

Intended for
WEC Business Services, LLC

Date
January 31, 2022

Project No.
1940100325

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

WESTON UNITS 3 & 4 BOTTOM ASH BASINS

**2021 ANNUAL GROUNDWATER MONITORING AND
CORRECTIVE ACTION REPORT
WESTON UNITS 3 & 4 BOTTOM ASH BASINS**

Project name **Ash Landfill Database Management, Sampling, and Reporting**
Project no. **1940100325**
Recipient **WEC Business Services, LLC**
Document type **CCR Rule Annual Report**
Revision **0**
Date **January 31, 2022**
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ACRONYMS AND ABBREVIATIONS

ASD	Alternate Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
F	Fluoride
mg/L	milligrams per liter
NRT	Natural Resource Technology, an OBG Company
OBG	O'Brien & Gere Engineers, Inc.
Ramboll	Ramboll Americas Engineering Solutions, Inc
SSI	Statistically Significant Increase
TBD	To be Determined
TDS	Total Dissolved Solids
Weston	Weston Generating Station
WPSC	Wisconsin Public Service Corporation

2021 MONITORING PROGRAM SUMMARY

The Weston Generating Station (Weston) Units 3 & 4 Bottom Ash Basins operated in the Detection Monitoring Program in accordance with Title 40 of the Code of Federal Regulations (40 CFR) 257.94 for the calendar year 2021. In 2021, groundwater analytical data was evaluated for statistically significant increases (SSIs) over background concentrations for Appendix III constituents in groundwater monitoring wells at the Weston Units 3 & 4 Bottom Ash Basins. The following constituents and wells had SSIs detected in 2021:

- Boron – OW-45, OW-46, and OW-50
- pH (low) – OW-50

Alternate Source Demonstrations (ASDs) prepared in 2021 or in prior years provide justification that the SSIs observed during the Detection Monitoring Program were not due to a release from the CCR unit but were from either laboratory variability in detection limits and statistical evaluation of non-detect data, naturally occurring conditions (e.g. natural variation in groundwater quality), or potential anthropogenic impacts in the area upgradient of the Weston Units 3 & 4 Bottom Ash Basins.

The Weston Units 3 & 4 Bottom Ash Basins remain in the Detection Monitoring Program in accordance with 40 CFR 257.94.

1. INTRODUCTION

This report has been prepared on behalf of Wisconsin Public Service Corporation (WPSC) by Ramboll Americas Engineering Solutions, Inc. (Ramboll) to provide the information required by Title 40 of the Code of Federal Regulations (40 CFR) 257.90(e) for the Weston Generating Station (Weston) Units 3 & 4 Bottom Ash Basins located in Rothschild, Wisconsin.

In accordance with 40 CFR 257.90(e), the owner or operator of an existing coal combustion residual (CCR) unit must prepare an annual groundwater monitoring and corrective action report (Annual Report) for the preceding calendar year. The Annual Report must document the status of the groundwater monitoring and corrective action program for the CCR unit and summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. At a minimum, the Annual Report must contain the following information, to the extent available:

1. 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;
2. 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;
3. In addition to all the monitoring data obtained under 40 CFR 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;
4. 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); and
5. Other information required to be included in the annual report as specified in 40 CFR 257.90 through 257.98.

This report provides the required information for the Weston Units 3 & 4 Bottom Ash Basins for calendar year 2021.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

The Weston Units 3 & 4 Bottom Ash Basins remained in Detection Monitoring (40 CFR 257.94) during 2021. Detection Monitoring Program sampling dates and parameters analyzed are provided in Table 1. Analytical results from the two sampling rounds collected and those statistically analyzed in 2021 are included in Table 2.

In accordance with 40 CFR 257.93(h)(2), the *Statistical Analysis Plan, Weston Units 3 & 4 Bottom Ash Basins* (Natural Resource Technology, an OBG Company, 2017), and within 90 days of completing sampling and analysis (receipt of data); analytical data was evaluated for statistically significant increases (SSIs) over background concentrations for Appendix III constituents in groundwater monitoring wells at the Weston Units 3 & 4 Bottom Ash Basins. SSIs and the SSI determination dates are provided in Table 1.

40 CFR 257.94(e)(2) allows 90 days to demonstrate that an SSI was caused by a source other than the CCR unit or resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (i.e., an alternate source demonstration). Alternate source demonstrations (ASDs) were completed for the Weston Units 3 & 4 Bottom Ash Basins on the dates provided in Table 1. The ASD documents for data collected and statistically analyzed in 2021 are provided in Appendix A.

Table 1. Detection Monitoring Program Summary

Detection Round	Sampling Date	Parameters Collected	Data Received	SSI Determination Date	SSI Parameters	Resample Date	ASD Date
7	12/9/20	Appendix III	1/8/20	4/8/21	B	NA	7/7/21
8	6/17/21	Appendix III	7/12/21	10/10/21	B, pH (low)	NA	1/8/22
9	12/14/21	Appendix III	TBD	TBD	TBD	TBD	TBD

B – Boron

NA – Not applicable

TBD – To Be Determined

The Weston Units 3 & 4 Bottom Ash Basins remain in the Detection Monitoring Program in accordance with 40 CFR 257.94.

3. KEY ACTIONS COMPLETED IN 2021

Two groundwater sampling events were completed in 2021 as part of the Detection Monitoring Program, Rounds 8 and 9. One groundwater sample was collected from each background and downgradient well in the monitoring system during each event. Sampling dates are summarized in Table 1. All samples were collected and analyzed in accordance with the *Sampling and Analysis Plan, Weston Units 3 & 4 Bottom Ash Basins* (Natural Resource Technology, an OBG Company, 2017). All monitoring data obtained under 40 CFR 257.90 through 257.98 (as applicable) in 2021 are presented in Table 2.

A map showing the groundwater monitoring system, including the CCR unit and all background (upgradient) and downgradient monitoring wells with well identification numbers, for Weston Units 3 & 4 Bottom Ash Basins is presented on Figure 1. There were no changes to the monitoring system in 2021.

Statistical evaluation, including SSI determinations, of analytical data from the Detection Monitoring Program for December 9, 2020 (Detection Monitoring Round 7) and June 17, 2021 (Detection Monitoring Round 8) were completed in 2021 and within 90 days of receipt of the analytical data. Statistical evaluation of analytical data was performed in accordance with the *Statistical Analysis Plan, Weston Units 3 & 4 Bottom Ash Basins* (Natural Resource Technology, an OBG Company, 2017).

ASDs for Detection Monitoring Round 8, dated January 8, 2022, and Detection Monitoring Round 7, dated July 7, 2021, were prepared for data collected in 2021 or statistically analyzed in 2021 and are provided in Appendix A. The ASDs were prepared in accordance with 40 CFR 257.94(e)(2) and provides a description, data, and pertinent information to support an alternate source for wells and parameters with SSIs at the Weston Units 3 & 4 Bottom Ash Basins. The ASDs provide justification that the SSIs observed during the Detection Monitoring Program were not due to a release from the CCR unit but were from either naturally occurring conditions (e.g. natural variation in groundwater quality) or potential anthropogenic impacts in the area upgradient of the Bottom Ash Basins.

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE PROBLEMS

No problems were encountered during implementation of the Detection Monitoring Program during 2021. Groundwater samples were collected and analyzed in accordance with the *Sampling and Analysis Plan, Weston Units 3 & 4 Bottom Ash Basins* (Natural Resource Technology, and OBG Company, 2017), and all data was accepted.

5. KEY ACTIVITIES FOR 2022

The following key activities are planned for 2022:

- Continuation of the Detection Monitoring Program with semi-annual sampling scheduled for the 2nd and 4th quarters of 2022.
- Complete statistical evaluation of analytical data from the downgradient wells, using background data to determine whether an SSI over background concentrations has occurred for Appendix III parameters.
- If an SSI is identified, potential alternate sources (i.e., a source other than the CCR unit caused the SSI or that that SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated. If an alternate source is demonstrated to be the cause of the SSI, a written demonstration will be completed within 90 days of the SSI determination and will be included in the annual groundwater monitoring and corrective action report for 2022.
 - If an alternate source(s) is not identified to be the cause of the SSI, the applicable requirements of 40 CFR 257.94 through 257.98 (e.g., assessment monitoring) will apply in 2022, including associated recordkeeping/notifications required by 40 CFR 257.105 through 257.108.

6. REFERENCES

Natural Resource Technology, an OBG Company, 2017, *Sampling and Analysis Plan, Weston Units 3 & 4 Bottom Ash Basins, Rothschild, Wisconsin, October 2, 2017.*

Natural Resource Technology, an OBG Company, 2017, *Statistical Analysis Plan, Weston Units 3 & 4 Bottom Ash Basins, Rothschild, Wisconsin, October 17, 2017.*

TABLES

Weston Unit 3&4 Bottom Ash CCR
Table 2. Weston Units 3 &4 Bottom Ash Basins: Appendix III Analytical Results

Date Range: 10/01/2020 to 06/17/2021

Lab Methods:

Well Id	Date Sampled	Lab Id	B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
OW-45	12/9/2020	AE50231	0.0556	22.0000	66.0	0.05	6.6	19.0
	6/17/2021	AE54109	0.0664	9.3100	17.8	<0.10	6.7	9.9
OW-46	12/9/2020	AE50232	0.0432	21.0000	100.0	0.04	6.2	10.0
	6/17/2021	AE54110	0.0461	12.5000	54.9	<0.10	6.6	15.7
OW-47/OW-47R	12/9/2020	AE50233	0.0871	24.1000	60.0	0.03	6.4	30.0
	6/17/2021	AE54111	0.2180	33.3000	62.5	<0.10	6.1	65.4
OW-48	12/9/2020	AE50234	0.2980	46.6000	82.0	0.06	6.1	100.0
	6/17/2021	AE54112	0.3750	35.1000	58.2	<0.10	6.2	99.7
OW-49	12/9/2020	AE50235	0.2560	51.1000	78.0	0.02	6.0	110.0
	6/17/2021	AE54113	0.2590	43.0000	74.7	<0.10	6.1	83.5
OW-50	12/9/2020	AE50236	0.0412	28.4000	60.0	0.02	5.6	16.0
	6/17/2021	AE54114	0.0493	26.9000	61.0	<0.10	5.7	17.6

Weston Unit 3&4 Bottom Ash CCR
Table 2. Weston Units 3 &4 Bottom Ash Basins: Appendix III Analytical Results

Date Range: 10/01/2020 to 06/17/2021

Lab Methods:

Well Id	Date Sampled	Lab Id	TDS, mg/L
OW-45	12/9/2020	AE50231	180.0
	6/17/2021	AE54109	118.0
OW-46	12/9/2020	AE50232	230.0
	6/17/2021	AE54110	192.0
OW-47/OW-47R	12/9/2020	AE50233	160.0
	6/17/2021	AE54111	262.0
OW-48	12/9/2020	AE50234	300.0
	6/17/2021	AE54112	310.0
OW-49	12/9/2020	AE50235	240.0
	6/17/2021	AE54113	336.0
OW-50	12/9/2020	AE50236	170.0
	6/17/2021	AE54114	234.0

FIGURES



- CCR RULE UPGRADIENT MONITORING WELL LOCATION
- CCR RULE DOWNGRADEMENT MONITORING WELL LOCATION
- WESTON UNITS 3 & 4 BOTTOM ASH BASINS

0 100 200
Feet

GROUNDWATER SAMPLING WELL LOCATION MAP

**2021 ANNUAL GROUNDWATER MONITORING AND
CORRECTIVE ACTION REPORT**
WESTON GENERATING STATION UNITS 3 & 4 BOTTOM ASH BASINS
ROTHSCHILD, WISCONSIN

FIGURE 1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY



**APPENDIX A
ALTERNATE SOURCE DEMONSTRATIONS (ASDS)**

***40 CFR SECTION 257.94(E)(2) ALTERNATE SOURCE DEMONSTRATION
(ASD) DETECTION MONITORING ROUND 7, WISCONSIN PUBLIC SERVICE
CORPORATION WESTON UNITS 3 & 4 BOTTOM ASH BASINS***

***40 CFR SECTION 257.94(E)(2) ALTERNATE SOURCE DEMONSTRATION
(ASD) DETECTION MONITORING ROUND 8, WISCONSIN PUBLIC SERVICE
CORPORATION WESTON UNITS 3 & 4 BOTTOM ASH BASINS***

Mr. Eric Kovatch
WEC Business Services, LLC
333 W. Everett Street – A231
Milwaukee, WI 53203

RE: 40 CFR Section 257.94(e)(2) Alternate Source Demonstration (ASD) Detection Monitoring Round 7, Wisconsin Public Service Corporation Weston Units 3 & 4 Bottom Ash Basins

July 7, 2021

Dear Mr. Kovatch:

This document has been prepared by Ramboll Americas Engineering Solutions, Inc. (Ramboll) to provide pertinent information for an alternate source demonstration (ASD) as allowed by 40 CFR Section 257.94(e)(2) for the Weston Units 3 & 4 Bottom Ash Basins, located in Weston, Wisconsin.

Detection Monitoring Round 7 samples were collected on December 9, 2020 for which analytical data was received on January 8, 2021. Analytical data is presented in the attached Table 1. In accordance with 40 CFR Section 257.93(h)(2), statistical analysis of the data from Detection Monitoring Round 7 to identify statistically significant increases (SSIs) of 40 CFR Part 257 Subpart D Appendix III parameters over background concentrations was completed within 90 days of receipt of the analytical data (April 8, 2021). The statistical determination identified no SSIs at downgradient monitoring wells using intrawell methods as described in the *Alternate Source Demonstration Weston Units 3 & 4 Bottom Ash Basins* dated April 15, 2018 (2018 ASD). For Detection Monitoring Round 7, statistical analysis was also completed for upgradient wells OW-45 and OW-46 to evaluate potential changes in concentrations following the background monitoring events. The analysis indicated apparent SSIs for the following upgradient monitoring wells:

- Boron above the background prediction interval at OW-45 and OW-46

The SSI reported at OW-45 is consistent with Detection Monitoring Round 6 for which an ASD was completed in the *Alternate Source Demonstration Weston Units 3 & 4 Bottom Ash Basins*, dated January 24, 2021. The boron concentration detected in OW-46 is generally consistent with results from previous sample events including Detection Monitoring Rounds 3 and 5. As discussed in the 2018 ASD, "revised limits were calculated for downgradient wells using intrawell statistical analyses." Limits were not calculated for upgradient wells because they do not provide evidence of impacts from the CCR unit. Statistical analysis of Detection Monitoring Round 7 was completed to evaluate changes in upgradient groundwater quality and determine whether it may be affecting the downgradient wells. As a result, the SSIs for OW-45 and OW-46 were reported.

40 CFR Section 257.94(e)(2) allows 90 days to demonstrate that an SSI was caused by a source other than the CCR unit or resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Accordingly, an alternate source demonstration for boron at well OW-46 was evaluated and completed within 90 days of the SSI determination, by July 7, 2021.

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Evaluation of Boron at OW-45

Based on the statistical analysis using intrawell methods, boron concentrations from Detection Monitoring Round 7 at upgradient well OW-46 exceeded background. The boron concentration measured in OW-46 (0.0432 mg/L) slightly exceeded the background concentration (0.0402 mg/L). These concentrations are similar to those observed in upgradient well OW-45 (0.0556 mg/L, Figure A).

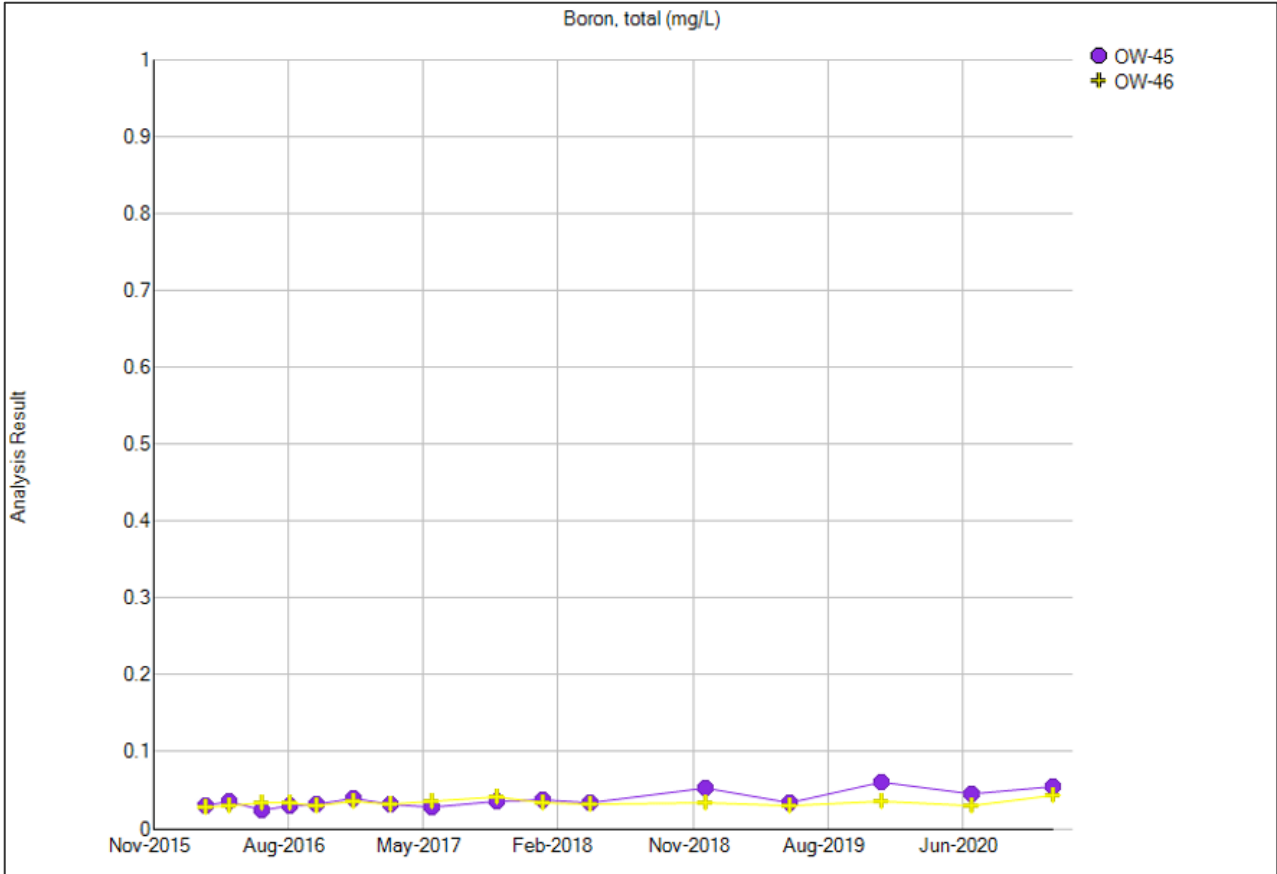


Figure A. Boron Concentrations in Upgradient Monitoring Wells OW-45 and OW-46.

The SSI reported in Detection Monitoring Round is not attributable to a release from the Bottom Ash Basins because well OW-46 is located hydraulically upgradient of the basins. Groundwater contour maps from June 2020 (Figure 1), and December 2020 (Figure 2) illustrate that the groundwater consistently flows to the northwest toward the Wisconsin River. This supports that the concentrations of boron in OW-46 are unrelated to the Bottom Ash Basins.

CONCLUSIONS


The presented lines of evidence demonstrate that a source other than the CCR unit contributed to the boron concentration reported above the background prediction interval in OW-46 during Detection Monitoring Round 7.

The preceding information serves as the ASD prepared in accordance with 40 CFR Section 257.94(e)(2) and supports the position that the SSI reported during Detection Monitoring Round 7 was not due to a release from the CCR unit but was from likely naturally occurring conditions (e.g. natural variation in groundwater quality). Therefore, no further action (i.e. assessment monitoring) is warranted and the Weston Units 3 & 4 Bottom Ash Basins will remain in detection monitoring.

If you have any questions regarding this document, please do not hesitate to contact us.

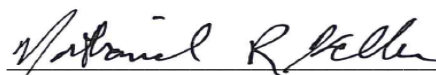
CERTIFICATIONS

I, Eric J. Tlachac, a qualified professional engineer, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.


Eric J. Tlachac
Senior Managing Engineer
Professional Engineer No. 36088
State of Wisconsin
Ramboll Americas Engineering Solutions, Inc.
Date: July 7, 2021



I, Nathaniel R. Keller, a qualified professional geologist, certify that the enclosed information is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.


Nathaniel R. Keller, PG
Senior Hydrogeologist
Professional Geologist No. 1283-013
State of Wisconsin
Ramboll Americas Engineering Solutions, Inc.
Date: July 7, 2021

Attachments:

- Table 1 Weston Units 3 & 4 Bottom Ash Basins: Appendix III Analytical Results
- Figure 1 Groundwater Contour Map – June 2020
- Figure 2 Groundwater Contour Map – December 2020

TABLES

Weston Unit 3&4 Bottom Ash CCR
Table 1. Weston Units 3 &4 Bottom Ash Basins: Appendix III Analytical Results

Date Range: 12/01/2019 to 12/09/2020

Lab Methods:

Well Id	Date Sampled	Lab Id	B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
OW-45	12/19/2019	AE42883	0.0610	22.0000	46.0	0.05	6.82	16.0
	6/24/2020	AE46669	0.0443	16.6000	32.0	<0.01	6.77	12.0
	12/9/2020	AE50231	0.0556	22.0000	66.0	0.05	6.60	19.0
OW-46	12/19/2019	AE42884	0.0360	23.0000	99.0	0.05	6.54	11.0
	6/24/2020	AE46670	0.0306	16.9000	70.0	<0.01	6.52	15.0
	12/9/2020	AE50232	0.0432	21.0000	100.0	0.04	6.23	10.0
OW-47/OW-47R	12/19/2019	AE42885	0.2100	34.0000	57.0	0.03	6.23	78.0
	6/24/2020	AE46671	0.0905	30.0000	58.0	<0.01	6.20	58.0
	12/9/2020	AE50233	0.0871	24.1000	60.0	0.03	6.35	30.0
OW-48	12/19/2019	AE42886	0.3300	42.0000	68.0	0.07	6.18	97.0
	6/24/2020	AE46672	0.1960	32.6000	69.0	0.03	6.23	69.0
	12/9/2020	AE50234	0.2980	46.6000	82.0	0.06	6.11	100.0
OW-49	12/19/2019	AE42887	0.2900	46.0000	82.0	0.02	6.16	82.0
	6/24/2020	AE46673	0.2460	43.6000	76.0	<0.01	6.11	86.0
	12/9/2020	AE50235	0.2560	51.1000	78.0	0.02	5.99	110.0
OW-50	12/19/2019	AE42888	0.0370	23.0000	42.0	0.01	5.78	21.0
	6/24/2020	AE46674	0.0348	24.6000	46.0	<0.01	5.79	18.0
	12/9/2020	AE50236	0.0412	28.4000	60.0	0.02	5.61	16.0

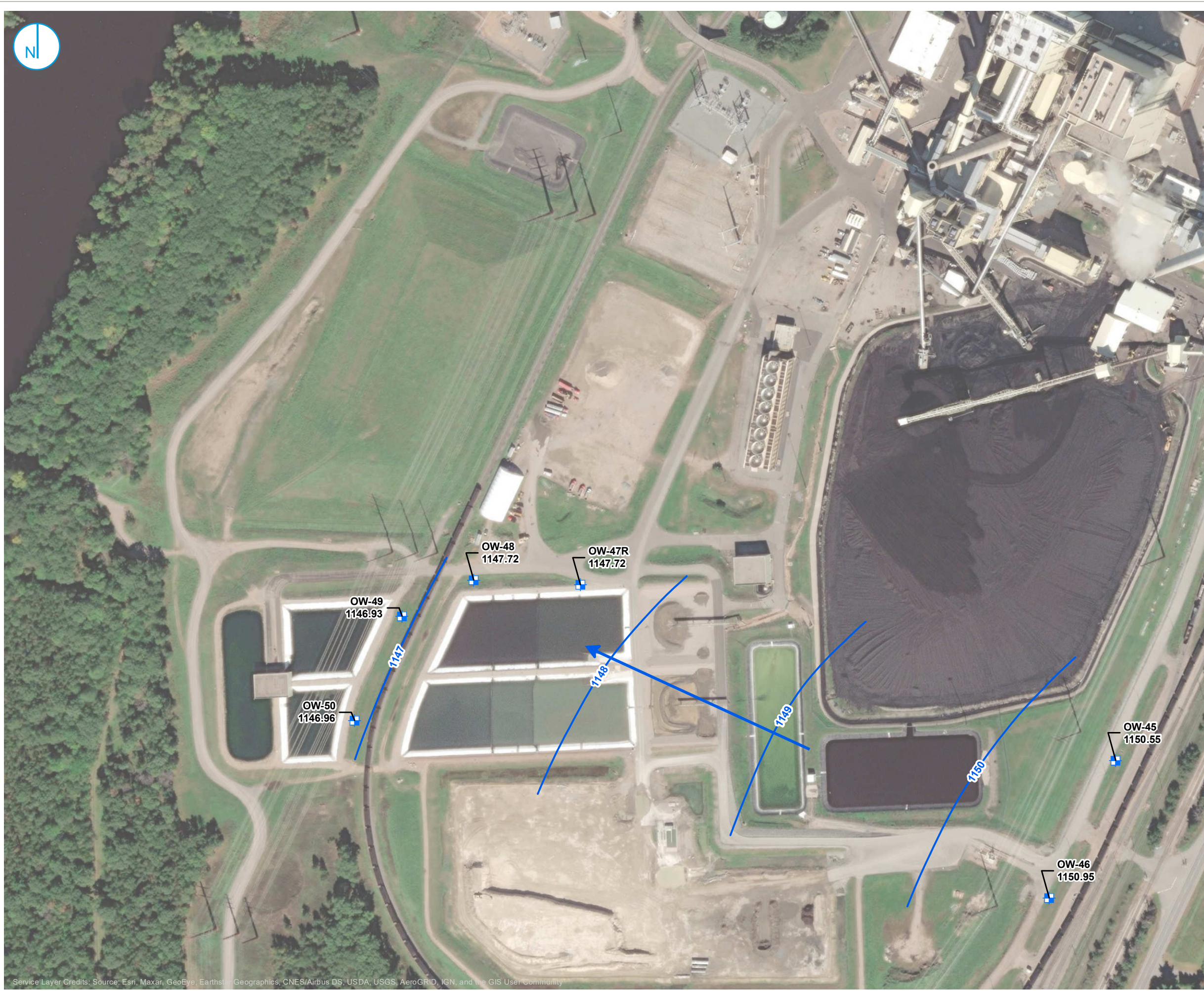
Weston Unit 3&4 Bottom Ash CCR
Table 2. Weston Units 3 &4 Bottom Ash Basins: Appendix III Analytical Results

Date Range: 12/01/2019 to 12/09/2020

Lab Methods:

Well Id	Date Sampled	Lab Id	TDS, mg/L
OW-45	12/19/2019	AE42883	170.0
	6/24/2020	AE46669	140.0
	12/9/2020	AE50231	180.0
OW-46	12/19/2019	AE42884	240.0
	6/24/2020	AE46670	210.0
	12/9/2020	AE50232	230.0
OW-47/OW-47R	12/19/2019	AE42885	260.0
	6/24/2020	AE46671	260.0
	12/9/2020	AE50233	160.0
OW-48	12/19/2019	AE42886	300.0
	6/24/2020	AE46672	270.0
	12/9/2020	AE50234	300.0
OW-49	12/19/2019	AE42887	330.0
	6/24/2020	AE46673	350.0
	12/9/2020	AE50235	240.0
OW-50	12/19/2019	AE42888	160.0
	6/24/2020	AE46674	200.0
	12/9/2020	AE50236	170.0

FIGURES



- CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD 88)
- GROUNDWATER FLOW DIRECTION

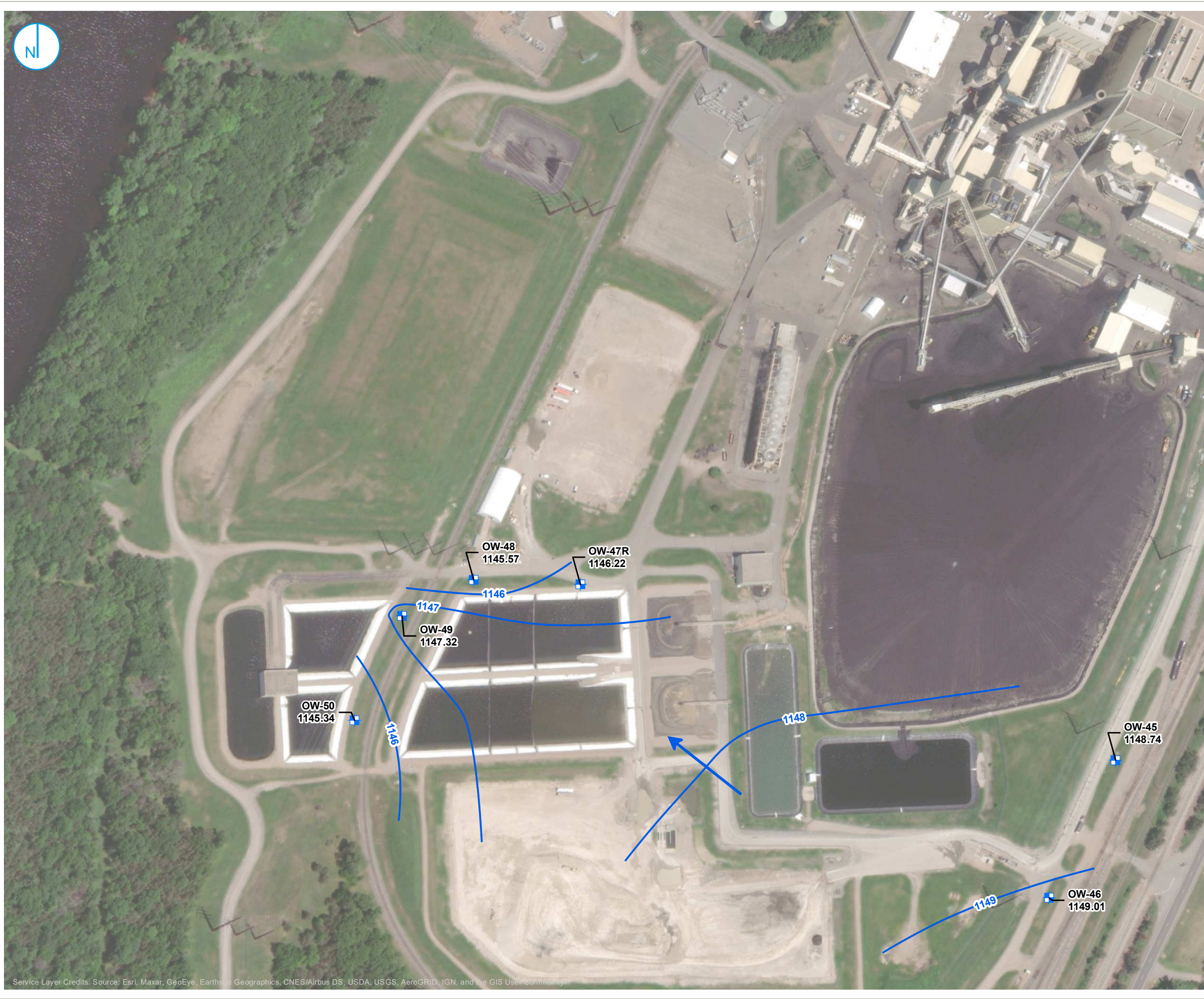


**UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
DETECTION MONITORING ROUND 6:
JUNE 24, 2020**

**Wpsc CCR Rule
GROUNDWATER MONITORING
WESTON GENERATING STATION
UNITS 3 & 4 BOTTOM ASH BASINS
ROTHSCHILD, WISCONSIN**

FIGURE 1





- CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD 88)
- GROUNDWATER FLOW DIRECTION



**UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
DETECTION MONITORING ROUND 7:
DECEMBER 9, 2020**

**WPSC CCR RULE
GROUNDWATER MONITORING
WESTON GENERATING STATION
UNITS 3 & 4 BOTTOM ASH BASINS
ROTHSCHILD, WISCONSIN**

FIGURE 2



Mr. Eric Kovatch
WEC Business Services, LLC
333 W. Everett Street – A231
Milwaukee, WI 53203

RE: 40 CFR Section 257.94(e)(2) Alternate Source Demonstration (ASD) Detection Monitoring Round 8, Wisconsin Public Service Corporation Weston Units 3 & 4 Bottom Ash Basins

January 8, 2022

Dear Mr. Kovatch:

This document has been prepared by Ramboll Americas Engineering Solutions, Inc. (Ramboll) to provide pertinent information for an alternate source demonstration (ASD) as allowed by 40 CFR Section 257.94(e)(2) for the Weston Units 3 & 4 Bottom Ash Basins, located in Weston, Wisconsin.

Detection Monitoring Round 8 (D8) samples were collected on June 17, 2021 for which analytical data was received on July 12, 2021. Analytical data is presented in the attached Table 1. In accordance with 40 CFR Section 257.93(h)(2), statistical analysis of the data from Detection Monitoring Round 8 to identify statistically significant increases (SSIs) of 40 CFR Part 257 Subpart D Appendix III parameters over background concentrations was completed within 90 days of receipt of the analytical data (October 10, 2021). The statistical determination identified SSIs using intrawell methods as described in the *Alternate Source Demonstration Weston Units 3 & 4 Bottom Ash Basins* dated April 15, 2018 (2018 ASD) for the following wells:

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- Boron above the background upper prediction interval at upgradient wells OW-45 and OW-46
- Boron above the background upper prediction interval at downgradient well OW-50

The SSIs reported at OW-45 and OW-46 are consistent with Detection Monitoring Round 6 and Detection Monitoring Round 7 for which ASDs were completed in the *Alternate Source Demonstration Weston Units 3 & 4 Bottom Ash Basins*, dated January 24, 2021 and July 7, 2021. The boron concentrations detected in OW-45 and OW-46 have increased slightly from background and previous detection monitoring sample events. As indicated in the ASDs referenced above, these increases were not attributed to the unit.

40 CFR Section 257.94(e)(2) allows 90 days to demonstrate that an SSI was caused by a source other than the CCR unit or resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Accordingly, an alternate source demonstration for boron at well OW-50 was evaluated and completed within 90 days of the SSI determination, by January 8, 2022.

Evaluation of Boron at OW-50

Based on the intrawell statistical analysis approach used during previous sampling events, boron concentrations from the D8 sampling event at upgradient wells OW-45 and OW-46 exceeded calculated background concentrations. The D8 boron

concentrations at OW-45 and OW-46 were not attributed to the Bottom Ash Basins because the wells are located upgradient of the unit. The concentration of boron measured in OW-50 (0.0493 mg/L) is similar to that measured in OW-46 (0.0461 mg/L), but less than that measured in OW-45 (0.0664 mg/L). The D8 boron concentrations measured in OW-45 and OW-46 increased slightly from those measured in Detection Monitoring Round 7 (Figure A, below). The exceedances and increasing concentrations in upgradient wells indicate the natural groundwater quality is variable and/or changing in upgradient locations.

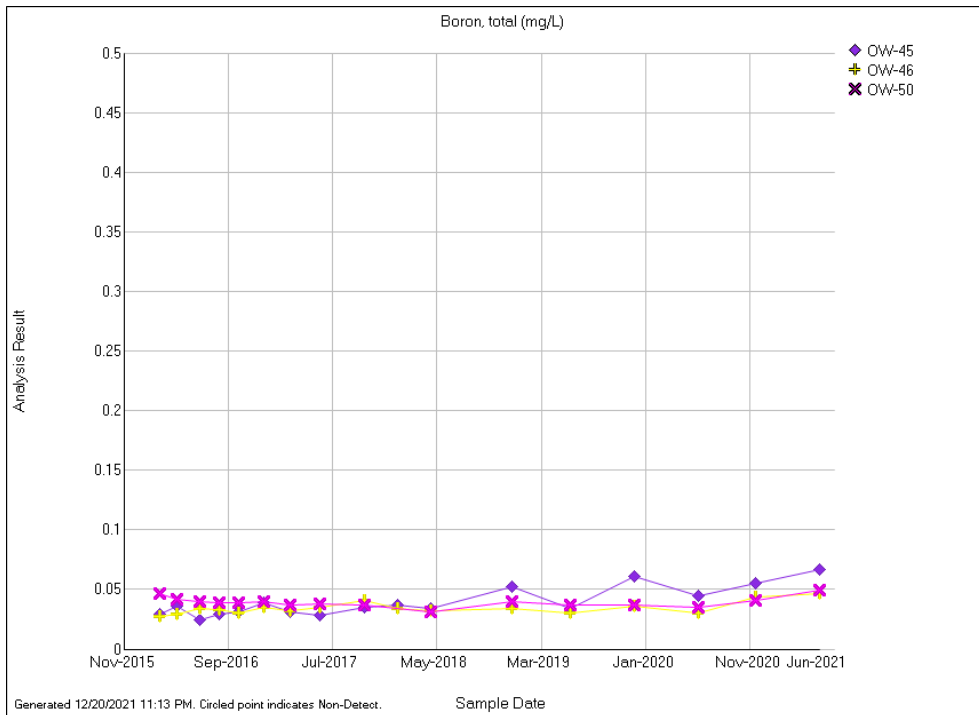


Figure A. Boron Concentrations in Upgradient Monitoring Wells OW-45 and OW-46 and Downgradient Monitoring Well OW-50.

The intrawell statistical analysis completed at OW-50, which resulted in the reported SSI, does not account for the observed increases in upgradient groundwater quality observed at OW-45 and OW-46. Interwell statistics were completed using OW-45 and OW-46 as background wells and comparing the results from OW-50 to the calculated background upper prediction intervals. The results (Attachment A) indicate that boron at OW-50 does not exceed interwell (upgradient) background, and the SSI is attributed to natural variation in groundwater quality and changes in upgradient groundwater quality.

Interwell statistics performed to evaluate the intrawell boron SSI at OW-50 indicated that the D8 pH measurement at OW-50 was lower than the interwell background lower prediction limit resulting in an SSI. This SSI was not identified in the intrawell statistical analysis because the D8 measurement (5.6 SU) is consistent with historical results measured at OW-50 (Figure B, below). The low pH SSI is not attributable to the Bottom Ash Basins because CCR leachate is alkaline¹ (Figure C), and concentrations

¹ USEPA, 2009. Characterization of Coal Combustion Residues from Electric Utilities – Leaching and Characterization Data. EPA-600/R-09/151 December 2009.

of CCR indicator parameters (boron and sulfate) measured at OW-50 are not elevated (Figure A, above, and Figure D, below).

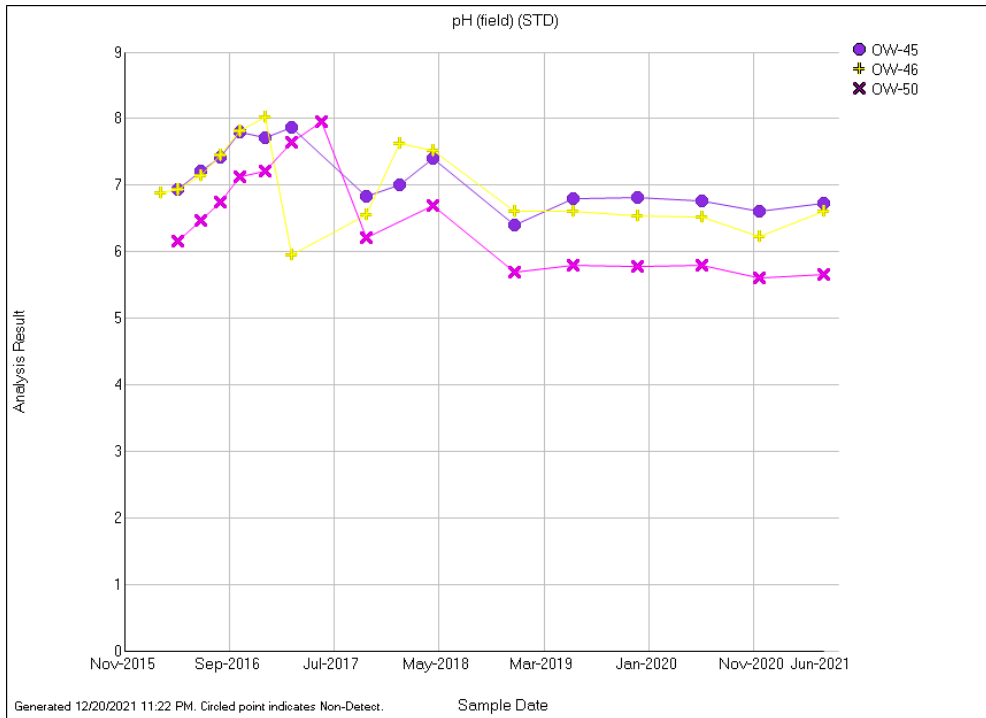


Figure B. pH Measurements in Upgradient Monitoring Wells OW-45, OW-46, and Downgradient Monitoring Well OW-50.

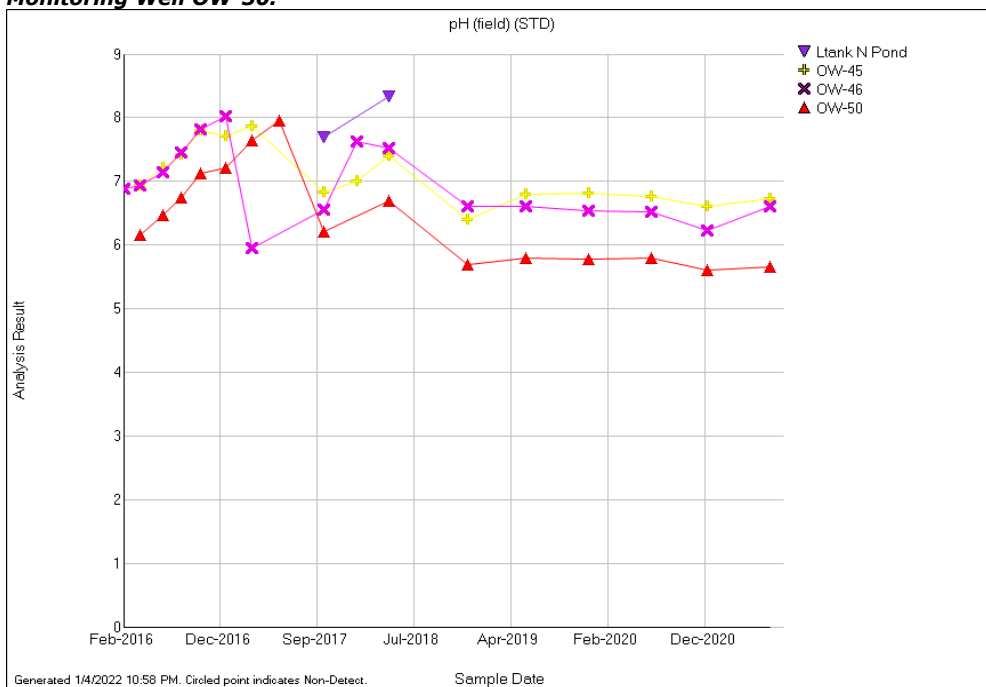


Figure C. pH Measurements in Leachate, Upgradient Monitoring Wells OW-45, OW-46, and Downgradient Monitoring Well OW-50.

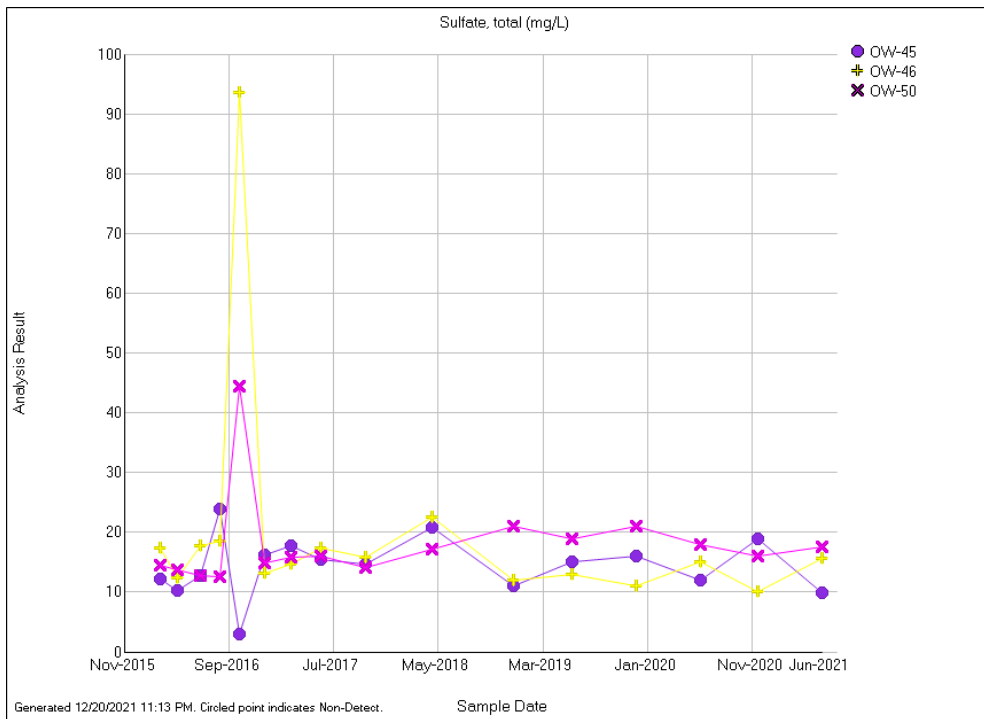


Figure D. Sulfate Concentrations in Upgradient Monitoring Wells OW-45, OW-46, and Downgradient Monitoring Well OW-50.

The SSI reported for boron during the D8 sampling event is not attributable to a release from the Bottom Ash Basins because the statistical methods utilized at OW-50 did not account for increases in upgradient concentrations. Following interwell statistical analysis, boron did not exceed the background/upgradient upper prediction interval. Interwell statistical analysis identified an SSI for pH at OW-50, however, the lack of elevated boron and sulfate concentrations in OW-50, primary indicators for CCR impacts, and the exceedance of the lower prediction limit for pH (whereas CCR leachate is alkaline), indicate that the pH SSI is also not attributable to the Bottom Ash Basins.

CONCLUSIONS

The above demonstrates that a source other than the CCR unit contributed to the boron concentration reported above the intrawell background upper prediction limit in OW-50 during the D8 sampling event.

The preceding information serves as the ASD prepared in accordance with 40 CFR Section 257.94(e)(2) and supports the position that the SSI reported during the D8 sampling event was not due to a release from the CCR unit, but was from likely naturally occurring conditions (e.g., natural variation in groundwater quality). Therefore, no further action (i.e., assessment monitoring) is warranted and the Weston Units 3 & 4 Bottom Ash Basins will remain in detection monitoring.

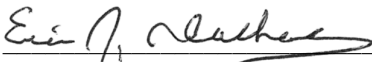
As a result of the observations presented in this ASD, statistical analysis for future detection monitoring events will be performed as follows:

- OW-45 and OW-46- These upgradient wells will be utilized as background locations for interwell statistical analysis at OW-50
- OW-47R, OW-48, OW-49- Intrawell statistical analysis will continue to be performed
- OW-50- Interwell statistical analysis as referenced above

If you have any questions regarding this document, please do not hesitate to contact us.

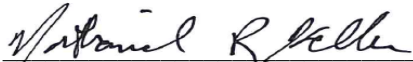
CERTIFICATIONS

I, Eric J. Tlachac, a qualified professional engineer, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.


Eric J. Tlachac
Senior Managing Engineer
Professional Engineer No. 36088
State of Wisconsin
Ramboll Americas Engineering Solutions, Inc.
Date: January 8, 2022



I, Nathaniel R. Keller, a qualified professional geologist, certify that the enclosed information is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.


Nathaniel R. Keller, PG
Senior Hydrogeologist
Professional Geologist No. 1283-013
State of Wisconsin
Ramboll Americas Engineering Solutions, Inc.
Date: January 8, 2022

Attachments:

- Table 1 Weston Units 3 & 4 Bottom Ash Basins: Appendix III Analytical Results
- Attachment A Weston Unit 3&4 Bottom Ash Basins: Statistical Analysis Procedure (OW-50)

ATTACHMENTS

Weston Unit 3&4 Bottom Ash CCR
Table 1. Weston Units 3 &4 Bottom Ash Basins: Appendix III Analytical Results

Date Range: 01/01/2021 to 06/17/2021

Lab Methods:

Well Id	Date Sampled	Lab Id	B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
OW-45	6/17/2021	AE54109	0.0664	9.3100	17.8	<0.10	6.72	9.9
OW-46	6/17/2021	AE54110	0.0461	12.5000	54.9	<0.10	6.61	15.7
OW-47/OW-47R	6/17/2021	AE54111	0.2180	33.3000	62.5	<0.10	6.14	65.4
OW-48	6/17/2021	AE54112	0.3750	35.1000	58.2	<0.10	6.21	99.7
OW-49	6/17/2021	AE54113	0.2590	43.0000	74.7	<0.10	6.07	83.5
OW-50	6/17/2021	AE54114	0.0493	26.9000	61.0	<0.10	5.66	17.6

Weston Unit 3&4 Bottom Ash CCR
Table 1. Weston Units 3 &4 Bottom Ash Basins: Appendix III Analytical Results

Date Range: 01/01/2021 to 06/17/2021

Lab Methods:

Well Id	Date Sampled	Lab Id	TDS, mg/L
OW-45	6/17/2021	AE54109	118.0
OW-46	6/17/2021	AE54110	192.0
OW-47/OW-47R	6/17/2021	AE54111	262.0
OW-48	6/17/2021	AE54112	310.0
OW-49	6/17/2021	AE54113	336.0
OW-50	6/17/2021	AE54114	234.0

ATTACHMENT A.

December 9, 2021

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Weston Unit 3&4 Bottom Ash Basins: Statistical Analysis Procedure (OW-50)

Run Id: 1

Location Id: OW-50

Compliance Test: Parametric Prediction Interval on Background

<u>Parameter</u>	<u>Sample Date</u>	<u>Lab Id</u>	<u>Re Testing</u>	<u>Upper Limit</u>	<u>Compliance Result</u>	<u>Exceedance</u>	<u>Possible SSI</u>	<u>Post-Hoc Trend</u>
B, tot mg/L	06/17/2021	AE54114	1 of 2	0.0578	0.0493	n	n	--

Run Id: 2

Location Id: OW-50

Compliance Test: Parametric Prediction Interval on Background

<u>Parameter</u>	<u>Sample Date</u>	<u>Lab Id</u>	<u>Re Testing</u>	<u>Upper Limit</u>	<u>Compliance Result</u>	<u>Exceedance</u>	<u>Possible SSI</u>	<u>Post-Hoc Trend</u>
Ca, tot mg/L	06/17/2021	AE54114	1 of 2	28.2	26.9	n	n	--

Run Id: 3

Location Id: OW-50

Compliance Test: Parametric Prediction Interval on Background

<u>Parameter</u>	<u>Sample Date</u>	<u>Lab Id</u>	<u>Re Testing</u>	<u>Upper Limit</u>	<u>Compliance Result</u>	<u>Exceedance</u>	<u>Possible SSI</u>	<u>Post-Hoc Trend</u>
Cl, tot mg/L	06/17/2021	AE54114	1 of 2	112.	61.0	n	n	--

Run Id: 4

Location Id: OW-50

Compliance Test: Non-Parametric Prediction Interval on Background Using largest background data value.

<u>Parameter</u>	<u>Sample Date</u>	<u>Lab Id</u>	<u>Re Testing</u>	<u>Upper Limit</u>	<u>Compliance Result</u>	<u>Exceedance</u>	<u>Possible SSI</u>	<u>Post-Hoc Trend</u>
F, tot mg/L	06/17/2021	AE54114	1 of 2	0.110	< 0.0950	n	n	--

Run Id: 5

NOTE: If trend test is performed, the background slope is listed under the Upper Limit heading and the compliance slope is listed under the Compliance Result heading.

ATTACHMENT A.

Weston Unit 3&4 Bottom Ash Basins: Statistical Analysis Procedure (OW-50)

Run Id: 5

Location Id: OW-50

Compliance Test: Parametric Prediction Interval on Background

<u>Parameter</u>	<u>Sample Date</u>	<u>Lab Id</u>	<u>Re</u> <u>Testing</u>	<u>Upper Limit</u>	<u>Lower Limit</u>	<u>Compliance</u> <u>Result</u>	<u>Exceedance</u>	<u>Possible</u> <u>SSI</u>	<u>Post-Hoc</u> <u>Trend</u>
pH (field) STD	06/17/2021	AE54114	1 of 2	7.44	6.13	5.66	n/y	n	--

Run Id: 6

Location Id: OW-50

Compliance Test: Parametric Prediction Interval on Background

<u>Parameter</u>	<u>Sample Date</u>	<u>Lab Id</u>	<u>Re</u> <u>Testing</u>	<u>Upper Limit</u>	<u>Compliance</u> <u>Result</u>	<u>Exceedance</u>	<u>Possible</u> <u>SSI</u>	<u>Post-Hoc</u> <u>Trend</u>
SO4, tot mg/L	06/17/2021	AE54114	1 of 2	20.3	17.6	n	n	--

Run Id: 7

Location Id: OW-50

Compliance Test: Parametric Prediction Interval on Background

<u>Parameter</u>	<u>Sample Date</u>	<u>Lab Id</u>	<u>Re</u> <u>Testing</u>	<u>Upper Limit</u>	<u>Compliance</u> <u>Result</u>	<u>Exceedance</u>	<u>Possible</u> <u>SSI</u>	<u>Post-Hoc</u> <u>Trend</u>
TDS mg/L	06/17/2021	AE54114	1 of 2	273.	234.	n	n	--

NOTE: If trend test is performed, the background slope is listed under the Upper Limit heading and the compliance slope is listed under the Compliance Result heading.