2018 Annual Groundwater Monitoring and Corrective Action Report

Edgewater Generating Station
I-43 Ash Disposal Facility
Town of Wilson
Sheboygan County, Wisconsin

Prepared for:

Alliant Energy

SCS ENGINEERS

25216069.18 | January 31, 2019

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

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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 groundwater monitoring system at the I-43 Ash Disposal Facility (ADF) is a multiunit system. The I-43 ADF is a landfill and consists of three existing CCR units that are contiguous:

- Phase 3, Module 1 (existing CCR Landfill)
- Phase 3, Module 2 (existing CCR Landfill)
- Phase 4, Module 1 (existing CCR Landfill)

The multiunit system is designed to detect monitored constituents at the waste boundary of the I-43 ADF as required by 40 CFR 257.91(d). The groundwater monitoring system consists of two background wells and three downgradient monitoring wells.

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 with an aerial image showing the I-43 Landfill CCR Units, and all background (or upgradient) and downgradient monitoring wells with identification numbers for the groundwater monitoring program, is provided as **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;

No new monitoring wells were installed and no wells were decommissioned as part of the groundwater monitoring program for the I-43 Landfill 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;

Two groundwater sampling events were completed in 2018 at the I-43 Landfill. The samples were collected under the detection monitoring program, which was established on October 17, 2017.

Groundwater samples collected during the semiannual events, April and October 2018, were analyzed for the Appendix III constituents. The samples from upgradient well MW-305 were also analyzed for Appendix IV constituents to complete background groundwater sampling at that monitoring well.

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 **Appendices A1** through **A2**.

Assessment monitoring has not been initiated for the CCR Units at the I-43 Landfill.

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);

There were no transitions between monitoring programs in 2018. The I-43 Landfill remained in the detection monitoring program.

In 2018, the monitoring results for the October 2017 and April 2018 monitoring events were evaluated for statistically significant increases (SSIs) in detection monitoring parameters relative to background. For both events, SSIs for boron were identified; however, alternative source demonstrations (ASDs) were completed, demonstrating that a source other than the CCR units was the likely cause of the observed concentrations. The ASD reports are provided in **Appendix B**.

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 I-43 Landfill.

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 is currently in detection monitoring.

Summary of Key Actions Completed.

- Statistical evaluation and determination of SSIs for the October 2017 and April 2018 monitoring events.
- ASD reports for the SSIs identified from the October 2017 and April 2018 monitoring events.
- Two semiannual groundwater sampling and analysis events (April and October 2018).

Description of Any Problems Encountered. No problems were encountered in 2018.

Discussion of Actions to Resolve the Problems. Not applicable.

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

- Statistical evaluation and determination of any SSIs for the October 2018 and April 2019 monitoring events.
- If an SSI is determined, then within 90 days either:
  - Complete alternative source demonstration (if applicable), or
  - Establish an assessment monitoring program.
- Two semiannual groundwater sampling and analysis events (April and October 2019).

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.

The ASD reports prepared to address the SSIs observed for the October 2017 and April 2018 sampling events are provided in **Appendix B**. The ASD reports are certified by a qualified professional engineer.

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.

Table 1

CCR Rule Groundwater Samples Summary

Table 1. CCR Rule Groundwater Samples Summary
Edgewater Generating Station I-43 Landfill
SCS Engineers Project #25216069.18

Sample Dates	Downgradient Wells			Background Wells	
	MW-301	MW-302	MW-303	MW-304	MW-305
4/3/2018	D	D	D	D	D/B
10/4/2018	D	D	D	D	D/B
Total Samples	2	2	2	2	2

Abbreviations:
B = Background Sample
D = Required by Detection Monitoring Program
-- = Not Sampled

Notes:
MW-305 was installed in February 2017.

Created by: NDK Date: 1/4/2018
Last revision by: NDK Date: 12/19/2018
Checked by: MDB Date: 12/19/2018

I:\25216069.00\Deliverables\2018 CCR Fed. Annual Report\Table\[Table 1. GW

Figure 1

Site Plan and Monitoring Well Locations

LEGEND

- APPROXIMATE PROPERTY LINE
- MODULE LIMITS
- GRADE (2' CONTOUR)
- 690 GRADE (10' CONTOUR)
- EDGE OF WATER
- SWALE
- CULVERT
- MH MANHOLE
- W CONTACT WATER TRANSFER PIPE
- AB ABANDONED 3" DIA. HDPE PIPE
- TREELINE/TREES
- PAVED ROAD
- UNPAVED ACCESS ROAD
- RAILROAD TRACKS
- FENCE
- UTILITY/LIGHT POLE
- MONITORING WELL (UNCONSOLIDATED)
- PIEZOMETER (UNCONSOLIDATED)
- PRIVATE WATER SUPPLY WELL
- CCR RULE PIEZOMETER (BEDROCK)
- CCR RULE UNITS

NOTE:

1. MONITORING WELLS MW-301, MW-303, AND MW-304 WERE INSTALLED BETWEEN NOVEMBER 30, 2015 AND JANUARY 26, 2016 BY BADGER STATE DRILLING INC. DRILLING WAS PERFORMED UNDER THE SUPERVISION OF SCS ENGINEERS.
2. MONITORING WELLS MW-301, MW-302, MW-303 AND MW-304 WERE SURVEYED ON FEBRUARY 8, 2016 BY SCS ENGINEERS.
3. MONITORING WELL MW-305 WAS SURVEYED ON FEBRUARY 15, 2017 BY CQM, INC.

N

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25216069.00	DRAWN BY:	JMO/BJM
DRAWN:	02/12/16	CHECKED BY:	KK
REVISED:	03/06/18	APPROVED BY:	SC 01/09/19

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

CLIENT: ALLIANT ENERGY
ALLIANT ENERGY WISCONSIN POWER AND LIGHT COMPANY

SITE: WISCONSIN POWER AND LIGHT
EDGEWATER GENERATING STATION
I-43 LANDFILL
TOWN OF WILSON, WISCONSIN

MONITORING WELL LOCATION MAP

FIGURE 1

I:\25216069.00\Drawings\Well Locations.dwg, 1/9/2019 1:34:00 PM

Appendix A

Laboratory Reports

A1 April 2018 Detection Monitoring

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

May 02, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on April 05, 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

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

CERTIFICATIONS

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

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
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SAMPLE SUMMARY

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40167040001	**MW-301**	Water	04/03/18 11:51	04/05/18 14:02
40167040002	**MW-302**	Water	04/03/18 12:48	04/05/18 14:02
40167040003	**MW-303**	Water	04/03/18 14:36	04/05/18 14:02
40167040004	**MW-304**	Water	04/03/18 09:16	04/05/18 14:02
40167040005	**MW-305**	Water	04/03/18 11:01	04/05/18 14:02
40167040006	**FIELD BLANK**	Water	04/03/18 14:45	04/05/18 14:02

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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SAMPLE ANALYTE COUNT

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40167040001	**MW-301**	EPA 6020	DS1	2	PASI-G
			RMW	7	PASI-G
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40167040002	**MW-302**	EPA 6020	DS1	2	PASI-G
			RMW	7	PASI-G
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40167040003	**MW-303**	EPA 6020	DS1	2	PASI-G
			RMW	7	PASI-G
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40167040004	**MW-304**	EPA 6020	DS1	2	PASI-G
			RMW	7	PASI-G
		SM 2540C	TMK	1	PASI-G
		EPA 9040	ALY	1	PASI-G
		EPA 300.0	HMB	3	PASI-G
40167040005	**MW-305**	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
40167040006	**FIELD BLANK**	EPA 6020	DS1	14	PASI-G
		EPA 7470	AJT	1	PASI-G
		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: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

Sample: MW-301 **Lab ID: 40167040001** Collected: 04/03/18 11:51 Received: 04/05/18 14:02 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	**136**	ug/L	11.0	3.3	1	04/11/18 07:09	04/12/18 06:31	7440-42-8	
Calcium	**36700**	ug/L	250	69.8	1	04/11/18 07:09	04/12/18 06:31	7440-70-2	
Field Data	Analytical Method:								
Field pH	**8.02**	Std. Units			1		04/03/18 11:51		
Field Specific Conductance	**384**	umhos/cm			1		04/03/18 11:51		
Oxygen, Dissolved	**0.1**	mg/L			1		04/03/18 11:51	7782-44-7	
REDOX	**-138**	mV			1		04/03/18 11:51		
Turbidity	**89.45**	NTU			1		04/03/18 11:51		
Static Water Level	**651.28**	feet			1		04/03/18 11:51		
Temperature, Water (C)	**8.6**	deg C			1		04/03/18 11:51		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**214**	mg/L	20.0	8.7	1		04/10/18 16:19		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.010	1		04/10/18 10:04		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.7**	mg/L	2.0	0.50	1		04/13/18 11:26	16887-00-6	
Fluoride	**0.62**	mg/L	0.30	0.10	1		04/13/18 11:26	16984-48-8	
Sulfate	**9.3**	mg/L	3.0	1.0	1		04/13/18 11:26	14808-79-8	

Sample: MW-302 **Lab ID: 40167040002** Collected: 04/03/18 12:48 Received: 04/05/18 14:02 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	**124**	ug/L	11.0	3.3	1	04/11/18 07:09	04/12/18 06:39	7440-42-8	
Calcium	**30000**	ug/L	250	69.8	1	04/11/18 07:09	04/12/18 06:39	7440-70-2	
Field Data	Analytical Method:								
Field pH	**8.02**	Std. Units			1		04/03/18 12:48		
Field Specific Conductance	**434**	umhos/cm			1		04/03/18 12:48		
Oxygen, Dissolved	**0.2**	mg/L			1		04/03/18 12:48	7782-44-7	
REDOX	**-75**	mV			1		04/03/18 12:48		
Turbidity	**35.46**	NTU			1		04/03/18 12:48		
Static Water Level	**651.25**	feet			1		04/03/18 12:48		
Temperature, Water (C)	**8.8**	deg C			1		04/03/18 12:48		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**248**	mg/L	20.0	8.7	1		04/10/18 16:20		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

Sample: MW-302 **Lab ID: 40167040002** Collected: 04/03/18 12:48 Received: 04/05/18 14:02 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.010	1		04/10/18 10:06		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5.2**	mg/L	2.0	0.50	1		04/13/18 11:39	16887-00-6	
Fluoride	**0.73**	mg/L	0.30	0.10	1		04/13/18 11:39	16984-48-8	
Sulfate	**22.6**	mg/L	3.0	1.0	1		04/13/18 11:39	14808-79-8	

Sample: MW-303 **Lab ID: 40167040003** Collected: 04/03/18 14:36 Received: 04/05/18 14:02 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	**94.6**	ug/L	11.0	3.3	1	04/11/18 07:09	04/12/18 06:46	7440-42-8	
Calcium	**31900**	ug/L	250	69.8	1	04/11/18 07:09	04/12/18 06:46	7440-70-2	
Field Data	Analytical Method:								
Field pH	**7.98**	Std. Units			1		04/03/18 14:36		
Field Specific Conductance	**494**	umhos/cm			1		04/03/18 14:36		
Oxygen, Dissolved	**0.2**	mg/L			1		04/03/18 14:36	7782-44-7	
REDOX	**-125**	mV			1		04/03/18 14:36		
Turbidity	**6.62**	NTU			1		04/03/18 14:36		
Static Water Level	**651.30**	feet			1		04/03/18 14:36		
Temperature, Water (C)	**8.9**	deg C			1		04/03/18 14:36		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**260**	mg/L	20.0	8.7	1		04/10/18 16:20		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.010	1		04/10/18 10:14		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5.0**	mg/L	2.0	0.50	1		04/13/18 11:52	16887-00-6	
Fluoride	**0.54**	mg/L	0.30	0.10	1		04/13/18 11:52	16984-48-8	
Sulfate	**27.3**	mg/L	3.0	1.0	1		04/13/18 11:52	14808-79-8	

Sample: MW-304 **Lab ID: 40167040004** Collected: 04/03/18 09:16 Received: 04/05/18 14:02 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	**98.6**	ug/L	11.0	3.3	1	04/11/18 07:09	04/12/18 06:54	7440-42-8	
Calcium	**20200**	ug/L	250	69.8	1	04/11/18 07:09	04/12/18 06:54	7440-70-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

Sample: MW-304 **Lab ID: 40167040004** Collected: 04/03/18 09:16 Received: 04/05/18 14:02 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method:								
Field pH	**7.99**	Std. Units			1		04/03/18 09:16		
Field Specific Conductance	**398**	umhos/cm			1		04/03/18 09:16		
Oxygen, Dissolved	**0.3**	mg/L			1		04/03/18 09:16	7782-44-7	
REDOX	**-103**	mV			1		04/03/18 09:16		
Turbidity	**9.62**	NTU			1		04/03/18 09:16		
Static Water Level	**652.86**	feet			1		04/03/18 09:16		
Temperature, Water (C)	**8.9**	deg C			1		04/03/18 09:16		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**222**	mg/L	20.0	8.7	1		04/10/18 16:20		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**8.0**	Std. Units	0.10	0.010	1		04/10/18 10:14		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1.7J**	mg/L	2.0	0.50	1		04/13/18 12:06	16887-00-6	M0
Fluoride	**0.50**	mg/L	0.30	0.10	1		04/13/18 12:06	16984-48-8	M0
Sulfate	**15.2**	mg/L	3.0	1.0	1		04/13/18 12:06	14808-79-8	M0

Sample: MW-305 **Lab ID: 40167040005** Collected: 04/03/18 11:01 Received: 04/05/18 14:02 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	04/11/18 07:09	04/12/18 07:17	7440-36-0	
Arsenic	**2.2**	ug/L	1.0	0.28	1	04/11/18 07:09	04/12/18 07:17	7440-38-2	
Barium	**177**	ug/L	1.1	0.34	1	04/11/18 07:09	04/12/18 07:17	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	04/11/18 07:09	04/12/18 07:17	7440-41-7	
Boron	**71.7**	ug/L	11.0	3.3	1	04/11/18 07:09	04/12/18 07:17	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	04/11/18 07:09	04/12/18 07:17	7440-43-9	
Calcium	**83000**	ug/L	250	69.8	1	04/11/18 07:09	04/12/18 07:17	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	04/11/18 07:09	04/12/18 07:17	7440-47-3	
Cobalt	**<0.085**	ug/L	1.0	0.085	1	04/11/18 07:09	04/12/18 07:17	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	04/11/18 07:09	04/12/18 07:17	7439-92-1	
Lithium	**12.0**	ug/L	1.0	0.14	1	04/11/18 07:09	04/12/18 07:17	7439-93-2	
Molybdenum	**2.5**	ug/L	1.5	0.44	1	04/11/18 07:09	04/12/18 07:17	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	04/11/18 07:09	04/12/18 07:17	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	04/11/18 07:09	04/12/18 07:17	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	04/12/18 12:25	04/13/18 08:09	7439-97-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

Sample: MW-305 **Lab ID: 40167040005** Collected: 04/03/18 11:01 Received: 04/05/18 14:02 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method:								
Field pH	**7.54**	Std. Units			1		04/03/18 11:01		
Field Specific Conductance	**915**	umhos/cm			1		04/03/18 11:01		
Oxygen, Dissolved	**0.2**	mg/L			1		04/03/18 11:01	7782-44-7	
REDOX	**-120**	mV			1		04/03/18 11:01		
Turbidity	**13.01**	NTU			1		04/03/18 11:01		
Static Water Level	**656.24**	feet			1		04/03/18 11:01		
Temperature, Water (C)	**8.9**	deg C			1		04/03/18 11:01		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**566**	mg/L	20.0	8.7	1		04/10/18 16:20		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.5**	Std. Units	0.10	0.010	1		04/10/18 10:16		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**21.8**	mg/L	2.0	0.50	1		04/12/18 20:51	16887-00-6	
Fluoride	**0.63**	mg/L	0.30	0.10	1		04/12/18 20:51	16984-48-8	M0
Sulfate	**129**	mg/L	30.0	10.0	10		04/13/18 11:31	14808-79-8	

Sample: FIELD BLANK **Lab ID: 40167040006** Collected: 04/03/18 14:45 Received: 04/05/18 14:02 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	04/11/18 07:09	04/12/18 04:29	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	04/11/18 07:09	04/12/18 04:29	7440-38-2	
Barium	**<0.34**	ug/L	1.1	0.34	1	04/11/18 07:09	04/12/18 04:29	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	04/11/18 07:09	04/12/18 04:29	7440-41-7	
Boron	**<3.3**	ug/L	11.0	3.3	1	04/11/18 07:09	04/12/18 04:29	7440-42-8	
Cadmium	**<0.081**	ug/L	1.0	0.081	1	04/11/18 07:09	04/12/18 04:29	7440-43-9	
Calcium	**<69.8**	ug/L	250	69.8	1	04/11/18 07:09	04/12/18 04:29	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	04/11/18 07:09	04/12/18 04:29	7440-47-3	
Cobalt	**<0.085**	ug/L	1.0	0.085	1	04/11/18 07:09	04/12/18 04:29	7440-48-4	
Lead	**<0.20**	ug/L	1.0	0.20	1	04/11/18 07:09	04/12/18 04:29	7439-92-1	
Lithium	**<0.14**	ug/L	1.0	0.14	1	04/11/18 07:09	04/12/18 04:29	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	04/11/18 07:09	04/12/18 04:29	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	04/11/18 07:09	04/12/18 04:29	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	04/11/18 07:09	04/12/18 04:29	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.13**	ug/L	0.42	0.13	1	04/12/18 12:25	04/13/18 08:11	7439-97-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

Sample: FIELD BLANK **Lab ID: 40167040006** Collected: 04/03/18 14:45 Received: 04/05/18 14:02 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		04/10/18 16:40		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**6.1**	Std. Units	0.10	0.010	1		04/10/18 10:18		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	2.0	0.50	1		04/12/18 21:23	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		04/12/18 21:23	16984-48-8	
Sulfate	**<1.0**	mg/L	3.0	1.0	1		04/12/18 21:23	14808-79-8	

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QUALITY CONTROL DATA

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

QC Batch: 285894 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40167040005, 40167040006

METHOD BLANK: 1672433 Matrix: Water
Associated Lab Samples: 40167040005, 40167040006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.13	0.42	04/13/18 07:37	

LABORATORY CONTROL SAMPLE: 1672434

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1672435 1672436

Parameter	Units	40166928001 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	5.1	5.0	101	100	85-115	2	20	

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QUALITY CONTROL DATA

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

QC Batch: 285709 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40167040001, 40167040002, 40167040003, 40167040004, 40167040005, 40167040006

METHOD BLANK: 1671714 Matrix: Water
Associated Lab Samples: 40167040001, 40167040002, 40167040003, 40167040004, 40167040005, 40167040006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	04/12/18 04:13	
Arsenic	ug/L	<0.28	1.0	04/12/18 04:13	
Barium	ug/L	<0.34	1.1	04/12/18 04:13	
Beryllium	ug/L	<0.18	1.0	04/12/18 04:13	
Boron	ug/L	<3.3	11.0	04/12/18 04:13	
Cadmium	ug/L	<0.081	1.0	04/12/18 04:13	
Calcium	ug/L	<69.8	250	04/12/18 04:13	
Chromium	ug/L	<1.0	3.4	04/12/18 04:13	
Cobalt	ug/L	<0.085	1.0	04/12/18 04:13	
Lead	ug/L	<0.20	1.0	04/12/18 04:13	
Lithium	ug/L	<0.14	1.0	04/12/18 04:13	
Molybdenum	ug/L	<0.44	1.5	04/12/18 04:13	
Selenium	ug/L	<0.32	1.1	04/12/18 04:13	
Thallium	ug/L	<0.14	1.0	04/12/18 04:13	

LABORATORY CONTROL SAMPLE: 1671715

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	533	107	80-120	
Arsenic	ug/L	500	505	101	80-120	
Barium	ug/L	500	502	100	80-120	
Beryllium	ug/L	500	523	105	80-120	
Boron	ug/L	500	486	97	80-120	
Cadmium	ug/L	500	524	105	80-120	
Calcium	ug/L	5000	4990	100	80-120	
Chromium	ug/L	500	497	99	80-120	
Cobalt	ug/L	500	492	98	80-120	
Lead	ug/L	500	488	98	80-120	
Lithium	ug/L	500	490	98	80-120	
Molybdenum	ug/L	500	509	102	80-120	
Selenium	ug/L	500	535	107	80-120	
Thallium	ug/L	500	484	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1671716 1671717

Parameter	Units	12106686010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.80J	500	500	514	526	103	105	75-125	2	20	

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QUALITY CONTROL DATA

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1671716 1671717

Parameter	Units	12106686010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	7.6	500	500	518	530	102	104	75-125	2	20	
Barium	ug/L	124	500	500	626	631	100	101	75-125	1	20	
Beryllium	ug/L	<0.18	500	500	425	422	85	84	75-125	1	20	
Boron	ug/L	6840	500	500	7260	7240	83	80	75-125	0	20	
Cadmium	ug/L	0.31J	500	500	485	496	97	99	75-125	2	20	
Calcium	ug/L	524000	5000	5000	512000	499000	-230	-486	75-125	3	20	P6
Chromium	ug/L	24.3	500	500	509	512	97	97	75-125	1	20	
Cobalt	ug/L	1.2	500	500	468	473	93	94	75-125	1	20	
Lead	ug/L	2.1	500	500	506	511	101	102	75-125	1	20	
Lithium	ug/L	15.8	500	500	450	447	87	86	75-125	1	20	
Molybdenum	ug/L	1.2J	500	500	511	517	102	103	75-125	1	20	
Selenium	ug/L	0.49J	500	500	523	538	104	107	75-125	3	20	
Thallium	ug/L	<0.14	500	500	515	519	103	104	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

QC Batch: 285653 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40167040001, 40167040002, 40167040003, 40167040004, 40167040005

METHOD BLANK: 1671427 Matrix: Water
Associated Lab Samples: 40167040001, 40167040002, 40167040003, 40167040004, 40167040005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	04/10/18 16:16	

LABORATORY CONTROL SAMPLE: 1671428

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	610	582	95	80-120	

SAMPLE DUPLICATE: 1671429

Parameter	Units	40166946005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	332	350	5	5	

SAMPLE DUPLICATE: 1671430

Parameter	Units	40166988002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2400	2340	2	5	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

QC Batch: 285658 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40167040006

METHOD BLANK: 1671457 Matrix: Water
Associated Lab Samples: 40167040006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	04/10/18 16:39	

LABORATORY CONTROL SAMPLE: 1671458

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	610	552	90	80-120	

SAMPLE DUPLICATE: 1671459

Parameter	Units	40167158002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2960	2930	1	5	

SAMPLE DUPLICATE: 1671460

Parameter	Units	40167161003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	600	596	1	5	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

QC Batch: 285585 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40167040001, 40167040002, 40167040003, 40167040004, 40167040005, 40167040006

SAMPLE DUPLICATE: 1671121

Parameter	Units	40167002006 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.8	6.9	0	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

QC Batch: 285643 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40167040001, 40167040002, 40167040003, 40167040004

METHOD BLANK: 1671381 Matrix: Water
Associated Lab Samples: 40167040001, 40167040002, 40167040003, 40167040004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	04/12/18 11:19	
Fluoride	mg/L	<0.10	0.30	04/12/18 11:19	
Sulfate	mg/L	<1.0	3.0	04/12/18 11:19	

LABORATORY CONTROL SAMPLE: 1671382

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.9	109	90-110	
Fluoride	mg/L	2	2.2	110	90-110	
Sulfate	mg/L	20	21.7	109	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1671383 1671384

Parameter	Units	40167002004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	36.8	100	100	146	146	109	109	90-110	0	15	
Fluoride	mg/L	<0.50	10	10	11.4	11.5	114	115	90-110	0	15	M0
Sulfate	mg/L	88.1	100	100	193	193	105	105	90-110	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1671385 1671386

Parameter	Units	40167040004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1.7J	20	20	24.6	24.9	114	116	90-110	1	15	M0
Fluoride	mg/L	0.50	2	2	2.8	2.8	113	115	90-110	1	15	M0
Sulfate	mg/L	15.2	20	20	37.4	37.7	111	113	90-110	1	15	M0

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

QC Batch: 285647 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40167040005, 40167040006

METHOD BLANK: 1671393 Matrix: Water
Associated Lab Samples: 40167040005, 40167040006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	04/12/18 20:30	
Fluoride	mg/L	<0.10	0.30	04/12/18 20:30	
Sulfate	mg/L	<1.0	3.0	04/12/18 20:30	

LABORATORY CONTROL SAMPLE: 1671394

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	99	90-110	
Sulfate	mg/L	20	20.3	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1671395 1671396

Parameter	Units	40167040005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	21.8	20	20	43.6	43.0	109	106	90-110	1	15	
Fluoride	mg/L	0.63	2	2	2.8	2.8	111	107	90-110	2	15	M0
Sulfate	mg/L	129	200	200	335	336	103	103	90-110	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1671397 1671398

Parameter	Units	40167187002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	466	400	400	868	881	100	104	90-110	1	15	
Fluoride	mg/L	<2.0	40	40	41.6	42.7	104	107	90-110	2	15	
Sulfate	mg/L	123	400	400	535	544	103	105	90-110	2	15	

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

Sample: MW-305 **Lab ID: 40167040005** Collected: 04/03/18 11:01 Received: 04/05/18 14:02 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.597 ± 0.436 (0.488) C:NA T:79%**	pCi/L	04/25/18 20:51	13982-63-3	
Radium-228	EPA 904.0	**0.730 ± 0.410 (0.750) C:73% T:84%**	pCi/L	04/27/18 14:14	15262-20-1	
Total Radium	Total Radium Calculation	**1.33 ± 0.846 (1.24)**	pCi/L	05/01/18 12:37	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: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

QC Batch: 294497 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40167040005

METHOD BLANK: 1441725 Matrix: Water
Associated Lab Samples: 40167040005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.232 ± 0.361 (0.625) C:NA T:80%	pCi/L	04/25/18 20:36	

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 - RADIOCHEMISTRY

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

QC Batch: 294499 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 40167040005

METHOD BLANK: 1441726 Matrix: Water
Associated Lab Samples: 40167040005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.258 ± 0.321 (0.681) C:81% T:89%	pCi/L	04/27/18 14:14	

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

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: 26216069 EDGEWATER I-43 CCR
Pace Project No.: 40167040

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40167040001	**MW-301**	EPA 3010	285709	EPA 6020	285797
40167040002	**MW-302**	EPA 3010	285709	EPA 6020	285797
40167040003	**MW-303**	EPA 3010	285709	EPA 6020	285797
40167040004	**MW-304**	EPA 3010	285709	EPA 6020	285797
40167040005	**MW-305**	EPA 3010	285709	EPA 6020	285797
40167040006	**FIELD BLANK**	EPA 3010	285709	EPA 6020	285797
40167040005	**MW-305**	EPA 7470	285894	EPA 7470	285949
40167040006	**FIELD BLANK**	EPA 7470	285894	EPA 7470	285949
40167040001	**MW-301**				
40167040002	**MW-302**				
40167040003	**MW-303**				
40167040004	**MW-304**				
40167040005	**MW-305**				
40167040005	**MW-305**	EPA 903.1	294497		
40167040005	**MW-305**	EPA 904.0	294499		
40167040005	**MW-305**	Total Radium Calculation	296594		
40167040001	**MW-301**	SM 2540C	285653		
40167040002	**MW-302**	SM 2540C	285653		
40167040003	**MW-303**	SM 2540C	285653		
40167040004	**MW-304**	SM 2540C	285653		
40167040005	**MW-305**	SM 2540C	285653		
40167040006	**FIELD BLANK**	SM 2540C	285658		
40167040001	**MW-301**	EPA 9040	285585		
40167040002	**MW-302**	EPA 9040	285585		
40167040003	**MW-303**	EPA 9040	285585		
40167040004	**MW-304**	EPA 9040	285585		
40167040005	**MW-305**	EPA 9040	285585		
40167040006	**FIELD BLANK**	EPA 9040	285585		
40167040001	**MW-301**	EPA 300.0	285643		
40167040002	**MW-302**	EPA 300.0	285643		
40167040003	**MW-303**	EPA 300.0	285643		
40167040004	**MW-304**	EPA 300.0	285643		
40167040005	**MW-305**	EPA 300.0	285647		
40167040006	**FIELD BLANK**	EPA 300.0	285647		

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www.pacelabs.com
...WEST REGION
MN: 6...2-607-1700 WI: 920-469-2436

40167040

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 WF
Project Contact:	Tom Karowski
Phone:	
Project Number:	26216069
Project Name:	Alliant Edgerton E-43
Project State:	WI
Sampled By (Print):	Gary Stirkel
Sampled By (Sign):	Gary Stirkel
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	SCS Engineers
Invoice To Address:	2830 Dairy Dr Madison WF 53718
Invoice To Phone:	
CLIENT COMMENTS	LAB COMMENTS (Lab Use Only) / Profile #

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: Chloride, Fluoride, Sulfate, TDS	Boron, Calcium	pH	Radium 226/228	Antimony, Arsenic, Barium, Beryllium, Cadmium	Chromium, Cobalt, Lead, Lithium, Mercury	Molybdenum, Selenium, Thallium
001	MW-301	4/3/18	1151	GW	N	A	X	X	X				
002	MW-302	4/3/18	1248	GW	N	D	X	X	X				
003	MW-303	4/3/18	1436	GW	N	A	X	X	X				
004	MW-304	4/3/18	0916	GW	N	D	X	X	X				
005	MW-305	4/3/18	1101	GW	N	D	X	X	X	X	X	X	X
006	Field Blank	4/3/18	1445	W	N	D	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:
Gary Stirkel	4/5/18 0800	Mary Fanning	4/5/18 1015
Mary Fanning	4/5/18 11:05	Rose Pau	4/5/18 1140
Rose Pau	4/5/18 1402	DSamspeed	4/5/18 1402

PACE Project No.: 40167040
Receipt Temp = 2.2 °C
Sample Receipt pH: OK / Adjusted
Cooler Custody Seal: Present / Not Present, Intact / Not Intact

Pace Analytical Services, LLC
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Green Bay, WI 54302

Sample Preservation Receipt Form

Client Name: SCS Project # 40167040

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

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

Initial when completed: RS 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																	✓		2.5 / 5 / 10
002											2		1																	✓		2.5 / 5 / 10
003											2		1																	✓		2.5 / 5 / 10
004											2		1																	✓		2.5 / 5 / 10
005											2		1													2				✓		2.5 / 5 / 10
006											2		1																	✓		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

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#: 40167040

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 - 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: 4/5/18
Initials: RS

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:** 4/5/18

A2 October 2018 Detection Monitoring

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

October 23, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on October 05, 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

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CERTIFICATIONS

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

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

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SAMPLE SUMMARY

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40177175001	**MW-301**	Water	10/04/18 10:26	10/05/18 15:35
40177175002	**MW-302**	Water	10/04/18 11:16	10/05/18 15:35
40177175003	**MW-303**	Water	10/04/18 12:06	10/05/18 15:35
40177175004	**MW-304**	Water	10/04/18 09:26	10/05/18 15:35

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SAMPLE ANALYTE COUNT

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40177175001	**MW-301**	EPA 6020	KXS	2
			AXL	7
		SM 2540C	TMK	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40177175002	**MW-302**	EPA 6020	KXS	2
			AXL	7
		SM 2540C	TMK	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40177175003	**MW-303**	EPA 6020	KXS	2
			AXL	7
		SM 2540C	TMK	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3
40177175004	**MW-304**	EPA 6020	KXS	2
			AXL	7
		SM 2540C	TMK	1
		EPA 9040	ALY	1
		EPA 300.0	HMB	3

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ANALYTICAL RESULTS

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

Sample: MW-301 **Lab ID: 40177175001** Collected: 10/04/18 10:26 Received: 10/05/18 15:35 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	**120**	ug/L	11.0	3.3	1	10/15/18 06:38	10/23/18 03:49	7440-42-8	
Calcium	**43700**	ug/L	250	69.8	1	10/15/18 06:38	10/18/18 20:16	7440-70-2	
Field Data	Analytical Method:								
Field pH	**8.15**	Std. Units			1		10/04/18 10:26		
Field Specific Conductance	**387**	umhos/cm			1		10/04/18 10:26		
Oxygen, Dissolved	**0.2**	mg/L			1		10/04/18 10:26	7782-44-7	
REDOX	**-97**	mV			1		10/04/18 10:26		
Turbidity	**136.6**	NTU			1		10/04/18 10:26		
Static Water Level	**650.71**	feet			1		10/04/18 10:26		
Temperature, Water (C)	**9.5**	deg C			1		10/04/18 10:26		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**260**	mg/L	20.0	8.7	1		10/09/18 16:00		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.2**	Std. Units	0.10	0.010	1		10/09/18 09:26		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.1**	mg/L	2.0	0.50	1		10/17/18 01:18	16887-00-6	
Fluoride	**0.61**	mg/L	0.30	0.10	1		10/17/18 01:18	16984-48-8	
Sulfate	**8.8**	mg/L	3.0	1.0	1		10/17/18 01:18	14808-79-8	

Sample: MW-302 **Lab ID: 40177175002** Collected: 10/04/18 11:16 Received: 10/05/18 15:35 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	**115**	ug/L	11.0	3.3	1	10/15/18 06:38	10/23/18 03:56	7440-42-8	
Calcium	**28200**	ug/L	250	69.8	1	10/15/18 06:38	10/18/18 20:36	7440-70-2	
Field Data	Analytical Method:								
Field pH	**8.08**	Std. Units			1		10/04/18 11:16		
Field Specific Conductance	**433**	umhos/cm			1		10/04/18 11:16		
Oxygen, Dissolved	**0.3**	mg/L			1		10/04/18 11:16	7782-44-7	
REDOX	**60**	mV			1		10/04/18 11:16		
Turbidity	**23.32**	NTU			1		10/04/18 11:16		
Static Water Level	**650.70**	feet			1		10/04/18 11:16		
Temperature, Water (C)	**10.1**	deg C			1		10/04/18 11:16		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**250**	mg/L	20.0	8.7	1		10/09/18 16:01		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

Sample: MW-302 **Lab ID: 40177175002** Collected: 10/04/18 11:16 Received: 10/05/18 15:35 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.010	1		10/09/18 09:28		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.5**	mg/L	2.0	0.50	1		10/17/18 02:07	16887-00-6	
Fluoride	**0.71**	mg/L	0.30	0.10	1		10/17/18 02:07	16984-48-8	
Sulfate	**19.6**	mg/L	3.0	1.0	1		10/17/18 02:07	14808-79-8	

Sample: MW-303 **Lab ID: 40177175003** Collected: 10/04/18 12:06 Received: 10/05/18 15:35 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	**87.3**	ug/L	11.0	3.3	1	10/15/18 06:38	10/23/18 04:03	7440-42-8	
Calcium	**31600**	ug/L	250	69.8	1	10/15/18 06:38	10/18/18 20:43	7440-70-2	
Field Data	Analytical Method:								
Field pH	**8.04**	Std. Units			1		10/04/18 12:06		
Field Specific Conductance	**500**	umhos/cm			1		10/04/18 12:06		
Oxygen, Dissolved	**0.2**	mg/L			1		10/04/18 12:06	7782-44-7	
REDOX	**-105**	mV			1		10/04/18 12:06		
Turbidity	**17.2**	NTU			1		10/04/18 12:06		
Static Water Level	**650.70**	feet			1		10/04/18 12:06		
Temperature, Water (C)	**10**	deg C			1		10/04/18 12:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**270**	mg/L	20.0	8.7	1		10/09/18 16:01		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.010	1		10/09/18 09:29		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.4**	mg/L	2.0	0.50	1		10/17/18 02:19	16887-00-6	
Fluoride	**0.56**	mg/L	0.30	0.10	1		10/17/18 02:19	16984-48-8	
Sulfate	**26.1**	mg/L	3.0	1.0	1		10/17/18 02:19	14808-79-8	

Sample: MW-304 **Lab ID: 40177175004** Collected: 10/04/18 09:26 Received: 10/05/18 15:35 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	**90.2**	ug/L	11.0	3.3	1	10/15/18 06:38	10/23/18 04:10	7440-42-8	
Calcium	**19400**	ug/L	250	69.8	1	10/15/18 06:38	10/18/18 20:50	7440-70-2	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

Sample: MW-304 **Lab ID: 40177175004** Collected: 10/04/18 09:26 Received: 10/05/18 15:35 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method:								
Field pH	**8.1**	Std. Units			1		10/04/18 09:26		
Field Specific Conductance	**400**	umhos/cm			1		10/04/18 09:26		
Oxygen, Dissolved	**0.2**	mg/L			1		10/04/18 09:26	7782-44-7	
REDOX	**-81**	mV			1		10/04/18 09:26		
Turbidity	**3**	NTU			1		10/04/18 09:26		
Static Water Level	**652.26**	feet			1		10/04/18 09:26		
Temperature, Water (C)	**9.5**	deg C			1		10/04/18 09:26		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**224**	mg/L	20.0	8.7	1		10/09/18 16:01		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.9**	Std. Units	0.10	0.010	1		10/09/18 09:30		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**1.8J**	mg/L	2.0	0.50	1		10/17/18 02:31	16887-00-6	
Fluoride	**0.50**	mg/L	0.30	0.10	1		10/17/18 02:31	16984-48-8	
Sulfate	**13.5**	mg/L	3.0	1.0	1		10/17/18 02:31	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

QC Batch: 303129 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40177175001, 40177175002, 40177175003, 40177175004

METHOD BLANK: 1770724 Matrix: Water
Associated Lab Samples: 40177175001, 40177175002, 40177175003, 40177175004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.3	11.0	10/23/18 01:46	
Calcium	ug/L	<69.8	250	10/18/18 17:12	

LABORATORY CONTROL SAMPLE: 1770725

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	500	461	92	80-120	
Calcium	ug/L	5000	5090	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1770726 1770727

Parameter	Units	40177434002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	73.0	500	500	516	509	89	87	75-125	1	20	
Calcium	ug/L	38500	5000	5000	46300	46400	156	157	75-125	0	20	P6

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

QC Batch: 302650 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40177175001, 40177175002, 40177175003, 40177175004

METHOD BLANK: 1767760 Matrix: Water
Associated Lab Samples: 40177175001, 40177175002, 40177175003, 40177175004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	10/09/18 15:57	

LABORATORY CONTROL SAMPLE: 1767761

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	615	554	90	80-120	

SAMPLE DUPLICATE: 1767762

Parameter	Units	40177100001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	460	444	4	5	

SAMPLE DUPLICATE: 1767763

Parameter	Units	40177175001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	260	258	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
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Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

QC Batch: 302556 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40177175001, 40177175002, 40177175003, 40177175004

SAMPLE DUPLICATE: 1767295

Parameter	Units	40176756001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.0	8.1	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
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Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

QC Batch: 302665 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40177175001, 40177175002, 40177175003, 40177175004

METHOD BLANK: 1767840 Matrix: Water
Associated Lab Samples: 40177175001, 40177175002, 40177175003, 40177175004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	10/16/18 20:50	
Fluoride	mg/L	<0.10	0.30	10/16/18 20:50	
Sulfate	mg/L	<1.0	3.0	10/16/18 20:50	

LABORATORY CONTROL SAMPLE: 1767841

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.6	98	90-110	
Fluoride	mg/L	2	2.0	101	90-110	
Sulfate	mg/L	20	19.7	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1767842 1767843

Parameter	Units	40177030001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	236	400	400	632	630	99	98	90-110	0	15	
Fluoride	mg/L	<2.0	40	40	41.4	41.3	103	103	90-110	0	15	
Sulfate	mg/L	229	400	400	618	616	97	97	90-110	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1767844 1767845

Parameter	Units	40177177001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	22.7	20	20	42.7	41.9	100	96	90-110	2	15	
Fluoride	mg/L	0.58	2	2	2.6	2.5	99	97	90-110	2	15	
Sulfate	mg/L	130	200	200	330	329	100	100	90-110	0	15	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

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

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.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177175

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40177175001	**MW-301**	EPA 3010	303129	EPA 6020	303240
40177175002	**MW-302**	EPA 3010	303129	EPA 6020	303240
40177175003	**MW-303**	EPA 3010	303129	EPA 6020	303240
40177175004	**MW-304**	EPA 3010	303129	EPA 6020	303240
40177175001	**MW-301**				
40177175002	**MW-302**				
40177175003	**MW-303**				
40177175004	**MW-304**				
40177175001	**MW-301**	SM 2540C	302650		
40177175002	**MW-302**	SM 2540C	302650		
40177175003	**MW-303**	SM 2540C	302650		
40177175004	**MW-304**	SM 2540C	302650		
40177175001	**MW-301**	EPA 9040	302556		
40177175002	**MW-302**	EPA 9040	302556		
40177175003	**MW-303**	EPA 9040	302556		
40177175004	**MW-304**	EPA 9040	302556		
40177175001	**MW-301**	EPA 300.0	302665		
40177175002	**MW-302**	EPA 300.0	302665		
40177175003	**MW-303**	EPA 300.0	302665		
40177175004	**MW-304**	EPA 300.0	302665		

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

Page 1 of

40177175

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:	Meg Blodgett
Phone:	608-345-9221
Project Number:	25214069.19
Project Name:	Edgewater I-43 Site
Project State:	WI
Sampled By (Print):	Gary Sterkel
Sampled By (Sign):	Gary Sterkel
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	SCS Engineers
Invoice To Address:	2830 Dairy Dr Madison WI 53718
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	Analyses Requested: Chloride	Fluoride	Sulfate	Boron	Calcium	pH	TDS	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
001	MW-301	10/4/18	1026	GW	X	X	X	X	X	X	X			
002	MW-302	10/4/18	1116	GW	X	X	X	X	X	X	X			
003	MW-303	10/4/18	1206	GW	X	X	X	X	X	X	X			
004	MW-304	10/4/18	0926	GW	X	X	X	X	X	X	X			

FILTERED? (YES/NO): Y/N — N N N N N N N
PRESERVATION (CODE)*: Pick Letter — A A A D D A A

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:
Gary Sterkel	10/5/18 0800	PBEMS pace	10/5/18 1010
PBEMS pace	10/5/18 1535	PACE	10/05/18 1535

PACE Project No.: 40177175
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 # 40177175

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

Lab Lot# of pH paper: 10507811 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: JH 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																	X		2.5 / 5 / 10
002											2		1																	X		2.5 / 5 / 10
003											2		1																	X		2.5 / 5 / 10
004											2		1																	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:	

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#: 40177175

40177175

Client Name: SCS ENGINEERING

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

Tracking #:

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

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

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

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

Cooler Temperature Uncorr: 2.0 /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: 10/05/18
Initials: JM

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☐Yes ☒No ☐N/A	2. no Qty #, Mail JM 10/05/18
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:		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.
-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: Rmk for Pm **Date:** 10/5/18

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

October 30, 2018

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

Dear Meghan Blodgett:
Enclosed are the analytical results for sample(s) received by the laboratory on October 05, 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: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

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: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40177177001	**MW-305**	Water	10/04/18 12:56	10/05/18 15:35
40177177002	**FIELD BLANK**	Water	10/04/18 13:10	10/05/18 15:35

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SAMPLE ANALYTE COUNT

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40177177001	**MW-305**	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
40177177002	**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

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

Sample: MW-305 **Lab ID: 40177177001** Collected: 10/04/18 12:56 Received: 10/05/18 15:35 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	10/15/18 06:38	10/18/18 06:13	7440-36-0	
Arsenic	**2.3**	ug/L	1.0	0.28	1	10/15/18 06:38	10/18/18 20:57	7440-38-2	
Barium	**169**	ug/L	4.9	1.5	1	10/15/18 06:38	10/18/18 06:13	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	10/15/18 06:38	10/23/18 04:30	7440-41-7	
Boron	**65.9**	ug/L	11.0	3.3	1	10/15/18 06:38	10/23/18 04:30	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	10/15/18 06:38	10/18/18 20:57	7440-43-9	
Calcium	**82200**	ug/L	250	69.8	1	10/15/18 06:38	10/18/18 20:57	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	10/15/18 06:38	10/18/18 20:57	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	10/15/18 06:38	10/18/18 20:57	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	10/15/18 06:38	10/18/18 06:13	7439-92-1	
Lithium	**11.2**	ug/L	1.0	0.19	1	10/15/18 06:38	10/23/18 04:30	7439-93-2	
Molybdenum	**2.3**	ug/L	1.5	0.44	1	10/15/18 06:38	10/18/18 20:57	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	10/15/18 06:38	10/18/18 20:57	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	10/15/18 06:38	10/18/18 06:13	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.084**	ug/L	0.28	0.084	1	10/11/18 10:15	10/12/18 08:08	7439-97-6	
Field Data	Analytical Method:								
Field pH	**7.65**	Std. Units			1		10/04/18 12:56		
Field Specific Conductance	**941**	umhos/cm			1		10/04/18 12:56		
Oxygen, Dissolved	**0.2**	mg/L			1		10/04/18 12:56	7782-44-7	
REDOX	**-101**	mV			1		10/04/18 12:56		
Turbidity	**10.56**	NTU			1		10/04/18 12:56		
Static Water Level	**655.89**	feet			1		10/04/18 12:56		
Temperature, Water (C)	**9.9**	deg C			1		10/04/18 12:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**572**	mg/L	20.0	8.7	1		10/10/18 17:07		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**7.5**	Std. Units	0.10	0.010	1		10/09/18 09:31		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**22.7**	mg/L	2.0	0.50	1		10/17/18 02:43	16887-00-6	
Fluoride	**0.58**	mg/L	0.30	0.10	1		10/17/18 02:43	16984-48-8	
Sulfate	**130**	mg/L	30.0	10.0	10		10/17/18 16:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

Sample: FIELD BLANK **Lab ID: 40177177002** Collected: 10/04/18 13:10 Received: 10/05/18 15:35 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	10/15/18 06:38	10/18/18 06:20	7440-36-0	
Arsenic	**<0.28**	ug/L	1.0	0.28	1	10/15/18 06:38	10/18/18 17:25	7440-38-2	
Barium	**<1.5**	ug/L	4.9	1.5	1	10/15/18 06:38	10/18/18 06:20	7440-39-3	
Beryllium	**<0.18**	ug/L	1.0	0.18	1	10/15/18 06:38	10/23/18 02:00	7440-41-7	
Boron	**<3.3**	ug/L	11.0	3.3	1	10/15/18 06:38	10/23/18 02:00	7440-42-8	
Cadmium	**<0.15**	ug/L	1.0	0.15	1	10/15/18 06:38	10/18/18 17:25	7440-43-9	
Calcium	**<69.8**	ug/L	250	69.8	1	10/15/18 06:38	10/18/18 17:25	7440-70-2	
Chromium	**<1.0**	ug/L	3.4	1.0	1	10/15/18 06:38	10/18/18 17:25	7440-47-3	
Cobalt	**<0.12**	ug/L	1.0	0.12	1	10/15/18 06:38	10/18/18 17:25	7440-48-4	
Lead	**<0.24**	ug/L	1.0	0.24	1	10/15/18 06:38	10/18/18 06:20	7439-92-1	
Lithium	**<0.19**	ug/L	1.0	0.19	1	10/15/18 06:38	10/23/18 02:00	7439-93-2	
Molybdenum	**<0.44**	ug/L	1.5	0.44	1	10/15/18 06:38	10/18/18 17:25	7439-98-7	
Selenium	**<0.32**	ug/L	1.1	0.32	1	10/15/18 06:38	10/18/18 17:25	7782-49-2	
Thallium	**<0.14**	ug/L	1.0	0.14	1	10/15/18 06:38	10/18/18 06:20	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	**<0.084**	ug/L	0.28	0.084	1	10/11/18 10:15	10/12/18 08:11	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		10/10/18 17:08		
9040 pH	Analytical Method: EPA 9040								
pH at 25 Degrees C	**6.5**	Std. Units	0.10	0.010	1		10/09/18 09:33		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.50**	mg/L	2.0	0.50	1		10/16/18 13:07	16887-00-6	
Fluoride	**<0.10**	mg/L	0.30	0.10	1		10/16/18 13:07	16984-48-8	
Sulfate	**<1.0**	mg/L	3.0	1.0	1		10/16/18 13:07	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

QC Batch: 302886 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 40177177001, 40177177002

METHOD BLANK: 1769065 Matrix: Water
Associated Lab Samples: 40177177001, 40177177002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.084	0.28	10/12/18 07:29	

LABORATORY CONTROL SAMPLE: 1769066

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: 1769067 1769068

Parameter	Units	40177375001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.000084 mg/L	5	5	5.0	5.1	100	103	85-115	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

QC Batch: 303129 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 40177177001, 40177177002

METHOD BLANK: 1770724 Matrix: Water
Associated Lab Samples: 40177177001, 40177177002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.15	1.0	10/18/18 03:02	
Arsenic	ug/L	<0.28	1.0	10/18/18 17:12	
Barium	ug/L	<1.5	4.9	10/18/18 03:02	
Beryllium	ug/L	<0.18	1.0	10/23/18 01:46	
Boron	ug/L	<3.3	11.0	10/23/18 01:46	
Cadmium	ug/L	<0.15	1.0	10/18/18 17:12	
Calcium	ug/L	<69.8	250	10/18/18 17:12	
Chromium	ug/L	<1.0	3.4	10/18/18 17:12	
Cobalt	ug/L	<0.12	1.0	10/18/18 17:12	
Lead	ug/L	<0.24	1.0	10/18/18 03:02	
Lithium	ug/L	<0.19	1.0	10/23/18 01:46	
Molybdenum	ug/L	<0.44	1.5	10/18/18 17:12	
Selenium	ug/L	<0.32	1.1	10/18/18 17:12	
Thallium	ug/L	<0.14	1.0	10/18/18 03:02	

LABORATORY CONTROL SAMPLE: 1770725

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	524	105	80-120	
Arsenic	ug/L	500	458	92	80-120	
Barium	ug/L	500	477	95	80-120	
Beryllium	ug/L	500	462	92	80-120	
Boron	ug/L	500	461	92	80-120	
Cadmium	ug/L	500	483	97	80-120	
Calcium	ug/L	5000	5090	102	80-120	
Chromium	ug/L	500	476	95	80-120	
Cobalt	ug/L	500	448	90	80-120	
Lead	ug/L	500	458	92	80-120	
Lithium	ug/L	500	446	89	80-120	
Molybdenum	ug/L	500	500	100	80-120	
Selenium	ug/L	500	478	96	80-120	
Thallium	ug/L	500	438	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1770726 1770727

Parameter	Units	40177434002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	0.41J	500	500	526	532	105	106	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1770726 1770727

Parameter	Units	40177434002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	2.5	500	500	473	483	94	96	75-125	2	20	
Barium	ug/L	87.8	500	500	567	574	96	97	75-125	1	20	
Beryllium	ug/L	<0.18	500	500	440	431	88	86	75-125	2	20	
Boron	ug/L	73.0	500	500	516	509	89	87	75-125	1	20	
Cadmium	ug/L	0.69J	500	500	477	483	95	97	75-125	1	20	
Calcium	ug/L	38500	5000	5000	46300	46400	156	157	75-125	0	20	P6
Chromium	ug/L	1.1J	500	500	483	487	96	97	75-125	1	20	
Cobalt	ug/L	0.54J	500	500	456	463	91	92	75-125	1	20	
Lead	ug/L	0.83J	500	500	457	464	91	93	75-125	2	20	
Lithium	ug/L	0.24J	500	500	424	420	85	84	75-125	1	20	
Molybdenum	ug/L	1.5	500	500	504	509	100	102	75-125	1	20	
Selenium	ug/L	0.96J	500	500	487	497	97	99	75-125	2	20	
Thallium	ug/L	0.33J	500	500	442	449	88	90	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

QC Batch: 302782 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 40177177001, 40177177002

METHOD BLANK: 1768461 Matrix: Water
Associated Lab Samples: 40177177001, 40177177002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	10/10/18 17:04	

LABORATORY CONTROL SAMPLE: 1768462

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	615	568	92	80-120	

SAMPLE DUPLICATE: 1768463

Parameter	Units	40177177001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	572	570	0	5	

SAMPLE DUPLICATE: 1768464

Parameter	Units	40177289001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	336	344	2	5	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

QC Batch: 302556 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 40177177001, 40177177002

SAMPLE DUPLICATE: 1767295

Parameter	Units	40176756001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.0	8.1	0	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

QC Batch: 302665
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40177177001

METHOD BLANK: 1767840 Matrix: Water
Associated Lab Samples: 40177177001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	10/16/18 20:50	
Fluoride	mg/L	<0.10	0.30	10/16/18 20:50	
Sulfate	mg/L	<1.0	3.0	10/16/18 20:50	

LABORATORY CONTROL SAMPLE: 1767841

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	19.6	98	90-110	
Fluoride	mg/L	2	2.0	101	90-110	
Sulfate	mg/L	20	19.7	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1767842 1767843

Parameter	Units	40177030001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	236	400	400	632	630	99	98	90-110	0	15	
Fluoride	mg/L	<2.0	40	40	41.4	41.3	103	103	90-110	0	15	
Sulfate	mg/L	229	400	400	618	616	97	97	90-110	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1767844 1767845

Parameter	Units	40177177001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	22.7	20	20	42.7	41.9	100	96	90-110	2	15	
Fluoride	mg/L	0.58	2	2	2.6	2.5	99	97	90-110	2	15	
Sulfate	mg/L	130	200	200	330	329	100	100	90-110	0	15	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

QC Batch: 302799
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40177177002

METHOD BLANK: 1768575 Matrix: Water
Associated Lab Samples: 40177177002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	10/16/18 10:04	
Fluoride	mg/L	<0.10	0.30	10/16/18 10:04	
Sulfate	mg/L	<1.0	3.0	10/16/18 10:04	

LABORATORY CONTROL SAMPLE: 1768576

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	20.0	100	90-110	
Fluoride	mg/L	2	2.0	98	90-110	
Sulfate	mg/L	20	20.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1768577 1768578

Parameter	Units	40177207001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	20.8	100	100	123	119	102	98	90-110	3	15	
Fluoride	mg/L	1.5	10	10	11.7	11.3	101	98	90-110	3	15	
Sulfate	mg/L	43.2	100	100	145	140	102	97	90-110	3	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1768579 1768580

Parameter	Units	40177208001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	9.6	20	20	29.9	30.1	101	102	90-110	1	15	
Fluoride	mg/L	<0.50	10	10	10.3	10.3	103	103	90-110	0	15	
Sulfate	mg/L	65.1	100	100	167	166	102	101	90-110	1	15	

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REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

Sample: MW-305 **Lab ID: 40177177001** Collected: 10/04/18 12:56 Received: 10/05/18 15:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.323 ± 0.449 (0.749) C:NA T:89%**	pCi/L	10/19/18 20:15	13982-63-3	
Radium-228	EPA 904.0	**0.716 ± 0.491 (0.949) C:67% T:83%**	pCi/L	10/25/18 16:20	15262-20-1	
Total Radium	Total Radium Calculation	**1.04 ± 0.940 (1.70)**	pCi/L	10/30/18 14:45	7440-14-4	

Sample: FIELD BLANK **Lab ID: 40177177002** Collected: 10/04/18 13:10 Received: 10/05/18 15:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.221 ± 0.382 (0.683) C:NA T:94%**	pCi/L	10/19/18 20:15	13982-63-3	
Radium-228	EPA 904.0	**1.40 ± 0.586 (0.953) C:69% T:83%**	pCi/L	10/25/18 16:21	15262-20-1	
Total Radium	Total Radium Calculation	**1.62 ± 0.968 (1.64)**	pCi/L	10/30/18 14:45	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: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

QC Batch: 316251 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 40177177001, 40177177002

METHOD BLANK: 1543386 Matrix: Water
Associated Lab Samples: 40177177001, 40177177002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.371 ± 0.321 (0.644) C:80% T:84%	pCi/L	10/25/18 12:58	

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: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

QC Batch: 316250 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 40177177001, 40177177002

METHOD BLANK: 1543385 Matrix: Water
Associated Lab Samples: 40177177001, 40177177002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.295 ± 0.356 (0.543) C:NA T:90%	pCi/L	10/19/18 19:46	

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: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

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.
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: 25214069.19 EDGEWATER I-43 CCR
Pace Project No.: 40177177

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40177177001	**MW-305**	EPA 3010	303129	EPA 6020	303240
40177177002	**FIELD BLANK**	EPA 3010	303129	EPA 6020	303240
40177177001	**MW-305**	EPA 7470	302886	EPA 7470	302920
40177177002	**FIELD BLANK**	EPA 7470	302886	EPA 7470	302920
40177177001	**MW-305**				
40177177001	**MW-305**	EPA 903.1	316250		
40177177002	**FIELD BLANK**	EPA 903.1	316250		
40177177001	**MW-305**	EPA 904.0	316251		
40177177002	**FIELD BLANK**	EPA 904.0	316251		
40177177001	**MW-305**	Total Radium Calculation	318524		
40177177002	**FIELD BLANK**	Total Radium Calculation	318524		
40177177001	**MW-305**	SM 2540C	302782		
40177177002	**FIELD BLANK**	SM 2540C	302782		
40177177001	**MW-305**	EPA 9040	302556		
40177177002	**FIELD BLANK**	EPA 9040	302556		
40177177001	**MW-305**	EPA 300.0	302665		
40177177002	**FIELD BLANK**	EPA 300.0	302799		

Pace Analytical®
www.pacelabs.com

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

40177177

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:	Mey Blodgett
Phone:	608-345-9221
Project Number:	25214069.19
Project Name:	Edgewater F.43 site
Project State:	WI
Sampled By (Print):	Gary Sterkel
Sampled By (Sign):	Gary Sterkel
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	SCS Engineers
Invoice To Address:	2830 Dairy Dr Madison WI 53718
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, B = Biota, C = Charcoal, O = Oil, S = Soil, SI = Sludge, W = Water, DW = Drinking Water, GW = Ground Water, SW = Surface Water, WW = Waste Water, WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	Analyses Requested	FILTERED? (YES/NO)	PRESERVATION (CODE)*	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
					Chloride, Fluoride, Sulfate, TDS, pH, Radium 228/226, B, Ca, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li, Hg, Mo, Se, Tl	Y/N	Pick Letter			
001	MW-305	10/4/18	1256	GW	X X X X X X X X	N	A D D D			
002	Field Blank	10/4/18	1310	W	X X X X X X X X	N	A D D D			

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:
Gary Sterkel	10/5/18 0800	[signature] pace	10/5/18 1010
[signature] pace	10/5/18 1535	[signature] PACE	10/05/18 1535

PACE Project No.
40177177

Receipt Temp = 0.1 °C
Sample Receipt pH OK / Adjusted
Cooler Custody Seal Present / Not Present
Intact / Not Intact

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

Sample Preservation Receipt Form

Client Name: SCS Project # 40177177

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

Lab Lot# of pH paper: 160781 Lab Std #ID of preservation (if pH adjusted):

Initial when completed: JH 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				X		2.5 / 5 / 10
003																										2				X		2.5 / 5 / 10
004																																2.5 / 5 / 10
005																																2.5 / 5 / 10
006																																2.5 / 5 / 10
007																																2.5 / 5 / 10
008																																2.5 / 5 / 10
009																																2.5 / 5 / 10
010																																2.5 / 5 / 10
011																																2.5 / 5 / 10
012																																2.5 / 5 / 10
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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 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#: 40177177

40177177

Client Name: SCS ENGINEERING

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

Tracking #: _____

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

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

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

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

Cooler Temperature Uncorr: 2.0 /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: 10/05/18
Initials: JM

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☐Yes ☒No ☐N/A	2. no Proj #, Mail JM 10/05/18
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:		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.
-Includes date/time/ID/Analysis Matrix: W		
Trip Blank Present:	☐Yes ☐No ☒N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☒N/A	
Pace Trip Blank Lot # (if purchased):		

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: Client Returned 2-1L poly HNO3, 2 BP3U, 1 BP3N JM 10/05/18

Project Manager Review: Rx x for PM **Date:** 10/5/18

Appendix B

Alternative Source Demonstration Reports

B1 Alternative Source Demonstration, October 2017 Detection Monitoring

SCS ENGINEERS

Alternative Source Demonstration
October 2017 Detection Monitoring

Edgewater Generating Station
I-43 Ash Disposal Facility
Town of Wilson
Sheboygan County, Wisconsin

Prepared for:

Alliant Energy

Prepared by:

SCS ENGINEERS
2830 Dairy Drive
Madison, Wisconsin 53718-6751
(608) 224-2830

April 16, 2018
File No. 25216069.18

Offices Nationwide
www.scsengineers.com

Alternative Source Demonstration
October 2017 Detection Monitoring
Edgewater Generating Station
I-43 Ash Disposal Facility
Town of Wilson
Sheboygan County, Wisconsin

Prepared for:

Alliant Energy

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Madison, Wisconsin 53718-6751
(608) 224-2830

April 16, 2018
File No. 25216069.18

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Appendices

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PE CERTIFICATION

I, Sherren Clark, hereby certify that that the information in this alternate source demonstration is accurate and meets the requirements of 40 CFR 257.94(e)(2). This certification is based on my review of the groundwater and data and related site information available for the Edgewater Generating Station I-43 Ash Disposal Facility. I am a duly licensed Professional Engineer under the laws of the State of Wisconsin.

SC Clark 4-16-18

(signature) (date)

Sherren Clark

(printed or typed name)

License number E-29863

My license renewal date is July 31, 2018.

Pages or sheets covered by this seal:

All - I-43 Ash Disposal Facility Alternative Source Demonstration

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1.0 INTRODUCTION

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

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

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

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

The ASD report is evaluating the SSIs observed in the statistical evaluation of the October 2017 detection monitoring event at the Edgewater I-43 Ash Disposal Facility (I-43 ADF).

1.2 SITE INFORMATION AND MAP

The I-43 ADF is located in the Town of Wilson, Sheboygan County, Wisconsin (**Figure 1**). The I-43 ADF receives CCR from the Edgewater Generating Station. The layout of the site on an aerial photograph base is shown on **Figure 2**. The I-43 ADF is operated under Wisconsin Department of Natural Resources (WDNR) License No. 02853.

The I-43 ADF includes a closed landfill (Phases 1 and 2) and multiple existing CCR Units which are landfill modules in Phases 3 and 4 of the facility. Contact water basins and storm water runoff basins, which do not receive CCR, are also present at the site. The existing CCR Units evaluated for this ASD are listed below:

- Phase 3, Module 1 (existing CCR Landfill)
- Phase 3, Module 2 (existing CCR Landfill)
- Phase 4, Module 1 (existing CCR Landfill)

These CCR Units are monitored with a multi-unit groundwater monitoring system.

The closed landfill (Phase 1 and Phase 2) was completely closed in 2012. The closed landfill did not accept CCR after October 19, 2015; therefore, it is not subject to the requirements of 40 CFR 257.50-107. The closed landfill was constructed with a 5-foot compacted clay liner.

The active landfill, which comprises the three CCR Units, is constructed with a composite liner system including 2 feet of compacted clay and a 60-mil high density polyethylene (HDPE) geomembrane, overlain by a leachate collection drainage layer. The active landfill first accepted CCR for disposal in October 2011.

A map showing the CCR Units and all background (or upgradient) and downgradient monitoring wells with identification numbers for the CCR groundwater monitoring program and the state monitoring program is provided as **Figure 2**.

1.3 STATISTICALLY SIGNIFICANT INCREASES IDENTIFIED

The only SSIs for the October 2017 monitoring event were for boron at monitoring wells MW-301 and MW-302. A summary of the October 2017 constituent concentrations and the established benchmark concentrations is provided in **Table 1**. The constituent concentrations with SSIs above the background concentration are highlighted in the table.

1.4 OVERVIEW OF ASD

This ASD report includes:

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

The CCR Rule constituent results from background and compliance sampling are provided in **Table 2** and concentration trends are shown in **Appendix A**. Complete laboratory reports for the background monitoring events and the October 2017 detection monitoring event were included in the 2017 Annual Groundwater Monitoring and Corrective Action Report for the I-43 ADF.

2.0 BACKGROUND

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

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

2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

2.1.1 Regional Information

For the purposes of groundwater monitoring, the Niagara Dolomite Aquifer is considered to be the uppermost aquifer unit, as defined under 40 CFR 257.53, at the I-43 ADF. This aquifer unit is present throughout Sheboygan County and is a water supply source in much of Eastern Wisconsin (Skinner and Borman, 1973). A regional geologic cross section and table summarizing the regional hydrogeologic stratigraphy are included in **Appendix B**.

The dolomite aquifer is underlain by the Maquoketa shale, which is a confining unit. The Maquoketa shale is underlain by the Cambrian-Ordovician sandstone aquifer. This sequence of sedimentary bedrock units is over 1,500 feet thick in the area of the I-43 ADF. The sedimentary sequence is underlain by Precambrian crystalline rocks that are not considered an aquifer in eastern Wisconsin.

An unconsolidated sand and gravel aquifer is present in some parts of Sheboygan County (Skinner and Borman, 1973), but does not appear laterally extensive.

Regional groundwater flow in the dolomite aquifer in the vicinity of the site is to the east or northeast. A map of regional flow is included in **Appendix B**.

2.1.2 Site Information

Soils at the site are primarily clay with discontinuous layers of sand and silty sand to a depth of at least 100 feet. Soils encountered during the site feasibility study for the I-43 ADF were described as homogeneous clay to a depth of 60 feet. In the one feasibility study boring advanced to a depth greater than 60 feet, varved clay with layers of silty fine sand was encountered from 60 to 75 feet, and hard clay was encountered from 75 feet to the total boring depth of 90 feet (Mead and Hunt, 1977). During drilling of the CCR wells, the unconsolidated materials were identified as consisting primarily of clay. Zones of sand and gravel are known to be present within the clay, but these appear to be discontinuous and no nearby private wells screened within the unconsolidated material have been identified. Soils encountered in borings MW-301, MW-302, MW-303, and MW-304 were primarily lean clay, silty clay, and silty sand. The upper 70 feet of soils in boring MW-305 were similar, but in approximately the lower 40 feet above bedrock, sand was the primary soil type. All borings were advanced into the dolomite bedrock unit. The depth to bedrock in the five wells ranged from approximately 109 feet to 133 feet below ground surface (bgs), and the elevation of the top of bedrock ranged from approximately 568 feet above mean sea level (amsl) to 605 feet amsl.

A 2010 report prepared for USEPA by Weston included an assessment of local aquifers and cross sections created using both site monitoring well logs and nearby private well logs. The cross sections of the local geology are provided in **Appendix C**.

Shallow groundwater at the site generally flows east to west towards Weedens Creek, a tributary of the Sheboygan River, as shown on **Figure 3**. Shallow monitoring well groundwater

elevations are provided in **Table 3**. The October 2017 flow direction to the west at the water table is consistent with previous water table maps since the site was developed in the mid-1980s.

Potentiometric surface maps were constructed using the CCR monitoring network wells, to understand the potentiometric surface conditions during the background sampling period. Potentiometric contours for the dolomite aquifer are shown for April 2016 on **Figure 4** and for October 2017 on **Figure 5**. Groundwater elevation data for the CCR monitoring wells are provided in **Table 4**.

The April 2016 potentiometric surface map (**Figure 4**), based on groundwater elevations from monitoring wells MW-301 through MW-304, shows groundwater flow to the northeast, consistent with regional information. The potentiometric surface map for October 2017 (**Figure 5**), which incorporates additional background well MW-305 (installed February 2017), shows a more northerly flow direction. For either of these flow directions, monitoring wells MW-301 and MW-302 are downgradient from active CCR Units.

2.2 CCR RULE MONITORING SYSTEM

The groundwater monitoring system established in accordance with the CCR Rule consists of two upgradient (background) monitoring wells and three downgradient monitoring wells. The background wells include MW-304 and MW-305. The downgradient wells include MW-301, MW-302, and MW-303. The CCR Rule wells are installed in the upper portion of the dolomite aquifer. Well depths range from approximately 119 to 145 feet, measured from the top of the well casing.

2.3 OTHER MONITORING WELLS

Thirty-four groundwater monitoring wells currently exist at the I-43 ADF as part of the monitoring system developed for the state monitoring program. The well locations are shown on **Figure 2**. These monitoring wells and one on-site water supply well (WS-1) are used to monitor groundwater conditions at the site under WDNR License No. 02853, which includes the closed Phase 1/2 Landfill and the active Phase 3/4 Landfill.

Monitoring wells for the state monitoring program are installed in the unconsolidated glacial till unit, which is not the uppermost aquifer as defined under 40 CFR 257.53. This shallow monitoring system includes water table wells, mid-depth piezometers, and deep piezometers. Well depths range from approximately 15 to 49 feet, measured from the top of the well casing.

3.0 METHODOLOGY AND ANALYSIS REVIEW

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

This section of the report provides the findings of the methodology and analysis review. **Section 4.0** of the report addresses the potential alternative sources.

3.1 SAMPLING AND FIELD ANALYSIS REVIEW

Field notes and sampling results were reviewed to determine if any sampling error may have caused or contributed to the observed SSIs for boron. Potential field sampling errors or issues could include mislabeling of samples, improper sample handling, missed holding times, cross contamination during sampling, or other field error. Field blank sample results were also reviewed for any indication of potential contamination from sampling equipment or containers. Based on the review of the field notes and results, SCS did not identify any indication that the boron SSIs were due to a sampling error.

Because boron is a laboratory parameter, there is little potential for a field analysis error to contribute to an SSI.

3.2 LABORATORY ANALYSIS REVIEW

Laboratory reports for the background monitoring and the October 2017 detection monitoring were reviewed to determine if any laboratory analysis error or issue may have caused or contributed to the observed SSIs for boron. The laboratory report review included reviewing the laboratory quality control flags and narrative, verifying that correct methods were used and desired detection limits were achieved, and checking the field and laboratory blank sample results. Laboratory reports were included in the 2017 Annual Groundwater Monitoring and Corrective Action Report for the facility.

Based on the review of the laboratory reports, SCS did not identify any indication that the boron SSIs were due to a laboratory analysis error. There were no laboratory quality control flags or issues identified in the laboratory report that affect the usability of the data for detection monitoring.

A time series plot of the boron analytical data were also reviewed for any anomalous results that might indicate a possible sampling or laboratory error (e.g., dilution error or incorrect sample labeling). The time series plot for boron is provided in **Appendix A**. The boron concentration trend appears to be stable during the background and the compliance sampling with the exception of the first sampling results for MW-301 and MW-302. The higher concentrations of boron in the initial sampling event are likely an artifact of drilling the new wells, and do not appear to be due to a sampling or analysis error. Because an interwell analysis was used for the SSI evaluation, comparing compliance well results to background well results, the initial background results for these two compliance wells do not affect the SSI determination for the October 2017 detection monitoring.

3.3 STATISTICAL EVALUATION REVIEW

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

- Input analytical data vs. laboratory analytical reports
- Review of statistical method and outlier concentration lists for each monitoring well/CCR Unit

Based on the review of the statistical evaluation, SCS did not identify any errors or issues in the statistical evaluation that caused or contributed to the determination of interwell SSIs for boron at wells MW-301 and MW-302.

3.4 SUMMARY OF METHODOLOGY AND ANALYSIS REVIEW FINDINGS

In summary, there were no changes to the SSI determinations for the October 2017 monitoring event based on the methodology and analysis review, and no errors or issues causing or contributing to the reported boron SSIs were identified.

4.0 ALTERNATIVE SOURCES

This section of the report discusses the potential alternative sources for the boron SSIs at MW-301 and MW-302, identifies the most likely alternative source(s), and presents the lines of evidence indicating that an alternative source is the most likely cause of the observed SSIs for boron.

4.1 POTENTIAL CAUSES OF SSI

4.1.1 Natural Variation

The statistical analysis was completed using an interwell approach, comparing the October 2017 detection monitoring results to the Upper Prediction Limits (UPLs) calculated based on sampling of the background wells (MW-304 and MW-305). If concentrations of a constituent that is naturally present in the aquifer vary spatially, then the potential exists that the downgradient concentrations may be higher than upgradient concentrations due to natural variation.

Boron was detected in both the upgradient (background) and downgradient (compliance) monitoring wells, which is an indication that it is naturally present in the aquifer. Additional regional and site information is discussed below, indicating that natural variation is a likely cause of the boron SSIs for wells MW-301 and MW-302.

4.1.2 Man-made Alternative Sources

Man-made alternative sources that could potentially contribute to the boron SSIs at MW-301 and MW-302 include the closed I-43 Phase 1/2 Landfill, the contact water basin, or the ash unloading

area. Based on monitoring performed since the mid-1980s under the state monitoring program, these potential sources do not appear to be the cause of the SSIs in MW-301 or MW-302. The highest boron concentrations in the shallow unconsolidated deposits monitored for the state program have typically been observed in samples from upgradient piezometers. Further, the closed Phase 1/2 Landfill was constructed with a 5-foot-thick compacted clay liner that is designed to inhibit the movement of leachate beyond the footprint of the closed landfill.

4.2 LINES OF EVIDENCE

The lines of evidence indicating that the SSIs for boron in compliance wells MW-301 and MW-302, relative to the background wells, are due to natural variability include:

1. The hydraulic conductivity of the thick glacial till aquitard overlying the dolomite aquifer is very low, and there is limited hydrogeologic connection between the shallow groundwater and the aquifer.

2. Groundwater monitoring in the glacial till before and after disposal of CCR at the I-43 ADF shows boron is naturally occurring in the till.

3. The boron results for MW-301 and MW-302 are within the range of boron detected in water supply wells obtaining water from the dolomite aquifer in the site vicinity.

4. Boron concentrations in the on-site water supply well have been generally decreasing or stable since the first samples were collected prior to the initial CCR disposal in the closed landfill (Phases 1 and 2) in 1986.

5. The active Phase 3/4 landfill was constructed with a clay and/or composite liner system, so the potential for a release is very low.

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

4.2.1 Glacial Clay Till Hydraulic Conductivity

The glacial clay till at the I-43 ADF is an aquitard with very low vertical hydraulic conductivity. A site review completed by Weston for the USEPA in 2010 found that samples of the native upper clay till collected by Warzyn Engineering, Inc. (Warzyn) in 1981 contained 65 to 85 percent clay size particles, indicating low hydraulic conductivity.

Vertical hydraulic conductivity tests of the clay till, completed as part of the 1981 Warzyn study, found the upper clay till ranged from 5 to 9 x 10^{-8} cm/s. The 1981 Warzyn study estimated the time required for groundwater to traverse vertically through the till to be "on the order of hundreds if not thousands of years" (Warzyn, 1981). Observed high vertical gradients provide further documentation of very low vertical hydraulic conductivity at the site (Weston, 2010). These results suggest there is limited hydrogeologic connection between the upper shallow till aquitard and the uppermost bedrock aquifer.

4.2.2 Upgradient Mid-Depth Piezometers Boron Concentrations

Groundwater monitoring in the glacial till before and after disposal of CCR at the I-43 ADF shows boron is naturally occurring in the till. Samples from upgradient mid-depth piezometers W-18 and W-33A (both approximately 50 feet deep) have had boron concentrations in the range of 200 to 400 micrograms per liter (µg/L) (**Table 5**) since the first samples were collected in the mid-1980s, prior to CCR disposal (**Appendix D**). Recent boron concentrations, from the state monitoring program, are provided in **Table 6**. The W-18 and W-33A results suggest that a natural source of boron is present in the glacial till.

4.2.3 Private Well Boron Concentrations

The boron results for MW-301 and MW-302 are within the range of boron detected in private water supply wells obtaining water from the dolomite aquifer in the site vicinity. Private well locations and boron concentrations are provided in **Table 7** and shown on **Figure 6**.

Boron was detected in samples collected in 1978, prior to CCR disposal, from two private wells located on the site property (Goebel and Beeck wells). The remaining private wells listed in **Table 7** were sampled in 2011 and had boron concentrations within a similar range of the 1978 sampled private wells, or had higher concentrations. The private wells with the highest boron concentrations are located upgradient and west of the I-43 ADF, including the wells at 5331 County Rd A, 5326 County Rd A, 4928 County Rd A, 5327 Stahl Rd, and 5228 County Rd A.

The presence of high boron concentrations observed within the bedrock upgradient and west of the site indicates 1) there is a natural source of boron in the bedrock aquifer, and 2) that the concentrations of boron reported for samples from MW-301 and MW-302 are within the range of natural background concentrations.

4.2.4 Site Supply Well Boron Concentrations

Boron concentrations in the on-site water supply well (WS-1) have been generally decreasing or stable since the first samples were collected prior to the initial CCR disposal in the closed landfill (Phases 1 and 2) in 1986. The site supply well obtains water from the dolomite bedrock. The boron concentrations at the downgradient monitoring wells, MW-301 and MW-302, are within range of the concentrations observed in the site supply well, WS-1 (**Table 8**). The long-term trend in boron concentrations is shown on a trend plot in **Appendix D**. These results are consistent with a natural source of boron and show no impact from CCR disposal at the I-43 site.

4.2.5 Liner Construction

The active landfill, which comprises the three CCR Units, is constructed with a low permeability liner system that minimizes potential leakage. Phase 4 Module 1 was constructed with a 5-foot compacted clay liner. Phase 3 Modules 1 and 2 were constructed with a composite liner system including 2 feet of compacted clay and a 60-mil HDPE geomembrane. The compacted clay hydraulic conductivity is less than 10^{-7} centimeter per second for all modules, documented through construction quality assurance testing. All constructed modules have a leachate

collection drainage layer overlying the liner. The collected leachate flows by gravity and/or is pumped to the contact water basin. The leachate/contact water swales and contact water basin have composite liners, consisting of compacted clay overlain by a 60-mil HDPE geomembrane.

5.0 ASD CONCLUSIONS

The lines of evidence discussed above regarding the SSIs reported for boron concentrations in downgradient monitoring wells MW-301 and MW-302 demonstrate that the SSIs are likely due to naturally occurring boron in the bedrock aquifer at the I-43 ADF.

6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS

In accordance with section 257.94(e)(2) of the CCR Rule, the I-43 site may continue with detection monitoring based on this ASD. The ASD report will be included in the 2018 Annual Report due January 31, 2019.

7.0 REFERENCES

Mead and Hunt, Inc., 1977, Preliminary Site Feasibility Report for Ash Disposal Site, Beeck-Goebel Properties, Wilson Township, Sheboygan County, WI, December, 1977.

SCS Engineers, 2018, 2017 Annual Groundwater Monitoring and Corrective Action Report, I-43 Ash Disposal Facility, 2018.

Skinner, Earl L. and Ronald G. Borman, Water Resources of Wisconsin-Lake Michigan Basin, Department of the Interior United States Geological Survey Hydrogeologic Investigations Atlas HA-432, 1973.

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

Weston Solutions, Inc., 2010, Technical Memorandum: Alliant Energy Site – Site Historical Information Review and Evaluation, Sheboygan County, WI, December 2010.

Warzyn Engineering, Inc., 1981, Summary Report, Proposed Fly Ash Disposal Facility, Beeck-Goebel Properties, Edgewater Power Plant – Unit 5, Wisconsin Power and Light Company, 1981.

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TABLES

Table 1. Detection Monitoring Results Summary - October 2017
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

Parameter Name	Units	Interwell Upper Prediction Limit (UPL)	Background Wells		Compliance Wells		
			MW 304	MW 305	MW 301	MW 302	MW 303
Boron	µg/L	116.3	104	70	**149**	**128**	89
Calcium	mg/L	118100	20100	90700	48700	31200	29100
Chloride	mg/L	26.75	1.7 J	21.5	4.7	5.5	6.8
Fluoride	mg/L	0.747	0.54	0.64	0.62	0.71	0.66
Field pH	Std. Units	8.77	7.74	7.55	7.82	7.7	7.59
Sulfate	mg/L	140	14.2	134	8.6	26.3	67.1
Total Dissolved Solids	mg/L	678	208	540	236	238	304

149 Statistically significant increase at compliance well

Notes:

1. UPL based on parametric prediction limit based on 1-of-2 resampling methodology for all parameters except sulfate. Optional resampling was not performed for boron.
2. UPL for sulfate based on non-parametric prediction limit (highest background value).
3. UPLs calculated from background well results for April 2016 through October 2017.
4. Analytical laboratory reports provided in the 2017 Annual Groundwater Monitoring and Corrective Action Report.

I:\25216069.00\Reports\2018 ASD Report\Tables\[Tables 2, and 4-8, Leachate Table.xlsx]Table 1. Detection Monit. Sum

Table 2. Boron Concentrations - CCR Rule Monitoring Well Network
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

Well Group	Well	Collection Date	Boron (µg/L)
Background	MW 304	4/26/2016	92.1
		6/21/2016	90.9
		8/9/2016	102
		10/19/2016	106
		12/19/2016	102
		1/23/2017	101
		2/23/2017	99.8
		4/7/2017	96.9
		6/6/2017	102
		8/1/2017	103
		10/23/2017	104
	MW 305	2/23/2017	94.4
		4/7/2017	86.4
		6/6/2017	78.8
		8/1/2017	76.5
		10/23/2017	70
Compliance	MW 301	4/26/2016	298*
		6/21/2016	157
		8/10/2016	151
		10/19/2016	148
		12/19/2016	174
		1/23/2017	177
		2/23/2017	181
		4/6/2017	144
		6/6/2017	138
		8/1/2017	145
		10/23/2017	149
	MW 302	4/26/2016	198*
		6/21/2016	121
		8/9/2016	131
		10/19/2016	126
		12/19/2016	127
		1/23/2017	151
		2/23/2017	149
		4/6/2017	132
		6/6/2017	124
		8/1/2017	130
		10/23/2017	128

Table 2. Boron Concentrations - CCR Rule Monitoring Well Network
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

Well Group	Well	Collection Date	Boron (µg/L)
Compliance	MW 303	4/26/2016	86.4
		6/21/2016	85
		8/9/2016	96
		10/19/2016	90.8
		12/19/2016	81.6
		1/23/2017	99.8
		2/23/2017	93.9
		4/7/2017	89.8
		6/6/2017	89.1
		8/1/2017	95
		10/23/2017	89

Abbreviations:
µg/L = micrograms per liter or parts per billion (ppb)

Notes:

Analytical laboratory reports provided in the 2017 Annual Groundwater Monitoring and Corrective Action Report.

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Last revision by:	NDK	Date:	Date: 2/21/2018
Checked by:	JD	Date:	Date: 2/22/2018

I:\25216069.00\Reports\2018 ASD Report\Tables\[Tables 2, and 4-8, Leachate Table.xlsx]Table 2-Analytical-CCR wells

Table 3. Groundwater Elevation Table - State Monitoring Program

WPL-Edgewater I-43 Ash Disposal Facility

Sheybogan, Wisconsin

Groundwater Elevation in feet above mean sea level (amsl)														
Well Number	**W-6R**	**W-10A**	**W-11R**	**W-12R**	**W-17**	**W-18**	**W-19BR**	**W-21**	**W-33**	**W-34R**	**W-37**	**W-38**	**W-39**	**W-40**
Top of Casing Elevation (feet amsl)	696.21	688.59	692.181	712.86	709.63	720.77	688.38	694.29	726.19	702.15	728.09	720.93	722.08	685.53
Screen Length (ft)														
Total Depth (ft from top of casing)	21.75	33.04	18.50	18.06	31.08	47.51	19.40	28.65	22.70	15.76	20.33	21.05	19.75	18.24
Measurement Date														
April 7, 2016	691.73	669.99	687.84	707.45	695.25	682.09	685.03	691.71	718.84	693.93	723.14	717.71	717.26	680.85
October 17-19, 2016	677.43	669.55	687.73	704.53	696.27	680.99	683.80	690.16	718.52	691.65	dry	715.88	715.86	680.62
April 11, 2017	691.71	671.05	688.72	707.32	695.46	683.51	684.55	688.99	718.86	691.47	724.03	716.58	717.77	680.79
October 10-11, 2017	684.79	667.96	685.07	697.55	694.68	681.92	679.29	686.01	718.06	684.88	dry	710.42	710.76	680.45
December 7, 2017	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Bottom of Well Elevation (ft)	674.46	655.55	673.68	694.80	678.55	673.26	668.98	665.64	703.49	686.39	707.76	699.88	702.33	667.29

Notes:
NM = not measured
Water levels collected during Sample Collection

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I:\25216069.00\Reports\2018 ASD Report\Tables\[Tables 2, and 4-8, Leachate Table.xlsx]Table 3. GW Elev -State

Table 4. Groundwater Elevation Table - CCR Rule Monitoring Well Network

WPL-Edgewater I-43 Ash Disposal Facility

Sheybogan, Wisconsin

Well Number	Ground Water Elevation in feet above mean sea level (amsl)				
	MW-301	MW-302	MW-303	MW-304	MW-305
Top of Casing Elevation (feet amsl)	696.96	702.57	719.25	691.97	717.67
Screen Length (ft)	5.00	5.00	5.00	5.00	5.00
Total Depth (ft from top of casing)	134.56	144.33	144.65	119.49	122.97
Top of Well Screen Elevation (ft)	567.40	563.24	579.60	577.48	600.46
Measurement Date					
April 8, 2016	653.54	653.56	653.59	655.90	--
Octoebr 23, 2017	652.03	652.05	652.03	653.65	657.22
Bottom of Well Elevation (ft)	562.40	558.24	574.60	572.48	594.70

Notes:
NM = not measured

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I:\25216069.00\Reports\2018 ASD Report\Tables\[Tables 2, and 4-8, Leachate Table.xlsx]Table 4. GW Elev -CCR

Table 5. Historical Boron Concentrations - State Monitoring Wells W-18 and W-33
WPL-Edgewater I-43 Ash Disposal Facility
Sheboygan, Wisconsin

Well ID	Date	Boron, Dissolved (µg/L)	Boron, Total (µg/L)
W-18	11/9/1983	--	350
	1/11/1984	--	350
	3/27/1984	--	420
	7/12/1984	340	--
	9/13/1984	390	--
	12/22/1984	420	--
	3/14/1985	--	430
	6/20/1985	--	350
	9/20/1985	--	340
	12/18/1985	--	350
	3/17/1986	--	410
	6/18/1986	--	350
	9/22/1986	--	410
	12/18/1986	--	460
	3/17/1987	--	400
	6/10/1987	--	300
	3/9/1988	--	280
	6/9/1988	--	290
	9/21/1988	370	--
	12/9/1988	160	--
	3/23/1989	1320	--
	6/28/1989	140	--
	9/25/1989	110	--
	12/18/1989	50	--
	3/29/1990	300	--
	6/15/1990	300	--
	9/21/1990	300	--
	12/17/1990	300	--
	3/15/1991	400	--
	6/3/1991	<200	--
	9/6/1991	250	--
	12/9/1991	280	--
	3/13/1992	360	--
	9/11/1992	300	--
	12/11/1992	340	--
	3/11/1993	310	--
	10/6/2009	262	--
	7/20/2010	240	--
	10/7/2010	280	--

Table 5. Historical Boron Concentrations - State Monitoring Wells W-18 and W-33
WPL-Edgewater I-43 Ash Disposal Facility
Sheboygan, Wisconsin

Well ID	Date	Boron, Dissolved (µg/L)	Boron, Total (µg/L)
W-18	1/19/2011	300	--
	4/22/2011	250	--
	10/28/2011	250	--
	4/19/2012	250	--
	10/25/2012	270	--
	4/9/2013	250	--
	10/23/2013	243	--
	4/22/2014	296	--
	10/29/2014	255	--
	4/8/2015	250	--
	10/7/2015	198	--
	4/7/2016	211	--
	10/18/2016	252	--
	4/12/2017	241	--
	10/11/2017	233	--
W-33A	3/14/1985	300	--
	3/14/1985	--	300
	6/20/1985	250	--
	6/20/1985	--	250
	9/20/1985	--	310
	12/18/1985	--	260
	3/17/1986	--	340
	6/18/1986	320	--
	6/18/1986	--	320
	9/22/1986	340	--
	9/22/1986	--	340
	12/18/1986	280	--
	3/17/1987	350	--
	6/10/1987	190	--
	9/10/1987	280	--
	12/14/1987	260	--
	3/9/1988	220	--
	3/23/1989	180	--
	6/28/1989	100	--
	9/25/1989	60	--
	12/18/1989	140	--
	3/29/1990	300	--
	6/15/1990	300	--
	9/21/1990	300	--
	12/17/1990	300	--
	3/15/1991	400	--

Table 5. Historical Boron Concentrations - State Monitoring Wells W-18 and W-33
WPL-Edgewater I-43 Ash Disposal Facility
Sheboygan, Wisconsin

Well ID	Date	Boron, Dissolved (µg/L)	Boron, Total (µg/L)
W-33A	6/3/1991	280	--
	9/6/1991	250	--
	12/9/1991	310	--
	3/13/1992	330	--
	6/12/1992	310	--
	9/11/1992	270	--
	12/11/1992	280	--
	3/11/1993	280	--
	6/11/1993	250	--
	9/17/1993	300	--
	12/9/1993	230	--
	3/18/1994	210	--
	9/9/1994	280	--
	12/9/1994	260	--
	3/10/1995	330	--
	6/14/1995	280	--
	9/15/1995	200	--
	3/22/1996	270	--
	9/18/1996	270	--
	3/18/1997	280	--
	9/17/1997	250	--
	3/19/1998	250	--
	10/22/1998	270	--
	4/27/1999	290	--
	10/20/1999	280	--
	4/11/2000	290	--
	10/11/2000	290	--
	4/13/2001	290	--
	10/9/2001	270	--
	4/16/2002	270	--
	10/23/2002	270	--
	4/24/2003	270	--
	10/22/2003	240	--
	4/7/2004	260	--
	10/6/2004	260	--
	4/21/2005	270	--
	10/5/2005	300	--
	4/5/2006	270	--
	10/17/2006	260	--
	4/18/2007	240	--
	10/25/2007	240	--

Table 5. Historical Boron Concentrations - State Monitoring Wells W-18 and W-33
WPL-Edgewater I-43 Ash Disposal Facility
Sheboygan, Wisconsin

Well ID	Date	Boron, Dissolved (µg/L)	Boron, Total (µg/L)
W-33A	4/10/2008	266	--
	10/7/2008	267	--
	4/28/2009	255	--
	10/6/2009	271	--
	4/8/2010	230	--
	7/20/2010	260	--
	10/7/2010	300	--
	1/19/2011	280	--
	4/22/2011	250	--
	10/28/2011	250	--
	4/18/2012	250	--
	10/25/2012	260	--
	4/11/2013	221	--
	10/24/2013	246	--
	4/23/2014	239	--
	10/30/2014	250	--
	4/9/2015	246	--
	10/7/2015	250	--
	4/7/2016	209	--
	10/20/2016	244	--
	4/12/2017	230	--

Abbreviations:
µg/L = micrograms per liter or parts per billion (ppb)
-- = not analyzed
Notes:
Data provided by the WDNR Groundwater and Environmental Monitoring System (GEMS).

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I:\25216069.00\Reports\2018 ASD Report\Tables\[Tables 2, and 4-8, Leachate Table.xlsx]Table 5 -Historical

Table 6. Boron Concentrations - 2016-2017 State Monitoring Program
WPL -Edgewater I-43 Ash Disposal Facility
Sheboygan, Wisconsin

Point Name	Reporting Period	Boron, dissolved (µg/L as B)
W-2	2016-Apr	99.4
	2016-Oct	97.4
	2017-Apr	98.4
	2017-Oct	138
W-6	2016-Apr	190
	2016-Oct	192
	2017-Apr	172
	2017-Oct	171
W-6A	2016-Apr	107
	2016-Oct	132
	2017-Apr	130
	2017-Oct	123
W-6R	2016-Apr	146
	2016-Oct	221
	2017-Apr	159
	2017-Oct	240
W-10	2016-Apr	174
	2016-Oct	193
	2017-Apr	179
	2017-Oct	324
W-10A	2016-Apr	122
	2016-Oct	139
	2017-Apr	138
	2017-Oct	193
W-10B	2016-Apr	35
	2016-Oct	62.5
	2017-Apr	34.2
	2017-Oct	79.6
W-11A	2016-Apr	126
	2016-Oct	132
	2017-Apr	136
	2017-Oct	132
W-11R	2016-Apr	86.4
	2016-Oct	108
	2017-Apr	154
	2017-Oct	44.4

Table 6. Boron Concentrations - 2016-2017 State Monitoring Program
WPL -Edgewater I-43 Ash Disposal Facility
Sheboygan, Wisconsin

Point Name	Reporting Period	Boron, dissolved (µg/L as B)
W-12AR	2016-Apr	133
	2016-Oct	144
	2017-Apr	141
	2017-Oct	146
W-12R	2016-Apr	47.9
	2016-Oct	63.3
	2017-Apr	41.4
	2017-Oct	55.6
W-17	2016-Apr	118
	2016-Oct	128
	2017-Apr	130
	2017-Oct	124
W-17AR	2016-Apr	116
	2016-Oct	125
	2017-Apr	124
	2017-Oct	126
W-17B	2016-Apr	60.6
	2016-Oct	48.8
	2017-Apr	41.5
	2017-Oct	49.9
W-18	2016-Apr	211
	2016-Oct	252
	2017-Apr	241
	2017-Oct	233
W-18AR	2016-Apr	--
	2016-Oct	--
	2017-Apr	--
	2017-Oct	160
W-18BR	2016-Apr	7.3 J
	2016-Oct	20.8
	2017-Apr	13.5
	2017-Oct	21.1
W-19	2016-Apr	88.8
	2016-Oct	84.8
	2017-Apr	87.5
	2017-Oct	81.6

Table 6. Boron Concentrations - 2016-2017 State Monitoring Program
WPL -Edgewater I-43 Ash Disposal Facility
Sheboygan, Wisconsin

Point Name	Reporting Period	Boron, dissolved (µg/L as B)
W-19A	2016-Apr	51.8
	2016-Oct	93.3
	2017-Apr	72.8
	2017-Oct	58.5
W-19BR	2016-Apr	35.1
	2016-Oct	56.2
	2017-Apr	49.5
	2017-Oct	33
W-21	2016-Apr	32.6
	2016-Oct	61.8
	2017-Apr	68.1
	2017-Oct	41.6
W-22	2016-Apr	27.4
	2016-Oct	55.5
	2017-Apr	34.9
	2017-Oct	46.9
W-22A	2016-Apr	101
	2016-Oct	187
	2017-Apr	116
	2017-Oct	123
W-22B	2016-Apr	28.4
	2016-Oct	35.8
	2017-Apr	26.7
	2017-Oct	36
W-33	2016-Apr	58.1
	2016-Oct	80
	2017-Apr	66.3
	2017-Oct	77.6
W-33A	2016-Apr	209
	2016-Oct	244
	2017-Apr	230
	2017-Oct	241
W-34R	2016-Apr	34
	2016-Oct	67.8
	2017-Apr	37.8
	2017-Oct	46.9

Table 6. Boron Concentrations - 2016-2017 State Monitoring Program
WPL -Edgewater I-43 Ash Disposal Facility
Sheboygan, Wisconsin

Point Name	Reporting Period	Boron, dissolved (µg/L as B)
W-37	2016-Apr	22.9
	2016-Oct	--
	2017-Apr	17.4 2q
	2017-Oct	--
W-38	2016-Apr	18.6
	2016-Oct	18.0
	2017-Apr	15.3
	2017-Oct	20.2
W-39	2016-Apr	22.9
	2016-Oct	22.7
	2017-Apr	25.2 2q
	2017-Oct	27.5
W-40	2016-Apr	189
	2016-Oct	273
	2017-Apr	222
	2017-Oct	333
W-40A	2016-Apr	138
	2016-Oct	154
	2017-Apr	146
	2017-Dec	163

Abbreviations:
µg/L = micrograms per liter or parts per billion (ppb)
mg/L = milligrams per liter or parts per million (ppm)

Notes:
Data provided by the WDNR Groundwater and Environmental Monitoring System (GEMS).

Created by:	SCC	Date:	2/24/2014
Last revision by:	MDB	Date:	1/10/2018
Checked by:	AJR	Date:	2/9/2018

I:\25216069.00\Reports\2018 ASD Report\Tables\[Tables 2, and 4-8, Leachate Table.xlsx]6. GW MW-Boron

Table 7. Boron Concentrations - Private Wells
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

Collection Date	Location I D	Well Location	Boron (µg/L)
5/15/1978	Goebel Well - Historical	Private Well - Previously located onsite	170
6/21/1978	Beeck Well - Historical	Private Well - Previously located onsite	80
10/5/2011	4928 Cty Rd A	Upgradient/sidegradient (northwest)	170
10/5/2011	5228 Cty Rd A	Upgradient (west)	140
10/5/2011	5326 Cty Rd A	Upgradient (west)	180
10/5/2011	5331 Cty Rd A	Upgradient (west)	220
10/6/2011	4632 Frontage Rd	Downgradient (northeast)	120
10/6/2011	4700 Frontage Rd	Downgradient (northeast)	110
10/6/2011	4730 Frontage Rd	Downgradient (northeast)	110
10/6/2011	4820 Frontage Rd	Downgradient (northeast)	100
10/6/2011	4910 Frontage Rd	Downgradient (northeast)	92
10/5/2011	5425 Racetrack Rd	Downgradient (east)	110
10/5/2011	5515 Racetrack Rd	Downgradient (east)	110
10/5/2011	5619 Roehrborn Rd	Upgradient (west)	110
10/5/2011	3836 Stahl Rd	Sidegradient (southeast)	120
10/5/2011	4202 Stahl Rd	Upgradient/sidegradient (south)	72
10/5/2011	5327 Stahl Rd	Upgradient (southwest)	170
10/5/2011	4121 Weeden Creek Rd	Downgradient/sidegradient (north)	150
10/6/2011	4124 Weeden Creek Rd	Downgradient/sidegradient (north)	150
10/6/2011	4701 Weeden Creek Rd	Downgradient/sidegradient (northwest)	130

Abbreviations:
µg/L = micrograms per liter or parts per billion (ppb)
-- = not analyzed
Note: Private Well Search completed by SCS Engineers.

Created by:	NDK	Date:	2/21/2018
Last revision by:	NDK	Date:	2/21/2018
Checked by:	JD	Date:	2/22/2018

I:\25216069.00\Reports\2018 ASD Report\Tables\[Tables 2, and 4-8, Leachate Table.xlsx]Table 7- Private Wells

Table 8. Boron Concentrations - Site Supply Well - WS-1
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

Collection Date	Boron (µg/L)
3/14/1985	150
7/9/1985	200
9/20/1985	180
12/18/1985	190
3/17/1986	220
6/18/1986	120
12/18/1986	160
3/17/1987	140
6/10/1987	<100
9/10/1987	140
12/14/1987	160
3/9/1988	120
9/21/1988	170
12/9/1988	280
3/23/1989	<50
6/28/1989	<50
6/30/1989	<50
9/25/1989	<50
12/19/1989	<50
3/29/1990	<200
6/15/1990	<200
9/21/1990	<400
12/17/1990	<200
3/15/1991	<200
6/3/1991	<400
9/6/1991	<200
12/9/1991	<200
3/13/1992	<200
9/15/1992	<200
12/11/1992	<200
3/11/1993	<200
6/15/1993	<200
9/16/1993	<200
12/9/1993	<200
3/18/1994	<200
9/9/1994	<200
12/8/1994	<200
3/10/1995	<200
6/14/1995	<200
9/15/1995	<200

Table 8. Boron Concentrations - Site Supply Well - WS-1
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

Collection Date	Boron (µg/L)
3/22/1996	<200
9/18/1996	88
3/18/1997	140
9/17/1997	98
3/19/1998	130
10/23/1998	88
4/27/1999	96
10/20/1999	89
4/11/2000	97
10/11/2000	93
4/13/2001	95
10/9/2001	92
4/16/2002	95
10/23/2002	96
4/23/2003	94
10/22/2003	92
4/7/2004	87
10/6/2004	90
4/21/2005	93
10/5/2005	90
4/5/2006	79
10/17/2006	82
4/18/2007	78
10/25/2007	85
4/10/2008	80.6
10/7/2008	84.8
4/28/2009	86.5
10/6/2009	100
4/8/2010	74
7/20/2010	97
10/7/2010	110
1/19/2011	120
4/21/2011	81
10/27/2011	87
4/18/2012	89
10/25/2012	88
4/11/2013	84.8
10/24/2013	83.1
4/23/2014	75.8
10/29/2014	71.6

Table 8. Boron Concentrations - Site Supply Well - WS-1
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

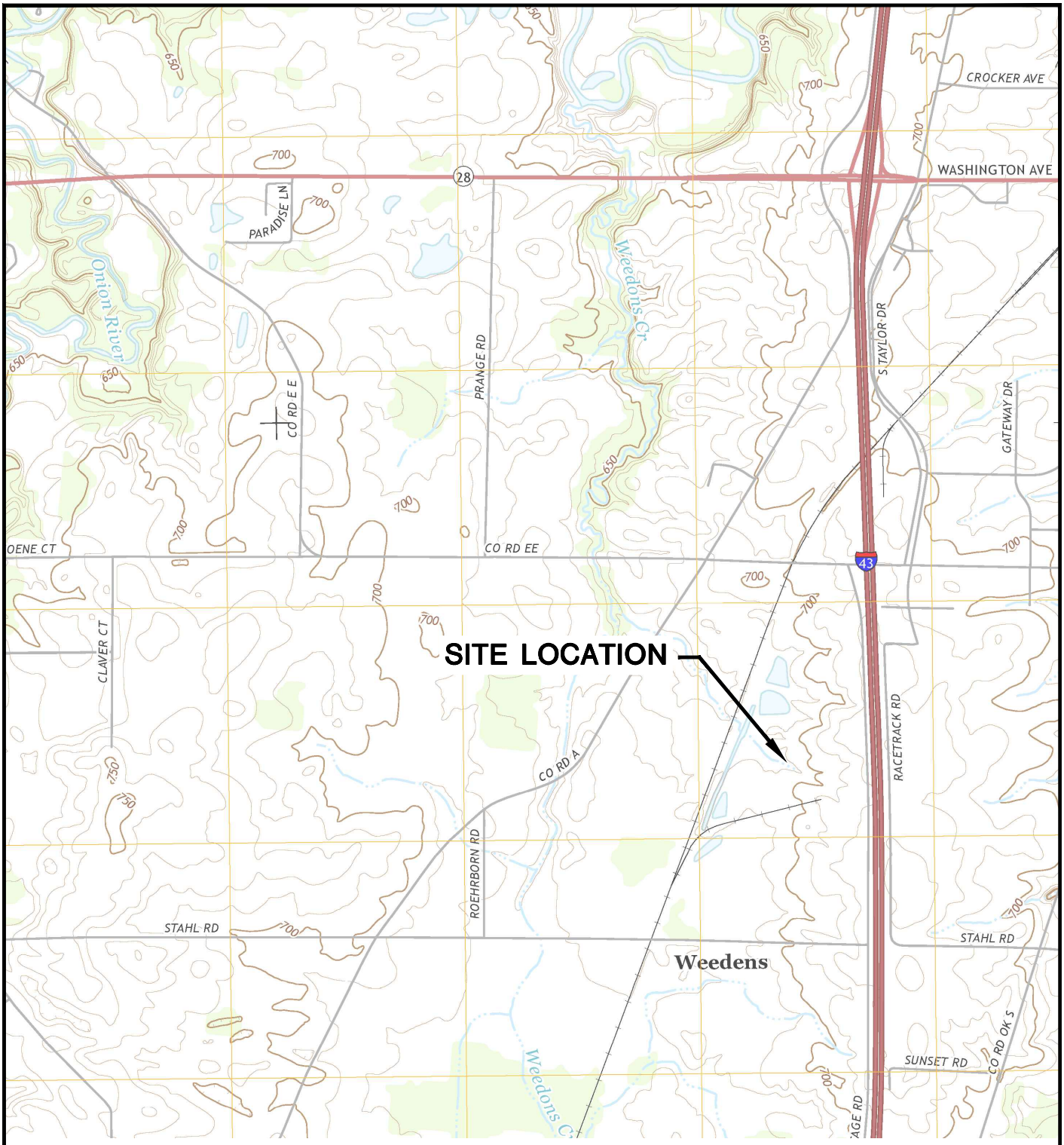
Collection Date	Boron (µg/L)
4/8/2015	88.7
10/7/2015	65.2
11/6/2015	88
4/28/2016	88.4
10/18/2016	88.3
4/12/2017	87.2
10/11/2017	94.7

Abbreviations:
µg/L = micrograms per liter or parts per billion (ppb)
-- = not analyzed
Notes:
Data provided by the WDNR Groundwater and Environmental Monitoring System (GEMS).

Created by:	NDK	Date:	2/21/2018
Last revision by:	NDK	Date:	2/21/2018
Checked by:	JD	Date:	2/22/2018

I:\25216069.00\Reports\2018 ASD Report\Tables\[Tables 2, and 4-8, Leachate Table.xlsx]Table 8. WS-1

FIGURES



N

SHEBOYGAN FALLS QUADRANGLE
WISCONSIN–SHEBOYGAN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
2015
SCALE: 1" = 2,000'

CLIENT	ALLIANT ENERGY WISCONSIN POWER AND LIGHT COMPANY	SITE	WISCONSIN POWER AND LIGHT EDGEWATER GENERATING STATION I–43 LANDFILL TOWN OF WILSON, WISCONSIN

SITE LOCATION MAP

PROJECT NO.	25215135.20	DRAWN BY:	BJM
DRAWN:	02/08/16	CHECKED BY:	KK
REVISED:	03/06/18	APPROVED BY:	TK 03/06/18

ENGINEER

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

FIGURE
1

LEGEND

- APPROXIMATE PROPERTY LINE
- MODULE LIMITS
- GRADE (2' CONTOUR)
- GRADE (10' CONTOUR)
- EDGE OF WATER
- SWALE
- CULVERT
- MH MANHOLE
- W CONTACT WATER TRANSFER PIPE
- AB ABANDONED 3" DIA. HDPE PIPE
- TREELINE/TREES
- PAVED ROAD
- UNPAVED ACCESS ROAD
- RAILROAD TRACKS
- FENCE
- UTILITY/LIGHT POLE
- MONITORING WELL (UNCONSOLIDATED)
- PIEZOMETER (UNCONSOLIDATED)
- PRIVATE WATER SUPPLY WELL
- CCR RULE PIEZOMETER (BEDROCK)
- CCR RULE UNITS

NOTE:

1. MONITORING WELLS MW-301, MW-303, AND MW-304 WERE INSTALLED BETWEEN NOVEMBER 30, 2015 AND JANUARY 26, 2016 BY BADGER STATE DRILLING INC. DRILLING WAS PERFORMED UNDER THE SUPERVISION OF SCS ENGINEERS.
2. MONITORING WELLS MW-301, MW-302, MW-303 AND MW-304 WERE SURVEYED ON FEBRUARY 8, 2016 BY SCS ENGINEERS.
3. MONITORING WELL MW-305 WAS SURVEYED ON FEBRUARY 15, 2017 BY CQM, INC.

N

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25216069.00	DRAWN BY:	JMO/BJM
DRAWN:	02/12/16	CHECKED BY:	KK
REVISED:	03/06/18	APPROVED BY:	TK 03/06/18

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

CLIENT: ALLIANT ENERGY
ALLIANT ENERGY WISCONSIN POWER AND LIGHT COMPANY

SITE: WISCONSIN POWER AND LIGHT
EDGEWATER GENERATING STATION
I-43 LANDFILL
TOWN OF WILSON, WISCONSIN

MONITORING WELL LOCATION MAP

FIGURE 2

I:\25216069.00\Drawings\Well Locations.dwg, 4/16/201 4:10:42 PM

LEGEND

- APPROXIMATE PROPERTY LINE
- DESIGN MANAGEMENT ZONE (FOLLOWS PROPERTY LINE WHERE LESS THAN 300 FEET FROM APPROVED LIMITS OF WASTE)
- LIMITS OF WASTE
- MODULE LIMIT
- EXISTING GRADE (2' CONTOUR)
- 690 EXISTING GRADE (10' CONTOUR)
- 686.8 EXISTING GRADE SPOT ELEVATION
- TREELINE/TREES
- PAVED ROAD
- UNPAVED ROAD
- TRAIL/PATH
- RAILROAD TRACKS
- FENCE
- UTILITY/LIGHT POLE
- EDGE OF WATER
- MONITORING WELL
- PIEZOMETER
- LEACHATE HEADWELL
- WATER SUPPLY WELL
- 680.21 WATER TABLE ELEVATION MEASURED OCTOBER 6-7, 2015
- WATER TABLE CONTOUR (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- PRIVATE WATER SUPPLY WELL

NOTES:

1. BASE MAP PREPARED BY KBM, INC. BASED ON AERIAL TOPOGRAPHIC SURVEY FLOWN DECEMBER 1, 2014. BASE MAP PREPARED USING WISCONSIN STATE PLANE COORDINATES. ELEVATIONS BASED ON USGS NATIONAL GEODETIC VERTICAL DATUM, 1929.
2. TOPOGRAPHIC CONTOUR INTERVAL IS 2 FEET.
3. CONVERSION FROM LOCAL COORDINATE SYSTEM TO STATE PLANE: SHIFT 2558047.2314,624139.6532, ROTATE 0.17° AROUND POINT WITH COORDINATES 2559697.2314,625039.6532.
4. SOIL BORING AND MONITORING WELL LOCATIONS BASED ON WELL INFORMATION FORM COORDINATES AND EXISTING CONDITIONS MAP F11 PREPARED BY WARZYN, INC. USING LOCAL COORDINATES.
5. WATER LEVELS MEASURED BY SCS IN OCTOBER 2017.

N

200 0 200

SCALE: 1" = 200'

PROJECT NO.	25216069.00	DRAWN BY:	KP/BJM
DRAWN:	12/03/13	CHECKED BY:	KAK
REVISED:	04/16/18	APPROVED BY:	SC 04/16/18

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

CLIENT: ALLIANT ENERGY, WISCONSIN POWER AND LIGHT COMPANY

SITE: ALTERNATIVE SOURCE DEMONSTRATION, EDGEWATER I-43 ASH DISPOSAL FACILITY, WILSON, WISCONSIN

WATER TABLE MAP, OCTOBER 2017

SHEET 3

LEGEND

- APPROXIMATE PROPERTY LINE
- MODULE LIMITS
- GRADE (2' CONTOUR)
- 690 GRADE (10' CONTOUR)
- EDGE OF WATER
- SWALE
- CULVERT
- MH MANHOLE
- W CONTACT WATER TRANSFER PIPE
- AB ABANDONED 3" DIA. HDPE PIPE
- TREELINE/TREES
- PAVED ROAD
- UNPAVED ACCESS ROAD
- RAILROAD TRACKS
- FENCE
- UTILITY/LIGHT POLE
- MONITORING WELL
- PIEZOMETER
- PRIVATE WATER SUPPLY WELL
- CCR RULE PIEZOMETER
- 653.54 POTENTIOMETRIC SURFACE ELEVATION MEASURED ON 04/08/16
- WATER TABLE CONTOUR
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- CCR RULE UNITS

NOTE:

1. MONITORING WELLS MW-301, MW-303, AND MW-304 WERE INSTALLED BETWEEN NOVEMBER 30, 2015 AND JANUARY 26, 2016 BY BADGER STATE DRILLING INC. DRILLING WAS PERFORMED UNDER THE SUPERVISION OF SCS ENGINEERS.
2. MONITORING WELLS MW-301, MW-302, MW-303 AND MW-304 WERE SURVEYED ON FEBRUARY 8, 2016 BY SCS ENGINEERS.

N

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25216069.00	DRAWN BY:	BJM
DRAWN:	02/22/18	CHECKED BY:	NK
REVISED:	02/22/18	APPROVED BY:	SCC 04/16/18

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

CLIENT: ALLIANT ENERGY
ALLIANT ENERGY WISCONSIN POWER AND LIGHT COMPANY

SITE: WISCONSIN POWER AND LIGHT
EDGEWATER GENERATING STATION
I-43 LANDFILL
TOWN OF WILSON, WISCONSIN

BEDROCK POTENTIOMETRIC SURFACE MAP
APRIL 2016

FIGURE 4

I:\25216069.00\Drawings\Wt\1 Large Ma .dwg, 4/16/201 4:13:16 PM

LEGEND

- APPROXIMATE PROPERTY LINE
- MODULE LIMITS
- GRADE (2' CONTOUR)
- 690 GRADE (10' CONTOUR)
- EDGE OF WATER
- SWALE
- CULVERT
- MH MANHOLE
- W CONTACT WATER TRANSFER PIPE
- AB ABANDONED 3" DIA. HDPE PIPE
- TREELINE/TREES
- PAVED ROAD
- UNPAVED ACCESS ROAD
- RAILROAD TRACKS
- FENCE
- UTILITY/LIGHT POLE
- MONITORING WELL
- PIEZOMETER
- PRIVATE WATER SUPPLY WELL
- CCR RULE PIEZOMETER
- 652.05 POTENTIOMETRIC SURFACE ELEVATION
- WATER TABLE CONTOUR
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- CCR RULE UNITS

NOTE:

1. MONITORING WELLS MW-301, MW-303, AND MW-304 WERE INSTALLED BETWEEN NOVEMBER 30, 2015 AND JANUARY 26, 2016 BY BADGER STATE DRILLING INC. DRILLING WAS PERFORMED UNDER THE SUPERVISION OF SCS ENGINEERS.
2. MONITORING WELLS MW-301, MW-302, MW-303 AND MW-304 WERE SURVEYED ON FEBRUARY 8, 2016 BY SCS ENGINEERS.

N

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25216069.00	DRAWN BY:	BJM
DRAWN:	02/22/18	CHECKED BY:	NK
REVISED:	02/22/18	APPROVED BY:	TK 03/06/18

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

CLIENT: ALLIANT ENERGY
ALLIANT ENERGY WISCONSIN POWER AND LIGHT COMPANY

SITE: WISCONSIN POWER AND LIGHT
EDGEWATER GENERATING STATION
I-43 LANDFILL
TOWN OF WILSON, WISCONSIN

BEDROCK POTENTIOMETRIC SURFACE MAP
OCTOBER 2017

FIGURE 5

I:\25216069.00\Drawings\Wt□l□Large Ma□dwg, 4/16/201□4:12:0□PM

4701 WEEDEN CREEK ROAD
130 (10/6/2011)

4124 WEEDEN CREEK ROAD
150 (10/6/2011)

4121 WEEDEN CREEK ROAD
150 (10/5/2011)

4632 FRONTAGE ROAD
120 (10/6/2011)

4700 FRONTAGE ROAD
110 (10/6/2011)

4730 FRONTAGE ROAD
110 (10/6/2011)

4820 FRONTAGE ROAD
100 (10/6/2011)

4928 COUNTY ROAD A
170 (10/5/2011)

4910 FRONTAGE ROAD
92 (10/6/2011)

MW-301
181 (2/23/2017)

5228 COUNTY ROAD A
140 (10/5/2011)

MW-302
151 (1/23/2017)

BEECK WELL
80 (6/21/1978)

WS-1
170
(9/21/1988)

MW-303
99.8 (1/23/2017)

5425 RACETRACK ROAD
110 (10/5/2011)

5326 COUNTY ROAD A
180 (10/5/2011)

5331 COUNTY ROAD A
220 (10/5/2011)

GOEBEL WELL
170 (5/15/1978)

5515 RACETRACK ROAD
110 (10/5/2011)

MW-304
106 (10/16/2016)

5619 ROEHRBORN ROAD
110 (10/5/2011)

94.4 (2/23/2017)
MW-305

4202 STAHL ROAD
72 (10/5/2011)

3836 STAHL ROAD
120 (10/5/2011)

5327 STAHL ROAD
170 (10/5/2011)

LEGEND

- APPROXIMATE LIMITS OF WASTE
- APPROXIMATE PRIVATE WELL LOCATION
- APPROXIMATE PRIVATE WELL LOCATION ABANDONED
- CCR RULE PIEZOMETER
- 170 (5/15/1978) MAXIMUM DETECTED BORON CONCENTRATION (ug/L) AND CORRESPONDING SAMPLE DATE
- PRIVATE WATER SUPPLY WELL

N

600 0 600

SCALE: 1" = 600'

PROJECT NO.	25216069.17	DRAWN BY:	BJM
DRAWN:	02/20/18	CHECKED BY:	NK
REVISED:	02/22/18	APPROVED BY:	TK 03/06/18

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

CLIENT: ALLIANT ENERGY
ALLIANT ENERGY WISCONSIN POWER AND LIGHT COMPANY

SITE: WISCONSIN POWER AND LIGHT
EDGEWATER GENERATING STATION
I-43 LANDFILL
TOWN OF WILSON, WISCONSIN

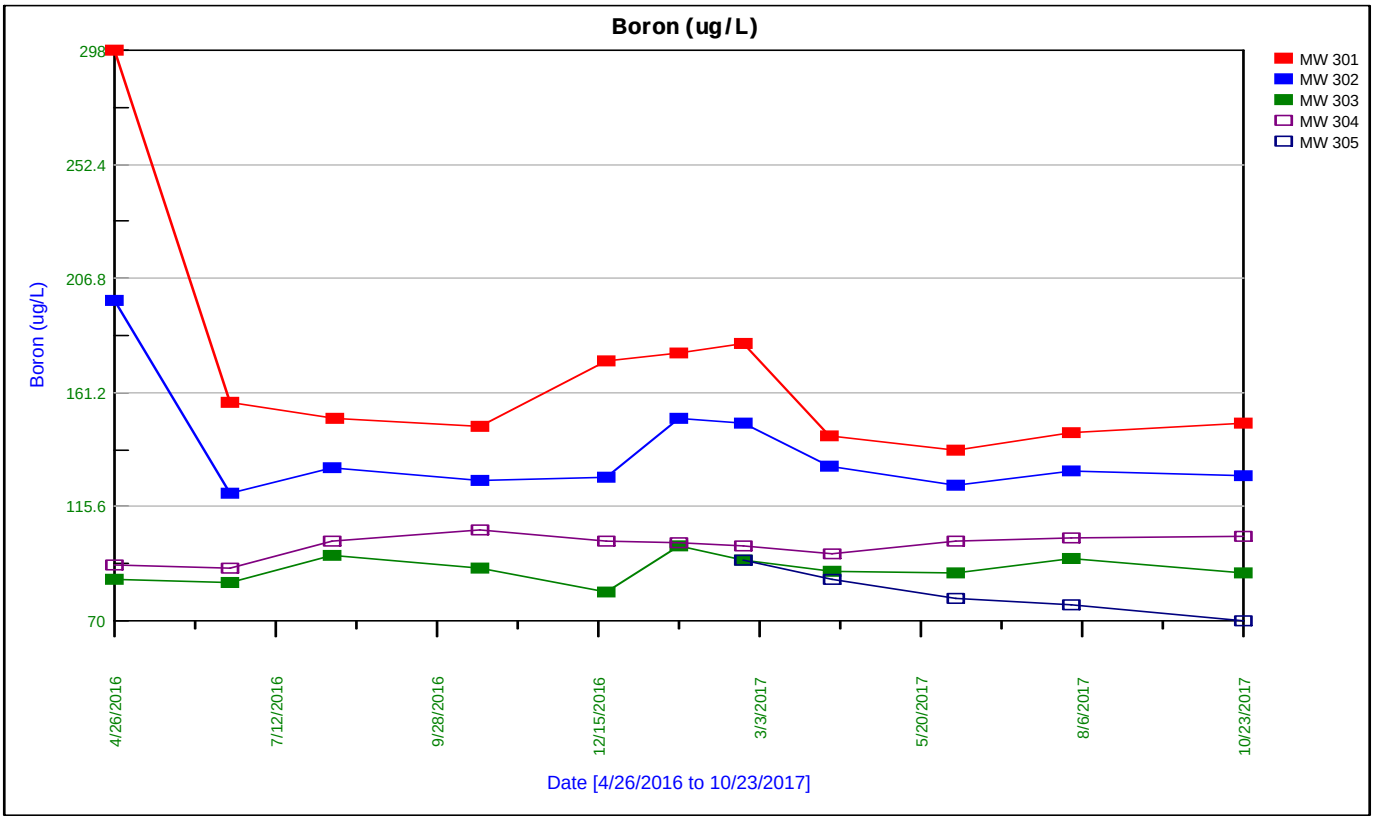
BEDROCK AQUIFER BORON CONCENTRATIONS

FIGURE 6

I:\25216069.00\Drawings\Private Well Location Map.dwg, 3/14/2018 9:46:53 AM

APPENDIX A

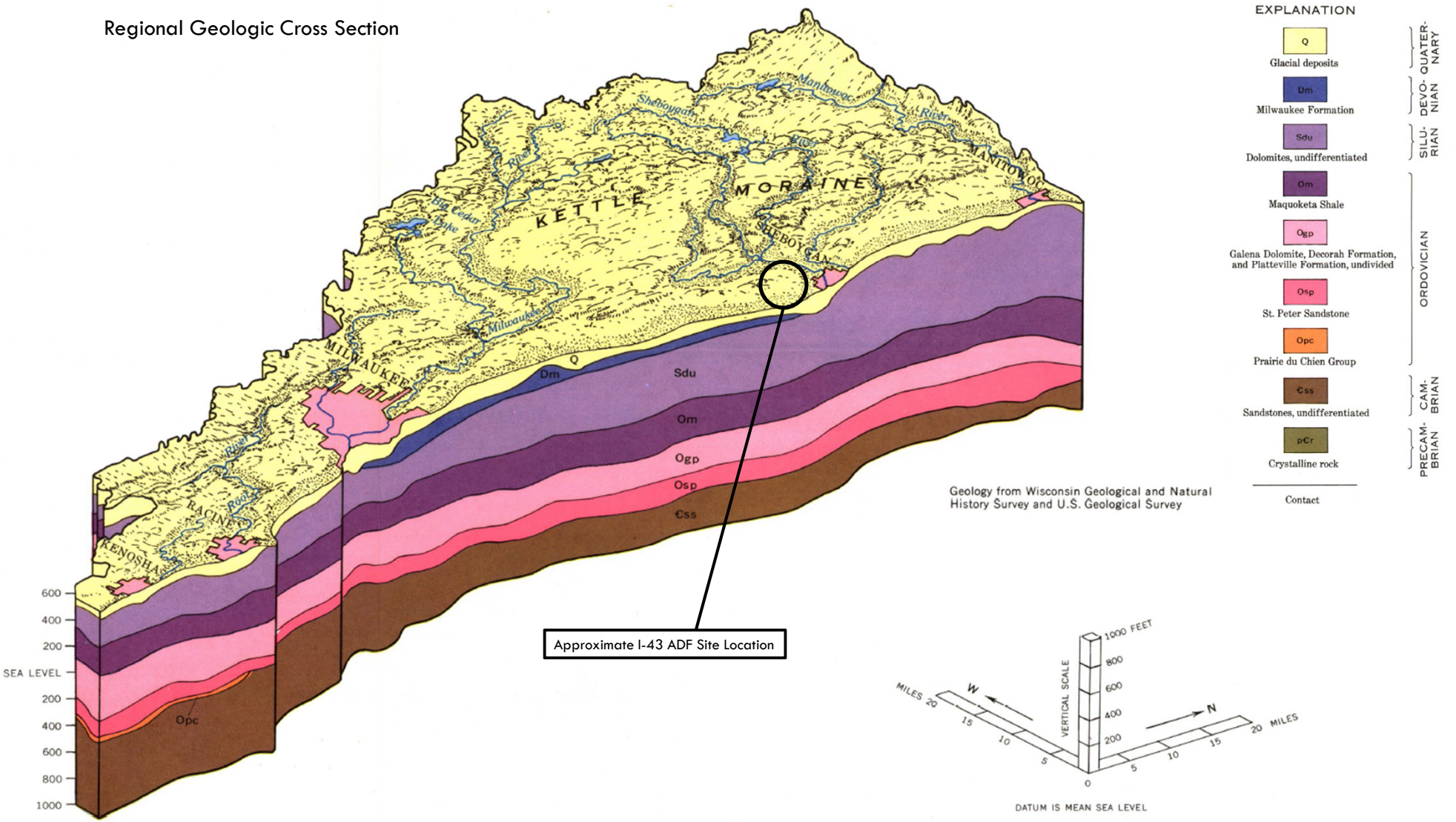
CCR Well Trend Plot – Boron


Boron (ug/L)
298
252.4
206.8
161.2
115.6
70
Boron (ug/L)
MW 301
MW 302
MW 303
MW 304
MW 305
4/26/2016
7/12/2016
9/28/2016
12/15/2016
3/3/2017
5/20/2017
8/6/2017
10/23/2017
Date [4/26/2016 to 10/23/2017]

APPENDIX B

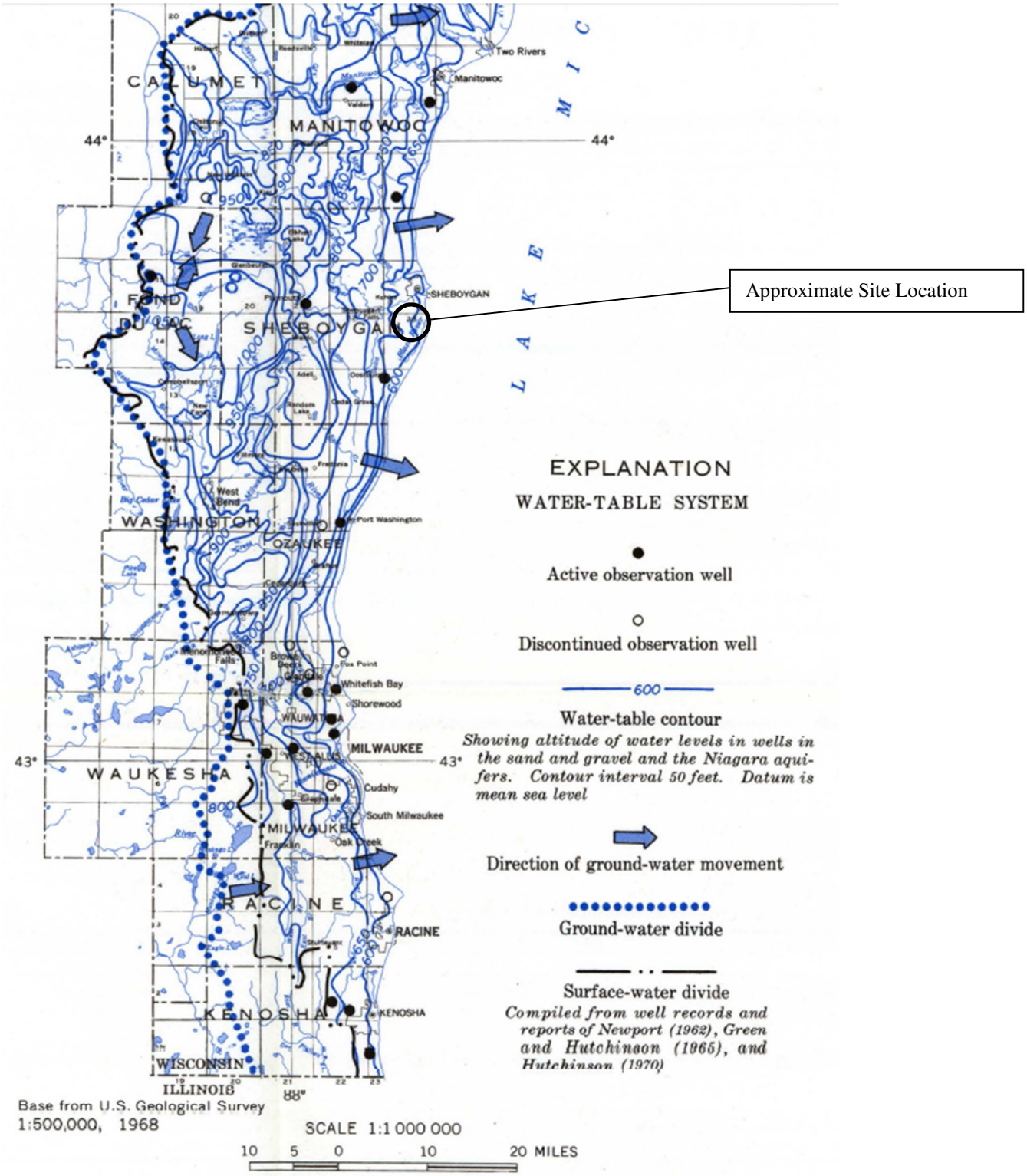
Regional Geologic and Hydrogeologic Background Information

Regional Geologic Cross Section



Source: Skinner, Earl L. and Ronald G. Borman, Water Resources of Wisconsin-Lake Michigan Basin, Department of the Interior United States Geological Survey Hydrogeologic Investigations Atlas HA-432, 1973.

Regional Groundwater Flow Map – Uppermost Aquifer



Source: Skinner, Earl L. and Ronald G. Borman, Water Resources of Wisconsin-Lake Michigan Basin, Department of the Interior United States Geological Survey Hydrogeologic Investigations Atlas HA-432, 1973.

Table I43-3. Regional Hydrogeologic Stratigraphy
Edgewater I-43 Landfill / SCS Engineers Project #25216069

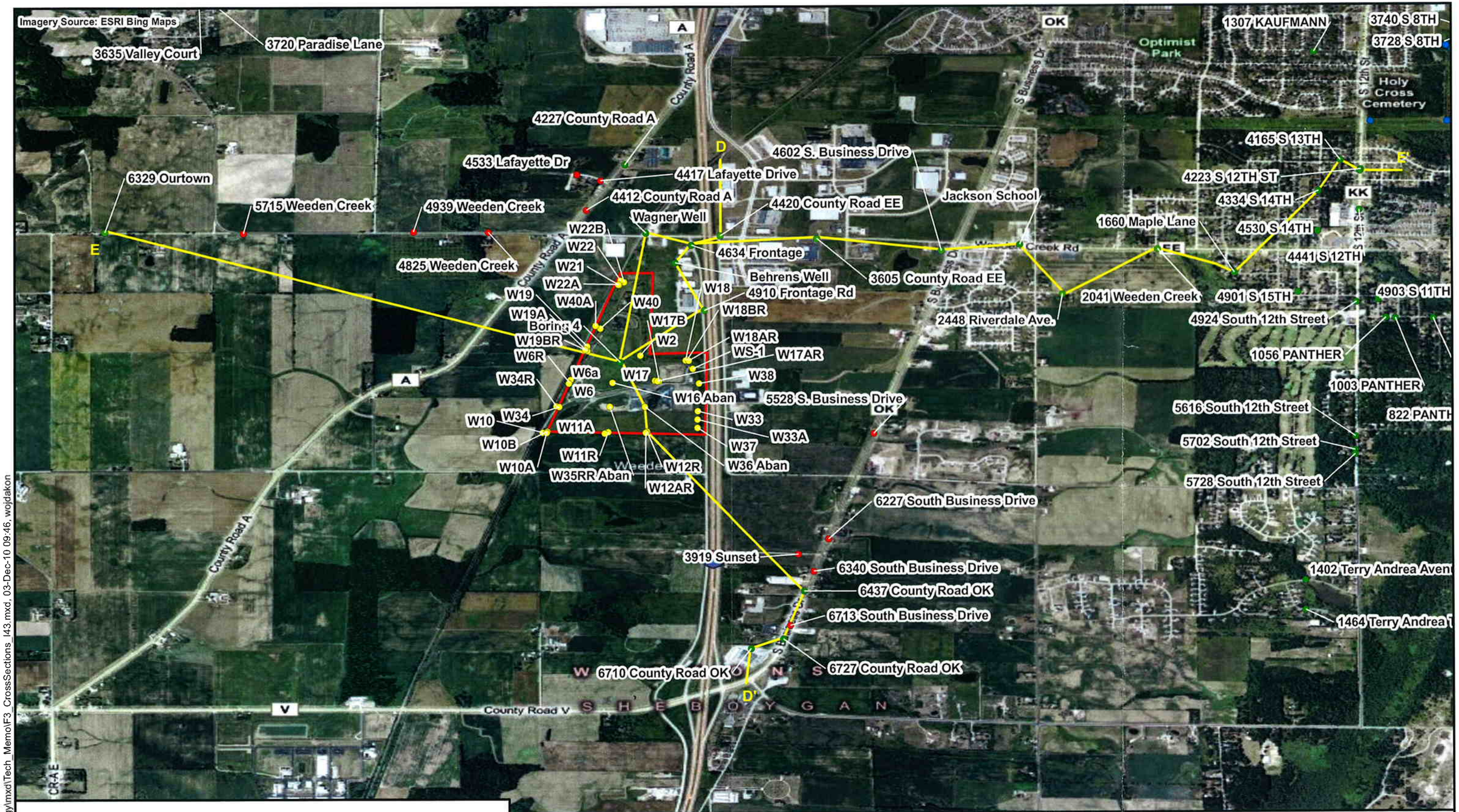
Age	Hydrogeologic Unit	General Thickness (feet)	Name of Rock Unit*	Predominant Lithology
Quaternary	Sand and Gravel Aquifer	0 to 235	Surface sand and gravel	Sand and Gravel
		0 to 300	Buried sand and gravel	
Devonian	Niagara Dolomite Aquifer	0 to 750	Dolomite (undifferentiated)	Dolomite
Silurian				
Ordovician	Confining Unit	0 to 400	Maquoketa Shale	Shale and dolomite
	Sandstone Aquifer	100 to 340	Galena Decorah Platteville	Dolomite
		0 to 330	St. Peter	Sandstone
		0 to 140	Prairie du Chien	Dolomite
Cambrian		0 to 3,500?	Trempeleau Franconia Galesville Eau Claire Mt. Simon	Sandstone, some Dolomite and Shale
Precambrian	Not an Aquifer	Unknown	Crystalline Rocks	Igneous and metamorphic rocks

Source:
Skinner, Earl L. and Ronald G. Borman, Water Resources of Wisconsin-Lake Michigan Basin, Department of the Interior United States Geological Survey Hydrogeologic Investigations Atlas HA-432, 1973.

I:\25216069.00\Reports\2018 ASD Report\Attachment A Regional Geology and Hydro\Regional_Hydrogeologic_Stratigraphy_I43.doc

APPENDIX C

Geologic Cross Sections from 2010 Weston Report



Legend

Observation Wells
- I43 Wells
- I4 Wells

Residential Wells
- Sampled in 1990
- Not Sampled

Landfill Boundary

0 2,000 Feet

N

Prepared For:
US EPA Region V
Contract No.: EP-S5-06-04
TDD: S05-0001-1005-007
DCN: 1040-2A-AJZM

Prepared By:
WESTON SOLUTIONS, INC.
7800 Outer Drive, Suite 200
Detroit, Michigan 48235

Figure 3
Well and Cross Section Locations - I43 Landfill
Alliant Energy
Sheboygan, Sheboygan County, Wisconsin

File: D:\Alliant_Energy\mxd\Tech_Memo\F3_CrossSections_I43.mxd, 03-Dec-10 09:46, wojdakon

NORTH

D

SOUTH

D'

APPROX. EXTENT OF I-43 LANDFILL

4420 CNTY EE

4634 FRONTAGE RD

BEHRENS D

4910 FRONTAGE RD

B-4

W 36 ABAND.

W 12AR

W 12R

6437 CNTY OK

6727 CNTY OK

6710 CNTY OK

CLAY DIAMICTON
(clay, sand, trace gravel)

HARD CLAY DIAMICTON
(compacted)

FEET ABOVE MSL

720 700 680 660 640 620 600 580 560 540 520 500 480 460 440 420 400 380 360

134'

178'

220'

303'

20'

30'

90'

242'

255'

375'

LEGEND

- SAND
- SANDY CLAY/ CLAYEY SAND
- CLAY DIAMICTON
- HARD PAN
- DOLOMITE
- WELL BORE
- WELL CASING
- WELL SCREEN
- 120' DENOTES END-OF-BORING IN FEET BELOW GROUNDSURFACE

0 800

SCALE
(feet)

Figure 7

Prepared for:
U.S. EPA. REGION V
Contract No: EP-S5-06-04

TDD NO: S05-0008-0805-012
DCN: 1040-2A-AJZM

Prepared by:
WESTON SOLUTIONS, INC.

7800 West Outer Drive, Ste. 200
Detroit, MI

GEOLOGIC CROSS-SECTION D-D' - I43 LANDFILL
ALLIANT ENERGY
SHEBOYGAN, SHEBOYGAN COUNTY, MICHIGAN

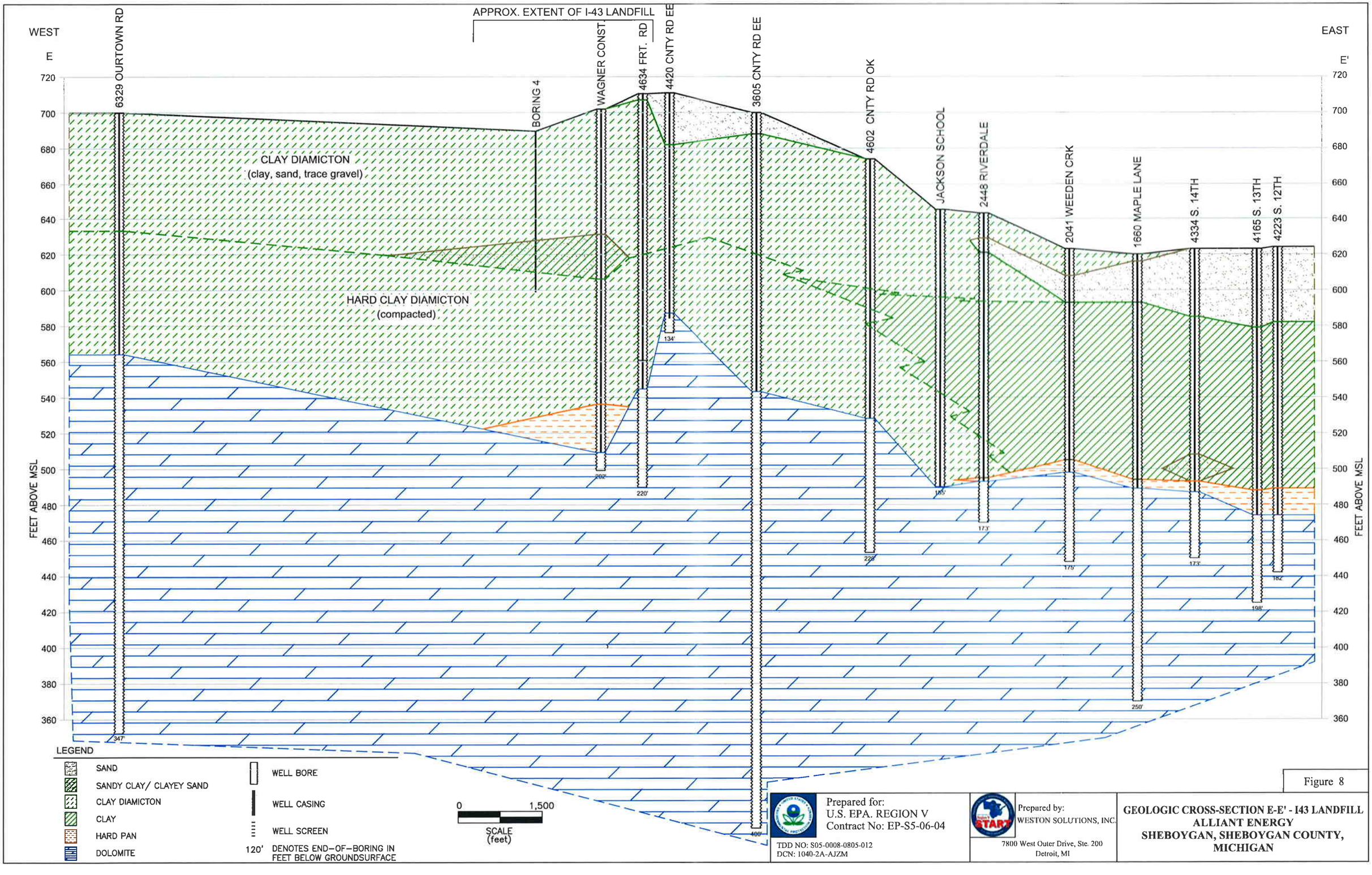


Figure 8

Prepared for:
U.S. EPA. REGION V
Contract No: EP-S5-06-04

TDD NO: S05-0008-0805-012
DCN: 1040-2A-AJZM

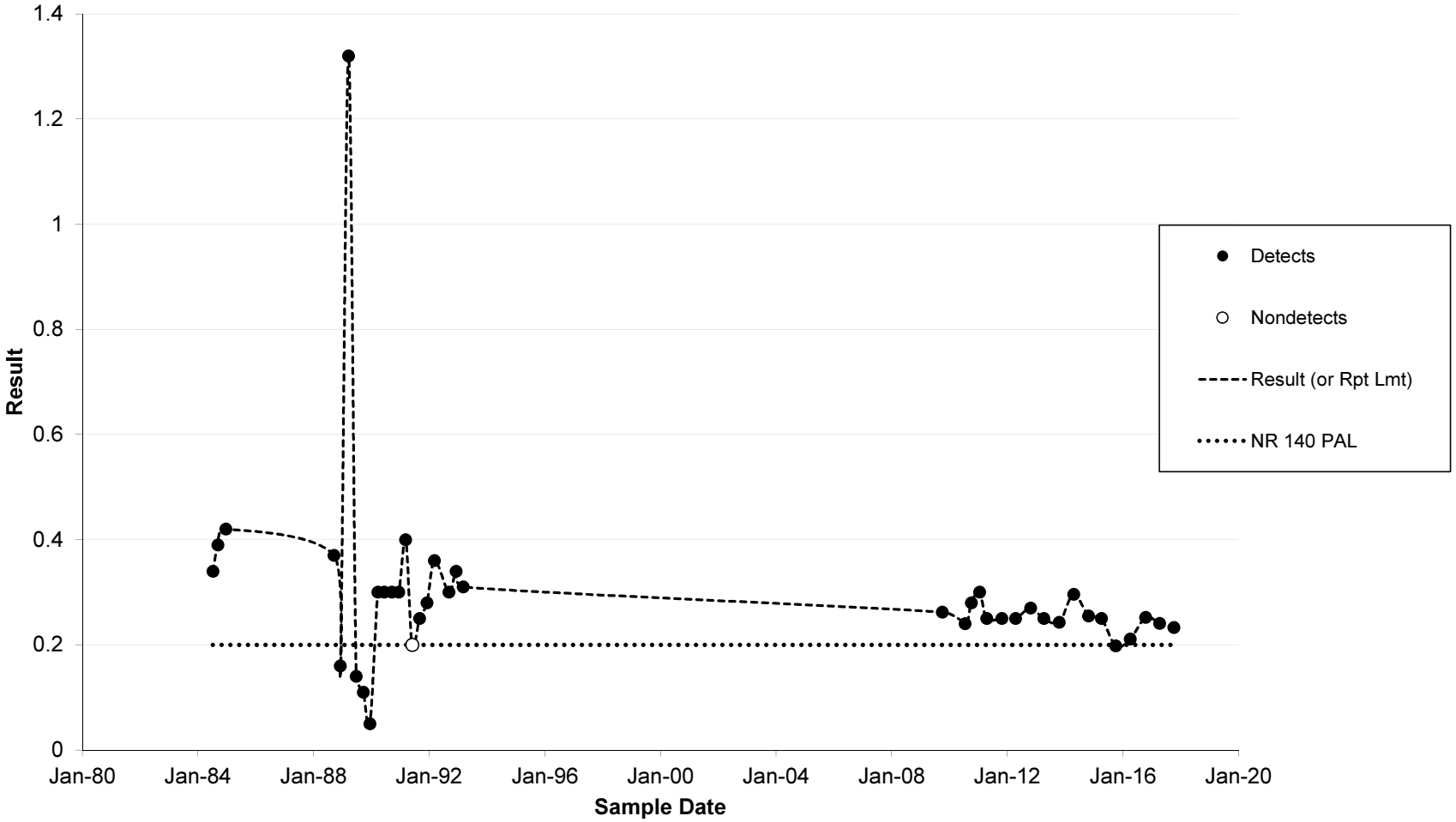
Prepared by:
WESTON SOLUTIONS, INC.
7800 West Outer Drive, Ste. 200
Detroit, MI

GEOLOGIC CROSS-SECTION E-E' - I43 LANDFILL
ALLIANT ENERGY
SHEBOYGAN, SHEBOYGAN COUNTY, MICHIGAN

APPENDIX D

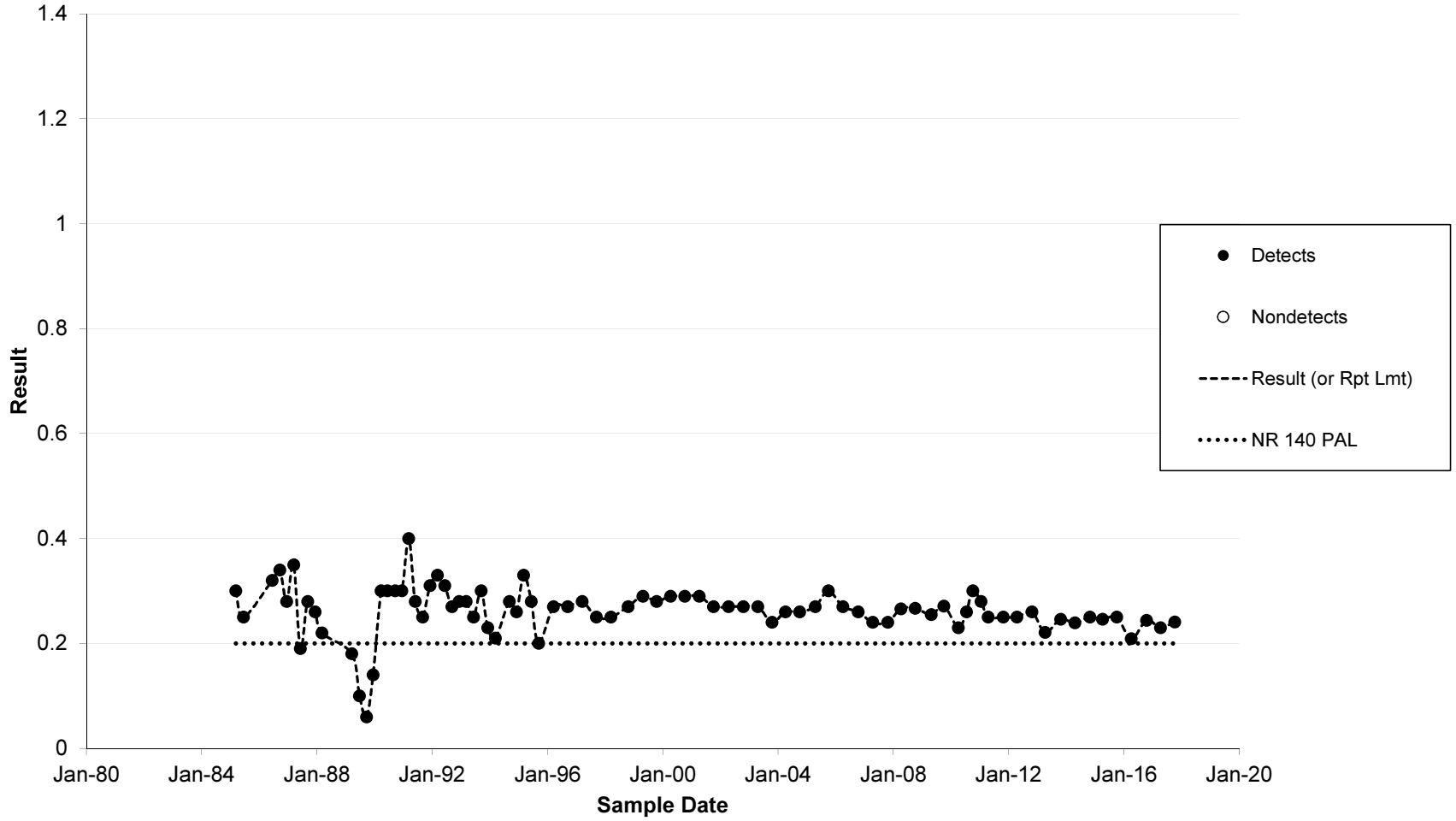
Long-Term Boron Trend Plots – Selected State Monitoring Program Wells

Wisconsin Power & Light Company
Edgewater I-43 Ash Disposal Facility
W-018 - Boron, dissolved (mg/l as B)



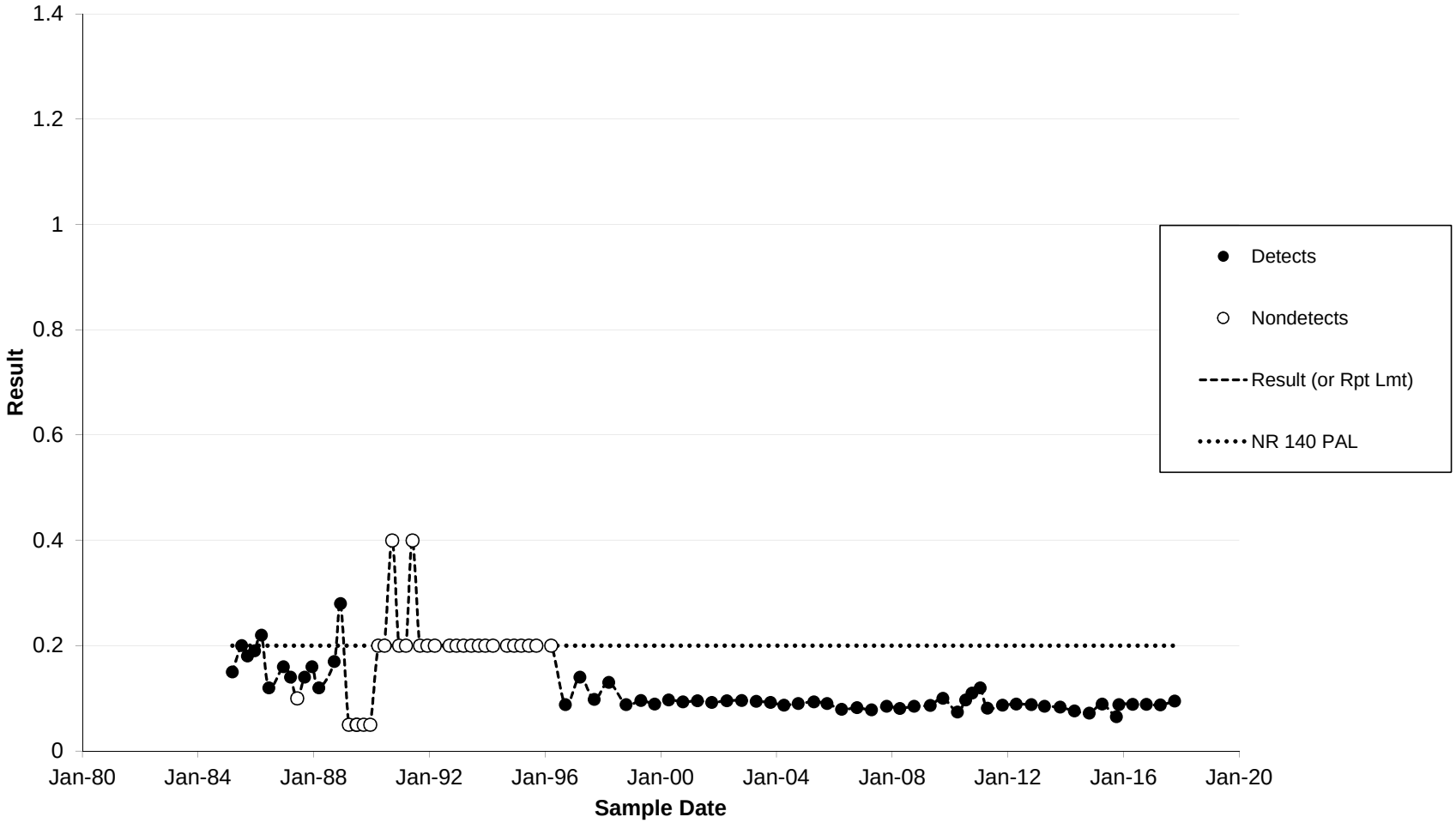
I:\25216069.00\Reports\2018 BR\E_Graphs\Bo_EDG I-43W-18 2/16/2018

Wisconsin Power & Light Company
Edgewater I-43 Ash Disposal Facility
W-033A - Boron, dissolved (mg/l as B)



I:\25216069.00\Reports\2018 BR\E_Graphs\Bo_EDG I-43W-33A 2/16/2018

Wisconsin Power & Light Company
Edgewater I-43 Ash Disposal Facility
WS-001 - Boron, µg/L



I:\25216069.00\Reports\ASD Report\Attachment E Boron Graphs\Bo_EDG I-43_WS1WS-1 2/22/2018

B2 Alternative Source Demonstration, April 2018 Detection Monitoring

Alternative Source Demonstration
April 2018 Detection Monitoring

Edgewater Generating Station
I-43 Ash Disposal Facility
Town of Wilson
Sheboygan County, Wisconsin

Prepared for:

Alliant Energy

SCS ENGINEERS

25216069.18 | October 30, 2018

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

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PE CERTIFICATION

I, Sherren Clark, hereby certify that that the information in this alternate source demonstration is accurate and meets the requirements of 40 CFR 257.94(e)(2). This certification is based on my review of the groundwater data and related site information available for the Edgewater Generating Station I-43 Ash Disposal Facility. I am a duly licensed Professional Engineer under the laws of the State of Wisconsin.

SL Clark 10-29-18

(signature) (date)

Sherren Clark

(printed or typed name)

License number E-29863

My license renewal date is July 31, 2020.

Pages or sheets covered by this seal:

Alternative Source Demonstration
April 2018 Detection Monitoring
I-43 Ash Disposal Facility

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1.0 INTRODUCTION

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

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

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

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

This ASD report is evaluating the SSIs observed in the statistical evaluation of the April 2018 detection monitoring event at the Edgewater I-43 Ash Disposal Facility (I-43 ADF). An ASD was previously prepared for this facility evaluating the SSIs observed in the statistical evaluation of the October 2017 detection monitoring event (SCS Engineers [SCS], 2018b). The October 2017 ASD (dated April 2018) concluded that several lines of evidence demonstrated that SSIs reported for boron concentrations in downgradient monitoring wells MW-301 and MW-302 were likely due to naturally occurring boron in the bedrock aquifer at the I-43 ADF.

As discussed in more detail in **Section 4.2** of this ASD, the findings for the April 2018 monitoring event were consistent with those for the previous event.

1.2 SITE INFORMATION AND MAP

The I-43 ADF is located in the Town of Wilson, Sheboygan County, Wisconsin (**Figure 1**). The I-43 ADF receives CCR from the Edgewater Generating Station. The layout of the site on an aerial photograph base is shown on **Figure 2**. The I-43 ADF is operated under Wisconsin Department of Natural Resources (WDNR) License No. 02853.

The I-43 ADF includes a closed landfill (Phases 1 and 2) and multiple existing CCR Units which are landfill modules in Phases 3 and 4 of the facility. Contact water basins and storm water runoff basins, which do not receive CCR, are also present at the site. The existing CCR Units evaluated for this ASD are listed below:

- Phase 3, Module 1 (existing CCR Landfill)
- Phase 3, Module 2 (existing CCR Landfill)

- Phase 4, Module 1 (existing CCR Landfill)

These CCR Units are monitored with a multi-unit groundwater monitoring system.

The closed landfill (Phase 1 and Phase 2) was completely closed in 2012. The closed landfill did not accept CCR after October 19, 2015; therefore, it is not subject to the requirements of 40 CFR 257.50-107. The closed landfill was constructed with a 5-foot compacted clay liner.

The active landfill, which comprises the three CCR Units, is constructed with a composite liner system including 2 feet of compacted clay and a 60-mil high density polyethylene (HDPE) geomembrane, overlain by a leachate collection drainage layer. The active landfill first accepted CCR for disposal in October 2011.

A map showing the CCR Units and all background (or upgradient) and downgradient monitoring wells with identification numbers for the CCR groundwater monitoring program and the state monitoring program is provided as **Figure 2**.

1.3 STATISTICALLY SIGNIFICANT INCREASES IDENTIFIED

The only SSIs for the April 2018 monitoring event were for boron at monitoring wells MW 301 and MW-302. A summary of the April 2018 constituent concentrations and the established benchmark concentrations is provided in **Table 1**. The October 2017 results are also included for comparison. The constituent concentrations with SSIs above the background concentration are highlighted in the table.

1.4 OVERVIEW OF ASD

This ASD report includes:

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

The boron results from background and compliance sampling are provided in **Table 2**. Complete laboratory reports for the background monitoring events and the October 2017 detection monitoring event were included in the 2017 Annual Groundwater Monitoring and Corrective Action Report for the I-43 ADF. The laboratory report for the April 2018 detection monitoring event was previously transmitted to WPL and will be included in the 2018 Annual Report due in January 2019.

2.0 BACKGROUND

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

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

A more detailed discussion of the background information for the site is provided in the ASD for the October 2017 event (SCS, 2018b).

2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

2.1.1 Regional Information

For the purposes of groundwater monitoring, the Niagara Dolomite Aquifer is considered to be the uppermost aquifer unit, as defined under 40 CFR 257.53, at the I-43 ADF. The dolomite aquifer is underlain by the Maquoketa shale, which is a confining unit. The Maquoketa shale is underlain by the Cambrian-Ordovician sandstone aquifer. This sequence of sedimentary bedrock units is over 1,500 feet thick in the area of the I-43 ADF. The sedimentary sequence is underlain by Precambrian crystalline rocks that are not considered an aquifer in eastern Wisconsin.

An unconsolidated sand and gravel aquifer is present in some parts of Sheboygan County (Skinner and Borman, 1973), but does not appear laterally extensive.

Regional groundwater flow in the dolomite aquifer in the vicinity of the site is to the east or northeast.

2.1.2 Site Information

Soils at the site are primarily clay with discontinuous layers of sand and silty sand to a depth of at least 100 feet. During drilling of the CCR wells, the unconsolidated materials were identified as consisting primarily of clay. Zones of sand and gravel are known to be present within the clay, but these appear to be discontinuous and no nearby private wells screened within the unconsolidated material have been identified. Soils encountered in borings MW-301, MW-302, MW-303, and MW-304 were primarily lean clay, silty clay, and silty sand. The upper 70 feet of soils in boring MW-305 were similar, but in approximately the lower 40 feet above bedrock, sand was the primary soil type. The depth to bedrock in the five wells ranged from approximately 109 feet to 133 feet below ground surface (bgs), and the elevation of the top of bedrock ranged from approximately 568 feet above mean sea level (amsl) to 605 feet amsl.

Shallow groundwater at the site generally flows east to west towards Weedens Creek, a tributary of the Sheboygan River. The April 2018 flow direction to the west at the water table is consistent with previous water table maps developed since the site was developed in the mid-1980s.

Groundwater elevations at the CCR wells are summarized in **Table 3**. The April 2018 potentiometric surface map for the dolomite aquifer (**Figure 3**), based on groundwater elevations from monitoring wells MW-301 through MW-305, shows groundwater flow to the north and northeast, consistent with previous potentiometric surface maps. The potentiometric surface map confirms that monitoring wells MW-301 and MW-302 are downgradient from the active CCR Units.

2.2 CCR RULE MONITORING SYSTEM

The groundwater monitoring system established in accordance with the CCR Rule consists of two upgradient (background) monitoring wells and three downgradient monitoring wells. The background wells include MW-304 and MW-305. The downgradient wells include MW-301, MW-302, and MW-303. The CCR Rule wells are installed in the upper portion of the dolomite aquifer. Well depths range from approximately 119 to 145 feet, measured from the top of the well casing.

2.3 OTHER MONITORING WELLS

Thirty-four groundwater monitoring wells currently exist at the I-43 ADF as part of the monitoring system developed for the state monitoring program. The well locations are shown on **Figure 2**. These monitoring wells and one on-site water supply well (WS-1) are used to monitor groundwater conditions at the site under WDNR License No. 02853, which includes the closed Phase 1/2 Landfill and the active Phase 3/4 Landfill.

Monitoring wells for the state monitoring program are installed in the unconsolidated glacial till unit, which is not the uppermost aquifer as defined under 40 CFR 257.53. This shallow monitoring system includes water table wells, mid-depth piezometers, and deep piezometers. Well depths range from approximately 15 to 49 feet, measured from the top of the well casing.

3.0 METHODOLOGY AND ANALYSIS REVIEW

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

3.1 SAMPLING AND FIELD ANALYSIS REVIEW

Field notes and sampling results were reviewed to determine if any sampling error may have caused or contributed to the observed SSIs for boron. Potential field sampling errors or issues could include mislabeling of samples, improper sample handling, missed holding times, cross contamination during sampling, or other field error. Field blank sample results were also reviewed for any indication of potential contamination from sampling equipment or containers. Based on the review of the field notes and results, SCS did not identify any indication that the boron SSIs were due to a sampling error.

Because boron is a laboratory parameter, there is little potential for a field analysis error to contribute to an SSI.

3.2 LABORATORY ANALYSIS REVIEW

Laboratory report for the April 2018 detection monitoring were reviewed to determine if any laboratory analysis error or issue may have caused or contributed to the observed SSIs for boron. The laboratory report review included reviewing the laboratory quality control flags and narrative, verifying that correct methods were used and desired detection limits were achieved, and checking the field and laboratory blank sample results. Laboratory reports for the background monitoring and the October 2017 detection monitoring event were included in the 2017 Annual Groundwater Monitoring and Corrective Action Report for the facility, and were reviewed as part of the ASD preparation for the October 2017 detection monitoring event.

Based on the review of the laboratory reports, SCS did not identify any indication that the boron SSIs were due to a laboratory analysis error. There were no laboratory quality control flags or issues identified in the laboratory report that affect the usability of the data for detection monitoring.

A time series plot of the boron analytical data was also reviewed for any anomalous results that might indicate a possible sampling or laboratory error (e.g., dilution error or incorrect sample labeling). The time series plot for boron is provided in **Appendix A**. The April 2018 boron results for MW-301 and MW-302 are consistent with the historical data.

3.3 STATISTICAL EVALUATION REVIEW

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

- Input analytical data vs. laboratory analytical reports
- Review of statistical method and outlier concentration lists for each monitoring well/CCR Unit

Based on the review of the statistical evaluation, SCS did not identify any errors or issues in the statistical evaluation that caused or contributed to the determination of interwell SSIs for boron at wells MW-301 and MW-302.

3.4 SUMMARY OF METHODOLOGY AND ANALYSIS REVIEW FINDINGS

In summary, there were no changes to the SSI determinations for the April 2018 monitoring event based on the methodology and analysis review, and no errors or issues causing or contributing to the reported boron SSIs were identified.

4.0 ALTERNATIVE SOURCES

This section of the report discusses the potential alternative sources for the boron SSIs at MW-301 and MW-302, identifies the most likely alternative source(s), and presents the lines of evidence indicating that an alternative source is the most likely cause of the observed SSIs for boron.

4.1 POTENTIAL CAUSES OF SSI

4.1.1 Natural Variation

The statistical analysis was completed using an interwell approach, comparing the April 2018 detection monitoring results to the Upper Prediction Limits (UPLs) calculated based on sampling of the background wells (MW-304 and MW-305). If concentrations of a constituent that is naturally present in the aquifer vary spatially, then the potential exists that the downgradient concentrations may be higher than upgradient concentrations due to natural variation.

Boron was detected in both the upgradient (background) and downgradient (compliance) monitoring wells, which is an indication that it is naturally present in the aquifer. The boron concentrations detected in the April 2018 monitoring event were consistent with previous results for MW-301 and MW-302. Additional regional and site information is discussed below, indicating that natural variation is a likely cause of the boron SSIs for wells MW-301 and MW 302.

4.1.2 Man-Made Alternative Sources

Man-made alternative sources that could potentially contribute to the boron SSIs at MW-301 and MW-302 include the closed I-43 Phase 1/2 Landfill, the contact water basin, or the ash unloading area. Based on monitoring performed since the mid-1980s under the state monitoring program,

these potential sources do not appear to be the cause of the SSIs in MW-301 or MW-302. The highest boron concentrations in the shallow unconsolidated deposits monitored for the state program have typically been observed in samples from upgradient piezometers. Further, the closed Phase 1/2 Landfill was constructed with a 5-foot-thick compacted clay liner that is designed to inhibit the movement of leachate beyond the footprint of the closed landfill.

4.2 LINES OF EVIDENCE

The lines of evidence indicating that the SSIs for boron in compliance wells MW-301 and MW 302, relative to the background wells, are due to natural variability include:

1. The hydraulic conductivity of the thick glacial till aquitard overlying the dolomite aquifer is very low, and there is limited hydrogeologic connection between the shallow groundwater and the aquifer.

2. Groundwater monitoring in the glacial till before and after disposal of CCR at the I-43 ADF shows boron is naturally occurring in the till.

3. The boron results for MW-301 and MW-302 are within the range of boron detected in water supply wells obtaining water from the dolomite aquifer in the site vicinity.

4. Boron concentrations in the on-site water supply well have been generally decreasing or stable since the first samples were collected prior to the initial CCR disposal in the closed landfill (Phases 1 and 2) in 1986.

5. The active Phase 3/4 landfill was constructed with a clay and/or composite liner system, so the potential for a release is very low.

Each of these lines of evidence and the supporting data were discussed in detail in the ASD for the October 2017 detection monitoring event (SCS, 2018b). The lines of evidence are discussed briefly below, focusing on any updated information collected since the previous ASD, with references to the previous ASD for additional details.

4.2.1 Glacial Clay Till Hydraulic Conductivity

The glacial clay till at the I-43 ADF is an aquitard with very low vertical hydraulic conductivity. A site review completed by Weston for the USEPA in 2010 found that samples of the native upper clay till collected by Warzyn Engineering, Inc. (Warzyn) in 1981 contained 65 to 85 percent clay size particles, indicating low hydraulic conductivity.

Vertical hydraulic conductivity tests of the clay till, completed as part of the 1981 Warzyn study, found the upper clay till ranged from 5 to 9 x 10-8 cm/s. The 1981 Warzyn study estimated the time required for groundwater to traverse vertically through the till to be “on the order of hundreds if not thousands of years” (Warzyn, 1981). Observed high vertical gradients provide further documentation of very low vertical hydraulic conductivity at the site (Weston, 2010). These results suggest there is limited hydrogeologic connection between the upper shallow till aquitard and the uppermost bedrock aquifer.

4.2.2 Upgradient Mid-Depth Piezometers Boron Concentrations

Groundwater monitoring in the glacial till before and after disposal of CCR at the I-43 ADF shows boron is naturally occurring in the till. Samples from upgradient mid-depth piezometers W-18 and

W-33A (both approximately 50 feet deep) have had boron concentrations in the range of 200 to 400 micrograms per liter (µg/L) since the first samples were collected in the mid-1980s, prior to CCR disposal. The W-18 and W-33A results suggest that a natural source of boron is present in the glacial till. Historical boron data for the mid-depth piezometers sampled under the state monitoring program are included in the April 2018 ASD (SCS, 2018b). The April 2018 boron results for W-18 and W-33 were consistent with previous results.

4.2.3 Private Well Boron Concentration

The boron results for MW-301 and MW-302 are within the range of boron detected in private water supply wells obtaining water from the dolomite aquifer in the site vicinity. Additional information regarding boron concentrations in nearby private wells is included in the April 2018 ASD (SCS, 2018b). No new private well sampling for boron has been conducted since the April 2018 ASD was prepared.

The presence of high boron concentrations observed within the bedrock upgradient and west of the site indicates 1) there is a natural source of boron in the bedrock aquifer, and 2) that the concentrations of boron reported for samples from MW-301 and MW-302 are within the range of natural background concentrations.

4.2.4 Site Supply Well Boron Concentrations

Boron concentrations in the on-site water supply well (WS-1) have been generally decreasing or stable since the first samples were collected prior to the initial CCR disposal in the closed landfill (Phases 1 and 2) in 1986. The site supply well obtains water from the dolomite bedrock. The boron concentrations at the downgradient monitoring wells, MW-301 and MW-302, are within range of the concentrations observed in the site supply well, WS-1. These results are consistent with a natural source of boron and show no impact from CCR disposal at the I-43 site. Historical boron concentrations at WS-1 are included in the April 2018 ASD (SCS, 2018b). The April 2018 boron result for WS-1 was consistent with previous results.

4.2.5 Liner Construction

The active landfill, which comprises the three CCR Units, is constructed with a low permeability liner system that minimizes potential leakage. Phase 4 Module 1 was constructed with a 5-foot compacted clay liner. Phase 3 Modules 1 and 2 were constructed with a composite liner system including 2 feet of compacted clay and a 60-mil HDPE geomembrane. The compacted clay hydraulic conductivity is less than 10-7 centimeter per second for all modules, documented through construction quality assurance testing. All constructed modules have a leachate collection drainage layer overlying the liner. The collected leachate flows by gravity and/or is pumped to the contact water basin. The leachate/contact water swales and contact water basin have composite liners, consisting of compacted clay overlain by a 60-mil HDPE geomembrane.

5.0 ASD CONCLUSIONS

The lines of evidence discussed above regarding the SSIs reported for boron concentrations in downgradient monitoring wells MW-301 and MW-302 demonstrate that the SSIs are likely due to naturally occurring boron in the bedrock aquifer at the I-43 ADF.

6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS

In accordance with section 257.94(e)(2) of the CCR Rule, the I-43 site may continue with detection monitoring based on this ASD. The ASD report will be included in the 2018 Annual Report due January 31, 2019.

For future detection monitoring events, SCS recommends that the statistical method for evaluating boron data at the three compliance wells be modified to an intrawell approach. This approach is appropriate for constituents which exhibit natural spatial variability, as has been documented for boron at the I-43 facility.

7.0 REFERENCES

Mead and Hunt, Inc., 1977, Preliminary Site Feasibility Report for Ash Disposal Site, Beeck-Goebel Properties, Wilson Township, Sheboygan County, WI, December 1977.

SCS Engineers, 2018a, 2017 Annual Groundwater Monitoring and Corrective Action Report, I 43 Ash Disposal Facility, January 2018.

SCS Engineers, 2018b, Alternative Source Demonstration, October 2017 Monitoring Event, I-43 Ash Disposal Facility, April 2018.

Skinner, Earl L. and Ronald G. Borman, Water Resources of Wisconsin-Lake Michigan Basin, Department of the Interior United States Geological Survey Hydrogeologic Investigations Atlas HA-432, 1973.

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

Warzyn Engineering, Inc., 1981, Summary Report, Proposed Fly Ash Disposal Facility, Beeck-Goebel Properties, Edgewater Power Plant – Unit 5, Wisconsin Power and Light Company, 1981.

Weston Solutions, Inc., 2010, Technical Memorandum: Alliant Energy Site – Site Historical Information Review and Evaluation, Sheboygan County, WI, December 2010.

Tables

Table 1. Detection Monitoring Results Summary - April 2018
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

Parameter Name	Units	Interwell Upper Prediction Limit (UPL)	Background Wells				Compliance Wells					
			MW 304		MW 305		MW 301		MW 302		MW 303	
			Oct-17	Apr-18	Oct-17	Apr-18	Oct-17	Apr-18	Oct-17	Apr-18	Oct-17	Apr-18
Boron	µg/L	116.3	104	98.6	70	71.7	**149**	**136**	**128**	**124**	89	94.6
Calcium	mg/L	118,100	20,100	20,200	90,700	83,000	48,700	36,700	31,200	30,000	29,100	31,900
Chloride	mg/L	26.75	1.7 J	1.7 J, M0	21.5	21.8	4.7	4.7	5.5	5.2	6.8	5
Fluoride	mg/L	0.747	0.54	0.5	0.64	0.63, M0	0.62	0.62	0.71	0.73	0.66	0.54
Field pH	Std. Units	8.77	7.74	7.99	7.55	7.54	7.82	8.02	7.7	8.02	7.59	7.98
Sulfate	mg/L	140	14.2	15.2	134	129	8.6	9.3	26.3	22.6	67.1	27.3
Total Dissolved Solids	mg/L	678	208	222	540	566	236	214	238	248	304	260

136 Statistically significant increase at compliance well

Notes:

1. UPL based on parametric prediction limit based on 1-of-2 resampling methodology for all parameters except sulfate. Optional resampling was not performed for boron.
2. UPL for sulfate based on non-parametric prediction limit (highest background value).
3. UPLs calculated from background well results for April 2016 through October 2017.

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

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

I:\25216069.00\Reports\2018 ASD Report #2\[Tables 1,2,3.xlsx]Table 1. Detection Monit. Sum

Table 2. Boron Concentrations - CCR Rule Monitoring Well Network
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

Well Group	Well	Collection Date	Boron (µg/L)
Background	MW 304	4/26/2016	92.1
		6/21/2016	90.9
		8/9/2016	102
		10/19/2016	106
		12/19/2016	102
		1/23/2017	101
		2/23/2017	99.8
		4/7/2017	96.9
		6/6/2017	102
		8/1/2017	103
		10/23/2017	104
		4/3/2018	98.6
	MW 305	2/23/2017	94.4
		4/7/2017	86.4
		6/6/2017	78.8
		8/1/2017	76.5
		10/23/2017	70
		4/3/2018	71.7
Compliance	MW 301	4/26/2016	298*
		6/21/2016	157
		8/10/2016	151
		10/19/2016	148
		12/19/2016	174
		1/23/2017	177
		2/23/2017	181
		4/6/2017	144
		6/6/2017	138
		8/1/2017	145
		10/23/2017	149
		4/3/2018	136
	MW 302	4/26/2016	198*
		6/21/2016	121
		8/9/2016	131
		10/19/2016	126
		12/19/2016	127
		1/23/2017	151
		2/23/2017	149
		4/6/2017	132
		6/6/2017	124
		8/1/2017	130
		10/23/2017	128
		4/3/2018	124

Table 2. Boron Concentrations - CCR Rule Monitoring Well Network
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

Well Group	Well	Collection Date	Boron (µg/L)
Compliance	MW 303	4/26/2016	86.4
		6/21/2016	85
		8/9/2016	96
		10/19/2016	90.8
		12/19/2016	81.6
		1/23/2017	99.8
		2/23/2017	93.9
		4/7/2017	89.8
		6/6/2017	89.1
		8/1/2017	95
		10/23/2017	89
		4/3/2018	94.6

Abbreviations:
µg/L = micrograms per liter or parts per billion (ppb)

Notes:

April 2016 through October 2017 analytical laboratory reports provided in the 2017 Annual Groundwater Monitoring and Corrective Action Report. The April 2018 analytical laboratory report will be provided in the 2018 Annual Groundwater Monitoring and Correction Action Report.

Created by:	NDK	Date:	Date: 2/21/2018
Last revision by:	MDB	Date:	Date: 9/3/2018
Checked by:	AJR	Date:	Date: 9/12/2018

I:\25216069.00\Reports\2018 ASD Report #2\[Tables 1,2,3.xlsx]Table 2-Analytical-CCR wells

Table 3. Groundwater Elevation Table - CCR Rule Monitoring Well Network
WPL-Edgewater I-43 Ash Disposal Facility
Sheybogan, Wisconsin

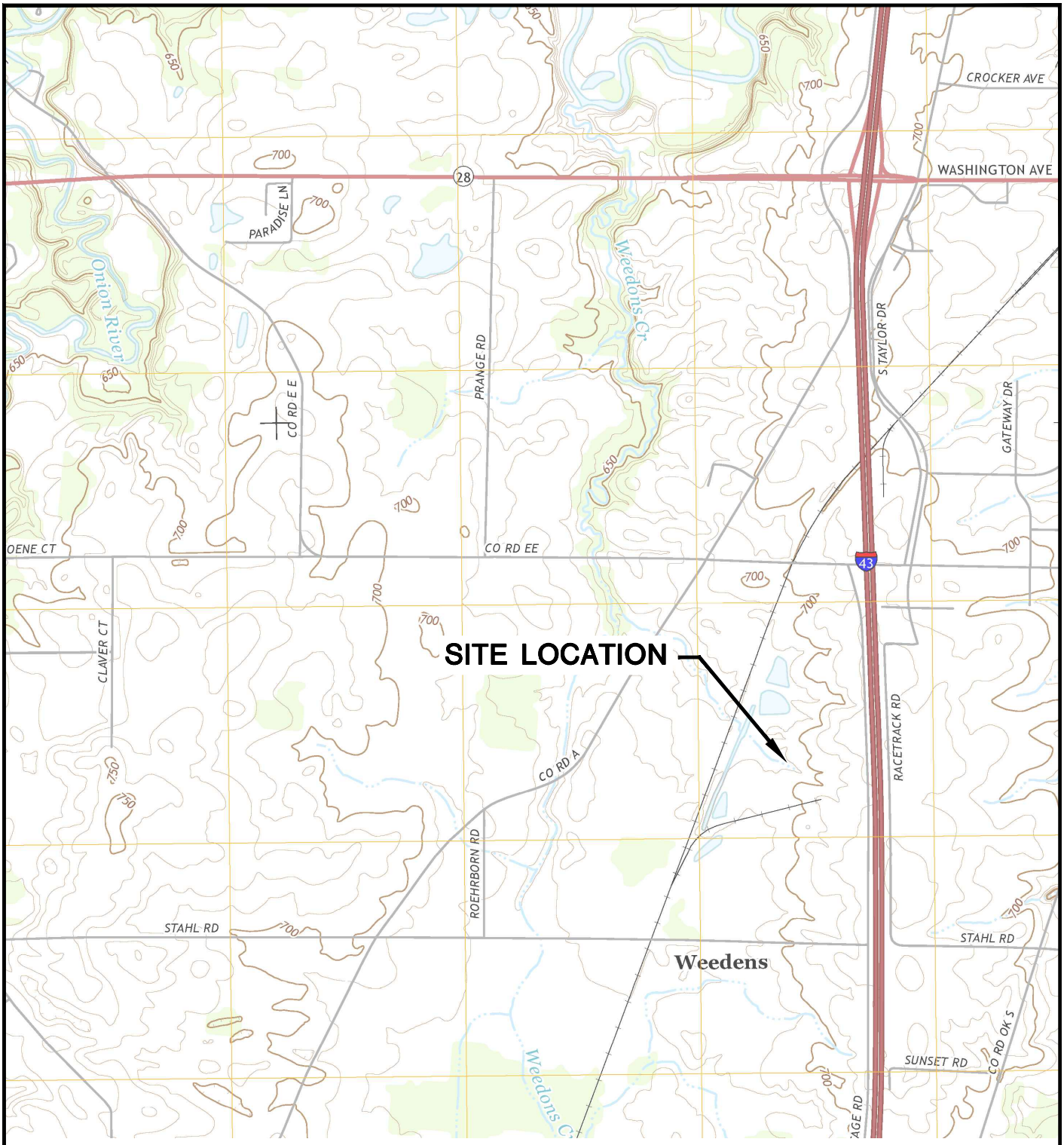
Well Number	Ground Water Elevation in feet above mean sea level (amsl)				
	MW-301	MW-302	MW-303	MW-304	MW-305
Top of Casing Elevation (feet amsl)	696.96	702.57	719.25	691.97	717.67
Screen Length (ft)	5.00	5.00	5.00	5.00	5.00
Total Depth (ft from top of casing)	134.56	144.33	144.65	119.49	122.97
Top of Well Screen Elevation (ft)	567.40	563.24	579.60	577.48	600.46
Measurement Date					
April 8, 2016	653.54	653.56	653.59	655.90	--
June 20, 2016	652.01	651.89	651.80	653.79	--
August 9, 2016	649.68	649.30	649.37	651.55	--
October 19, 2016	652.32	652.38	652.18	654.00	--
December 19, 2016	652.85	652.79	652.82	654.26	--
January 23, 2017	652.98	664.97	652.92	654.37	--
February 23, 2017	653.14	653.10	653.10	654.49	658.02
April 7, 2017	654.43	654.72	654.55	654.85	659.65
June 6, 2017	654.11	654.12	654.14	655.70	659.70
August 1, 2017	652.64	652.55	652.50	654.49	658.54
October 23, 2017	652.03	652.05	652.03	653.65	657.22
April 3, 2018	651.28	651.25	651.30	652.86	656.24
Bottom of Well Elevation (ft)	562.40	558.24	574.60	572.48	594.70

Notes:
NM = not measured

Created by: NDK Date: 2/21/2018
Last revision by: MDB Date: 9/3/2018
Checked by: AJR Date: 9/12/2018

I:\25216069.00\Reports\2018 ASD Report #2\[Tables 1,2,3.xlsx]Table 3. GW Elev -CCR

Figures



N

SHEBOYGAN FALLS QUADRANGLE
WISCONSIN–SHEBOYGAN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
2015
SCALE: 1" = 2,000'

CLIENT	ALLIANT ENERGY WISCONSIN POWER AND LIGHT COMPANY	SITE	WISCONSIN POWER AND LIGHT EDGEWATER GENERATING STATION I–43 LANDFILL TOWN OF WILSON, WISCONSIN

SITE LOCATION MAP

PROJECT NO.	25215135.20	DRAWN BY:	BJM
DRAWN:	02/08/16	CHECKED BY:	KK
REVISED:	03/06/18	APPROVED BY:	TK 03/06/18

ENGINEER

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

FIGURE
1

I:\25216069.00\Drawings\□ite Loc.dwg, 4/16/201□ 4:1□:44 PM

LEGEND

- APPROXIMATE PROPERTY LINE
- MODULE LIMITS
- GRADE (2' CONTOUR)
- GRADE (10' CONTOUR)
- EDGE OF WATER
- SWALE
- CULVERT
- MH MANHOLE
- W CONTACT WATER TRANSFER PIPE
- AB ABANDONED 3" DIA. HDPE PIPE
- TREELINE/TREES
- PAVED ROAD
- UNPAVED ACCESS ROAD
- RAILROAD TRACKS
- FENCE
- UTILITY/LIGHT POLE
- MONITORING WELL (UNCONSOLIDATED)
- PIEZOMETER (UNCONSOLIDATED)
- PRIVATE WATER SUPPLY WELL
- CCR RULE PIEZOMETER (BEDROCK)
- CCR RULE UNITS

NOTE:

1. MONITORING WELLS MW-301, MW-303, AND MW-304 WERE INSTALLED BETWEEN NOVEMBER 30, 2015 AND JANUARY 26, 2016 BY BADGER STATE DRILLING INC. DRILLING WAS PERFORMED UNDER THE SUPERVISION OF SCS ENGINEERS.
2. MONITORING WELLS MW-301, MW-302, MW-303 AND MW-304 WERE SURVEYED ON FEBRUARY 8, 2016 BY SCS ENGINEERS.
3. MONITORING WELL MW-305 WAS SURVEYED ON FEBRUARY 15, 2017 BY CQM, INC.

N

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25216069.00	DRAWN BY:	JMO/BJM
DRAWN:	02/12/16	CHECKED BY:	KK
REVISED:	03/06/18	APPROVED BY:	TK 03/06/18

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

CLIENT: ALLIANT ENERGY
ALLIANT ENERGY WISCONSIN POWER AND LIGHT COMPANY

SITE: WISCONSIN POWER AND LIGHT
EDGEWATER GENERATING STATION
I-43 LANDFILL
TOWN OF WILSON, WISCONSIN

MONITORING WELL LOCATION MAP

FIGURE 2

I:\25216069.00\Drawings\Well Locations.dwg, 4/16/201 4:10:42 PM

LEGEND

- APPROXIMATE PROPERTY LINE
- MODULE LIMITS
- GRADE (2' CONTOUR)
- 690 GRADE (10' CONTOUR)
- EDGE OF WATER
- SWALE
- CULVERT
- MH MANHOLE
- W CONTACT WATER TRANSFER PIPE
- AB ABANDONED 3" DIA. HDPE PIPE
- TREELINE/TREES
- PAVED ROAD
- UNPAVED ACCESS ROAD
- RAILROAD TRACKS
- FENCE
- UTILITY/LIGHT POLE
- MONITORING WELL (UNCONSOLIDATED)
- PIEZOMETER (UNCONSOLIDATED)
- PRIVATE WATER SUPPLY WELL
- CCR RULE PIEZOMETER (BEDROCK)
- CCR RULE UNITS
- 652.86 WATER LEVEL MEASURED APRIL 2018
- 656 POTENTIOMETRIC SURFACE CONTOUR
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTE:

1. MONITORING WELLS MW-301, MW-303, AND MW-304 WERE INSTALLED BETWEEN NOVEMBER 30, 2015 AND JANUARY 26, 2016 BY BADGER STATE DRILLING INC. DRILLING WAS PERFORMED UNDER THE SUPERVISION OF SCS ENGINEERS.
2. MONITORING WELLS MW-301, MW-302, MW-303 AND MW-304 WERE SURVEYED ON FEBRUARY 8, 2016 BY SCS ENGINEERS.
3. MONITORING WELL MW-305 WAS SURVEYED ON FEBRUARY 15, 2017 BY CQM, INC.

N

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25216069.00	DRAWN BY:	RJG
DRAWN:	09/25/18	CHECKED BY:	SC
REVISED:	10/29/18	APPROVED BY:	TK

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

CLIENT: ALLIANT ENERGY
ALLIANT ENERGY WISCONSIN POWER AND LIGHT COMPANY

SITE: WISCONSIN POWER AND LIGHT
EDGEWATER GENERATING STATION
I-43 LANDFILL
TOWN OF WILSON, WISCONSIN

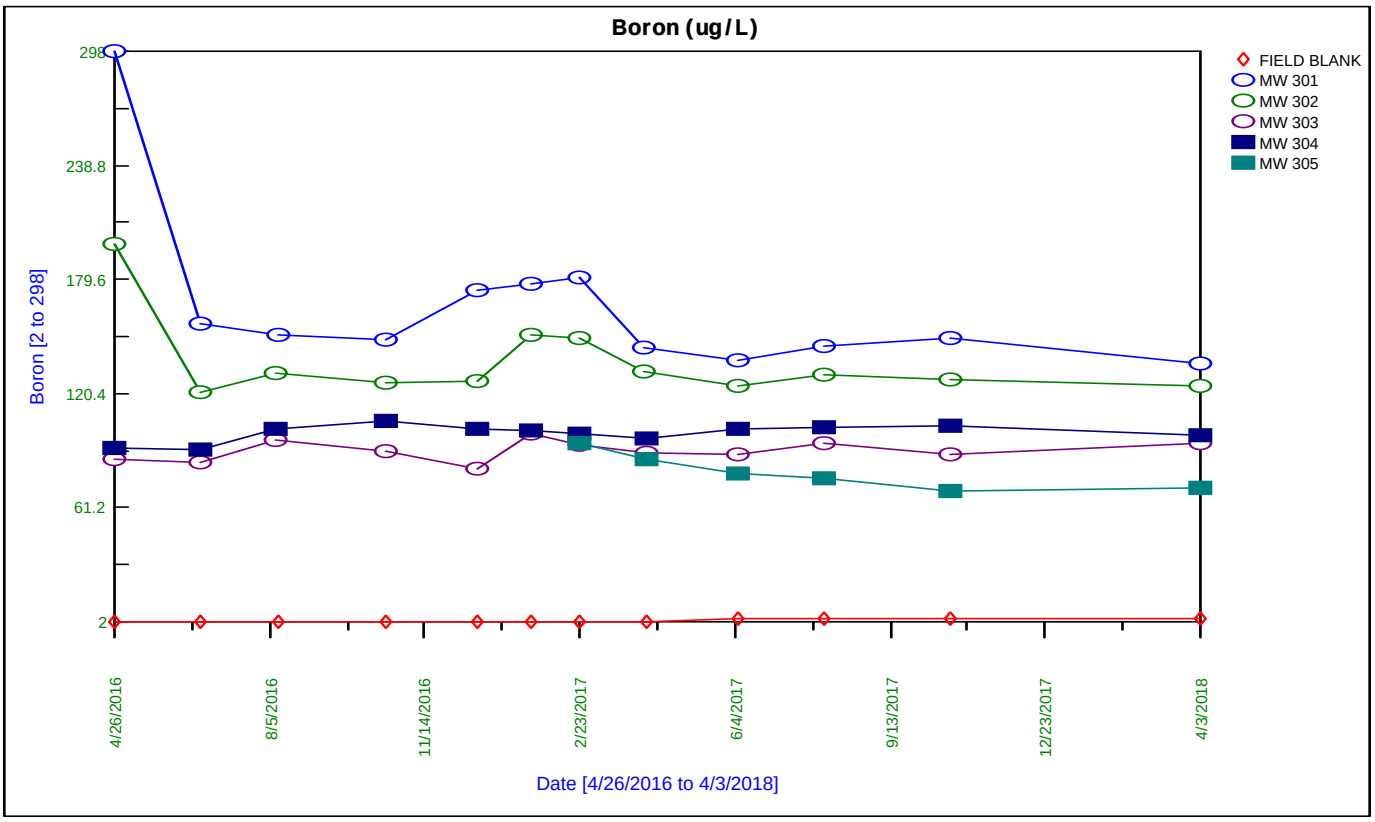
POTENTIOMETRIC SURFACE MAP
APRIL 2018

FIGURE
3

I:\25216069.00\Drawings\Well Locations□□□ril 201□.dwg, 10/29/201□ 3:12:12 PM

Appendix A

CCR Well Trend Plot – Boron


Boron (ug/L)
298
238.8
179.6
120.4
61.2
2
Boron [2 to 298]
FIELD BLANK
MW 301
MW 302
MW 303
MW 304
MW 305
4/26/2016
8/5/2016
11/14/2016
2/23/2017
6/4/2017
9/13/2017
12/23/2017
4/3/2018
Date [4/26/2016 to 4/3/2018]