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2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT CALEDONIA ASH LANDFILL

2019 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	O'Brien & Gere Engineers, Inc., a Ramboll Company
SO ₄	Sulfate
SSI	Statistically Significant Increase
TBD	To be Determined
TDS	Total Dissolved Solids

1. INTRODUCTION

This report has been prepared on behalf of We Energies by O'Brien & Gere Engineers, Inc., a Ramboll Company (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 2019.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

The Caledonia Ash Landfill remained in Detection Monitoring (40 CFR 257.94) during 2019. 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 2019 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). Alternate source demonstrations (ASDs) were completed for the Caledonia Ash Landfill on the dates provided in Table 1. ASD documents for 2019 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
3	11/14/18-11/15/18	Appendix III	11/29/18	2/27/19	B, Ca, SO ₄ , TDS	3/5/19	5/28/19
4	5/8/19	Appendix III	6/25/19	9/23/19	B, Ca, SO ₄ , TDS	10/2/19-10/3/19	12/22/19
5	11/4/19-11/5/19	Appendix III	12/12/19	TBD (before 3/11/20)	TBD	TBD	TBD

B – Boron

Ca – Calcium

NA – Not applicable

SO₄ – Sulfate

TBD – To Be Determined

TDS – Total Dissolved Solids

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

3. KEY ACTIONS COMPLETED IN 2019

Two groundwater sampling events were completed in 2019 as part of the Detection Monitoring Program, Rounds 4 and 5. One groundwater sample was collected from each background and downgradient well in the monitoring system during each event. Two resampling events were 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 2019 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 2019.

Statistical evaluation, including SSI determinations, of analytical data from the Detection Monitoring Program for November 14-15, 2018 (Detection Monitoring Round 3) and May 8, 2019 (Detection Monitoring Round 4) were completed in 2019 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).

Alternate Source Demonstrations for Detection Monitoring Rounds 3 and 4 dated May 28 and December 22, 2019, respectively, were prepared for the Caledonia Ash Landfill in 2019 and are provided in Appendix A. ASDs were prepared in accordance with 40 CFR 257.94(e)(2) and provide a description, data, and pertinent information to support an alternate source for wells and parameters with SSIs at the Caledonia Ash Landfill. 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 either from an error in sampling or analysis or from naturally occurring conditions (e.g. natural variation in groundwater quality).

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE PROBLEMS

No problems were encountered during implementation of the Detection Monitoring Program during 2019. 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 2020

The following key activities are planned for 2020:

- Continuation of the Detection Monitoring Program with semi-annual sampling scheduled for the 2nd and 4th quarters of 2020.
- Complete statistical evaluation of analytical data from the downgradient wells, using background data to determine whether a 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 2020.
 - 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 2020, 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: 11/01/2018 to 12/31/2019

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	11/14/2018	AE31851	0.450	50.000	10.000	0.950	7.500	210.000
	05/08/2019	AE37963	0.460	51.000	10.000	1.100	7.520	230.000
	11/04/2019	AE41843	0.440	48.000	10.000	1.000	7.400	200.000
W09D	11/14/2018	AE31849	0.410	19.000	3.400	1.200	8.000	34.000
	03/05/2019	AE34023	0.390				7.800	
	05/08/2019	AE37960	0.410	18.000	3.700	1.300	8.210	37.000
	10/02/2019	AE40913	0.400				7.900	
W10D	11/04/2019	AE41842	0.390	18.000	3.600	1.300	7.900	33.000
	11/15/2018	AE31854	0.440	21.000	3.500	1.200	8.000	43.000
	05/08/2019	AE37959	0.440	21.000	4.000	1.200	8.070	46.000
W46D	11/05/2019	AE41847	0.410	20.000	3.700	1.200	8.000	40.000
	11/14/2018	AE31848	0.380	26.000	5.800	1.000	7.600	36.000
	05/08/2019	AE37956	0.370	27.000	7.100	1.100	7.490	37.000
W48	11/04/2019	AE41841	0.360	24.000	5.000	1.100	7.500	35.000
	11/15/2018	AE31852	0.390	26.000	3.500	0.820	7.800	0.560
	05/08/2019	AE37957	0.380	27.000	3.700	0.970	7.960	2.500
W49	11/05/2019	AE41845	0.370	25.000	3.500	0.880	7.800	<0.140
	11/15/2018	AE31853	0.440	20.000	4.900	1.000	7.900	43.000
	05/08/2019	AE37958	0.450	16.000	4.600	1.400	8.300	54.000
W50	11/05/2019	AE41846	0.430	16.000	4.200	1.300	8.000	50.000
	11/15/2018	AE31855	0.520	27.000	5.700	1.000	7.800	76.000
	05/08/2019	AE37962	0.530	30.000	6.800	1.100	7.760	83.000
	10/03/2019	AE41032					7.000	
	11/05/2019	AE41848	0.490	28.000	5.900	0.990	7.700	73.000




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

Date Range: 11/01/2018 to 12/31/2019

Well Id	Date Sampled	Lab Id	TDS, mg/L
W08D	11/14/2018	AE31851	430.000
	05/08/2019	AE37963	440.000
	11/04/2019	AE41843	430.000
W09D	11/14/2018	AE31849	160.000
	05/08/2019	AE37960	190.000
	11/04/2019	AE41842	150.000
W10D	11/15/2018	AE31854	160.000
	05/08/2019	AE37959	190.000
	11/05/2019	AE41847	180.000
W46D	11/14/2018	AE31848	140.000
	05/08/2019	AE37956	210.000
	11/04/2019	AE41841	200.000
W48	11/15/2018	AE31852	130.000
	05/08/2019	AE37957	220.000
	11/05/2019	AE41845	190.000
W49	11/15/2018	AE31853	170.000
	05/08/2019	AE37958	210.000
	11/05/2019	AE41846	180.000
W50	11/15/2018	AE31855	220.000
	05/08/2019	AE37962	270.000
	10/03/2019	AE41032	260.000
	11/05/2019	AE41848	260.000

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

FIGURE 1

**2019 ANNUAL GROUNDWATER MONITORING AND
CORRECTIVE ACTION REPORT
WE ENERGIES CALEDONIA ASH LANDFILL
CALEDONIA, WISCONSIN**

RAMBOLL US CORPORATION
A RAMBOLL COMPANY



APPENDIX A
ALTERNATE SOURCE DEMONSTRATIONS (ASD)

**APPENDIX A1
40 CFR SECTION 257.94(E)(2) ALTERNATE SOURCE DEMONSTRATION
(ASD) DETECTION MONITORING ROUND 3, WE ENERGIES CALEDONIA ASH
LANDFILL**

May 28, 2019

Mr. Tim Muehlfeld

WEC Business Services, LLC
333 W. Everett Street – A231
Milwaukee, WI 53226

RE: 40 CFR Section 257.94(e)(2) Alternate Source Demonstration (ASD)
Detection Monitoring Round 3, We Energies Caledonia Ash Landfill

Dear **Mr. Muehlfeld**:

This letter has been prepared by O'Brien & Gere Engineers, Inc., a Part of Ramboll (OBG) to provide pertinent information for an alternate source demonstration (ASD) as allowed by Title 40 Code of Federal Regulations (40 CFR) Part 257, Subpart D, Section 257.94(e)(2) for the Caledonia Ash Landfill located in Caledonia, Wisconsin.

The third semi-annual detection monitoring samples (Detection Monitoring Round 3) were collected on November 14-15, 2018 for which analytical data was received on November 29, 2018. 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 3 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 (February 27, 2019). The statistical determination identified the following SSIs at downgradient monitoring wells:

- Boron above the background prediction interval at wells W08D, W09D, W10D, W49, and W50
- Sulfate above the background prediction interval at wells W08D, W09D, W10D, W49, and W50
- Calcium above the background prediction interval at well W08D
- Total dissolved solids (TDS) above the background prediction interval at well W08D

The SSIs above background identified during Detection Monitoring Round 3 are consistent with Detection Monitoring Round 1 and Round 2. Boron was detected at a concentration indicative of a SSI above background at W09 during Detection Monitoring Round 2, but the well was resampled and SSI was not confirmed, as documented in an Alternate Source Demonstration (ASD), *Alternate Source Demonstration, Caledonia Ash Landfill, Caledonia, Wisconsin*; dated November 27, 2018 (OBG, 2018).

For the wells and parameters listed above that are consistent with Detection Monitoring Rounds 1 and 2, an ASD, *Alternate Source Demonstration, Caledonia Ash Landfill, Caledonia, Wisconsin*; dated April 15, 2018 (OBG, 2018), prepared in accordance with 40 CFR Section 257.94(e)(2) provides a description, data, and pertinent information supporting an alternate source which applies to the wells and parameters with SSIs in Detection Monitoring Rounds 1 and 2. The ASD supports the position that the SSIs observed during the Detection Monitoring Rounds 1 and 2, were not due to a release from the CCR unit but were from naturally occurring conditions and anthropogenic impacts in the area of the Caledonia Ash Landfill. The SSI reported for boron at W09D, was not verified during a resample event, as discussed in the ASD dated November 27, 2018.

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 W09D was evaluated and completed within 90 days of the SSI determination, by May 28, 2019.

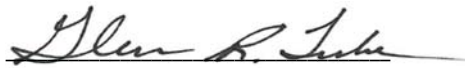


To verify the SSI in Detection Monitoring Round 3, well W09D was resampled on March 5, 2019 and analyzed for only the SSI parameter (boron), in accordance the Statistical Analysis Plan¹. Analytical results were received on April 17, 2019 and are included in Table 1. The concentration of boron at W09D collected during the resample event did not exceed background and the SSI was not confirmed.

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 3 was not due to a release from the CCR unit but was from either an error in sampling or analysis or naturally occurring conditions (e.g. natural variation in groundwater quality). Therefore, no further action (i.e. assessment monitoring) is warranted and the Caledonia Ash Landfill will remain in detection monitoring.

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

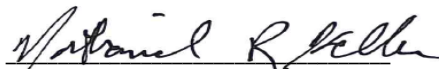
Sincerely,
O'BRIEN & GERE ENGINEERS, INC.



Glenn R. Luke, PE
Managing Engineer

Professional Engineer No. 42834-6
State of Wisconsin
O'Brien & Gere Engineers, Inc.
Date: May 28, 2019

I, Glenn R. Luke, a qualified professional engineer in good standing in the State of Wisconsin, certify that 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
O'Brien & Gere Engineers, Inc.
Date: May 28, 2019

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.

Attachments: Table 1. Caledonia Ash Landfill: Appendix III Analytical Results

¹ Natural Resource Technology, an OBG Company, 2017, Statistical Analysis Plan, Caledonia Ash Landfill, Caledonia, Wisconsin, October 17, 2017.

Caledonia CCR
Table 1. Caledonia Ash Landfill: Appendix III Analytical Results

Date Range: 01/01/1983 to 03/05/2019

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	11/11/2015	40124666006	0.407	52.500	13.000	1.000	7.700	181.000
	02/16/2016	40128456003	0.426	54.700	11.500	0.720	7.440	191.000
	05/11/2016	40132272002	0.472	57.600	11.600	0.760	7.400	196.000
	08/30/2016	40137606003	0.402	58.200	10.400	0.710	7.600	177.000
	11/14/2016	40142064003	0.457	57.000	12.900	1.100	7.400	204.000
	02/08/2017	40145548002	0.420	51.800	11.000	0.860	7.940	201.000
	05/15/2017	40150143005	0.470	51.400	10.600	0.910	7.450	204.000
	08/22/2017	40155549007	0.450	48.900	10.800	1.100	6.940	203.000
	11/14/2017	40161125002	0.456	49.100	11.900	1.100	7.410	222.000
	05/16/2018	AE27556	0.270	51.000	10.000	0.960	7.300	200.000
11/14/2018	AE31851	0.450	50.000	10.000	0.950	7.500	210.000	
W09D	11/11/2015	40124666005	0.379	19.900	4.600	1.300	8.200	30.400
	02/16/2016	40128456004	0.404	18.600	4.900	1.300	8.340	31.200
	05/11/2016	40132272003	0.389	18.800	4.900	1.400	8.130	32.300
	08/30/2016	40137606004	0.350	19.900	4.100	1.300	8.300	31.500
	11/14/2016	40142064004	0.389	18.900	3.900	1.400	8.300	33.900
	02/08/2017	40145548003	0.370	18.400	4.000	1.300	8.190	33.500
	05/15/2017	40150143006	0.380	17.900	3.800	1.400	7.830	33.400
	08/22/2017	40155549008	0.390	17.700	3.800	1.300	7.700	31.800
	11/14/2017	40161125003	0.394	18.600	4.900	1.400	8.230	32.200
	05/16/2018	AE27554	0.410	19.000	3.400	1.200	7.900	32.000
09/07/2018	AE30278	0.390				7.900		
11/14/2018	AE31849	0.410	19.000	3.400	1.200	8.000	34.000	
03/05/2019	AE34023	0.390				7.800		
W10D	11/11/2015	40124666004	0.398	22.700	4.700	1.200	8.200	38.800
	02/17/2016	40128456007	0.445	23.300	6.300	1.200	8.100	43.000
	05/11/2016	40132272005	0.428	21.600	6.500	1.300	7.900	46.000
	08/30/2016	40137606005	0.388	21.800	4.700	1.300	8.100	41.600
	11/14/2016	40142064005	0.417	21.600	4.400	1.400	8.000	44.000
	02/08/2017	40145548005	0.390	20.500	4.300	1.300	8.360	41.700
	05/15/2017	40150143007	0.410	20.300	4.200	1.400	7.980	43.000
	08/22/2017	40155549009	0.420	20.700	4.200	1.300	7.870	40.800
	11/14/2017	40161125004	0.417	20.400	4.300	1.400	8.070	44.500
	05/16/2018	AE27553	0.430	21.000	3.500	1.200	7.600	41.000
11/15/2018	AE31854	0.440	21.000	3.500	1.200	8.000	43.000	
W46D	11/11/2015	40124666001	0.332	31.000	6.100	0.820	8.100	26.300

Caledonia CCR
Table 1. Caledonia Ash Landfill: Appendix III Analytical Results

Date Range: 01/01/1983 to 03/05/2019

			B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
W46D	02/17/2016	40128456008	0.376	35.900	7.400	0.740	7.800	11.600
	05/11/2016	40132272008	0.406	33.200	10.100	4.000	7.400	5.400
	08/30/2016	40137606006	0.358	30.300	7.200	2.300	7.600	25.000
	11/14/2016	40142064007	0.370	29.600	9.600	0.540	7.500	26.500
	02/08/2017	40145548006	0.370	28.400	10.400	<0.500	7.210	25.700
	05/16/2017	40150143010	0.370	25.900	9.900	1.100	7.150	30.200
	08/21/2017	40155549004	0.380	28.100	10.600	1.000	7.410	29.100
	11/14/2017	40161125001	0.391	27.000	6.800	1.200	7.580	34.500
	05/15/2018	AE27550	0.400	27.000	6.000	1.100	7.600	33.000
	11/14/2018	AE31848	0.380	26.000	5.800	1.000	7.600	36.000
	W48	11/11/2015	40124666002	0.349	27.200	4.600	0.900	8.000
02/16/2016		40128456002	0.373	24.900	5.000	0.900	8.000	3.000
05/11/2016		40132272006	0.385	26.700	4.900	0.980	7.900	2.600
08/30/2016		40137606001	0.344	28.100	4.100	0.900	8.000	<2.000
11/14/2016		40142064006	0.357	26.500	4.100	0.990	8.000	<1.000
02/08/2017		40145548001	0.350	26.300	4.000	0.930	8.170	1.300
05/15/2017		40150143004	0.360	25.100	3.800	0.950	7.990	<1.000
08/21/2017		40155549006	0.360	27.300	3.800	0.920	7.460	<1.000
11/15/2017		40161125005	0.370	27.400	4.100	1.000	7.860	<1.000
05/16/2018		AE27551	0.390	27.000	3.500	0.850	7.700	0.620
11/15/2018		AE31852	0.390	26.000	3.500	0.820	7.800	0.560
W49	06/21/2017	40152212001	0.420	40.600	6.500	1.200	7.970	44.900
	08/22/2017	40155549012	0.410	24.900	6.300	1.300	7.870	46.100
	11/15/2017	40161125007	0.432	19.500	5.800	1.500	8.090	51.600
	05/16/2018	AE27557	0.440	18.000	5.000	1.200	7.800	47.000
W50	11/15/2018	AE31853	0.440	20.000	4.900	1.000	7.900	43.000
	06/02/2017	40151093001	0.500	30.800	6.500	1.200	6.920	51.300
	08/22/2017	40155549013	0.500	25.900	5.400	1.200	7.150	75.200
	11/15/2017	40161125008	0.490	26.200	5.800	1.300	7.840	80.800
	05/16/2018	AE27555	0.510	28.000	5.400	1.100	7.700	75.000
	11/15/2018	AE31855	0.520	27.000	5.700	1.000	7.800	76.000

Caledonia CCR
Table 1. Caledonia Ash Landfill: Appendix III Analytical Results

Date Range: 01/01/1983 to 03/05/2019

Well Id	Date Sampled	Lab Id	TDS, mg/L
W08D	11/11/2015	40124666006	432.000
	02/16/2016	40128456003	460.000
	05/11/2016	40132272002	446.000
	08/30/2016	40137606003	484.000
	11/14/2016	40142064003	510.000
	02/08/2017	40145548002	454.000
	05/15/2017	40150143005	448.000
	08/22/2017	40155549007	444.000
	11/14/2017	40161125002	416.000
	05/16/2018	AE27556	440.000
	11/14/2018	AE31851	430.000
W09D	11/11/2015	40124666005	202.000
	02/16/2016	40128456004	198.000
	05/11/2016	40132272003	194.000
	08/30/2016	40137606004	206.000
	11/14/2016	40142064004	206.000
	02/08/2017	40145548003	192.000
	05/15/2017	40150143006	200.000
	08/22/2017	40155549008	208.000
	11/14/2017	40161125003	170.000
	05/16/2018	AE27554	180.000
	11/14/2018	AE31849	160.000
W10D	11/11/2015	40124666004	222.000
	02/17/2016	40128456007	190.000
	05/11/2016	40132272005	206.000
	08/30/2016	40137606005	232.000
	11/14/2016	40142064005	210.000
	02/08/2017	40145548005	192.000
	05/15/2017	40150143007	196.000
	08/22/2017	40155549009	222.000
	11/14/2017	40161125004	180.000
	05/16/2018	AE27553	180.000
	11/15/2018	AE31854	160.000
W46D	11/11/2015	40124666001	230.000
	02/17/2016	40128456008	244.000
	05/11/2016	40132272008	218.000

Caledonia CCR
Table 1. Caledonia Ash Landfill: Appendix III Analytical Results

Date Range: 01/01/1983 to 03/05/2019

			TDS, mg/L
W46D	08/30/2016	40137606006	256.000
	11/14/2016	40142064007	260.000
	02/08/2017	40145548006	114.000
	05/16/2017	40150143010	230.000
	08/21/2017	40155549004	232.000
	11/14/2017	40161125001	196.000
	05/15/2018	AE27550	200.000
	11/14/2018	AE31848	140.000
W48	11/11/2015	40124666002	254.000
	02/16/2016	40128456002	222.000
	05/11/2016	40132272006	224.000
	08/30/2016	40137606001	242.000
	11/14/2016	40142064006	238.000
	02/08/2017	40145548001	224.000
	05/15/2017	40150143004	236.000
	08/21/2017	40155549006	254.000
	11/15/2017	40161125005	244.000
	05/16/2018	AE27551	200.000
	11/15/2018	AE31852	130.000
	W49	06/21/2017	40152212001
08/22/2017		40155549012	216.000
11/15/2017		40161125007	210.000
05/16/2018		AE27557	180.000
11/15/2018		AE31853	170.000
W50	06/02/2017	40151093001	270.000
	08/22/2017	40155549013	256.000
	11/15/2017	40161125008	260.000
	05/16/2018	AE27555	250.000
	11/15/2018	AE31855	220.000

**APPENDIX A2
40 CFR SECTION 257.94(E)(2) ALTERNATE SOURCE DEMONSTRATION
(ASD) DETECTION MONITORING ROUND 4, WE ENERGIES CALEDONIA ASH
LANDFILL**

Mr. Tim Muehlfeld
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 4, We Energies Caledonia Ash Landfill

Dear Mr. Muehlfeld:

This document has been prepared by O'Brien & Gere Engineers, Inc., a Ramboll company (Ramboll) to provide pertinent information for an alternate source demonstration (ASD) as allowed by 40 CFR Section 257.94(e)(2) for the Caledonia Ash Landfill, located in the Caledonia, Wisconsin.

Date December 22, 2019

The fourth semi-annual detection monitoring samples (Detection Monitoring Round 4) were collected on May 8, 2019 for which analytical data was received on June 25, 2019. 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 4 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 (September 23, 2019). The statistical determination identified the following SSIs at downgradient monitoring wells:

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- Boron above the background prediction interval at W08D, W09D, W10D, W49, and W50
- Calcium above the background prediction interval at W08D
- Sulfate above the background prediction interval at W08D, W09D, W10D, W49, and W50
- Total dissolved solids (TDS) above the background prediction interval W08D and W50

The SSIs above background identified during Detection Monitoring Round 4 are consistent with Detection Monitoring Rounds 1-3 with the exception of TDS at W50 and boron at W09D. Boron was detected at a concentration indicative of a SSI above background at W09D during Detection Monitoring Rounds 2 and 3, but the well was resampled and SSI was not confirmed, as documented in *Alternate Source Demonstration (ASD) Detection Monitoring Round 2, We Energies Caledonia Ash Landfill; dated November 27, 2018 (OBG, 2018)* and *Alternate Source Demonstration (ASD) Detection Monitoring Round 3, We Energies Caledonia Ash Landfill; dated May 28, 2019 (OBG, 2018)*.

For the wells and parameters listed above that are consistent with Detection Monitoring Rounds 1-3, *Alternate Source Demonstration, Caledonia Ash Landfill, Caledonia, Wisconsin; dated April 15, 2018 (OBG, 2018)*, prepared in accordance with 40 CFR Section 257.94(e)(2) provides a description, data, and pertinent information supporting an alternate source which applies to the wells and parameters with SSIs in Detection Monitoring Rounds 1-3. The ASD supports the position that the SSIs observed during the Detection Monitoring Rounds 1-3 were

not due to a release from the CCR unit but were from naturally occurring conditions and anthropogenic impacts in the area of the Caledonia Ash Landfill.

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 W09D and TDS at W50 was evaluated and completed within 90 days of the SSI determination, by December 22, 2019.

To verify the SSI in Detection Monitoring Round 4, wells W09D and W50 were resampled on October 2-3, 2019 and analyzed for only the SSI parameters (boron, TDS as appropriate), in accordance the Statistical Analysis Plan¹. Analytical results were received on October 23, 2019 and are included in Table 1. The concentrations of boron at W09D and TDS at W50 collected during the resample event did not exceed background and the SSI was not confirmed.

The preceding information serves as the ASD prepared in accordance with 40 CFR Section 257.94(e)(2) and supports the position that the SSIs reported during Detection Monitoring Round 4 were not due to a release from the CCR unit but were from either an error in sampling or analysis or naturally occurring conditions (e.g. natural variation in groundwater quality). Therefore, no further action (i.e. assessment monitoring) is warranted and the Caledonia Ash Landfill will remain in detection monitoring.

¹ Natural Resource Technology, an OBG Company, 2017, Statistical Analysis Plan, Caledonia Ash Landfill, Caledonia, Wisconsin, October 17, 2017.

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

Sincerely,



Glenn R. Luke, PE
Managing Engineer
Professional Engineer No. 42834-6
State of Wisconsin
O'Brien & Gere Engineers, Inc., a Ramboll company
Date: December 22, 2019

I, Glenn R. Luke, a qualified professional engineer in good standing in the State of Wisconsin, certify that 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
O'Brien & Gere Engineers, Inc., a Ramboll company
Date: December 22, 2019

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.

Tables

Table 1 Caledonia Ash Landfill: Appendix III Analytical Results

TABLES

Caledonia CCR
Table 1. Caledonia Ash Landfill: Appendix III Analytical Results

Date Range: 01/01/1983 to 10/23/2019

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	11/11/2015	40124666006	0.407	52.500	13.000	1.000	7.700	181.000
	02/16/2016	40128456003	0.426	54.700	11.500	0.720	7.440	191.000
	05/11/2016	40132272002	0.472	57.600	11.600	0.760	7.400	196.000
	08/30/2016	40137606003	0.402	58.200	10.400	0.710	7.600	177.000
	11/14/2016	40142064003	0.457	57.000	12.900	1.100	7.400	204.000
	02/08/2017	40145548002	0.420	51.800	11.000	0.860	7.940	201.000
	05/15/2017	40150143005	0.470	51.400	10.600	0.910	7.450	204.000
	08/22/2017	40155549007	0.450	48.900	10.800	1.100	6.940	203.000
	11/14/2017	40161125002	0.456	49.100	11.900	1.100	7.410	222.000
	05/16/2018	AE27556	0.270	51.000	10.000	0.960	7.300	200.000
	11/14/2018	AE31851	0.450	50.000	10.000	0.950	7.500	210.000
	05/08/2019	AE37963	0.460	51.000	10.000	1.100	7.520	230.000
	W09D	11/11/2015	40124666005	0.379	19.900	4.600	1.300	8.200
02/16/2016		40128456004	0.404	18.600	4.900	1.300	8.340	31.200
05/11/2016		40132272003	0.389	18.800	4.900	1.400	8.130	32.300
08/30/2016		40137606004	0.350	19.900	4.100	1.300	8.300	31.500
11/14/2016		40142064004	0.389	18.900	3.900	1.400	8.300	33.900
02/08/2017		40145548003	0.370	18.400	4.000	1.300	8.190	33.500
05/15/2017		40150143006	0.380	17.900	3.800	1.400	7.830	33.400
08/22/2017		40155549008	0.390	17.700	3.800	1.300	7.700	31.800
11/14/2017		40161125003	0.394	18.600	4.900	1.400	8.230	32.200
05/16/2018		AE27554	0.410	19.000	3.400	1.200	7.900	32.000
09/07/2018		AE30278	0.390				7.900	
11/14/2018		AE31849	0.410	19.000	3.400	1.200	8.000	34.000
03/05/2019		AE34023	0.390				7.800	
05/08/2019	AE37960	0.410	18.000	3.700	1.300	8.210	37.000	
10/02/2019	AE40913	0.400				7.900		
W10D	11/11/2015	40124666004	0.398	22.700	4.700	1.200	8.200	38.800
	02/17/2016	40128456007	0.445	23.300	6.300	1.200	8.100	43.000
	05/11/2016	40132272005	0.428	21.600	6.500	1.300	7.900	46.000
	08/30/2016	40137606005	0.388	21.800	4.700	1.300	8.100	41.600
	11/14/2016	40142064005	0.417	21.600	4.400	1.400	8.000	44.000
	02/08/2017	40145548005	0.390	20.500	4.300	1.300	8.360	41.700
	05/15/2017	40150143007	0.410	20.300	4.200	1.400	7.980	43.000
	08/22/2017	40155549009	0.420	20.700	4.200	1.300	7.870	40.800
	11/14/2017	40161125004	0.417	20.400	4.300	1.400	8.070	44.500

Caledonia CCR
Table 1. Caledonia Ash Landfill: Appendix III Analytical Results

Date Range: 01/01/1983 to 10/23/2019

			B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
W10D	05/16/2018	AE27553	0.430	21.000	3.500	1.200	7.600	41.000
	11/15/2018	AE31854	0.440	21.000	3.500	1.200	8.000	43.000
	05/08/2019	AE37959	0.440	21.000	4.000	1.200	8.070	46.000
W46D	11/11/2015	40124666001	0.332	31.000	6.100	0.820	8.100	26.300
	02/17/2016	40128456008	0.376	35.900	7.400	0.740	7.800	11.600
	05/11/2016	40132272008	0.406	33.200	10.100	4.000	7.400	5.400
	08/30/2016	40137606006	0.358	30.300	7.200	2.300	7.600	25.000
	11/14/2016	40142064007	0.370	29.600	9.600	0.540	7.500	26.500
	02/08/2017	40145548006	0.370	28.400	10.400	<0.500	7.210	25.700
	05/16/2017	40150143010	0.370	25.900	9.900	1.100	7.150	30.200
	08/21/2017	40155549004	0.380	28.100	10.600	1.000	7.410	29.100
	11/14/2017	40161125001	0.391	27.000	6.800	1.200	7.580	34.500
	05/15/2018	AE27550	0.400	27.000	6.000	1.100	7.600	33.000
	11/14/2018	AE31848	0.380	26.000	5.800	1.000	7.600	36.000
	05/08/2019	AE37956	0.370	27.000	7.100	1.100	7.490	37.000
W48	11/11/2015	40124666002	0.349	27.200	4.600	0.900	8.000	2.300
	02/16/2016	40128456002	0.373	24.900	5.000	0.900	8.000	3.000
	05/11/2016	40132272006	0.385	26.700	4.900	0.980	7.900	2.600
	08/30/2016	40137606001	0.344	28.100	4.100	0.900	8.000	<2.000
	11/14/2016	40142064006	0.357	26.500	4.100	0.990	8.000	<1.000
	02/08/2017	40145548001	0.350	26.300	4.000	0.930	8.170	1.300
	05/15/2017	40150143004	0.360	25.100	3.800	0.950	7.990	<1.000
	08/21/2017	40155549006	0.360	27.300	3.800	0.920	7.460	<1.000
	11/15/2017	40161125005	0.370	27.400	4.100	1.000	7.860	<1.000
	05/16/2018	AE27551	0.390	27.000	3.500	0.850	7.700	0.620
	11/15/2018	AE31852	0.390	26.000	3.500	0.820	7.800	0.560
	05/08/2019	AE37957	0.380	27.000	3.700	0.970	7.960	2.500
W49	06/21/2017	40152212001	0.420	40.600	6.500	1.200	7.970	44.900
	08/22/2017	40155549012	0.410	24.900	6.300	1.300	7.870	46.100
	11/15/2017	40161125007	0.432	19.500	5.800	1.500	8.090	51.600
	05/16/2018	AE27557	0.440	18.000	5.000	1.200	7.800	47.000
	11/15/2018	AE31853	0.440	20.000	4.900	1.000	7.900	43.000
05/08/2019	AE37958	0.450	16.000	4.600	1.400	8.300	54.000	
W50	06/02/2017	40151093001	0.500	30.800	6.500	1.200	6.920	51.300
	08/22/2017	40155549013	0.500	25.900	5.400	1.200	7.150	75.200
	11/15/2017	40161125008	0.490	26.200	5.800	1.300	7.840	80.800

Caledonia CCR
Table 1. Caledonia Ash Landfill: Appendix III Analytical Results

Date Range: 01/01/1983 to 10/23/2019

			B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
W50	05/16/2018	AE27555	0.510	28.000	5.400	1.100	7.700	75.000
	11/15/2018	AE31855	0.520	27.000	5.700	1.000	7.800	76.000
	05/08/2019	AE37962	0.530	30.000	6.800	1.100	7.760	83.000
	10/03/2019	AE41032					7.000	

Caledonia CCR
Table 1. Caledonia Ash Landfill: Appendix III Analytical Results

Date Range: 01/01/1983 to 10/23/2019

Well Id	Date Sampled	Lab Id	TDS, mg/L
W08D	11/11/2015	40124666006	432.000
	02/16/2016	40128456003	460.000
	05/11/2016	40132272002	446.000
	08/30/2016	40137606003	484.000
	11/14/2016	40142064003	510.000
	02/08/2017	40145548002	454.000
	05/15/2017	40150143005	448.000
	08/22/2017	40155549007	444.000
	11/14/2017	40161125002	416.000
	05/16/2018	AE27556	440.000
	11/14/2018	AE31851	430.000
	05/08/2019	AE37963	440.000
	W09D	11/11/2015	40124666005
02/16/2016		40128456004	198.000
05/11/2016		40132272003	194.000
08/30/2016		40137606004	206.000
11/14/2016		40142064004	206.000
02/08/2017		40145548003	192.000
05/15/2017		40150143006	200.000
08/22/2017		40155549008	208.000
11/14/2017		40161125003	170.000
05/16/2018		AE27554	180.000
11/14/2018		AE31849	160.000
05/08/2019		AE37960	190.000
W10D		11/11/2015	40124666004
	02/17/2016	40128456007	190.000
	05/11/2016	40132272005	206.000
	08/30/2016	40137606005	232.000
	11/14/2016	40142064005	210.000
	02/08/2017	40145548005	192.000
	05/15/2017	40150143007	196.000
	08/22/2017	40155549009	222.000
	11/14/2017	40161125004	180.000
	05/16/2018	AE27553	180.000
	11/15/2018	AE31854	160.000
	05/08/2019	AE37959	190.000

Caledonia CCR
Table 1. Caledonia Ash Landfill: Appendix III Analytical Results

Date Range: 01/01/1983 to 10/23/2019

			TDS, mg/L
W46D	11/11/2015	40124666001	230.000
	02/17/2016	40128456008	244.000
	05/11/2016	40132272008	218.000
	08/30/2016	40137606006	256.000
	11/14/2016	40142064007	260.000
	02/08/2017	40145548006	114.000
	05/16/2017	40150143010	230.000
	08/21/2017	40155549004	232.000
	11/14/2017	40161125001	196.000
	05/15/2018	AE27550	200.000
	11/14/2018	AE31848	140.000
	05/08/2019	AE37956	210.000
	W48	11/11/2015	40124666002
02/16/2016		40128456002	222.000
05/11/2016		40132272006	224.000
08/30/2016		40137606001	242.000
11/14/2016		40142064006	238.000
02/08/2017		40145548001	224.000
05/15/2017		40150143004	236.000
08/21/2017		40155549006	254.000
11/15/2017		40161125005	244.000
05/16/2018		AE27551	200.000
11/15/2018		AE31852	130.000
05/08/2019		AE37957	220.000
W49		06/21/2017	40152212001
	08/22/2017	40155549012	216.000
	11/15/2017	40161125007	210.000
	05/16/2018	AE27557	180.000
	11/15/2018	AE31853	170.000
W50	05/08/2019	AE37958	210.000
	06/02/2017	40151093001	270.000
	08/22/2017	40155549013	256.000
	11/15/2017	40161125008	260.000
	05/16/2018	AE27555	250.000
	11/15/2018	AE31855	220.000
05/08/2019	AE37962	270.000	

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

Date Range: 01/01/1983 to 10/23/2019

			TDS, mg/L
W50	10/03/2019	AE41032	260.000