2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

FEDERAL CCR RULE

BRANDYWINE ASH MANAGEMENT FACILITY PHASE II, BRANDYWINE, MARYLAND

GenOn MD Ash Management LLC
25100 Chalk Point Road
Aquasco, Maryland 20608

January 2021

Prepared by:

Geosyntec Consultants, Inc.
10211 Wincopin Circle, Floor 4
Columbia, Maryland 21044

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY iii

1. INTRODUCTION 1

2. SITE DESCRIPTION 1

2.1 Site Description 1
2.2 Regional Physiographic Setting 1

3. GROUNDWATER MONITORING SYSTEM 1

4. CCR RULE GROUNDWATER MONITORING COMPLETED – 2020 2

4.1 Groundwater Monitoring 2
4.1.1 Detection Monitoring Program 2
4.1.2 Groundwater Elevation and Flow Velocities 2
4.2 Data Usability 3
4.3 Statistically Significant Increases Comparison Test 3
4.4 Transition to Intra-Well Statistical Analysis 3
4.5 Alternate Source Demonstration and Verification Resampling 4

5. DETECTION MONITORING STATISTICS 4

6. ASSESSMENT MONITORING STATISTICS 4

7. PROBLEMS ENCOUNTERED AND RESOLUTIONS 4

8. STATUS OF MONITORING PROGRAM 5

9. PLANNED KEY ACTIVITIES FOR 2021 5

10. REFERENCES 6

LIST OF FIGURES

Figure 1: Site Location Map

Figure 2: Site Features Map

Figure 3: Groundwater Monitoring Well Network

Figure 4: Groundwater Potentiometric Surface – February 2020

Figure 5: Groundwater Potentiometric Surface – August 2020

TABLE OF CONTENTS (Continued)

LIST OF TABLES

Table 1: Well Construction Details

Table 2: Summary of 2015-2019 Monitoring Events

Table 3: 2019 Groundwater Elevation Measurements

Table 4: Appendix III Analytical Data – Background Wells

Table 5: Appendix III Analytical Data – Compliance Wells and Statistically Significant Increases (SSIs)

Table 6: Appendix III Intra-Well Statistical Background Concentrations

LIST OF APPENDICES

Appendix A: Groundwater Flow Velocity Calculations

Appendix B: Alternate Source Demonstration – March 2020

Appendix C: Verification Resampling – May 2020

EXECUTIVE SUMMARY

This Groundwater Monitoring and Corrective Action Report (Report) has been prepared by Geosyntec Consultants, Inc. (Geosyntec) on behalf of GenOn MD Ash Management LLC (MD Ash) to summarize the groundwater monitoring activities conducted at Phase II at the Brandywine Ash Management Facility (Site) in Brandywine, Maryland pursuant to the Coal Combustion Residuals (CCR) Rule (40 Code of Federal Regulations [CFR] § 257.90(e)) through 31 December 2020. This executive summary has been included in this Report to meet the requirements of 40 CFR § 257.90(e)(6).

At both the beginning and end of 2020, the Site was monitored under a detection monitoring program in accordance with 40 CFR § 257.94. Two semi-annual groundwater monitoring events (February and August) were completed during 2020 to assess which, if any, constituents listed within Appendix III to 40 CFR Part 257 were detected at concentrations which were statistically significant increases (SSIs) over background concentrations. As discussed herein, there were no SSIs detected for Appendix III constituents at Site compliance wells during 2020 and the Site remains in detection monitoring.

1. INTRODUCTION

The Federal Coal Combustion Residuals (CCR) Rule (40 Code of Federal Regulations [CFR] § 257.90(e)) (USEPA, 2015) requires owners and or operators of existing CCR landfills to prepare a Groundwater Monitoring and Corrective Action Report (Report) no later than 31 January 2021. Geosyntec Consultants (Geosyntec) has prepared this Report for Phase II at the Brandywine Ash Management Facility in Brandywine, Maryland (Site). This Report summarizes the groundwater monitoring activities conducted pursuant to the CCR Rule through 31 December 2020.

2. SITE DESCRIPTION

2.1 Site Description

The Site is located in Brandywine, Prince George's County, Maryland (**Figure 1**) and is operated by GenOn MD Ash Management LLC (MD Ash). The Site is a dry ash management operation and does not have CCR surface impoundments (SI) as defined in the CCR Rule. The Site encompasses 217 acres of which approximately 29 acres have been used to manage CCR at the Phase II cell. Phase I, Historical Area 1, and Historical Area 2, are located adjacent to Phase II, are inactive and therefore are not regulated by the Federal CCR Rule. Phase II was constructed with a geosynthetic bottom liner and associated leachate collection system that directs leachate to Pond 006, located directly to the east. Non-contact stormwater runoff is directed away from Phase II through perimeter ditches. In addition to leachate, Pond 006 is used to manage contact stormwater. Pond 006 is exempt from the Federal CCR Rule. Features of the Site and their locations are presented on **Figure 2**.

2.2 Regional Physiographic Setting

The Site is located on the Atlantic Coastal Plain province of Maryland and was previously used for sand and gravel mining operations. The sand and gravel unit is the upper aquifer at the Site as defined in the CCR Rule. A regional aquitard (the Calvert Formation) underlies the sand and gravel.

Regional groundwater flow in the upper aquifer in the Site vicinity is to the north/northeast toward the Mataponi Creek that is considered to be the discharge location for shallow groundwater in the upper aquifer. The Mataponi Creek is incised into the Calvert Formation confining unit. Groundwater flow directions are locally variable and are influenced by nearby tributaries to Mataponi Creek that are localized groundwater discharge zones.

3. GROUNDWATER MONITORING SYSTEM

This section describes the groundwater monitoring well network for the CCR Rule at Phase II. This network utilizes several monitoring wells initially installed as part of a separate site-wide hydrogeologic investigation in addition to wells installed explicitly for the CCR Rule. As described in the *Basis for Groundwater Monitoring Network* (Geosyntec, 2017a), the groundwater

monitoring network around Phase II was designed to comply with 40 CFR § 257.91. No monitoring wells were installed or decommissioned during 2020.

Groundwater quality is monitored around Phase II through a network of eleven monitoring wells. As shown on **Figure 3**, there are seven compliance monitoring wells (B15S, B16, B26, B27, B37, B38, and B39) and four background monitoring wells (B34, B35, B36, and B41). These background locations were selected in consultation with Maryland Department of Environment (MDE) under a separate regulatory program. Monitoring well construction and soil boring logs were provided in *Basis for Groundwater Monitoring Network* (Geosyntec, 2017a). Compliance and background monitoring well construction details are summarized in **Table 1**.

4. CCR RULE GROUNDWATER MONITORING COMPLETED – 2020

4.1 Groundwater Monitoring

The baseline monitoring program was completed in August 2017 and the Site transitioned to detection monitoring beginning in October 2017. Groundwater monitoring continued in 2020 and was conducted in accordance with the *Sampling and Analysis Plan* (SAP) provided in Geosyntec (2015). Detection monitoring is performed on a semi-annual basis during the first and third quarters.

4.1.1 Detection Monitoring Program

Table 2 summarizes the history of baseline and detection monitoring events through 2020. Sampling occurred in February and August of 2020. In accordance with 40 CFR § 257.94(a) of the CCR Rule, samples were analyzed for Appendix III list constituents only. Prior to sampling, a synoptic round of groundwater measurements was conducted which included the compliance and background monitoring wells. Groundwater elevation data are presented in **Table 3**. Analytical results for background and compliance wells are summarized in **Table 4** and **Table 5**, respectively. The Site remains in detection monitoring.

4.1.2 Groundwater Elevation and Flow Velocities

Groundwater elevation monitoring was conducted in February and August 2020. A synoptic round of water level measurements was made at the start of each monitoring event. Groundwater elevation measurements were collected in accordance with the SAP. Potentiometric surface maps based on the elevations measured during the February and August 2020 monitoring events are presented on **Figure 4** and **Figure 5**, respectively. Groundwater elevation data are summarized in **Table 3**. As shown by **Figure 4** and **Figure 5**, groundwater under the eastern half of Phase II flows from west to east. The groundwater elevations and flow directions are very stable among the various monitoring events.

The average hydraulic gradient around Phase II ranged from 0.024 ft/ft between monitoring wells B16 and B28 to 0.0074 ft/ft between monitoring wells B16 and B27. The groundwater flow

velocity calculation package is provided in **Appendix A**. **Table A-2** shows groundwater flow velocities at the Site ranges from 1.3 X 10^{-4} centimeters per second (cm/sec) (136 inches/month; 144 feet/year) between monitoring wells B16 and B28 to 4.5 X 10^{-6} cm/sec (4.6 inches/month; 4.6 feet/year) between monitoring wells B26 and B27.

4.2 Data Usability

Upon receipt of laboratory analytical reports, the data were evaluated for usability. Analytical data were checked for the following:

- Samples were analyzed within the method-specified hold times;
- Samples were received within holding temperature;
- The chain of custody was complete;
- Precision was within SAP control limits using relative percent differences of blind duplicate samples;
- Matrix spike and matrix spike duplicate recoveries and laboratory control samples were within the SAP control limits; and
- Potential for positive bias was evaluated using method blanks concentrations.

Upon completion of the data usability assessment the data were qualified as needed and added to the data tables. All data received were considered complete and usable.

4.3 Statistically Significant Increases Comparison Test

The baseline monitoring data from the four background wells (B34, B35, B36, and B41) between 2015 and 2017 were previously used to select statistical methods for calculating the range of background concentrations for Appendix III constituents. These data are discussed and presented in the *2017 Annual Groundwater Monitoring and Corrective Action Report* (Geosyntec, 2018a).

In January 2018, the calculated background concentrations were compared to the results of the first Detection Monitoring Event conducted in October 2017. Comparison of those data to the calculated background upper prediction limits (UPLs) resulted in statistically significant increases (SSIs) over background and an alternate source demonstration (ASD) was triggered. ASDs and supplemental ASDs (SASDs) that were completed and successful in years prior are discussed in previous versions of the *Annual Groundwater Monitoring and Corrective Action Report*.

4.4 Transition to Intra-Well Statistical Analysis

After the ASD and SASD were completed and an alternate source for CCB constituents in Phase II compliance well groundwater was identified, the Site statistical analysis was transitioned from inter-well to intra-well statistical analysis (Geosyntec, 2018d). The intra-well statistical analysis compared groundwater concentrations from each monitoring well against the baseline data collected from the respective well. The intra-well statistical analysis was certified by a professional Engineer. New background concentrations for each Appendix III constituent were calculated for

use in the 2018 Annual Groundwater Monitoring and Corrective Action Report (Geosyntec, 2019). The new background concentrations are presented in **Table 6**. Subsequent monitoring results have been compared to the new calculated background UPLs through 2020.

4.5 Alternate Source Demonstration and Verification Resampling

Following the comparison of calculated background UPLs to the August 2019 detection monitoring concentrations, a potential SSI was detected for calcium at downgradient compliance monitoring well B27. An ASD was completed in March 2020 which demonstrated that the calcium SSI at B27 was not due to a release of CCR leachate from the Phase II unit. The March 2020 ASD is provided in **Appendix B**. The ASD was completed within 180 days of the SSI trigger date and certified by a professional engineer.

Following the comparison of calculated background UPLs to the February 2020 detection monitoring concentrations, potential SSIs were detected at compliance wells B15S for total dissolved solids (TDS), and B37 and B38 for sulfate. In May 2020, Geosyntec remobilized to the Site to collect verification resamples to confirm those select concentrations. Upon receipt of the verification resample data from the laboratory, each concentration was less than its respective background UPL. The verification samples disconfirmed the original detections from the February 2020 monitoring event, and the Site remains in detection monitoring. The letter report which summarizes the May 2020 verification resampling is provided in **Appendix C.**

5. DETECTION MONITORING STATISTICS

In accordance with 40 CFR § 257.93(b)(2), intra-well detection monitoring statistics were used to evaluate groundwater concentrations of Appendix III constituents collected during February and August 2020 detection monitoring events. **Table 5** provides a comparison of the Appendix III detection monitoring results to the calculated background concentrations. Other than the detections that were addressed in **Section 4.4**, there were no SSIs above background detected at compliance wells during the monitoring period.

6. ASSESSMENT MONITORING STATISTICS

Based on the results of the detection monitoring statistics the Site is not in assessment monitoring.

7. PROBLEMS ENCOUNTERED AND RESOLUTIONS

The following section discusses problems encountered during the detection monitoring program and their resolution.

Problem 1: SSI of an Appendix III constituent (calcium) was detected during the August 2019 detection monitoring event in downgradient compliance well B27.

Resolution 1: An ASD was completed in March 2020 which successfully demonstrated that the SSI was not due to a release of CCR leachate from the Phase II CCR unit.

Problem 2: SSIs of Appendix III constituents (TDS and sulfate) were detected during the February 2020 detection monitoring event in compliance wells B15S, B37, and B38.

Resolution 2: Geosyntec performed verification resampling of those select locations for parameters which had SSI detections in May 2020. The verification resample results indicated concentrations below background UPLs for each well-constituent pair. The verification resample results therefore disconfirm the original results.

8. STATUS OF MONITORING PROGRAM

As of 31 December 2020, the Site is currently undergoing detection monitoring and has successfully demonstrated an alternate source of Appendix III constituents in groundwater detected in Phase II compliance wells.

9. PLANNED KEY ACTIVITIES FOR 2021

The following section discusses the planned activities for 2021.

January 2021: This 2020 Annual Groundwater Monitoring and Corrective Action Report will be entered into the facility's operating record and notification will be sent to the Maryland Department of the Environment (MDE)**.**

February 2021: Completion of semi-annual detection groundwater monitoring.

March 2021: The 2020 Annual Groundwater Monitoring and Corrective Action Report will be posted to the public internet site.

May/June 2021: SSI testing of the February 2021 groundwater monitoring results.

August 2021: Completion of semi-annual detection groundwater monitoring.

November/December 2021: SSI testing of the August 2021 groundwater monitoring results.

December 2021: Preparation of the 2021 Annual Groundwater Monitoring and Corrective Action Report will begin.

10. REFERENCES

Driscoll, F.G., 1986.Groundwater and Wells, Second Edition. St. Paul, Minnesota, H.M. Smyth Company.

Geosyntec Consultants, Inc., 2015. Sampling and Analysis Plan, Brandywine Ash Management Facility, Brandywine Maryland, September.

Geosyntec Consultants, Inc., 2017a. Basis for Groundwater Monitoring Network, Brandywine Ash Management Facility, Brandywine, Maryland, October.

Geosyntec Consultants, Inc. 2017b. Statistical Analysis Calculations Package for Background Groundwater – Phase II, Brandywine Ash Storage Facility, Brandywine, MD

Geosyntec Consultants, Inc., 2018a. 2017 Annual Groundwater Monitoring and Corrective Action Report – Federal CCR Rule, Brandywine Ash Management Facility Phase II, Brandywine, MD

Geosyntec Consultants, Inc., 2018b. Alternate Source Demonstration Report – Federal CCR Rule, Brandywine Ash Management Facility, Phase II, Brandywine, MD

Geosyntec Consultants, Inc., 2018c. Supplemental Alternate Source Demonstration Report – Federal CCR Rule, Brandywine Ash Management Facility, Phase II, Brandywine, MD

Geosyntec Consultants, Inc., 2018d. Intra-Well Statistical Analysis Calculation Package for Background Groundwater - Phase II, Brandywine Ash Management Facility, Brandywine, MD

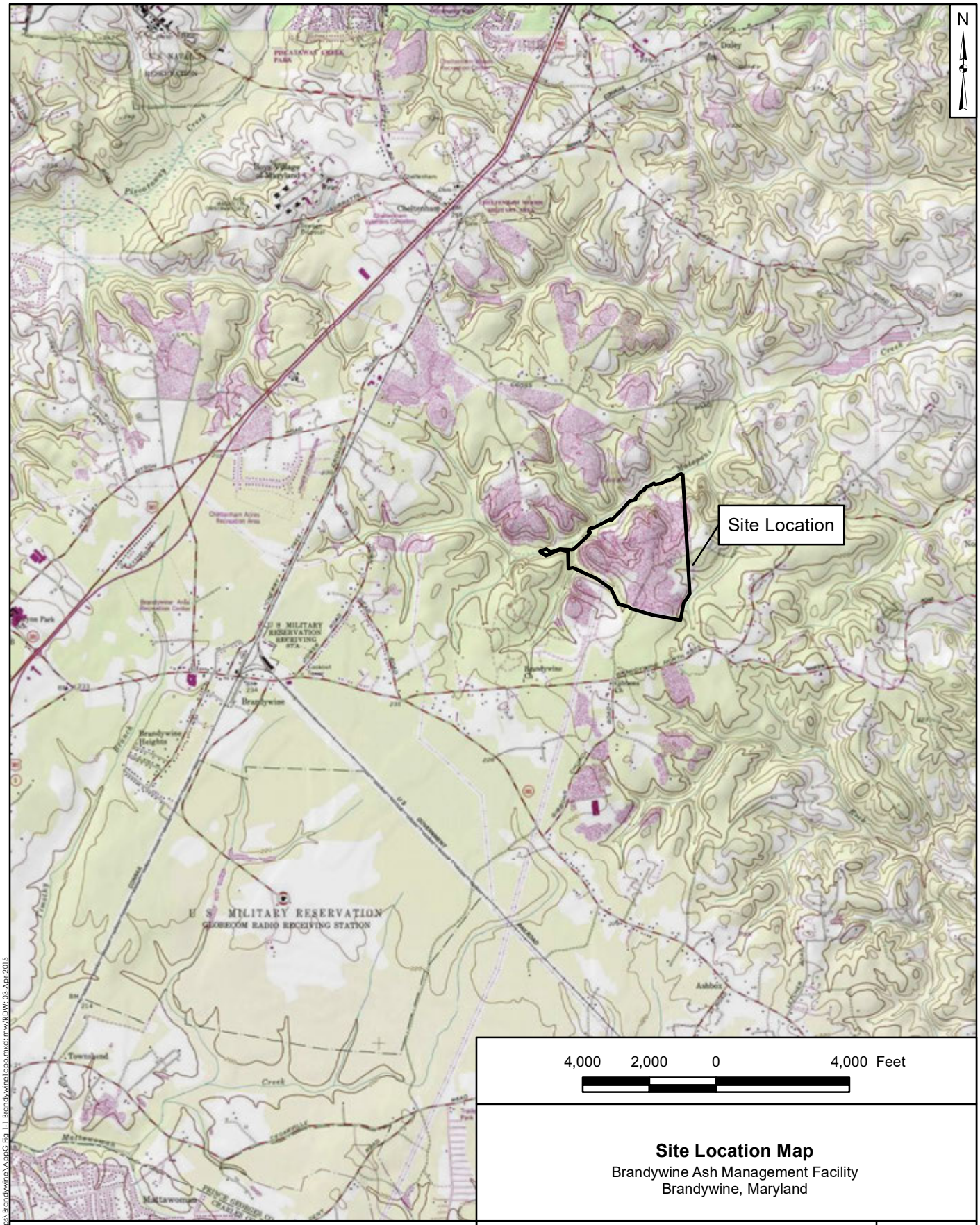
Geosyntec Consultants, Inc., 2019. 2018 Annual Groundwater Monitoring and Corrective Action Report – Federal CCR Rule, Brandywine Ash Management Facility Phase II, Brandywine, MD

Geosyntec Consultants, Inc., 2020a. 2019 Annual Groundwater Monitoring and Corrective Action Report – Federal CCR Rule, Brandywine Ash Management Facility Phase II, Brandywine, MD

U.S. EPA, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance. March.

U.S. EPA, 2015. Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities (Final Rule). Fed. Reg. 80 FR 21301, pp. 21301-21501, 40 CFR Parts 257 and 261, April.

FIGURES



Site Location Map
Brandywine Ash Management Facility
Brandywine, Maryland

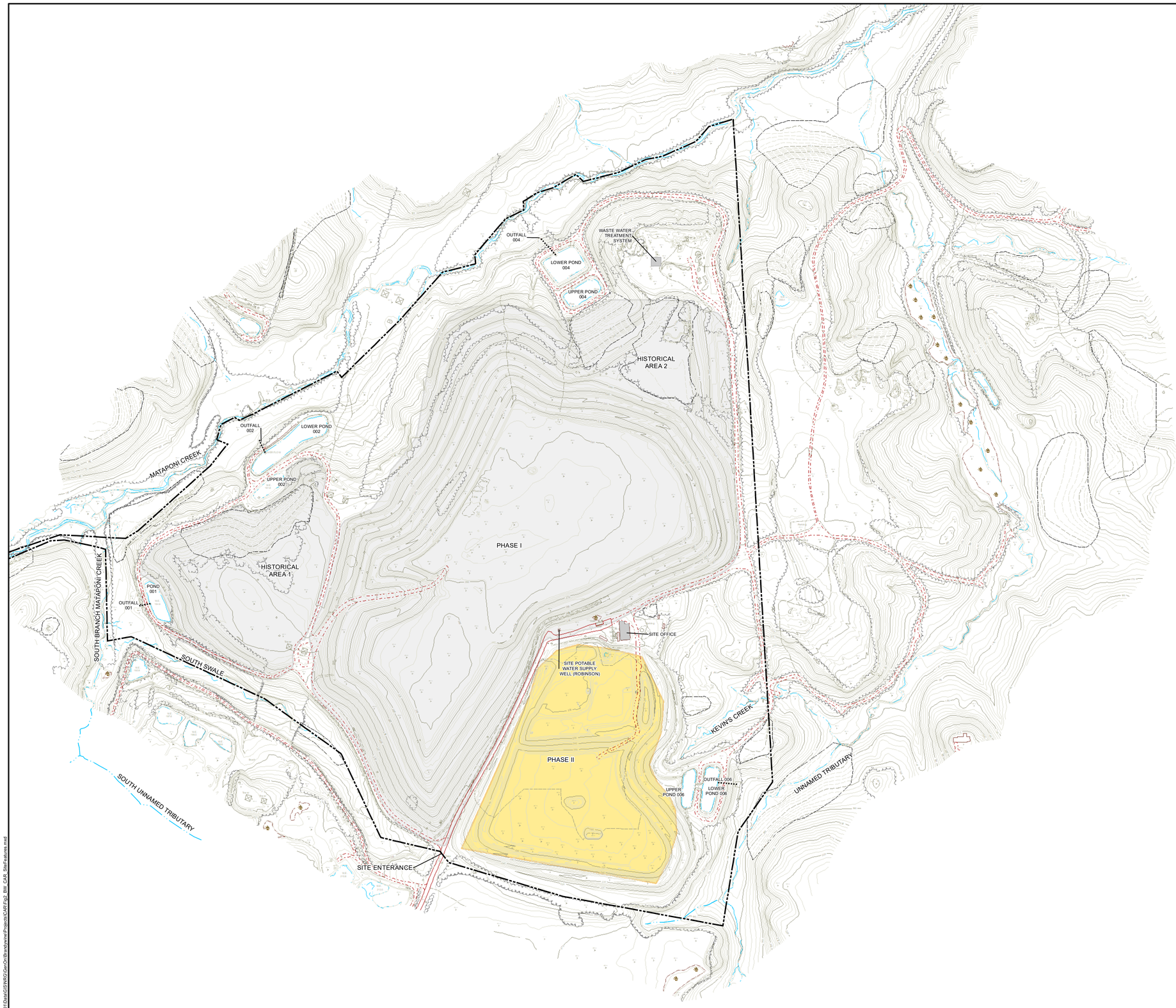
Source:
USGS Topographic Quadrangle - Brandywine, Maryland, provided by the National Geographic Society and i-cubed. © 2011 National Geographic Society, i-cubed

Geosyntec consultants

Columbia, Maryland | January 2021

Figure 1

Path: P:\GIS\NRG\GeoOnx\Maps\Brandywine\Apdg Fig. 1-1 BrandywineTopo.mxd; mw/RDW; 03-Apr-2015



N

Legend

- PROPERTY BOUNDARY
- WET
- GRADE CONTOUR (FEET, MSL)
- TREE LINE
- WATER / CHANNEL LINE
- PAVED / UNPAVED ROAD
- UNPAVED ROAD
- NPDES OUTFALL
- CCB MANAGEMENT UNITS NOT REGULATED UNDER THE CCR RULE (APPROXIMATE LIMITS)
- CCB MANAGEMENT UNITS REGULATED UNDER THE CCR RULE (APPROXIMATE LIMITS)

NOTES:
1. EXISTING CONDITIONS FROM GROUND CONTROL SURVEY DATED 28 DECEMBER 2013 BY L. ROBERT KIMBALL INC. AND FROM AERIAL PHOTOGRAPHY DATED 13 DECEMBER 2012 BY AIR PHOTOGRAPHICS INC.
2. HORIZONTAL CONTROL IS BASED ON NAD83 MARYLAND STATE PLANE DATUM; VERTICAL CONTROL IS BASED ON NAVD88 DATUM.
3. PROPERTY BOUNDARIES ACCESSED VIA TOWSON UNIVERSITY'S ARCGIS SERVER AT HTTP://MDIMAP.TOWSON.EDU/ARCGIS/SERVICES ON 26 AUGUST 2014.
4. GROUND SURFACE SURVEY PERFORMED BY BEN DYER AND ASSOCIATES, INC. WEEK OF 19 OCTOBER 2015.

0 125 250 500
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
10211 WINCOPIN CIRCLE, 4TH FLOOR
COLUMBIA MARYLAND 21044 USA
PHONE: 410.381.4333

GenOn

TITLE: SITE FEATURES MAP

PROJECT: 2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT / FEDERAL CCR RULE

SITE: BRANDYWINE ASH MANAGEMENT FACILITY
BRANDYWINE, MARYLAND

DESIGN BY:	BNM	DATE:	JANUARY 2021
DRAWN BY:	BNM	PROJECT NO.:	MEM0822K
CHECKED BY:	KWH	FILI	Fig2_BW_CAR_SiteFeatures
REVIEWED BY:	MB	FIGURE NO.:	2
APPROVED BY:	RMG		

\\columbia-01\Data\GIS\RIG\GenOn\Brandywine\Projects\CAR\Fig2_BW_CAR_SiteFeatures.mxd

N

Legend

- PROPERTY BOUNDARY
- WET
- GRADE CONTOUR (FEET, MSL)
- TREE LINE
- WATER / CHANNEL LINE
- PAVED / UNPAVED ROAD
- UNPAVED ROAD
- NPDES OUTFALL
- EXISTING PIEZOMETER
- MONITORING WELL USED FOR WATER LEVELS ONLY
- BACKGROUND MONITORING WELL
- COMPLIANCE MONITORING WELL
- SURFACE WATER STATION
- CCB MANAGEMENT UNITS NOT REGULATED UNDER THE CCR RULE (APPROXIMATE LIMITS)
- CCB MANAGEMENT UNITS REGULATED UNDER THE CCR RULE (APPROXIMATE LIMITS)

NOTES:
1. EXISTING CONDITIONS FROM GROUND CONTROL SURVEY DATED 28 DECEMBER 2013 BY L. ROBERT KIMBALL INC. AND FROM AERIAL PHOTOGRAPHY DATED 13 DECEMBER 2012 BY AIR PHOTOGRAPHICS INC.
2. HORIZONTAL CONTROL IS BASED ON NAD83 MARYLAND STATE PLANE DATUM; VERTICAL CONTROL IS BASED ON NAVD88 DATUM.
3. PROPERTY BOUNDARIES ACCESSED VIA TOWSON UNIVERSITY'S ARCGIS SERVER AT HTTP://MDIMAP.TOWSON.EDU/ARCGIS/SERVICES ON 26 AUGUST 2014.
4. GROUND SURFACE SURVEY PERFORMED BY BEN DYER AND ASSOCIATES, INC. WEEK OF 19 OCTOBER 2015.

0 125 250 500
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
10211 WINCOPIN CIRCLE, 4TH FLOOR
COLUMBIA MARYLAND 21044 USA
PHONE: 410.381.4333

GenOn

TITLE: GROUNDWATER MONITORING WELL NETWORK

PROJECT: 2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT / FEDERAL CCR RULE

SITE: BRANDYWINE ASH MANAGEMENT FACILITY
BRANDYWINE, MARYLAND

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

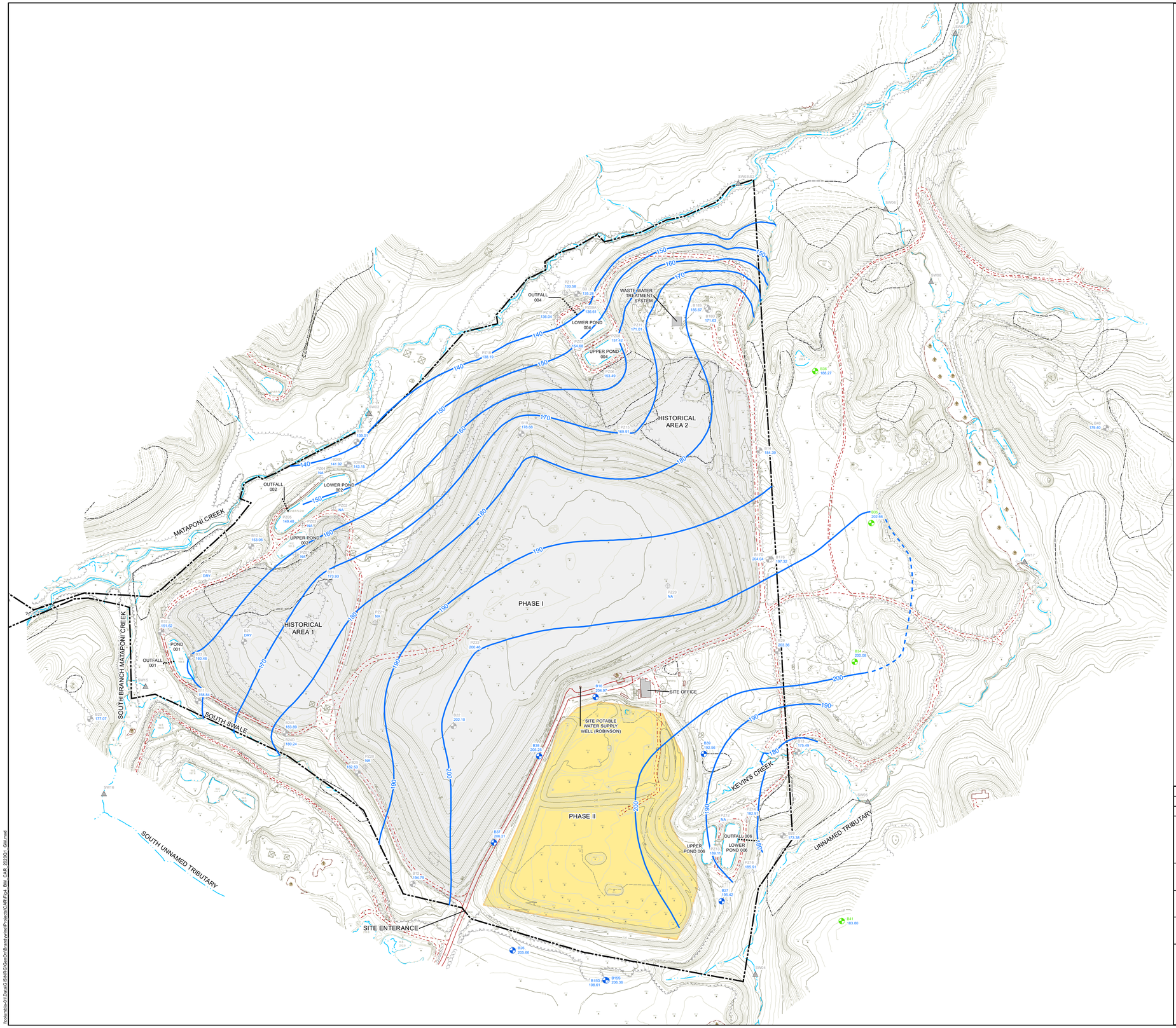
NOT FOR CONSTRUCTION

SIGNATURE

DATE

DESIGN BY:	BNM	DATE:	JANUARY 2021
DRAWN BY:	BNM	PROJECT NO.:	MEM0822K
CHECKED BY:	KWH	FILE:	Fig3_BW_CAR_GW_MonitoringWell_Network2
REVIEWED BY:	MB	FIGURE NO.:	3
APPROVED BY:	RMG		

C:\Columbia-301Data\GIS\NRG\GenOn\Brandywine\Projects\CAR\Fig3_BW_CAR_GW_MonitoringWell_Network2.mxd



REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
10211 WINCOPIN CIRCLE, 4TH FLOOR
COLUMBIA MARYLAND 21044 USA
PHONE: 410.381.4333

GenOn

TITLE: GROUNDWATER POTENTIOMETRIC SURFACE - FEBRUARY 2020

PROJECT: 2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT / FEDERAL CCR RULE

SITE: BRANDYWINE ASH MANAGEMENT FACILITY BRANDYWINE, MARYLAND

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

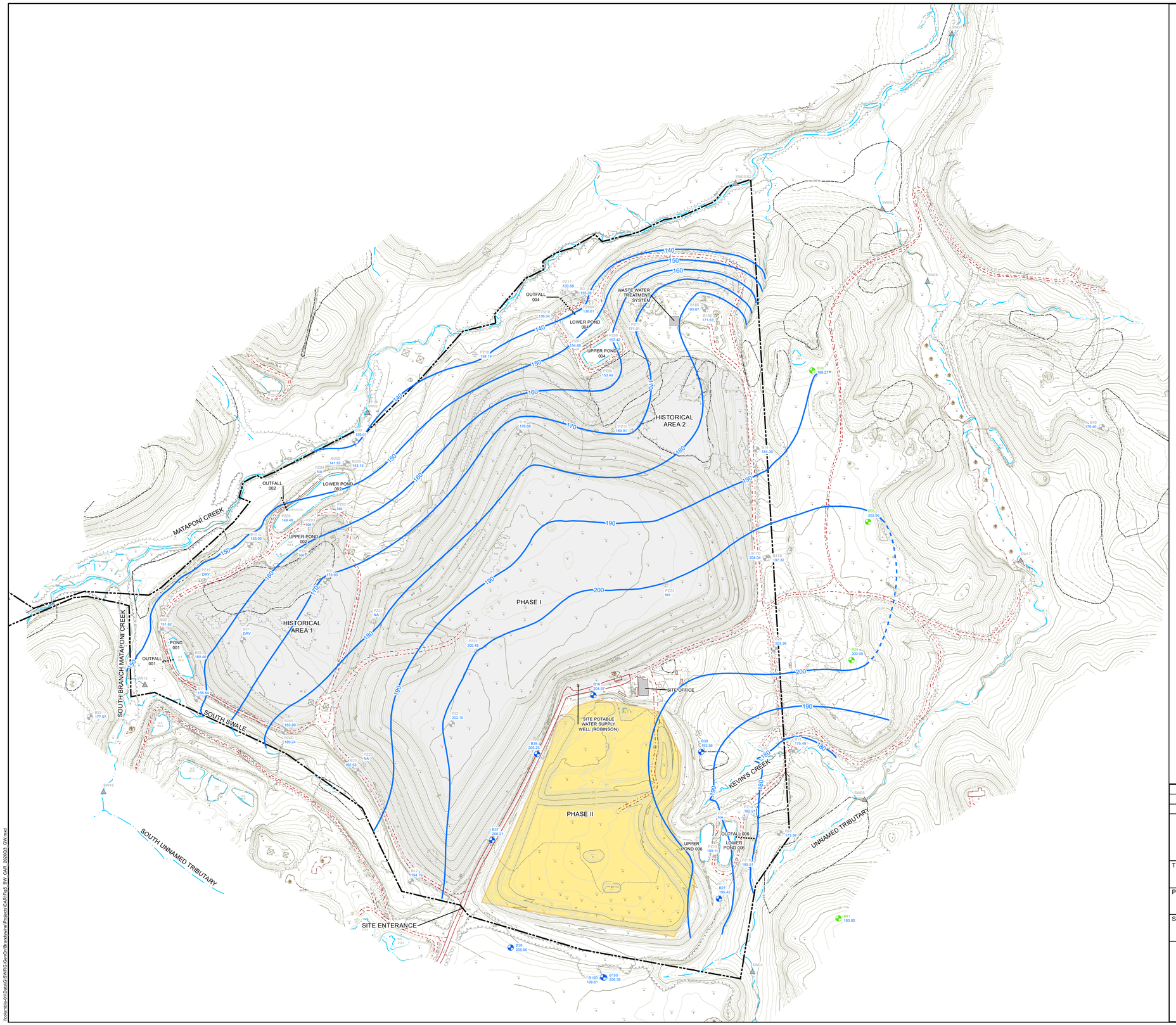
NOT FOR CONSTRUCTION

SIGNATURE

DATE

DESIGN BY:	BNM	DATE:	JANUARY 2021
DRAWN BY:	BNM	PROJECT NO.:	MEM0822K
CHECKED BY:	KWH	FILE:	Fig4_BW_CAR_2020Q1_GW
REVIEWED BY:	MB	FIGURE NO.:	4
APPROVED BY:	RMG		

\\columbia-nt1\Data\GIS\NRG\GenOn\Brandywine\Projects\CAR\Fig4_BW_CAR_2020Q1_GW.mxd



N

Legend

- PROPERTY BOUNDARY
- WET AREA
- GRADE CONTOUR (FEET, MSL)
- TREE LINE
- WATER / CHANNEL LINE
- PAVED / UNPAVED ROAD
- UNPAVED ROAD
- NPDES OUTFALL
- EXISTING PIEZOMETER
- MONITORING WELL USED FOR WATER LEVELS ONLY
- BACKGROUND MONITORING WELL
- COMPLIANCE MONITORING WELL
- SURFACE WATER STATION
- POTENTIOMETRIC CONTOUR
- INFERRED CONTOUR
- CCB MANAGEMENT UNITS NOT REGULATED UNDER THE CCR RULE (APPROXIMATE LIMITS)
- CCB MANAGEMENT UNITS REGULATED UNDER THE CCR RULE (APPROXIMATE LIMITS)

NM NOT MEASURED

DRY MONITORING WELL DRY AT TIME OF MEASUREMENT

NOTES:
1. EXISTING CONDITIONS FROM GROUND CONTROL SURVEY DATED 28 DECEMBER 2013 BY L. ROBERT KIMBALL INC. AND FROM AERIAL PHOTOGRAPHY DATED 13 DECEMBER 2012 BY AIR PHOTOGRAPHICS INC.
2. HORIZONTAL CONTROL IS BASED ON NAD83 MARYLAND STATE PLANE DATUM; VERTICAL CONTROL IS BASED ON NAVD88 DATUM.
3. PROPERTY BOUNDARIES ACCESSED VIA TOWSON UNIVERSITY'S ARCGIS SERVER AT HTTP://MDIMAP.TOWSON.EDU/ARCGIS/SERVICES ON 26 AUGUST 2014.
4. GROUND SURFACE SURVEY PERFORMED BY BEN DYER AND ASSOCIATES, INC. WEEK OF 19 OCTOBER 2015.
5. GROUNDWATER ELEVATION DATA FROM SYNOPTIC WATER LEVEL MEASUREMENTS ON 11 AUGUST 2020.
6. DEEP MONITORING WELLS WERE NOT USED TO DEVELOP THE POTENTIOMETRIC SURFACE.
7. NO SURVEY DATA PRESENT FOR B40 AND B41. LOCATION AND GROUNDWATER ELEVATIONS ARE APPROXIMATE.

0 125 250 500
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
10211 WINCOPIN CIRCLE, 4TH FLOOR
COLUMBIA MARYLAND 21044 USA
PHONE: 410.381.4333

GenOn

TITLE: GROUNDWATER POTENTIOMETRIC SURFACE - AUGUST 2020

PROJECT: 2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT / FEDERAL CCR RULE

SITE: BRANDYWINE ASH MANAGEMENT FACILITY
BRANDYWINE, MARYLAND

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

NOT FOR CONSTRUCTION

SIGNATURE

DATE

DESIGN BY:	BNM	DATE:	JANUARY 2021
DRAWN BY:	BNM	PROJECT NO.:	MEM0822K
CHECKED BY:	KWH	FILE:	Fig5_BW_CAR_2020Q3_GW
REVIEWED BY:	MB	FIGURE NO.:	5
APPROVED BY:	RMG		

\\columbia-pri\Data\GIS\NRG\GenOn\Brandywine\Projects\CAR\Fig5_BW_CAR_2020Q3_GW.mxd

TABLES

TABLE 1
WELL CONSTRUCTION DETAILS
FEDERAL CCR RULE - 2020 ANNUAL GROUNDWATER AND CORRECTIVE ACTION REPORT

Brandywine Ash Management Facility, Phase II - MD

Well ID	Compliance / Background	Permit Number	Installation Date	Northing (feet) Maryland State Plane 1900 NAD 1983	Easting (feet) Maryland State Plane 1900 NAD 1983	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Inner Casing Diameter (inches)	Top of Sand Pack (ft bgs)	Screen Interval (ft bgs)	Screen Length (feet)	Screen Slot Size (inch)
B15S	Compliance	PG-11-0414	10/20/2015	376978.815	1368413.012	212.71	214.95	2	6.0	7.75 - 17.75	10	0.010
B16	Compliance	PG-11-0431	6/2/2015	378557.6383	1368348.641	233.73	236.11	2	23.5	24.75 - 34.75	10	0.010
B26	Compliance	PG-11-0416	10/21/2015	377144.555	1367902.054	216.00	218.41	2	14.0	16.75 - 26.75	10	0.010
B27	Compliance	PG-11-0417	6/3/2015	377411.8764	1369043.668	212.05	214.77	2	13.0	14.75 - 24.75	10	0.010
B34	Background	PG-11-0437	6/9/2015	378729.3841	1369777.659	212.73	215.34	2	8.0	10.00 - 20.00	10	0.010
B35	Background	PG-11-0438	6/9/2015	379488.9853	1369866.212	204.31	206.82	2	5.0	7.00 - 17.00	10	0.010
B36	Background	PG-11-0439	6/18/2015	380323.7961	1369560.447	204.25	206.68	2	7.6	9.75 - 19.75	10	0.010
B37	Compliance	PG-11-0461	8/12/2015	377761.92	1367808.354	220.29	220.23	2	17.5	19.75 - 29.75	10	0.010
B38	Compliance	PG-11-0460	8/12/2015	378210.411	1368043.469	233.59	233.66	2	27.5	29.75 - 39.75	10	0.010
B39	Compliance	PG-11-0462	8/10/2015	378222.643	1368948.299	200.56	202.71	2	8.5	10.75 - 20.75	10	0.010
B41	Background	PG-14-0171	9/16/2016	377307.030	1369709.911	209.00	211.50 [1]	2	18.0	20.00 - 30.00	10	0.010

Notes:

ft msl feet above mean sea level

ft bgs feet below ground surface

Professional land survey performed week of 19 October 2015 by Ben Dyer and Associates, Inc.

[1] Elevation is an estimated value

TABLE 2
SUMMARY OF 2015-2020 MONITORING EVENTS
FEDERAL CCR RULE - 2020 ANNUAL GROUNDWATER AND CORRECTIVE ACTION REPORT

Brandywine Ash Management Facility, Phase II - MD

Monitoring Program:	Baseline Monitoring																			
Monitoring Event:	3Q 2015			4Q 2015			1Q 2016			2Q 2016			3Q 2016			4Q 2016			1Q 2017		
Sample Date: / Well ID	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17
Background Wells																					
B34													III,IV [1,2]					III,IV	III,IV		III,IV
B35													III,IV [1,2]					III,IV	III,IV	III,IV	
B36													III,IV [1,2]					III,IV	III,IV		III,IV
B41													[4]			III,IV [1,2]	[3]	III,IV [1]		III,IV [1,2]	III,IV
Compliance Wells																					
B15S		[4]			III,IV			III,IV		III,IV			III,IV			III,IV			III,IV		
B16		III,IV [2]			III,IV		III,IV			III,IV			III,IV			III,IV			III,IV [1]		
B26		[4]			III,IV			III,IV		III,IV			III,IV			III,IV			III,IV		
B27		III,IV			III,IV		III,IV			III,IV			III,IV			III,IV			III,IV		
B37		III,IV			III,IV		III,IV			III,IV			III,IV			III,IV				III,IV	
B38		III,IV			III,IV		III,IV			III,IV			III,IV			III,IV				III,IV	
B39		III,IV			III,IV			III,IV		III,IV			III,IV			III,IV				III,IV	

Monitoring Program:	Baseline Monitoring							Detection Monitoring													
Monitoring Event:	2Q 2017			3Q 2017			Total Baseline Sampling Events [5]	4Q 2017			1Q 2018			2Q 2018			3Q 2018			4Q 2018		
Sample Date: / Well ID	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17		Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-19	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Background Wells																						
B34	III,IV	III,IV	III,IV	III,IV	III,IV		≥8	III							III			III				
B35	III,IV	III,IV	III,IV	III,IV	III,IV		≥8	III						III				III				
B36	III,IV	III,IV	III,IV	III,IV	III,IV		≥8	III							III			III				
B41	III,IV	III,IV	III,IV	III,IV	III,IV		≥6	III							III			III				
Compliance Wells																						
B15S	III,IV			III,IV			8	III							III			III				
B16	III,IV						8	III						III			III					
B26	III,IV			III,IV			8	III							III			III				
B27	III,IV						8	III							III			III				
B37	III,IV						8	III							III			III				
B38	III,IV						8	III							III			III				
B39	III,IV						8	III							III			III				

TABLE 2
SUMMARY OF 2015-2020 MONITORING EVENTS
FEDERAL CCR RULE - 2020 ANNUAL GROUNDWATER AND CORRECTIVE ACTION REPORT

Brandywine Ash Management Facility, Phase II - MD

Monitoring Program:	Detection Monitoring																			
Monitoring Event:	1Q 2019			2Q 2019			3Q 2019			4Q 2019			1Q 2020			2Q 2020			3Q 2020		
Sample Date:	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20
Well ID																					
Background Wells																					
B34		III						III						III						III	
B35		III						III						III						III	
B36		III						III						III						III	
B41		III						III						III						III	
Compliance Wells																					
B15S		III						III						III						III	
B16		III						III						III						III	
B26		III						III						III						III	
B27		III						III						III						III	
B37		III						III						III						III	
B38		III						III						III						III	
B39		III						III						III						III	

Monitoring Program:	Detection Monitoring			
Monitoring Event:	4Q 2020			Total Detection Sampling Events
Sample Date:	Oct-20	Nov-20	Dec-20	
Well ID				
Background Wells				
B34				7
B35				7
B36				7
B41				7
Compliance Wells				
B15S				7
B16				7
B26				7
B27				7
B37				7
B38				7
B39				7

Notes:

III Groundwater samples collected for laboratory analysis of Appendix III parameters.

IV Groundwater samples collected for laboratory analysis of Appendix IV parameters.

[1] Radium was omitted from sampling or the well went dry before sampling of these parameters could be completed.

[2] Fluoride was omitted from analysis.

[3] Monitoring well was dry at the time of sampling, no samples were collected.

[4] Monitoring well not yet installed.

[5] All background and compliance monitoring wells met the minimum number of samples collected, except for B41, which went dry during sampling and only a partial sample set was collected over nine sampling events, which resulted in 6 complete sample sets.

TABLE 3
2020 GROUNDWATER ELEVATION MEASUREMENTS
FEDERAL CCR RULE - 2020 ANNUAL GROUNDWATER AND CORRECTIVE ACTION REPORT

Brandywine Ash Management Facility, Phase II - MD

Well ID	Top of Casing Elevation (ft msl)	Depth to Water Measurement Date	Depth to Water (ft btoic)	Groundwater Elevation (ft msl)
B15S	214.95	2/4/2020	8.59	206.36
		8/11/2020	8.34	206.61
B16	236.11	2/4/2020	31.14	204.97
		8/11/2020	31.25	204.86
B26	218.41	2/4/2020	12.75	205.66
		8/11/2020	12.26	206.15
B27	214.77	2/4/2020	19.35	195.42
		8/11/2020	19.60	195.17
B34	215.34	2/4/2020	15.26	200.08
		8/11/2020	13.17	202.17
B35	206.82	2/4/2020	4.16	202.66
		8/11/2020	4.51	202.31
B36	206.68	2/4/2020	18.41	188.27
		8/11/2020	16.80	189.88
B37	220.23	2/4/2020	14.02	206.21
		8/11/2020	14.01	206.22
B38	233.66	2/4/2020	28.41	205.25
		8/11/2020	28.55	205.11
B39	202.71	2/4/2020	10.15	192.56
		8/11/2020	10.22	192.49
B41	211.50 [1]	2/4/2020	27.70	183.80
		8/11/2020	22.59	188.91

Notes:

ft bgs feet below ground surface
ft msl feet above mean sea level
ft btoic feet below top of inner case
NM Not measured
NA Not Available
[1] Top of casing elevation is estimated value based on ground elevation.

TABLE 4
APPENDIX III ANALYTICAL DATA - BACKGROUND WELLS

FEDERAL CCR RULE - 2020 ANNUAL GROUNDWATER AND CORRECTIVE ACTION REPORT
Brandywine Ash Management Facility, Phase II - MD

	Analyte:	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
Well ID	**Sample Date**	µg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L
B34	5/2/2018	<10.1 U	0.639	3.6	<0.25 U	5.2	7.2	49.0 J
	8/3/2018	13.4 J	2.4	2.4	<0.25 U	5.4	6.4	54.0 J
	8/3/2018 [1]	19.3 J	2.34	2.2	NS	NS	6.4	52.5 J
	2/6/2019	12.1 J	1.69	1.4 J	<0.25 U	5.5	14.5	46.5 J
	8/26/2019	<9.9 U	0.362 J	2.5	<0.25 U	5.4	5.4	28.5 J
	8/26/2019 [1]	<9.9 U	0.332 J	2.4	<0.25 U	5.7	5.2	21.0 J
	2/11/2020	<12.0 U	0.383	3.3	<0.25 U	5.6	6.6	25.0 J
	8/17/2020	23.0 J	1.3	1.9 J	<0.25 U	5.5	7.3	46.0
B35	4/30/2018	<10.1 U	2.4	2.9	<0.25 U	5.6	10.7	37.0 J
	8/2/2018	<12.0 U	1.94	3.4	<0.25 U	5.4	7.0	39.0 J
	2/6/2019	<12.0 U	2.1	2.8	<0.25 U	5.7	6.8	34.5 J
	8/26/2019	<9.9 U	1.82	3.6	<0.25 U	5.7	6.2	37.0
	2/10/2020	<12.0 U	2.37	3.5	<0.25 U	5.8	7.6	40.5
	8/17/2020	17.0 J	1.90	3.1	<0.25 U	5.4	4.7 J	51.0
B36	5/1/2018	15.3 J	4.75	7.0	<0.25 U	5.1	4.7 J	86.5
	8/6/2018	<12.0 U	5.40	7.1	<0.25 U	4.7	16.1	75.5
	2/11/2019	21.1 J	4.95	6.5	<0.25 U	5.5	5.3	67.0
	8/22/2019	13.9 J	4.83	8.1	<0.25 U	4.5	8.5	66.5
	2/10/2020	12.7 J	5.36	6.9	<0.25 U	4.7	6.9	68.0
	8/12/2020	<12.0 U	4.10	6.5 J	<0.25 U	4.7	5.1 J	67.0
B41	5/1/2018	<10.1 U	2.93	6.0	<0.25 U	6.0	<1.50 U	47.5 J
	8/6/2018	<12.0 U	4.79	4.7	<0.25 U	3.4 [2] J	21.9	66.0
	2/11/2019	12.2 J	2.74	8.3	<0.25 U	6.7	9.5	51.0 J
	8/22/2019	<9.9 U	1.0	4.7	<0.25 U	5.9	<1.5 U	37.0
	2/10/2020	<12.0 U	2.03	6.2	<0.25 U	6.1	3.2 J	43.0
	8/13/2020	<12.0 U	0.94	4.2	<0.25 U	5.9	6.4	44.0

Notes:

µg/L micrograms per Liter
mg/L milligrams per Liter
S.U. Standard Units
J Constituent detected below reportable quantitation limit; result is an estimated value.
U Constituent not detected above method detection limit.
N.D. Non-Detect
NS Not Sampled
[1] Duplicate sample collected.
[2] Result is suspected to be erroneous.

TABLE 5
APPENDIX III STATISTICALLY SIGNIFICANT INCREASES (SSIs)
FEDERAL CCR RULE - 2020 ANNUAL GROUNDWATER AND CORRECTIVE ACTION REPORT

Brandywine Ash Management Facility, Phase II - MD

Analyte:		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
		µg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L
Well ID	**Background UPL:**	**43.4**	**5.58**	**12.4**	**DQR [3]**	**3.84 - 6.71**	**41.7**	**121**
B15S	5/2/2018	14.1 J	1.84	5.4	0.50 U	5.50	16.7	59.5 J
	5/2/2018 [1]	14.5 J	1.81	5.5	0.50 U	5.50	16.8	68.0
	8/1/2018	36.4 J	1.60	4.8	0.31 J	5.70	15.0	60.5
	2/6/2019	13.6 J	2.18	3.6	0.50 U	5.70	30.2	77.0
	8/23/2019	18.9	1.17	3.8	0.50 U	6.00	9.1	44.0
	2/10/2020	17.7 J	2.34	2.1	0.50 U	6.70	19.2	**139.0** [6]
	5/11/2020	NS	NS	NS	NS	NS	NS	96.5 [7]
	8/12/2020	25.0 J	2.50	4.0	0.53	5.70	27.0 J	90.0
	8/12/20 [1]	25.0 J	2.50	2.7	0.50 U	5.70	27.0	93.0
Background UPL:		**59,057**	**497**	**2,950**	**DQR**	**5.76 - 7.48**	**791 [2]**	**16,227**
B16	4/30/2018	58,200	426	1,870	0.50 U	6.70	**1,032** [4]	13,400
	7/31/2018	53,500	385	1,850	0.50 U	6.90	**1,997** [4]	13,400
	2/11/2019	56,100	307	1,850	0.50 U	7.30	207	13,500
	8/22/2019	40,900	199	1,380	0.50 U	7.20	-1,709	10,900
	2/7/2020	41,800	206	1,450	0.50 U	7.40	-1,161	11,000
	2/7/2020 [1]	42,100	218	1,380	0.50 U	7.30	-1,461	11,200
	8/13/2020	43,000	270	1,900 J	0.50 U	7.00	-816	11,000
Background UPL:		**124**	**11.7**	**20.6**	**DQR**	**4.20 - 5.90 [5]**	**62.9**	**213**
B26	5/1/2018	22.3 J	4.45	10.0	0.50 U	5.20	12.1	67.5
	8/1/2018	18.6 J	4.85	9.9	0.50 U	5.20	13.4	59.0 J
	2/6/2019	12.0 U	4.62	9.4	0.50 U	5.50	13.4	69.0
	8/23/2019	31.7 J	4.97	8.8	0.50 U	5.30	12.3	55.0
	2/10/2020	12.0 U	4.77	10.4	0.50 U	5.70	13.5	71.0
	8/14/2020	19.0 J	5.40	11.0	0.50 U	5.30	13.0	75.0
Background UPL:		**1,494**	**59.6**	**233**	**0.47**	**4.87 - 8.40**	**654**	**1,247**
B27	5/1/2018	665	53.9	23.4	0.50 U	7.00	74.1	419
	8/2/2018	547	41.4	13.4	0.50 U	7.10	53.7	306
	2/7/2019	261	26.8	5.8	0.50 U	6.90	44.1	197
	8/22/2019	593	**98.7** [4]	35.2	0.50 U	7.00	285	824
	2/11/2020	545	55.4	17.2	0.50 U	7.00	100	430
	8/14/2020	520	53.0	14.0	0.50 U	7.40	46.0	430
Background UPL:		**4,011**	**213**	**32.9 [2]**	**2.21**	**2.90 - 5.87**	**779**	**2,559**
B37	5/1/2018	1,430	90.2	6.5	0.61	5.00	422	964
	8/3/2018	899	56.1	-52.1	0.39 J	5.20	197	512
	2/8/2019	1,400	77.4	-44.3	0.50 U	4.70	437	802
	8/22/2019	2,020	104	19.2	1.20	4.20	672	1,240
	2/10/2020	1,890	109	-56.1	1.50	4.50	**938** [6]	1,240
	5/11/2020	NS	NS	NS	NS	NS	684 [7]	NS
	8/14/2020	1,500	88.0	-33.2	0.73	5.00	560	900
Background UPL:		**27,194**	**566**	**810**	**1.04**	**4.08 - 9.01**	**2,540**	**5,185**
B38	5/1/2018	14,000	421	248	0.50 J	6.40	2,390	3,260
	8/3/2018	14,400	341	225	0.50 J	6.80	2,360	3,270
	2/8/2019	15,000	351	284	0.50 U	6.10	2,210	3,690
	8/22/2019	18,700	429	224	0.50 U	6.10	2,150	3,180
	2/7/2020	16,500	339	223	0.50 U	6.20	**2,590** [6]	3,620
	5/11/2020	NS	NS	NS	NS	NS	2,340 [7]	NS
	8/13/2020	17,000	360	350	0.50 U	6.70	2,300	3,600
Background UPL:		**1,346 [2]**	**188**	**59.8 [2]**	**2.87**	**2.01 - 4.20**	**184 [2]**	**364 [2]**
B39	5/1/2018	-1,114	107	-88.4	0.50 U	3.10 J	-393	288
	5/1/2018 [1]	-1,044	105	-78.4	0.50 U	3.20 J	-393	-252
	8/3/2018	-2,497	60.3	-275	0.50 U	2.70 J	-470	-1,047
	2/8/2019	-3,477	76.0	-207	0.50 U	3.10 J	-1,024	-957
	8/23/2019	-1,606	96.1	-166	0.50 U	3.10 J	-644	-231
	2/11/2020	-4,065	113.0	-196	0.50 U	3.20 J	-614	-902
	8/17/2020	-5,900	70.0	-402	0.50 U	3.20 J	-1,328	-1,141

Notes:

Bold Concentration is a statistically significant increase (SSI) over background during the most recent sampling event.

Bold Concentration is a statistically significant increase (SSI) over background.

µg/L micrograms per Liter

mg/L milligrams per Liter

S.U. Standard Units

J Constituent detected below reportable quantitation limit; result is an estimated value.

U Constituent not detected above method detection limit; result shown as the reporting limit.

NS Not sampled.

[1] Duplicate sample collected.

[2] For datasets that exhibited upward trends, the background value is the Upper Prediction Limit (UPL) for the residuals of the background dataset. To identify SSIs, the UPLs are compared to the residuals of the detection monitoring results based on the linear regression for the background dataset. In some cases, the values are negative and indicate a decrease.

[3] Fluoride at wells B15S, B16, and B26 follows the Double Quantification Rule (DQR).

[4] Alternate Source Demonstration successful.

[5] For nonparametric pH distributions, the nonparametric prediction limits are the minimum and maximum background concentration (Unified Guidance, 2009, p. 18.16).

[6] SSI detected, however verification resample disconfirms the result.

[7] Well-constituent pair was resampled and SSI was not verified.

TABLE 6
APPENDIX III INTRA-WELL STATISCAL BACKGROUND CONCENTRATIONS

FEDERAL CCR RULE - 2020 ANNUAL GROUNDWATER AND CORRECTIVE ACTION REPORT
Brandywine Ash Management Facility, Phase II - MD

Analyte:	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
Well ID	µg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L
B15S	43.4	5.58	12.4	DQR [1]	3.84 - 6.71	41.7	121
B16	59,057	497	2,950	DQR [1]	5.76 - 7.48	791 [2]	16,227
B26	124	11.7	20.6	DQR [1]	4.20 - 5.90	62.9	213
B27	1,494	59.6	233	0.47	4.87 - 8.40	654	1,247
B37	4,011	213	32.9 [2]	2.21	2.90 - 5.87	779	2,559
B38	27,194	566	810	1.04	4.08 - 9.01	2,540	5,185
B39	1,346 [2]	188	59.8 [2]	2.87	2.01 - 4.20	184 [2]	364 [2]

Notes:

µg/L micrograms per Liter
mg/L milligrams per Liter
S.U. Standard Units
[1] Fluoride at wells B15S, B16, and B26 follows the Double Quantification Rule (DQR).
[2] The background value is the Upper Prediction Limit (UPL) for the residuals of the background dataset. To identify SSIs, the UPLs are compared to the residuals of the detection monitoring results based on the linear regression for the background dataset.

APPENDIX A
Groundwater Flow Velocity Calculation

Appendix A

Groundwater Velocity Calculation

Brandywine Ash Management Facility Phase II

Brandywine, Maryland

1. Governing Equation

Groundwater flow velocity at the Site was calculated between several monitoring wells around Phase II. The calculations were performed using the following equation.

$$V_{\eta} = \frac{K}{\eta} \times \frac{\Delta h}{\Delta l}$$

Where:

V_{η} = Groundwater velocity (cm per second)
K = Hydraulic conductivity estimated through aquifer slug tests (cm per second)
η = Effective porosity % (unitless)
Δh = Change in groundwater elevation between two points (ft)
Δl = Distance between two points (ft)

This equation is for Darcy flow through porous media.

2. Hydraulic Conductivity Estimated

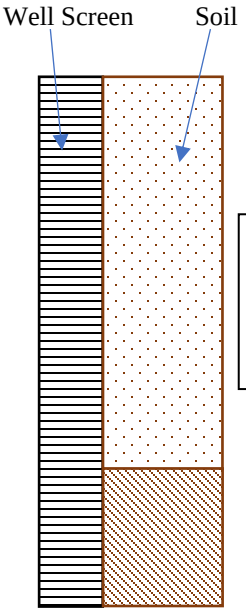
Hydraulic conductivity (*K*) was calculated at select monitoring wells around Phase II. Monitoring wells B15S, B16, B26, B27, and B28 were slug tested at least two times (rising and falling head tests). The location of the slug tested wells are shown on **Figure 3**. The *K* value for each slug test at a given well was averaged, which generated an average *K* for each monitoring well. *K* values are presented in **Table A-1**. The average of the K value between two monitoring wells is presented in **Table A-2**.

3. Average Porosity

As shown in **Table A-1**, each monitoring well has an average porosity (η) calculated for each screen interval. The averaged η values were obtained from *Groundwater and Wells, Second Edition, Driscoll* [Driscoll, 1986]. A range for η is presented in [Driscoll, 1986] and the average for each η range was used in the calculation. The published η values and the calculated average η values are presented in **Table A-1**.

The averaged η value was then used to estimate an η value for each screen based on the geology observed during the well installation. See diagram below to see how η was estimated for each monitoring well screen.

EXAMPLE POROSITY ESTIMATION FOR WELL SCREEN



The top 8 feet of the screen is screened in sand (SP). The average η of SP is 32.5%.

The bottom 2 feet of the screen is screened in silt (ML). The average η of ML is 42.5%.

$$Average\ \eta\ of\ the\ well\ screen = (\eta_{SP} \times 0.8) + (\eta_{ML} \times 0.2)$$

$$Average\ \eta\ of\ the\ well\ screen = (32.5_{SP} \times 0.8) + (42.5_{ML} \times 0.2)$$

$$Average\ \eta\ of\ the\ well\ screen = (26) + (8.5)$$

$$Average\ \eta\ of\ the\ well\ screen = 34.5\%$$

Boring logs were provided in *Basis for Groundwater Monitoring Network* [Geosyntec, 2017a].

After the average η value was calculated for each well screen, the average of the η values between the two monitoring wells along a groundwater flow path was calculated. See **Table A-1** for the calculated average η for each monitoring well screen. The average η value between the two monitoring wells was then used to calculate the groundwater velocity. Average η value between monitoring wells is presented in **Table A-2**.

4. Monitoring Well Selection

To estimate groundwater velocity, monitoring wells upgradient and downgradient of Phase II were selected. Ideally, monitoring wells should be along a groundwater flow path. Based on that requirement, the groundwater velocity was calculated between B16 to B27, B16 to B28, B26 to B27, and B26 to B28. See **Figure 3** through **Figure 5** for the selected well locations relative to groundwater flow.

5. Groundwater Velocity

Groundwater velocity around Phase II ranged from 1.31 X 10^{-4} centimeters per second (cm/sec) (136 inches/month) between monitoring wells B16 and B28 to 4.47 X 10^{-6} cm/sec (4.62 inches/month) between monitoring wells B26 and B27. The average groundwater velocity around Phase II was calculated at 2.54 X 10^{-5} cm/sec (26 inches/month). **Table A-2** of **Appendix A** presents the calculated groundwater velocities. Therefore, to be considered independent samples, groundwater monitoring events should be at least two (2) weeks apart for groundwater to completely travel through the 8-inch diameter borehole.

APPENDIX A
TABLE A-1
Groundwater Flow Velocity Variables

Brandywine CCR Management Facility Phase II
Brandywine, Maryland

Groundwater Velocity Equation

$$V_\eta = \frac{K}{\eta} \times \frac{\Delta h}{\Delta l}$$

V_η = linear groundwater velocity (cm/sec)
K = hydraulic conductivity (cm/sec)
η = effective porosity (unitless)
Δh = change in head between wells (ft)
Δl = distance between wells (ft)

Upgradient Well	Downgradient Well	Δl (ft)	Δh (ft)
B16	B27	1,315	9.69
B16	B28	1,270	30.25
B26	B27	1,172.5	10.98
B26	B28	1,612.5	31.5

Well ID:	Average Hydraulic Conductivity (K) (cm/sec) [1]
B16	2.81E-03
B26	5.50E-06
B27	3.85E-04
B28	8.17E-04

Well Location	Soil Observed in the Screen	Average η of Screen
B16	(SP/GP) (75%),(SP/ML) (25%)	24.5
B26	ML 100%	42.5
B27	ML/SP 50% and CL/SP 50%	39.4
B28	SP/CL 100%	41.3

Sediment Size	Effective Porosity % (η)	Average η [2]
Clay (CL)	45-55	50
Silt (ML)	35-50	42.5
Sand (SP)	25-40	32.5
Gravel (GP)	25-40	32.5
Sand and Gravel (SP/GP)	10-35	22.5

Notes:
ft - feet
cm/sec - centimeters per second
[1] Average hydraulic conductivity is an average result of the falling and rising head slug tests.
[2] Average effective porosity is an average of the published effective porosities for each soil type.
[3] Δh values were calculated from groundwater elevation measurements collected on 20 August 2019.

APPENDIX A
Table A-2
Groundwater Flow Velocity Calculation

Brandywine CCR Management Facility Phase II
Brandywine, Maryland

Upgradient Well	Downgradient Well	Hydraulic Conductivity (K) (cm/sec)	Average Porosity of Screen Interval (%)	DTW (ft btoic) [1]	TOC Elevation	Groundwater Elevation (ft-msl)	Average K (cm/sec) [2]	Average η	Δ h (ft)	Δ l (ft)	Δ h/Δ l	Linear Velocity (cm/sec)	Linear Velocity (inches/month)
B16	NA	2.81E-03	24.5	31.25	236.11	204.86	NA	NA	NA	NA	NA	**NA**	**NA**
B16	B27	3.85E-04	39.4	19.60	214.77	195.17	1.60E-03	0.3195	9.69	1,315	0.0074	**3.68E-05**	**38.12**
B16	B28	8.17E-04	41.3	5.17	179.78	174.61	1.81E-03	0.329	30.25	1,270	0.0238	**1.31E-04**	**135.84**

Upgradient Well	Downgradient Well	Hydraulic Conductivity (K) (cm/sec)	Average Porosity of Screen Interval (%)	DTW (ft btoic)	TOC Elevation	Groundwater Elevation (ft-msl)	Average K (cm/sec) [1]	Average η	Δ h (ft)	Δ l (ft)	Δ h/Δ l	Linear Velocity (cm/sec)	Linear Velocity (inches/month)
B26	NA	5.50E-06	42.5	12.26	218.41	206.15	NA	NA	NA	NA	NA	**NA**	**NA**
B26	B27	3.85E-04	39.4	19.60	214.77	195.17	1.95E-04	0.4095	10.98	1,173	0.0094	**4.47E-06**	**4.62**
B26	B28	8.17E-04	41.3	5.17	179.78	174.61	4.11E-04	0.419	31.5	1,613	0.0196	**1.92E-05**	**19.86**

Groundwater Velocity Mean	**2.54E-05**	**cm/sec**	**26.26** **inches/month**
Groundwater Velocity Median	**2.80E-05**	**cm/sec**	**28.99** **inches/month**

Groundwater Velocity Equation

$$V_{\eta} = \frac{K}{\eta} \times \frac{\Delta h}{\Delta l}$$

V_{η} = linear groundwater velocity
K = hydraulic conductivity (cm/sec)
η = effective porosity (unitless)
Δh = change in head between wells (ft)
Δl = distance between wells (ft)

[1] Groundwater flow velocities were calculated form groundwater elevation measurements collected on 11 August 2020.
[2] Average hydraulic conductivity is the average hydraulic conductivities between B16 or B26 and identified well.

APPENDIX B
Alternate Source Demonstration – March 2020

Geosyntec consultants

10211 Wincopin Circle, Floor 4
Columbia, Maryland 21044
PH 410.381.4333
FAX 410.381.4499
www.geosyntec.com

30 March 2020

Mr. Walter Johnson
GenOn MD Ash Management LLC
c/o Chalk Point Generating Station
25100 Chalk Point Road
Aquasco, Maryland 20608

Subject: Alternative Source Demonstration
Groundwater Detection Monitoring Program, Federal CCR Rule
Brandywine Ash Management Facility – Phase II, Brandywine, Maryland

Dear Mr. Johnson:

Geosyntec Consultants, Inc. (Geosyntec) has completed statistical testing for potential statistically significant increases (SSIs) over background concentrations in downgradient compliance monitoring wells at the Brandywine Ash Management Facility Phase II located in Brandywine, Maryland (the Site) pursuant to the Federal CCR Rule. **Table 1** (attached) shows a potential SSI was detected for calcium at downgradient compliance monitoring well B27. The sample was collected in August 2019 during the fifth Detection Monitoring Program event. Previous Alternative Source Demonstrations (ASDs) concluded those SSIs were due to laboratory error, natural variations, or an alternative source other than the CCR unit (Phase II).

SSIs for the primary coal combustion residuals (CCR) indicators (boron and sulfate) were not detected in the August 2019 monitoring event. Boron and sulfate are considered to be the primary, and most reliable, indicators for a release of CCR leachate because they are present at high concentrations in CCR leachate relative to background groundwater, they are highly mobile in groundwater, and they generally are not attenuated.[1] If SSIs are not detected for these primary indicators, the likelihood of a release from the CCR unit is low. The concentration of boron and sulfate at B27 during the August 2019 monitoring event was 0.593 mg/L and 285 mg/L, respectively. The background Upper Prediction Limits (UPLs) for boron and sulfate at B27 are 1,494mg/L and 654 mg/L, respectively. Furthermore, the concentration of calcium subsequently decreased from 98.7 mg/L (in August 2019) to 55.4 mg/L (in February 2020), which is below the UPL of 59.6 mg/L for calcium at location B27.

[1] Guidelines for Development of Alternative Source Demonstrations at Coal Combustion Residual Sites, Electric Power Research Institute, October 2017.

Geosyntec consultants

In summary, this ASD shows that the SSI detected for calcium at the downgradient compliance monitoring well (B27) in the August 2019 sample is not due to a release of CCR leachate from the Phase II CCR unit. Therefore, the site should remain in the Detection Monitoring Program.

If you have any questions regarding this letter or the approach it describes, please do not hesitate to contact the undersigned at 410.381.4333.

Very truly yours,

Mark Bauer
Project Geologist

Robert M. Glazier
Principal

Attachments:
Certification
Table 1 – Appendix III Statistically Significant Increases (SSIs)

cc: Mark Nitz, GenOn
Steve Frank, GenOn
Pilantana Anderson, GenOn

Geosyntec consultants

Certification

I, **Stephanie N. Jones**, a qualified professional engineer registered in the state of **Maryland**, verify the accuracy of the information in the *Alternate Source Demonstration Report for the Brandywine Ash Management Facility Phase II Unit* based on my review and understanding of the requirements of 40 CFR 257.94(e)(2).

Printed Name:	Stephanie N. Jones
PE License Number:	53570 State: Maryland
Signature:	
Date:	03/23/2020
Seal:	Stamp:

TABLE 1
APPENDIX III STATISTICALLY SIGNIFICANT INCREASES (SSIs)
FEDERAL CCR RULE - ALTERNATE SOURCE DEMONSTRATION
Brandywine Ash Management Facility, Phase II - MD

Analyte:		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
		µg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L
Well ID	**Background UPL:**	**43.4**	**5.58**	**12.4**	**DQR [3]**	**3.84 - 6.71**	**41.7**	**121**
B15S	5/2/2018	14.1 J	1.84	5.4	0.50 U	5.5	16.7	59.5 J
	5/2/2018 [1]	14.5 J	1.81	5.5	0.50 U	5.5	16.8	68.0
	8/1/2018	36.4 J	1.60	4.8	0.31 J	5.7	15.0	60.5
	2/6/2019	13.6 J	2.18	3.6	0.50 U	5.7	30.2	77.0
	8/23/2019	18.9	1.17	3.8	0.50 U	6.0	9.1	44.0
	Background UPL:	**59,057**	**497**	**2,950**	**DQR**	**5.76 - 7.48**	**791 [2]**	**16,227**
B16	4/30/2018	58,200	426	1,870	0.50 U	6.7	1,032 [4]	13,400
	7/31/2018	53,500	385	1,850	0.50 U	6.9	1,997 [4]	13,400
	2/11/2019	56,100	307	1,850	0.50 U	7.3	207	13,500
	8/22/2019	40,900	199	1,380	0.50 U	7.2	-1,709	10,900
	Background UPL:	**124**	**11.7**	**20.6**	**DQR**	**4.20 - 5.90 [5]**	**62.9**	**213**
B26	5/1/2018	22.3 J	4.45	10.0	0.50 U	5.2	12.1	67.5
	8/1/2018	18.6 J	4.85	9.9	0.50 U	5.2	13.4	59.0 J
	2/6/2019	12.0 U	4.62	9.4	0.50 U	5.5	13.4	69.0
	8/23/2019	31.7 J	4.97	8.8	0.50 U	5.3	12.3	55.0
	Background UPL:	**1,494**	**59.6**	**233**	**0.47**	**4.87 - 8.40**	**654**	**1,247**
B27	5/1/2018	665	53.9	23.4	0.50 U	7.0	74.1	419
	8/2/2018	547	41.4	13.4	0.50 U	7.1	53.7	306
	2/7/2019	261	26.8	5.8	0.50 U	6.9	44.1	197
	8/22/2019	593	98.7 [4]	35.2	0.50 U	7.0	285	824
	Background UPL:	**4,011**	**213**	**32.9 [2]**	**2.21**	**2.90 - 5.87**	**779**	**2,559**
B37	5/1/2018	1,430	90.2	6.5	0.61	5.0	422	964
	8/3/2018	899	56.1	-52.1	0.39 J	5.2	197	512
	2/8/2019	1,400	77.4	-44.3	0.50 U	4.7	437	802
	8/22/2019	2,020	104	19.2	1.20	4.2	672	1,240
	Background UPL:	**27,194**	**566**	**810**	**1.04**	**4.08 - 9.01**	**2,540**	**5,185**
B38	5/1/2018	14,000	421	248	0.50 J	6.4	2,390	3,260
	8/3/2018	14,400	341	225	0.50 J	6.8	2,360	3,270
	2/8/2019	15,000	351	284	0.50 U	6.1	2,210	3,690
	8/22/2019	18,700	429	224	0.50 U	6.1	2,150	3,180
	Background UPL:	**1,346 [2]**	**188**	**59.8 [2]**	**2.87**	**2.01 - 4.20**	**184 [2]**	**364 [2]**
B39	5/1/2018	-1,114	107	-88.4	0.50 U	3.1 J	-393	288
	5/1/2018 [1]	-1,044	105	-78.4	0.50 U	3.2 J	-393	-252
	8/3/2018	-2,497	60.3	-275	0.50 U	2.7 J	-470	-1,047
	2/8/2019	-3,477	76.0	-207	0.50 U	3.1 J	-1,024	-957
	8/23/2019	-1,606	96.1	-166	0.50 U	3.1 J	-644	-231

Notes:

Concentration is a statistically significant increase (SSI) over background.

µg/L micrograms per Liter

mg/L milligrams per Liter

S.U. Standard Units

J Constituent detected below reportable quantitation limit; result is an estimated value.

U Constituent not detected above method detection limit; result shown as the reporting limit.

[1] Duplicate sample collected.

[2] For datasets that exhibited upward trends, the background value is the Upper Prediction Limit (UPL) for the residuals of the background dataset. To identify SSIs, the UPLs are compared to the residuals of the detection monitoring results based on the linear regression for the background dataset. In some cases, the values are negative and indicate a decrease.

[3] Fluoride at wells B15S, B16, and B26 follows the Double Quantification Rule (DQR).

[4] Alternate Source Demonstration successful.

[5] For nonparametric pH distributions, the nonparametric prediction limits are the minimum and maximum background concentration (Unified Guidance, 2009, p. 18.16).

APPENDIX C
Verification Resampling – May 2020

Geosyntec consultants

10211 Wincopin Circle, Floor 4
Columbia, Maryland 21044
PH 410.381.4333
FAX 410.381.4499
www.geosyntec.com

28 May 2020

Mr. Walter Johnson
GenOn MD Ash Management LLC
c/o Chalk Point Generating Station
25100 Chalk Point Road
Aquasco, Maryland 20608

Subject: SSI Detections and Verification Resampling, First 2020 Semi-Annual Groundwater Detection Monitoring Program Event, Federal CCR Rule Brandywine Ash Management Facility – Phase II, Brandywine, Maryland

Dear Mr. Johnson:

Geosyntec Consultants, Inc. (Geosyntec) completed groundwater sampling during February 2020 at compliance and background monitoring wells at the Brandywine Ash Management Facility Phase II located in Brandywine, Maryland (the Site) pursuant to the Federal CCR Rule. This was the sixth semi-annual monitoring event in the Detection Monitoring Program. Three compliance well samples collected during this monitoring event had concentrations which exceeded the background upper prediction limits (UPLs) for select constituents, which indicated potentially statistically significant increases (SSIs) above background (Table 1). These samples included total dissolved solids at B15S and sulfate at B37 and B38. There were no SSIs detected for boron, a primary CCR indicator constituent in these samples.

In May 2020, Geosyntec remobilized to the Site to collect verification resamples to confirm those select concentrations. Upon receipt of the verification resample data from the laboratory, each concentration was less than its respective background UPL as follows:

- The concentration of TDS at B15S was 96.5 milligrams per liter (mg/L) (background UPL is 121 mg/L).
- The concentration of sulfate at B37 was 684 mg/L (background UPL is 779 mg/L).
- The concentration of sulfate at B38 was 2,340 mg/L (background UPL is 2,540 mg/L).

The verification resamples disconfirm the original detections from the February 2020 monitoring event. In addition, review of Table 1 indicates that the verification resample results are similar to previous monitoring results at these wells and the February 2020 results are anomalous while the boron results were consistent with prior results (see attached time-series trend graphs). Further statistical testing is not recommended and there are no other indicators that there has been a release of CCR (coal combustion residuals) leachate from the Phase II CCR Unit at this time. Therefore,

Geosyntec consultants

the Site should remain in Detection Monitoring. If you have any questions regarding this letter or the approach it describes, please do not hesitate to contact the undersigned at 410.381.4333.

Very truly yours,

Keith Hollerbach
Scientist

Robert M. Glazier
Principal

Attachments:
Appendix III Statistically Significant Increases (SSIs)
Time-series trend graphs for boron and SSI constituents at B15S, B37, and B38

cc: Mark Nitz, GenOn
Steve Frank, GenOn
Pilantana Anderson, GenOn

TABLE 1
APPENDIX III STATISTICALLY SIGNIFICANT INCREASES (SSIs)
FEDERAL CCR RULE

Brandywine Ash Management Facility, Brandywine, MD

Analyte:		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
		µg/L	mg/L	mg/L	mg/L	S.U.	mg/L	mg/L
Well ID	**Background UPL:**	**43.4**	**5.58**	**12.4**	**DQR [3]**	**3.84 - 6.71**	**41.7**	**121**
B15S	5/2/2018	14.1 J	1.84	5.4	0.50 U	5.50	16.7	59.5 J
	5/2/2018 [1]	14.5 J	1.81	5.5	0.50 U	5.50	16.8	68.0
	8/1/2018	36.4 J	1.60	4.8	0.31 J	5.70	15.0	60.5
	2/6/2019	13.6 J	2.18	3.6	0.50 U	5.70	30.2	77.0
	8/23/2019	18.9	1.17	3.8	0.50 U	6.00	9.1	44.0
	2/10/2020	17.7 J	2.34	2.1	0.50 U	6.70	19.2	**139.0** [6]
	5/11/2020	NS	NS	NS	NS	NS	NS	96.5 [7]
	Background UPL:	**59,057**	**497**	**2,950**	**DQR**	**5.76 - 7.48**	**791 [2]**	**16,227**
B16	4/30/2018	58,200	426	1,870	0.50 U	6.70	**1,032** [4]	13,400
	7/31/2018	53,500	385	1,850	0.50 U	6.90	**1,997** [4]	13,400
	2/11/2019	56,100	307	1,850	0.50 U	7.30	207	13,500
	8/22/2019	40,900	199	1,380	0.50 U	7.20	-1,709	10,900
	2/7/2020	41,800	206	1,450	0.50 U	7.40	-1,161	11,000
	2/7/2020 [1]	42,100	218	1,380	0.50 U	7.30	-1,461	11,200
	Background UPL:	**124**	**11.7**	**20.6**	**DQR**	**4.20 - 5.90 [5]**	**62.9**	**213**
B26	5/1/2018	22.3 J	4.45	10.0	0.50 U	5.20	12.1	67.5
	8/1/2018	18.6 J	4.85	9.9	0.50 U	5.20	13.4	59.0 J
	2/6/2019	12.0 U	4.62	9.4	0.50 U	5.50	13.4	69.0
	8/23/2019	31.7 J	4.97	8.8	0.50 U	5.30	12.3	55.0
	2/10/2020	12.0 U	4.77	10.4	0.50 U	5.70	13.5	71.0
	Background UPL:	**1,494**	**59.6**	**233**	**0.47**	**4.87 - 8.40**	**654**	**1,247**
B27	5/1/2018	665	53.9	23.4	0.50 U	7.00	74.1	419
	8/2/2018	547	41.4	13.4	0.50 U	7.10	53.7	306
	2/7/2019	261	26.8	5.8	0.50 U	6.90	44.1	197
	8/22/2019	593	**98.7** [4]	35.2	0.50 U	7.00	285	824
	2/11/2020	545	55.4	17.2	0.50 U	7.00	100	430
	Background UPL:	**4,011**	**213**	**32.9 [2]**	**2.21**	**2.90 - 5.87**	**779**	**2,559**
B37	5/1/2018	1,430	90.2	6.5	0.61	5.00	422	964
	8/3/2018	899	56.1	-52.1	0.39 J	5.20	197	512
	2/8/2019	1,400	77.4	-44.3	0.50 U	4.70	437	802
	8/22/2019	2,020	104	19.2	1.20	4.20	672	1,240
	2/10/2020	1,890	109	-56.1	1.50	4.50	**938** [6]	1,240
	5/11/2020	NS	NS	NS	NS	NS	684 [7]	NS
	Background UPL:	**27,194**	**566**	**810**	**1.04**	**4.08 - 9.01**	**2,540**	**5,185**
B38	5/1/2018	14,000	421	248	0.50 J	6.40	2,390	3,260
	8/3/2018	14,400	341	225	0.50 J	6.80	2,360	3,270
	2/8/2019	15,000	351	284	0.50 U	6.10	2,210	3,690
	8/22/2019	18,700	429	224	0.50 U	6.10	2,150	3,180
	2/7/2020	16,500	339	223	0.50 U	6.20	**2,590** [6]	3,620
	5/11/2020	NS	NS	NS	NS	NS	2,340 [7]	NS
	Background UPL:	**1,346 [2]**	**188**	**59.8 [2]**	**2.87**	**2.01 - 4.20**	**184 [2]**	**364 [2]**
B39	5/1/2018	-1,114	107	-88.4	0.50 U	3.10 J	-393	288
	5/1/2018 [1]	-1,044	105	-78.4	0.50 U	3.20 J	-393	-252
	8/3/2018	-2,497	60.3	-275	0.50 U	2.70 J	-470	-1,047
	2/8/2019	-3,477	76.0	-207	0.50 U	3.10 J	-1,024	-957
	8/23/2019	-1,606	96.1	-166	0.50 U	3.10 J	-644	-231
	2/11/2020	-4,065	113.0	-196	0.50 U	3.20 J	-614	-902

Notes:

Bold Concentration is a statistically significant increase (SSI) over background during the most recent sampling event.

Bold Concentration is a statistically significant increase (SSI) over background.

µg/L micrograms per Liter

mg/L milligrams per Liter

S.U. Standard Units

J Constituent detected below reportable quantitation limit; result is an estimated value.

U Constituent not detected above method detection limit; result shown as the reporting limit.

NS Not sampled.

[1] Duplicate sample collected.

[2] For datasets that exhibited upward trends, the background value is the Upper Prediction Limit (UPL) for the residuals of the background dataset. To identify SSIs, the UPLs are compared to the residuals of the detection monitoring results based on the linear regression for the background dataset. In some cases, the values are negative and indicate a decrease.

[3] Fluoride at wells B15S, B16, and B26 follows the Double Quantification Rule (DQR).

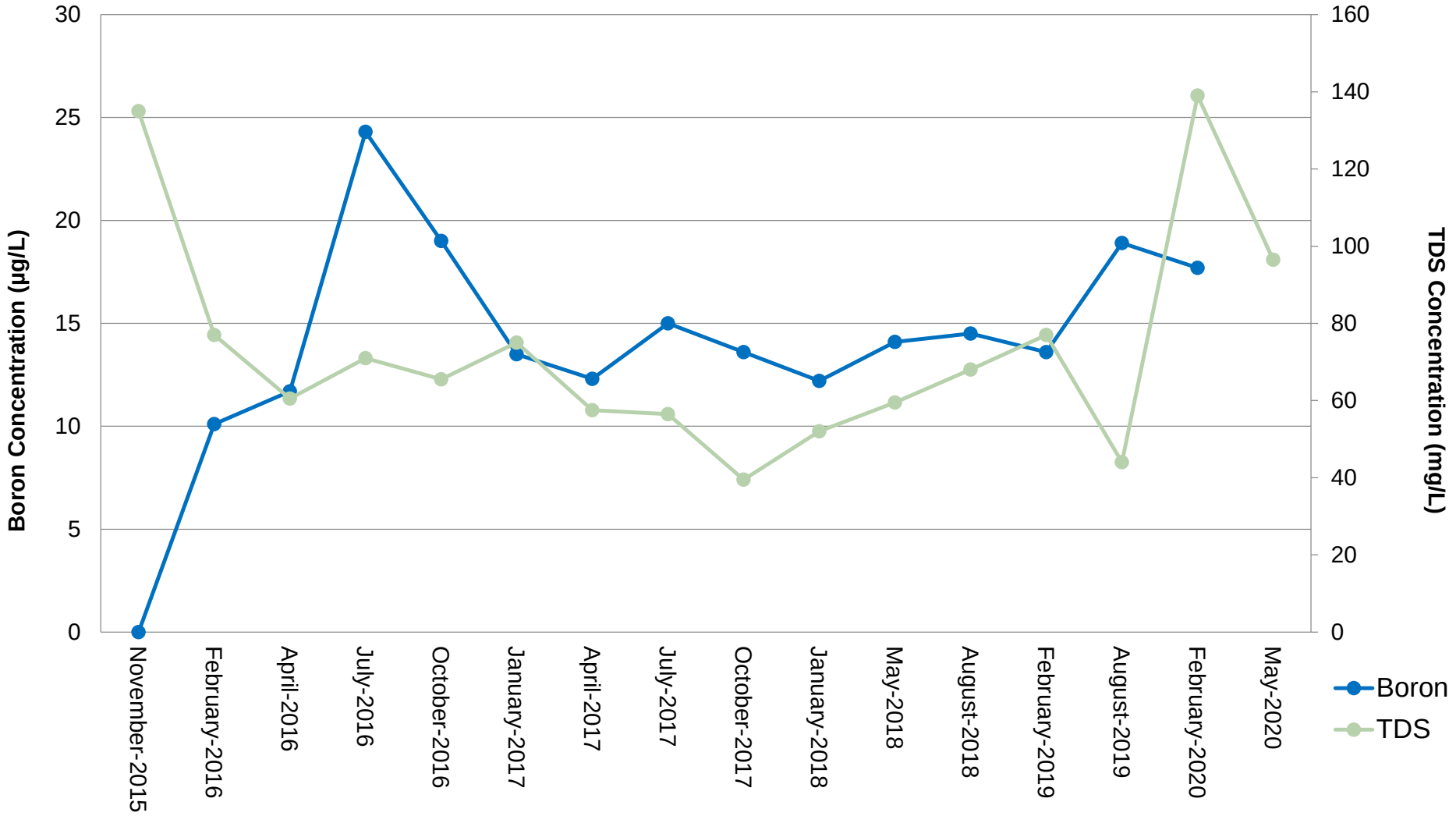
[4] Alternate Source Demonstration successful.

[5] For nonparametric pH distributions, the nonparametric prediction limits are the minimum and maximum background concentration (Unified Guidance, 2009, p. 18.16).

[6] SSI detected, however verification resample disconfirms the result.

[7] Well-constituent pair was resampled to verify SSI detection.

Unfiltered Boron and Total Dissolved Solids
Monitoring Well B15S



Notes

µg/L - micrograms per Liter
mg/L - milligrams per Liter

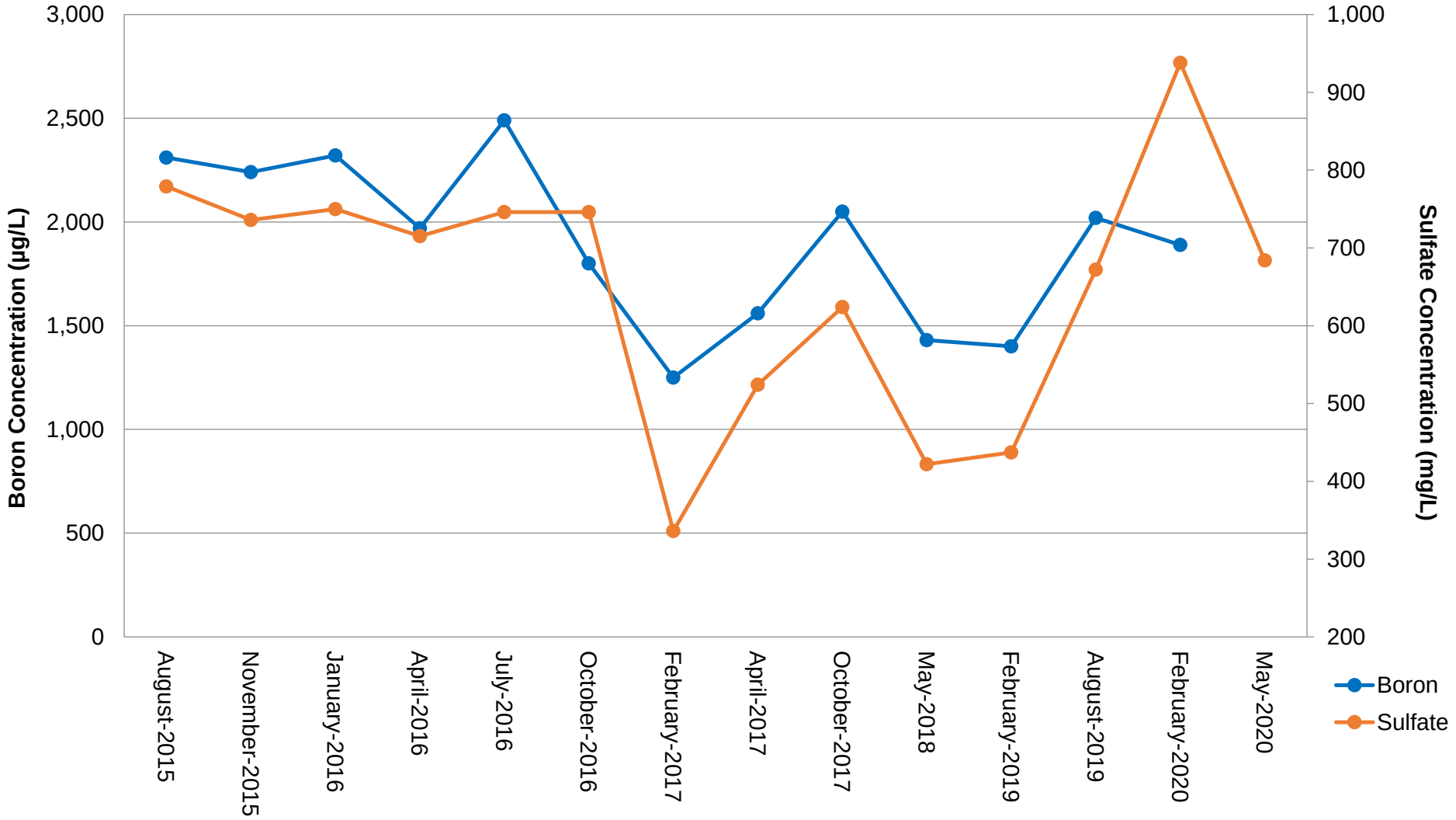
Groundwater Monitoring Results
Unfiltered Boron and Total Dissolved Solids (TDS)
Brandywine Ash Management Facility
Brandywine, Maryland

Geosyntec consultants

Columbia, Maryland | May 2020

Figure 1

Unfiltered Boron and Sulfate
Monitoring Well B37



Notes

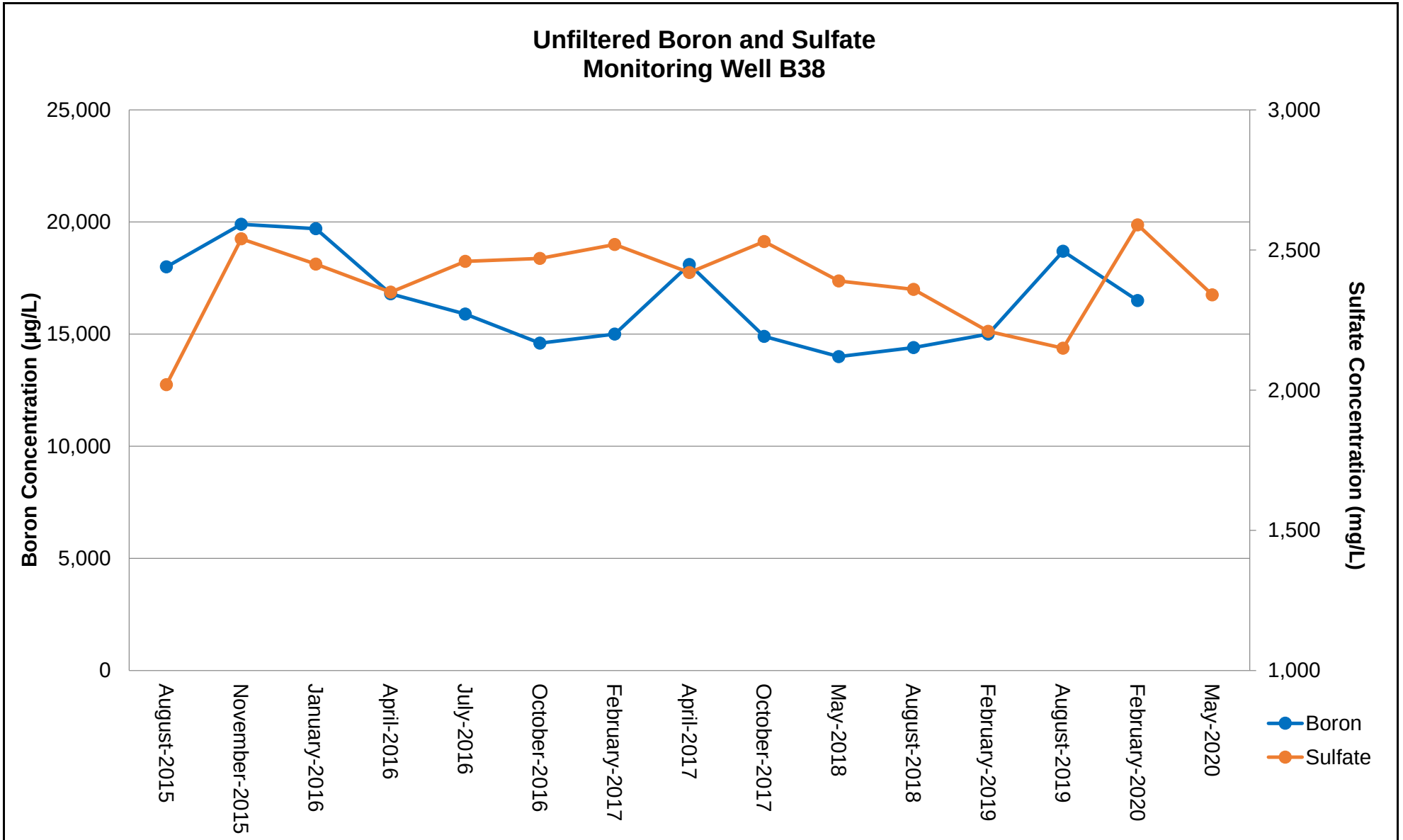
µg/L - micrograms per Liter
mg/L - milligrams per Liter

Groundwater Monitoring Results
Unfiltered Boron and Sulfate
Brandywine Ash Management Facility
Brandywine, Maryland

Geosyntec consultants

Columbia, Maryland | May 2020

Figure 2



Notes

µg/L - micrograms per Liter
mg/L - milligrams per Liter

Groundwater Monitoring Results
Unfiltered Boron and Sulfate
Brandywine Ash Management Facility
Brandywine, Maryland

Geosyntec consultants

Columbia, Maryland | May 2020

Figure 3