	Notes
4	WT	Radium 226	1-1L Plastic w/ HNO3	4	0		
4	WT	Radium 228	1-1L Plastic w/ HNO3	4	0		
4	WT	Metals	250mL plastic w/HNO3	4	0	M-8-103-04BB	
4	WT	pH	250mL plastic unpres	4	0	M-8-124-04BB	
4	WT	TDS, Cl, F, SO4	250mL plastic unpres	4	0	M-8-124-04BB	

Hazard Shipping Placard In Place : NA

*Sample receiving hours are Monday through Friday 8:00 am to 6:00 pm and Saturday from 9:00 am to 12:00 pm unless special arrangements are made with your 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 and disposal.

*Payment term are net 30 days.

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

Sample Notes

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

Ship Date :	08/20/2018
Prepared By:	Mai Yer Her
Verified By:	

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

Sample Preservation Receipt Form

Client Name: SCS Project # 40174560

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

Lab Lot# of pH paper: 1245076 Lab Std #ID of preservation (if pH adjusted):

Pace Lab #	Glass							Plastic							Vials						Jars			General			VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN							
001											2		1													2				X		2.5 / 5 / 10
002											2		1													2				X		2.5 / 5 / 10
003											2		1													2				X		2.5 / 5 / 10
004											2		1													2				X		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	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	1L HNO3 poly

Pace Analytical 1241 Bellevue Street, Green Bay, WI 54302	Document Name: **Sample Condition Upon Receipt (SCUR)**	Document Revised: 25Apr2018
	Document No.: **F-GB-C-031-Rev.07**	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40174560

40174560

Client Name: SCS

Courier: ☑ CS Logistics ☐ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other:

Tracking #:

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

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

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

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

Cooler Temperature Uncorr: ROT /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.

Person examining contents:
Date: 8/24/18
Initials:

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☐Yes ☑No ☐N/A	2. light, mail to, invoice 8/24/18
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☐No	6.
Rush Turn Around Time Requested:	☐Yes ☑No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD: ☐Yes ☑No ☐N/A		8.
Correct Containers Used:	☑Yes ☐No	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
Trip Blank Present:	☐Yes ☐No ☑N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: AL for DM **Date:** 8/24/18

A8 Round 8 Background Sampling, Analytical Laboratory Report

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

October 22, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on September 22, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

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

CERTIFICATIONS

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

Pennsylvania Certification IDs

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
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

Green Bay Certification IDs

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

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

SAMPLE SUMMARY

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40176330001	**MW309**	Water	09/21/18 11:10	09/22/18 09:30
40176330002	**MW310**	Water	09/21/18 12:55	09/22/18 09:30
40176330003	**MW311**	Water	09/21/18 14:05	09/22/18 09:30
40176330004	**FIELD BLANK**	Water	09/21/18 14:10	09/22/18 09:30

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SAMPLE ANALYTE COUNT

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40176330001	**MW309**	EPA 6020	DS1, KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40176330002	**MW310**	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40176330003	**MW311**	EPA 6020	KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
			AXL	7	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40176330004	**FIELD BLANK**	EPA 6020	DS1, KXS	14	PASI-G
		EPA 7470	AJT	1	PASI-G
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G

Pace Analytical Services, LLC
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Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

Sample: MW309 **Lab ID: 40176330001** Collected: 09/21/18 11:10 Received: 09/22/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Lithium	**0.76J**	ug/L	1.0	0.19	1	10/04/18 07:00	10/05/18 17:49	7439-93-2	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	10/04/18 07:00	10/05/18 17:49	7440-41-7	
Boron	**30.0**	ug/L	11.0	3.3	1	10/04/18 07:00	10/05/18 17:49	7440-42-8	
Calcium	**55200**	ug/L	2500	698	10	10/04/18 07:00	10/08/18 14:32	7440-70-2	P6
Chromium	**1.3J**	ug/L	3.4	1.0	1	10/04/18 07:00	10/05/18 17:49	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	10/04/18 07:00	10/05/18 17:49	7440-48-4	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	10/04/18 07:00	10/05/18 17:49	7440-38-2	
Selenium	**0.33J**	ug/L	1.1	0.32	1	10/04/18 07:00	10/05/18 17:49	7782-49-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	10/04/18 07:00	10/05/18 17:49	7439-98-7	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	10/04/18 07:00	10/05/18 17:49	7440-43-9	
Antimony	**<0.15**	ug/L	1.0	0.15	1	10/04/18 07:00	10/05/18 17:49	7440-36-0	
Barium	**22.2**	ug/L	4.9	1.5	1	10/04/18 07:00	10/05/18 17:49	7440-39-3	
Thallium	**<0.14**	ug/L	1.0	0.14	1	10/04/18 07:00	10/05/18 17:49	7440-28-0	
Lead	**<0.24**	ug/L	1.0	0.24	1	10/04/18 07:00	10/05/18 17:49	7439-92-1	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.084**	ug/L	0.28	0.084	1	10/01/18 09:00	10/02/18 09:30	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.83**	Std. Units			1		09/21/18 11:10		
Field Specific Conductance	**1423**	umhos/cm			1		09/21/18 11:10		
Oxygen, Dissolved	**10.75**	mg/L			1		09/21/18 11:10	7782-44-7	
REDOX	**65.5**	mV			1		09/21/18 11:10		
Turbidity	**3.18**	NTU			1		09/21/18 11:10		
Static Water Level	**787.08**	feet			1		09/21/18 11:10		
Temperature, Water (C)	**12.72**	deg C			1		09/21/18 11:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**830**	mg/L	20.0	8.7	1		09/24/18 16:29		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.010	1		09/24/18 11:25		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**329**	mg/L	40.0	10.0	20		09/27/18 19:28	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		09/27/18 14:46	16984-48-8	
Sulfate	**35.9**	mg/L	3.0	1.0	1		09/27/18 14:46	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

Sample: MW310 **Lab ID: 40176330002** Collected: 09/21/18 12:55 Received: 09/22/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**0.49J**	ug/L	1.0	0.15	1	10/04/18 07:00	10/05/18 18:16	7440-36-0	
Arsenic	**0.76J**	ug/L	1.0	0.28	1	10/04/18 07:00	10/05/18 18:16	7440-38-2	
Barium	**26.1**	ug/L	4.9	1.5	1	10/04/18 07:00	10/05/18 18:16	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	10/04/18 07:00	10/05/18 18:16	7440-41-7	
Boron	**80.3**	ug/L	11.0	3.3	1	10/04/18 07:00	10/05/18 18:16	7440-42-8	
Cadmium	**0.17J**	ug/L	1.0	0.15	1	10/04/18 07:00	10/05/18 18:16	7440-43-9	
Calcium	**54100**	ug/L	250	69.8	1	10/04/18 07:00	10/05/18 18:16	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	10/04/18 07:00	10/05/18 18:16	7440-47-3	
Cobalt	**0.24J**	ug/L	1.0	0.12	1	10/04/18 07:00	10/05/18 18:16	7440-48-4	
Lead	**0.25J**	ug/L	1.0	0.24	1	10/04/18 07:00	10/05/18 18:16	7439-92-1	
Lithium	**1.1**	ug/L	1.0	0.19	1	10/04/18 07:00	10/05/18 18:16	7439-93-2	
Molybdenum	**4.8**	ug/L	1.5	0.44	1	10/04/18 07:00	10/05/18 18:16	7439-98-7	
Selenium	**1.4**	ug/L	1.1	0.32	1	10/04/18 07:00	10/05/18 18:16	7782-49-2	
Thallium	**0.27J**	ug/L	1.0	0.14	1	10/04/18 07:00	10/05/18 18:16	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.084**	ug/L	0.28	0.084	1	10/01/18 09:00	10/02/18 09:32	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.98**	Std. Units			1		09/21/18 12:55		
Field Specific Conductance	**1114**	umhos/cm			1		09/21/18 12:55		
Oxygen, Dissolved	**10.49**	mg/L			1		09/21/18 12:55	7782-44-7	
REDOX	**51.5**	mV			1		09/21/18 12:55		
Turbidity	**3.99**	NTU			1		09/21/18 12:55		
Static Water Level	**787.24**	feet			1		09/21/18 12:55		
Temperature, Water (C)	**13.52**	deg C			1		09/21/18 12:55		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**736**	mg/L	20.0	8.7	1		09/24/18 16:30		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.010	1		09/24/18 11:31		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**152**	mg/L	10.0	2.5	5		09/27/18 20:05	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		09/27/18 15:22	16984-48-8	
Sulfate	**118**	mg/L	15.0	5.0	5		09/27/18 20:05	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

Sample: MW311 **Lab ID: 40176330003** Collected: 09/21/18 14:05 Received: 09/22/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	10/04/18 07:00	10/05/18 18:30	7440-36-0	
Arsenic	**0.56J**	ug/L	1.0	0.28	1	10/04/18 07:00	10/05/18 18:30	7440-38-2	
Barium	**18.2**	ug/L	4.9	1.5	1	10/04/18 07:00	10/05/18 18:30	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	10/04/18 07:00	10/05/18 18:30	7440-41-7	
Boron	**27.5**	ug/L	11.0	3.3	1	10/04/18 07:00	10/05/18 18:30	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	10/04/18 07:00	10/05/18 18:30	7440-43-9	
Calcium	**75400**	ug/L	250	69.8	1	10/04/18 07:00	10/05/18 18:30	7440-70-2	
Chromium	**1.5J**	ug/L	3.4	1.0	1	10/04/18 07:00	10/05/18 18:30	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	10/04/18 07:00	10/05/18 18:30	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	10/04/18 07:00	10/05/18 18:30	7439-92-1	
Lithium	**0.82J**	ug/L	1.0	0.19	1	10/04/18 07:00	10/05/18 18:30	7439-93-2	
Molybdenum	**2.5**	ug/L	1.5	0.44	1	10/04/18 07:00	10/05/18 18:30	7439-98-7	
Selenium	**1.2**	ug/L	1.1	0.32	1	10/04/18 07:00	10/05/18 18:30	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	10/04/18 07:00	10/05/18 18:30	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.084**	ug/L	0.28	0.084	1	10/01/18 09:00	10/02/18 09:35	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.95**	Std. Units			1		09/21/18 14:05		
Field Specific Conductance	**600**	umhos/cm			1		09/21/18 14:05		
Oxygen, Dissolved	**10.31**	mg/L			1		09/21/18 14:05	7782-44-7	
REDOX	**42.4**	mV			1		09/21/18 14:05		
Turbidity	**10.3**	NTU			1		09/21/18 14:05		
Static Water Level	**787.66**	feet			1		09/21/18 14:05		
Temperature, Water (C)	**13.07**	deg C			1		09/21/18 14:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**424**	mg/L	20.0	8.7	1		09/24/18 16:30		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.010	1		09/24/18 11:33		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**3.9**	mg/L	2.0	0.50	1		09/27/18 15:35	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		09/27/18 15:35	16984-48-8	
Sulfate	**92.4**	mg/L	15.0	5.0	5		09/27/18 20:17	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

Sample: FIELD BLANK **Lab ID: 40176330004** Collected: 09/21/18 14:10 Received: 09/22/18 09:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Antimony	**<0.15**	ug/L	1.0	0.15	1	10/04/18 07:00	10/05/18 15:17	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	10/04/18 07:00	10/05/18 15:17	7440-38-2	
Barium	**<1.5**	ug/L	4.9	1.5	1	10/04/18 07:00	10/05/18 15:17	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	10/04/18 07:00	10/05/18 15:17	7440-41-7	
Boron	**<3.3**	ug/L	11.0	3.3	1	10/04/18 07:00	10/05/18 15:17	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	10/04/18 07:00	10/05/18 15:17	7440-43-9	
Calcium	**<69.8**	ug/L	250	69.8	1	10/04/18 07:00	10/08/18 14:18	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	10/04/18 07:00	10/05/18 15:17	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	10/04/18 07:00	10/05/18 15:17	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	10/17/18 07:46	10/17/18 17:23	7439-92-1	
Lithium	**<0.19**	ug/L	1.0	0.19	1	10/04/18 07:00	10/05/18 15:17	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	10/04/18 07:00	10/05/18 15:17	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	10/04/18 07:00	10/05/18 15:17	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	10/04/18 07:00	10/05/18 15:17	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.084**	ug/L	0.28	0.084	1	10/01/18 09:00	10/02/18 09:37	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		09/24/18 16:30		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.0**	Std. Units	0.10	0.010	1		09/24/18 11:35		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	2.0	0.50	1		09/27/18 15:47	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		09/27/18 15:47	16984-48-8	
Sulfate	**<1.0**	mg/L	3.0	1.0	1		09/27/18 15:47	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(920)469-2436

QUALITY CONTROL DATA

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

QC Batch: 301700 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

METHOD BLANK: 1762651 Matrix: Water
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.084	0.28	10/02/18 09:05	

LABORATORY CONTROL SAMPLE: 1762652

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1762653 1762654

Parameter	Units	40176611001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.084	5	5	5.1	5.1	101	102	85-115	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

QC Batch: 302148 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

METHOD BLANK: 1764715 Matrix: Water
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	10/05/18 15:10	
Arsenic	ug/L	<0.28	1.0	10/05/18 15:10	
Barium	ug/L	<1.5	4.9	10/05/18 15:10	
Beryllium	ug/L	<0.18	1.0	10/05/18 15:10	
Boron	ug/L	<3.3	11.0	10/05/18 15:10	
Cadmium	ug/L	<0.15	1.0	10/05/18 15:10	
Calcium	ug/L	<69.8	250	10/08/18 14:11	
Chromium	ug/L	<1.0	3.4	10/05/18 15:10	
Cobalt	ug/L	<0.12	1.0	10/05/18 15:10	
Lead	ug/L	<0.24	1.0	10/05/18 15:10	
Lithium	ug/L	<0.19	1.0	10/05/18 15:10	
Molybdenum	ug/L	<0.44	1.5	10/05/18 15:10	
Selenium	ug/L	<0.32	1.1	10/05/18 15:10	
Thallium	ug/L	<0.14	1.0	10/05/18 15:10	

LABORATORY CONTROL SAMPLE: 1764716

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	519	104	80-120	
Arsenic	ug/L	500	497	99	80-120	
Barium	ug/L	500	501	100	80-120	
Beryllium	ug/L	500	498	100	80-120	
Boron	ug/L	500	476	95	80-120	
Cadmium	ug/L	500	518	104	80-120	
Calcium	ug/L	5000	4840	97	80-120	
Chromium	ug/L	500	494	99	80-120	
Cobalt	ug/L	500	485	97	80-120	
Lead	ug/L	500	468	94	80-120	
Lithium	ug/L	500	482	96	80-120	
Molybdenum	ug/L	500	508	102	80-120	
Selenium	ug/L	500	526	105	80-120	
Thallium	ug/L	500	467	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1764717 1764718

Parameter	Units	40176330001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	<0.15	500	500	520	523	104	105	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1764717 1764718

Parameter	Units	40176330001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	<0.28	500	500	514	509	103	102	75-125	1	20	
Barium	ug/L	22.2	500	500	507	509	97	97	75-125	0	20	
Beryllium	ug/L	<0.18	500	500	456	463	91	93	75-125	1	20	
Boron	ug/L	30.0	500	500	456	457	85	85	75-125	0	20	
Cadmium	ug/L	<0.15	500	500	495	495	99	99	75-125	0	20	
Calcium	ug/L	55200	5000	5000	63300	61500	161	126	75-125	3	20	P6
Chromium	ug/L	1.3J	500	500	486	487	97	97	75-125	0	20	
Cobalt	ug/L	<0.12	500	500	468	465	94	93	75-125	1	20	
Lead	ug/L	<0.24	500	500	475	468	95	93	75-125	2	20	
Lithium	ug/L	0.76J	500	500	443	445	88	89	75-125	0	20	
Molybdenum	ug/L	<0.44	500	500	513	517	103	103	75-125	1	20	
Selenium	ug/L	0.33J	500	500	541	532	108	106	75-125	2	20	
Thallium	ug/L	<0.14	500	500	475	475	95	95	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

QC Batch: 303441 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40176330004

METHOD BLANK: 1772343 Matrix: Water
Associated Lab Samples: 40176330004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Lead	ug/L	<0.24	1.0	10/17/18 17:16	

LABORATORY CONTROL SAMPLE & LCSD: 1772344 1772347

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Lead	ug/L	500	466	468	93	94	80-120	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

QC Batch: 301076 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

METHOD BLANK: 1758475 Matrix: Water
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	09/24/18 16:26	

LABORATORY CONTROL SAMPLE: 1758476

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	622	588	95	80-120	

SAMPLE DUPLICATE: 1758477

Parameter	Units	40176049001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	504	536	6	5	R1

SAMPLE DUPLICATE: 1758478

Parameter	Units	40176074001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	686	690	1	5	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

QC Batch: 301017 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

SAMPLE DUPLICATE: 1758314

Parameter	Units	40176009001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.4	8.3	0	20	H6

SAMPLE DUPLICATE: 1758315

Parameter	Units	40176225001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	9.4	9.4	0	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

QC Batch: 301185 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

METHOD BLANK: 1759016 Matrix: Water
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	09/27/18 11:18	
Fluoride	mg/L	<0.10	0.30	09/27/18 11:18	
Sulfate	mg/L	<1.0	3.0	09/27/18 11:18	

LABORATORY CONTROL SAMPLE: 1759017

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.0	105	90-110	
Fluoride	mg/L	2	2.2	108	90-110	
Sulfate	mg/L	20	21.1	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1759018 1759019

Parameter	Units	40176330001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	329	400	400	727	718	99	97	90-110	1	15	
Fluoride	mg/L	<0.10	2	2	1.9	1.9	94	95	90-110	1	15	
Sulfate	mg/L	35.9	20	20	56.1	56.3	101	102	90-110	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1759020 1759021

Parameter	Units	40176373001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	3440	10000	10000	13400	13400	100	100	90-110	0	15	
Fluoride	mg/L	ND	1000	1000	1050	1050	105	105	90-110	1	15	
Sulfate	mg/L	ND	10000	10000	9850	9960	98	100	90-110	1	15	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(920)469-2436

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

Sample: MW309 **Lab ID: 40176330001** Collected: 09/21/18 11:10 Received: 09/22/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.569 ± 0.595 (0.932) C:NA T:76%**	pCi/L	10/08/18 19:38	13982-63-3	
Radium-228	EPA 904.0	**-0.304 ± 0.327 (0.833) C:77% T:80%**	pCi/L	10/09/18 15:11	15262-20-1	
Total Radium	Total Radium Calculation	**0.569 ± 0.922 (1.77)**	pCi/L	10/11/18 16:32	7440-14-4	

Sample: MW310 **Lab ID: 40176330002** Collected: 09/21/18 12:55 Received: 09/22/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.285 ± 0.486 (0.857) C:NA T:75%**	pCi/L	10/08/18 19:38	13982-63-3	
Radium-228	EPA 904.0	**0.190 ± 0.360 (0.791) C:78% T:77%**	pCi/L	10/09/18 15:11	15262-20-1	
Total Radium	Total Radium Calculation	**0.475 ± 0.846 (1.65)**	pCi/L	10/11/18 16:32	7440-14-4	

Sample: MW311 **Lab ID: 40176330003** Collected: 09/21/18 14:05 Received: 09/22/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.424 ± 0.589 (0.995) C:NA T:75%**	pCi/L	10/08/18 19:38	13982-63-3	
Radium-228	EPA 904.0	**0.349 ± 0.549 (1.19) C:74% T:72%**	pCi/L	10/09/18 15:11	15262-20-1	
Total Radium	Total Radium Calculation	**0.773 ± 1.14 (2.19)**	pCi/L	10/11/18 16:32	7440-14-4	

Sample: FIELD BLANK **Lab ID: 40176330004** Collected: 09/21/18 14:10 Received: 09/22/18 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.143 ± 0.443 (0.857) C:NA T:81%**	pCi/L	10/08/18 19:38	13982-63-3	
Radium-228	EPA 904.0	**0.143 ± 0.468 (1.05) C:72% T:73%**	pCi/L	10/09/18 15:12	15262-20-1	
Total Radium	Total Radium Calculation	**0.286 ± 0.911 (1.91)**	pCi/L	10/11/18 16:32	7440-14-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL - RADIOCHEMISTRY

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

QC Batch: 314550 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

METHOD BLANK: 1535389 Matrix: Water
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0737 ± 0.336 (0.684) C:NA T:80%	pCi/L	10/08/18 19:38	

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REPORT OF LABORATORY ANALYSIS

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

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

QC Batch: 314551 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

METHOD BLANK: 1535390 Matrix: Water
Associated Lab Samples: 40176330001, 40176330002, 40176330003, 40176330004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.0428 ± 0.320 (0.737) C:79% T:81%	pCi/L	10/09/18 15:11	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(920)469-2436

QUALIFIERS

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

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 and percent moisture.
LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.
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.

LABORATORIES

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

WORKORDER QUALIFIERS

WO: 40176330

[1]	REVISED REPORT: 40176330004 was reanalyzed to confirm laboratory contamination of lead in the initial analysis.

BATCH QUALIFIERS

Batch: 303523

[1]	A matrix spike/matrix spike duplicate was not performed for this batch due to sample being a Field Blank

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.
R1	RPD value was outside control limits.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25217156.01 ALLIANT COLUMBIA
Pace Project No.: 40176330

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40176330001	**MW309**	EPA 3010	302148	EPA 6020	302229
40176330002	**MW310**	EPA 3010	302148	EPA 6020	302229
40176330003	**MW311**	EPA 3010	302148	EPA 6020	302229
40176330004	**FIELD BLANK**	EPA 3010	302148	EPA 6020	302229
40176330004	**FIELD BLANK**	EPA 3010	303441	EPA 6020	303523
40176330001	**MW309**	EPA 7470	301700	EPA 7470	301809
40176330002	**MW310**	EPA 7470	301700	EPA 7470	301809
40176330003	**MW311**	EPA 7470	301700	EPA 7470	301809
40176330004	**FIELD BLANK**	EPA 7470	301700	EPA 7470	301809
40176330001	**MW309**				
40176330002	**MW310**				
40176330003	**MW311**				
40176330001	**MW309**	EPA 903.1	314550		
40176330002	**MW310**	EPA 903.1	314550		
40176330003	**MW311**	EPA 903.1	314550		
40176330004	**FIELD BLANK**	EPA 903.1	314550		
40176330001	**MW309**	EPA 904.0	314551		
40176330002	**MW310**	EPA 904.0	314551		
40176330003	**MW311**	EPA 904.0	314551		
40176330004	**FIELD BLANK**	EPA 904.0	314551		
40176330001	**MW309**	Total Radium Calculation	316372		
40176330002	**MW310**	Total Radium Calculation	316372		
40176330003	**MW311**	Total Radium Calculation	316372		
40176330004	**FIELD BLANK**	Total Radium Calculation	316372		
40176330001	**MW309**	SM 2540C	301076		
40176330002	**MW310**	SM 2540C	301076		
40176330003	**MW311**	SM 2540C	301076		
40176330004	**FIELD BLANK**	SM 2540C	301076		
40176330001	**MW309**	EPA 9040	301017		
40176330002	**MW310**	EPA 9040	301017		
40176330003	**MW311**	EPA 9040	301017		
40176330004	**FIELD BLANK**	EPA 9040	301017		
40176330001	**MW309**	EPA 300.0	301185		
40176330002	**MW310**	EPA 300.0	301185		
40176330003	**MW311**	EPA 300.0	301185		
40176330004	**FIELD BLANK**	EPA 300.0	301185		

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

Pace Analytical®
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CHAIN OF CUSTODY

40176330

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

(Please Print Clearly)	
Company Name:	SCS Engineers
Branch/Location:	25-Madison
Project Contact:	Tom Karwoski
Phone:	608-216-7369
Project Number:	25217156.01
Project Name:	Columbia Energy Center
Project State:	WI
Sampled By (Print):	Nick Harms
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	Tom Karwoski
Mail To Company:	SCS Engineers
Mail To Address:	2830 Dairy Drive Madison, WI 53718
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

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

FILTERED? (YES/NO) — Y / N
PRESERVATION (CODE)* — Pick Letter

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	Analyses Requested: Boron, Calcium	Metals	Mercury	Cl, F, SO4, TDS	226 + 228 Radium	pH	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
					N								
					D	D	D	A	D				
001	MW309	9/21/18	1110	GW	X	X	X	X	X	X			
002	MW310		1255	GW	X	X	X	X	X	X			
003	MW311		1405	GW	X	X	X	X	X	X			
004	Field Blank		1410	GW	X	X	X	X	X	X			

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:
Nick Harms	9/21/18 1900		
Fed Ex	9/22/18 0930		9/22/18 0930

PACE Project No.
40176330

Receipt Temp = 2.0 °C

Sample Receipt pH
OK / Adjusted

Cooler Custody Seal
Present / Not Present
Intact / Not Intact

C019a(27Jun2006)

Version 6.0 06/14/06

ORIGINAL

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

Sample Preservation Receipt Form

Client Name: SCS Project # V0176330

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

Lab Lot# of pH paper: 10054771 Lab Std #ID of preservation (if pH adjusted):

Pace Lab #	Glass: AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	Plastic: BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	Vials: DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	Jars: JGFU	WGFU	WPFU	General: SP5T	ZPLC	GN	VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001											2		1													2							2.5 / 5 / 10
002											2		1													2							2.5 / 5 / 10
003											2		1													2							2.5 / 5 / 10
004											2		1													2							2.5 / 5 / 10
005																																	2.5 / 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	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	1L poly HNO_3

Pace Analytical™ 1241 Bellevue Street, Green Bay, WI 54302	Document Name: Sample Condition Upon Receipt (SCUR)	Document Revised: 25Apr2018
	Document No.: F-GB-C-031-Rev.07	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Client Name: SCS

Project #: WO#: 40176330

Courier: ☐ CS Logistics ☒ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other:

Tracking #: 8130 2340 5289

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: ROI /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.

Person examining contents:
Date: 9/22/18
Initials: SSM

Chain of Custody Present:	☒Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☐Yes ☒No ☐N/A	2. Page #, indica info SSM 9/22/18
Chain of Custody Relinquished:	☒Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☒Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☐Yes ☒No SSM 9/22/18	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☒No	6.
Rush Turn Around Time Requested:	☐Yes ☒No	7.
Sufficient Volume: For Analysis: ☒Yes ☐No MS/MSD: ☐Yes ☒No ☐N/A		8.
Correct Containers Used:	☒Yes ☐No	9.
-Pace Containers Used:	☒Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☒N/A	
Containers Intact:	☒Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☒N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: W	☒Yes ☐No ☐N/A	12.
Trip Blank Present:	☐Yes ☐No ☒N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☒N/A	
Pace Trip Blank Lot # (if purchased):		

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: AL for DM **Date:** 9/22/18

A9 Round 9 Background Sampling, Analytical Laboratory Report

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

October 26, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25217156 ALLIANT COLUMBIA HG
Pace Project No.: 40178164

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on October 23, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

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

CERTIFICATIONS

Project: 25217156 ALLIANT COLUMBIA HG
Pace Project No.: 40178164

Green Bay Certification IDs

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

Pace Analytical Services, LLC
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Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: 25217156 ALLIANT COLUMBIA HG
Pace Project No.: 40178164

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40178164001	**FIELD BLANK**	Water	10/22/18 14:30	10/23/18 10:10
40178164002	**MW-309**	Water	10/22/18 14:05	10/23/18 10:10
40178164003	**MW-310**	Water	10/22/18 14:27	10/23/18 10:10
40178164004	**MW-311**	Water	10/22/18 15:00	10/23/18 10:10

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(920)469-2436

SAMPLE ANALYTE COUNT

Project: 25217156 ALLIANT COLUMBIA HG
Pace Project No.: 40178164

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40178164001	**FIELD BLANK**	EPA 7470	AJT	1
40178164002	**MW-309**	EPA 7470	AJT	1
			AXL	7
40178164003	**MW-310**	EPA 7470	AJT	1
			AXL	7
40178164004	**MW-311**	EPA 7470	AJT	1
			AXL	7

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156 ALLIANT COLUMBIA HG
Pace Project No.: 40178164

Sample: FIELD BLANK **Lab ID: 40178164001** Collected: 10/22/18 14:30 Received: 10/23/18 10:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.084**	ug/L	0.28	0.084	1	10/24/18 10:05	10/25/18 11:18	7439-97-6	

Sample: MW-309 **Lab ID: 40178164002** Collected: 10/22/18 14:05 Received: 10/23/18 10:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.084**	ug/L	0.28	0.084	1	10/24/18 10:05	10/25/18 11:39	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.56**	Std. Units			1		10/22/18 14:05		
Field Specific Conductance	**1424**	umhos/cm			1		10/22/18 14:05		
Oxygen, Dissolved	**10.23**	mg/L			1		10/22/18 14:05	7782-44-7	
REDOX	**157.1**	mV			1		10/22/18 14:05		
Turbidity	**2.81**	NTU			1		10/22/18 14:05		
Static Water Level	**787.99**	feet			1		10/22/18 14:05		
Temperature, Water (C)	**13.3**	deg C			1		10/22/18 14:05		

Sample: MW-310 **Lab ID: 40178164003** Collected: 10/22/18 14:27 Received: 10/23/18 10:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.084**	ug/L	0.28	0.084	1	10/24/18 10:05	10/25/18 11:42	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.70**	Std. Units			1		10/22/18 14:27		
Field Specific Conductance	**1182**	umhos/cm			1		10/22/18 14:27		
Oxygen, Dissolved	**10.27**	mg/L			1		10/22/18 14:27	7782-44-7	
REDOX	**145.0**	mV			1		10/22/18 14:27		
Turbidity	**5.53**	NTU			1		10/22/18 14:27		
Static Water Level	**788.18**	feet			1		10/22/18 14:27		
Temperature, Water (C)	**13.6**	deg C			1		10/22/18 14:27		

Sample: MW-311 **Lab ID: 40178164004** Collected: 10/22/18 15:00 Received: 10/23/18 10:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.084**	ug/L	0.28	0.084	1	10/24/18 10:05	10/25/18 11:44	7439-97-6	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25217156 ALLIANT COLUMBIA HG
Pace Project No.: 40178164

Sample: MW-311 **Lab ID: 40178164004** Collected: 10/22/18 15:00 Received: 10/23/18 10:10 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method:								
Field pH	**7.50**	Std. Units			1		10/22/18 15:00		
Field Specific Conductance	**699**	umhos/cm			1		10/22/18 15:00		
Oxygen, Dissolved	**9.96**	mg/L			1		10/22/18 15:00	7782-44-7	
REDOX	**146.0**	mV			1		10/22/18 15:00		
Turbidity	**3.73**	NTU			1		10/22/18 15:00		
Static Water Level	**788.64**	feet			1		10/22/18 15:00		
Temperature, Water (C)	**13.4**	deg C			1		10/22/18 15:00		

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25217156 ALLIANT COLUMBIA HG
Pace Project No.: 40178164

QC Batch: 304149 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40178164001, 40178164002, 40178164003, 40178164004

METHOD BLANK: 1776905 Matrix: Water
Associated Lab Samples: 40178164001, 40178164002, 40178164003, 40178164004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.084	0.28	10/25/18 10:31	

LABORATORY CONTROL SAMPLE: 1776906

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1776907 1776908

Parameter	Units	40177875001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.084	5	5	4.9	5.1	98	102	85-115	5	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: 25217156 ALLIANT COLUMBIA HG
Pace Project No.: 40178164

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 and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25217156 ALLIANT COLUMBIA HG
Pace Project No.: 40178164

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40178164001	**FIELD BLANK**	EPA 7470	304149	EPA 7470	304235
40178164002	**MW-309**	EPA 7470	304149	EPA 7470	304235
40178164003	**MW-310**	EPA 7470	304149	EPA 7470	304235
40178164004	**MW-311**	EPA 7470	304149	EPA 7470	304235
40178164002	**MW-309**				
40178164003	**MW-310**				
40178164004	**MW-311**				

40178164

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document

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

SSM

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	SCS ENGINEERS	Report To:	Meghan Blodgett	Attention:	
Address:	2830 Dairy Drive	Copy To:		Company Name:	
Madison, WI 53718				Address:	
Email:	mblodgett@scsengineers.com	Purchase Order #:		Pace Quote:	
Phone:	608-216-7362 Fax	Project Name:	CCR Rule Alliant Columbia (25216067) Hg	Pace Project Manager:	dan.milewsky@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	

Regulatory Agency

State / Location

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Y/N	Analyses Test: Mercury	Residual Chlorine (Y/N)
1	FIELD BLANK 201	WT				10/22/18	14:30					X							X	
2	MW-309 202	WT					14:05	133				X							X	
3	MW-310 203	WT					14:29					X							X	
4	MW-311 204	WT					15:00	134				X							X	
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				

Grab

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
ALL SAMPLES UNFILTERED	Heather Grooms	10/22/18	19:00							
	FEDEX	10/23/18	1318		10/23/18	1010	N/A	N	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed:

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

Pace Container Order #410117

40178164

Addresses

Order By :		Ship To :		Return To:	
Company	SCS ENGINEERS	Company	SCS ENGINEERS (Pace Analytical	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	CCR Rule Alliant Columbia (25216067) Hg	**Due Date**	10/16/2018	**Profile**		**Quote**	
Project Manager	Milewsky, Dan	**Return**		**Carrier**	Most Economical	**Location**	

Trip Blanks

- [ ] Include Trip Blanks

Bottle Labels

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

Bottles

- [ ] Boxed Cases
- [ ] Individually Wrapped
- [X] Grouped By Sample

Return Shipping Labels

- [ ] No Shipper Number
- [ ] With Shipper Number

COC Options

- [ ] Number of Blanks
- [X] Pre-Printed 1

Misc

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

# of Samples	Matrix	Test	Container	Total	# of QC	Lot #	Notes
4	WT	Mercury	250mL plastic HNO3	4	0	M-8-242-03BB	

Hazard Shipping Placard In Place : NA

*Sample receiving hours are Monday through Friday 8:00 am to 6:00 pm and Saturday from 9:00 am to 12:00 pm unless special arrangements are made with your 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 and disposal.

*Payment term are net 30 days.

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

Sample Notes

ALL SAMPLES UNFILTERED

Ship Date : 10/11/2018

Prepared By: Mai Yer Her

Verified By:

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

Sample Preservation Receipt Form

Client Name: SCS Project # 40178164

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

Lab Lot# of pH paper: 1205268 Lab Std #ID of preservation (if pH adjusted):

	Glass							Plastic							Vials						Jars			General			VOA Vials (>6mm) *						
Pace Lab #	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN		H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001																															✓		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
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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	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	

Pace Analytical™ 1241 Bellevue Street, Green Bay, WI 54302	Document Name: Sample Condition Upon Receipt (SCUR)	Document Revised: 25Apr2018
	Document No.: F-GB-C-031-Rev.07	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Project #: WO#: 40178164

Client Name: SCS

Courier: ☐ CS Logistics ☑ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other:

Tracking #: 7833 8129 4989

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: N/A /Corr:

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

Person examining contents: Date: 10/23/18 Initials:

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C.

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☐Yes ☑No ☐N/A	2. proj.state 10/23/18
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☑No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No	6.
Rush Turn Around Time Requested:	☐Yes ☑No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD:	☐Yes ☑No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
Trip Blank Present:	☐Yes ☐No ☑N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

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

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: A for JM **Date:** 10/23/18