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2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

CALEDONIA ASH LANDFILL

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT CALEDONIA ASH LANDFILL

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ACRONYMS AND ABBREVIATIONS

ASD	Alternate Source Demonstration
B	Boron
Ca	Calcium
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
mg/L	milligrams per liter
NRT	Natural Resource Technology, an OBG Company
OBG	O'Brien & Gere Engineers, Inc.
Ramboll	Ramboll Americas Engineering Solutions, Inc
SO ₄	Sulfate
SSI	Statistically Significant Increase
TBD	To be Determined
TDS	Total Dissolved Solids

2021 MONITORING PROGRAM SUMMARY

The Caledonia Ash Landfill 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 Caledonia Ash Landfill. The following constituents and wells had SSIs detected in 2021:

- Boron – W08D, W09D, W10D, W49, and W50
- Calcium – W08D
- Sulfate – W08D, W09D, W10D, W49, and W50
- Total Dissolved Solids (TDS) – W08D, and W50

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 either from an error in sampling or analysis or from naturally occurring conditions (e.g. natural variation in groundwater quality).

The Caledonia Ash Landfill remains in the Detection Monitoring Program in accordance with 40 CFR 257.94.

1. INTRODUCTION

This report has been prepared on behalf of We Energies 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 Caledonia Ash Landfill located in Caledonia, 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 Caledonia Ash Landfill for calendar year 2021.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

The Caledonia Ash Landfill remained in Detection Monitoring (40 CFR 257.94) during 2021. Detection Monitoring Program sampling dates and parameters collected are provided in Table 1. Analytical results from the two sampling rounds collected and those statistically analyzed in 2021 (Detection Monitoring Round 7) are included in Table 2.

In accordance with 40 CFR 257.93(h)(2), the *Statistical Analysis Plan, Caledonia Ash Landfill* (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 Caledonia Ash Landfill. SSIs and the SSI determination dates are provided in Table 1.

40 CFR 257.94(e)(2) allows 90 days to demonstrate that a 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). An alternate source demonstration (ASD) was completed for the Caledonia Ash Landfill on the date provided in Table 1.

Table 1. Detection Monitoring Program Summary

Detection Round	Sampling Date	Parameters Collected	Data Received	SSI Determination Date	SSI Parameters	Resample Date	ASD Date
7	11/9/20-11/11/20	Appendix III	12/16/20	3/16/21	B, Ca, SO ₄ , TDS	NA	4/15/18 ¹ 12/22/19
8	5/11/21-5/12/21	Appendix III	6/8/21	9/6/21	B, Ca, SO ₄ , TDS	NA	4/15/18 ¹ 12/22/19
9	11/8/21-11/9/21	Appendix III	12/15/21	TBD Before 3/15/22	TBD	TBD	TBD

B – Boron

Ca – Calcium

NA – Not applicable

SO₄ – Sulfate

TBD – To Be Determined

TDS – Total Dissolved Solids

1. The April 15, 2018 and December 22, 2019 ASDs for Caledonia Ash Landfill provided a description, data, and pertinent information supporting an alternate source for the wells and parameters with SSIs in Detection Monitoring Rounds 7-8. Data resulting in SSIs above background are consistent with analytical results observed in previous detection monitoring rounds.

The Caledonia Ash Landfill remains 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. One resampling event was completed in accordance with the *Statistical Analysis Plan, Caledonia Ash Landfill* (Natural Resource Technology, an OBG Company, 2017). Sampling dates are summarized in Table 1. All samples were collected and analyzed in accordance with the *Sampling and Analysis Plan* (Natural Resource Technology, an OBG Company, 2017) prepared for the Caledonia Ash Landfill. 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 the Caledonia Ash Landfill 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 November 9-11, 2020 (Detection Monitoring Round 7) and May 11-12, 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, Caledonia Ash Landfill* (Natural Resource Technology, an OBG Company, 2017).

No additional Alternate Source Demonstrations were prepared for the Caledonia Ash Landfill in 2021.

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* (Natural Resource Technology, an OBG Company, 2017) prepared for the Caledonia Ash Landfill, 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 Revision 2, Caledonia Ash Landfill, Caledonia, Wisconsin, September 29, 2017.*

Natural Resource Technology, an OBG Company, 2017, *Statistical Analysis Plan, Caledonia Ash Landfill, Caledonia, Wisconsin, October 17, 2017.*

TABLES

Caledonia CCR
Table 2. Caledonia Ash Landfill: Appendix III Analytical Results

Date Range: 11/01/2020 to 12/31/2021

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
W08D	11/10/2020	AE49635	0.481	50.800	10.000	1.300	7.7	220.000
	5/11/2021	AE53141	0.488	49.900	9.800	1.100	7.5	200.000
	11/9/2021	AE57087	0.450	49.800	9.800	1.300	7.5	219.000
W09D	11/9/2020	AE49634	0.446	19.900	3.500	1.500	8.0	34.000
	5/11/2021	AE53142	0.435	18.000	3.700	1.400	8.2	35.700
	11/8/2021	AE57086	0.391	18.400	3.800	1.400	8.1	33.200
W10D	11/10/2020	AE49637	0.444	21.600	4.000	1.500	7.9	44.000
	5/11/2021	AE53143	0.440	21.400	4.000	1.300	8.1	41.100
	11/9/2021	AE57090	0.429	20.900	4.000	1.300	8.0	40.600
W46D	11/9/2020	AE49633	0.394	25.300	4.800	1.300	7.6	35.000
	5/11/2021	AE53144	0.404	27.600	7.100	1.100	7.5	33.100
	11/8/2021	AE57085	0.385	26.100	5.600	1.200	7.3	17.700
W48	11/10/2020	AE49638	0.400	27.600	3.700	1.000	7.9	0.380
	5/11/2021	AE53145	0.416	28.600	3.800	0.920	8.0	<0.440
	11/9/2021	AE57089	0.377	27.100	3.800	0.970	7.9	<0.440
W49	11/11/2020	AE49640	0.442	15.400	5.400	1.400	7.8	46.000
	5/12/2021	AE53149	0.469	16.000	4.200	1.400	8.4	49.700
	11/9/2021	AE57092	0.449	16.800	4.500	1.400	7.6	37.800
W50	11/11/2020	AE49639	0.540	29.800	5.500	1.300	7.6	75.000
	5/12/2021	AE53148	0.542	28.200	5.900	1.200	7.4	78.000
	11/9/2021	AE57091	0.510	28.400	6.000	1.200	7.7	81.400

Caledonia CCR
Table 2. Caledonia Ash Landfill: Appendix III Analytical Results




Date Range: 11/01/2020 to 12/31/2021

Lab Methods:

Well Id	Date Sampled	Lab Id	TDS, mg/L
W08D	11/10/2020	AE49635	410.000
	5/11/2021	AE53141	448.000
	11/9/2021	AE57087	472.000
W09D	11/9/2020	AE49634	82.000
	5/11/2021	AE53142	206.000
	11/8/2021	AE57086	186.000
W10D	11/10/2020	AE49637	150.000
	5/11/2021	AE53143	204.000
	11/9/2021	AE57090	212.000
W46D	11/9/2020	AE49633	200.000
	5/11/2021	AE53144	230.000
	11/8/2021	AE57085	206.000
W48	11/10/2020	AE49638	220.000
	5/11/2021	AE53145	236.000
	11/9/2021	AE57089	256.000
W49	11/11/2020	AE49640	230.000
	5/12/2021	AE53149	210.000
	11/9/2021	AE57092	204.000
W50	11/11/2020	AE49639	250.000
	5/12/2021	AE53148	278.000
	11/9/2021	AE57091	272.000

FIGURES



-  CCR RULE BACKGROUND MONITORING WELL LOCATION
-  CCR RULE DOWNGRADIENT MONITORING WELL LOCATION
-  CCR RULE UPGRADIENT MONITORING WELL LOCATION

0 250 500 Feet

GROUNDWATER SAMPLING WELL LOCATION MAP

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT WE ENERGIES CALEDONIA ASH LANDFILL CALEDONIA, WISCONSIN

FIGURE 1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

