Illinois Power Resources Generating, LLC
1500 Eastport Plaza Dr.
Collinsville, IL 62234

January 28, 2022

Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Re: Duck Creek Bottom Ash Basin (IEPA ID: W0578010001-03) Annual Consolidated Report

Dear Mr. LeCrone:

In accordance with 35 IAC § 845.550, Illinois Power Resources Generating, LLC (IPRG) is submitting the annual consolidated report for the Duck Creek Bottom Ash Basin (IEPA ID: W0578010001-03), as enclosed.

Sincerely,

Dianna Tickner

Dianna Tickner
Director Decommissioning & Demolition

Enclosures

Annual Consolidated Report
Illinois Power Resources Generating, LLC
Duck Creek Power Plant
Bottom Ash Basin; IEPA **ID: W0578010001-03**

In accordance with 35 IAC § 845.550, Illinois Power Resources Generating, LLC (IPRG) has prepared the annual consolidated report. The report is provided in three sections as follows:

Section 1
1) Annual CCR fugitive dust control report (Section 845.500(c))

Section 2
2) Annual inspection report (Section 845.540(b)), including:

A) Annual hazard potential classification certification

B) Annual structural stability assessment certification

C) Annual safety factor assessment certification

D) Inflow design flood control system plan certification

It should be noted that the drawings and attachments of the certification report were included in the operating permit application submittal.

Section 3
3) Annual Groundwater Monitoring and Corrective Action Report (Section 845.610(e))

Section 1
Annual CCR Fugitive Dust Control Report

Annual CCR Fugitive Dust Control Report

for

Duck Creek Power Plant

Prepared for:

Illinois Power Resources Generating, LLC

Duck Creek Power Plant
17751 North Cilco Road
Canton, IL 61520

November 2021

Reporting Year: 4th Quarter 2020 through 3rd Quarter 2021

Completed by:____Dianna Tickner___ ____Director, Decommissioning & Demolition_

Name Title

This Annual CCR Fugitive Dust Control Report has been prepared for the Duck Creek Power Plant in accordance with 40 CFR 257.80(c) and 35 I.A.C. 845.500. Section 1 provides a description of the actions taken to control CCR fugitive dust at the facility during the reporting year, including a summary of any corrective measures taken. Section 2 provides a record of citizen complaints received concerning CCR fugitive dust at the facility during the reporting year, including a summary of any corrective measures taken.

Section 1 Actions Taken to Control CCR Fugitive Dust

In accordance with the Duck Creek Power Plant CCR Fugitive Dust Control Plan (Plan), the following measures were used to control CCR fugitive dust from becoming airborne at the facility during the reporting year:

CCR Activity	Actions Taken to Control CCR Fugitive Dust
Management of CCR in the facility's CCR units	CCR to be emplaced in the landfill is conditioned before emplacement.
	Cover exposed dry CCR in the landfill.
	Wet management of CCR bottom ash and flue gas desulfurization materials in CCR surface impoundments.
	Water areas of exposed CCR in CCR units, as necessary.
	Naturally occurring grass vegetation in areas of exposed CCR in CCR surface impoundments.
	Apply chemical dust suppressant on areas of exposed CCR in CCR units, as necessary.
Handling of CCR at the facility	Wet sluice CCR bottom ash and flue gas desulfurization materials to CCR surface impoundments.
	CCR bottom ash removed from CCR surface impoundments and loaded into trucks for transport remains conditioned during handling.
	Pneumatically convey dry CCR fly ash to storage silos in an enclosed system.

CCR Activity	Actions Taken to Control CCR Fugitive Dust
Handling of CCR at the facility	CCR to be emplaced in the landfill is conditioned before emplacement.
	Load CCR transport trucks from the CCR fly ash silos in a partially enclosed area.
	Load CCR transport trucks from the CCR fly ash silos using a telescoping chute.
	Maintain and operate the bin vent filters on each CCR fly ash silo as needed during fly ash loadout.
	Perform housekeeping, as necessary, in the fly ash loading area.
	Operate fly ash handling system in accordance with good operating practices.
	Maintain and repair as necessary dust controls on the fly ash handling system.
Transportation of CCR at the facility	CCR from the CCR fly ash silos to be emplaced in the landfill is conditioned before emplacement.
	Cover or enclose trucks used to transport CCR fly ash.
	Limit the speed of vehicles to no more than 15 mph on facility roads.
	Cover or enclose trucks used to transport CCR other than fly ash, as necessary.
	Sweep or rinse off the outside of the trucks transporting CCR, as necessary.
	Remove CCR, as necessary, deposited on facility road surfaces during transport.

Based on a review of the Plan and inspections associated with CCR fugitive dust control performed in the reporting year, the control measures identified in the Plan as implemented at the facility effectively minimized CCR from becoming airborne at the facility. No revisions or additions to control measures identified in the Plan were needed.

The Illinois Environmental Protection Agency rule 35 IAC 212.314 does not require fugitive dust controls when the wind speed is greater than 25 mph.

No material changes occurred in the reporting year in site conditions potentially resulting in CCR fugitive dust becoming airborne at the facility that warrant an amendment of the Plan.

Duck Creek ceased operation in December of 2019. Not all the CCR activities that are listed in the table occurred after the plant was permanently shut down. For the activities that did occur, the actions taken to control CCR Fugitive Dust that are listed in the table were followed and were adequate to effectively minimize fugitive dust.

Section 2 Record of Citizen Complaints

No citizen complaints were received regarding CCR fugitive dust at Duck Creek Power Plant in the reporting year.

Section 2

Annual Inspection Report (Section 845.540(b)), including:

A) Annual Hazard Potential Classification Certification, if applicable (Section 845.440)

B) Annual Structural Stability Assessment Certification, if applicable (Section 845.450)

C) Annual Safety Factor Assessment Certification, if applicable (Section 845.460)

D) Inflow Design Flood Control System Plan Certification (Section 845.510(c))

ANNUAL INSPECTION BY A QUALIFIED PROFESSIONAL ENGINEER 35 IAC § 845.540
(b)(1) The CCR surface impoundment must be inspected on an annual basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR surface impoundment is consistent with recognized and generally accepted engineering standards. The inspection must, at a minimum, include: A) A review of available information regarding the status and condition of the CCR surface impoundment, including files available in the operating record (e.g., CCR surface impoundment design and construction information required by Sections 845.220(a)(1) and 845.230(d)(2)(A), previous structural stability assessments required under Section 845.450, the results of inspections by a qualified person, and results of previous annual inspections); B) A visual inspection of the CCR surface impoundment to identify signs of distress or malfunction of the CCR surface impoundment and appurtenant structures; C) A visual inspection of any hydraulic structures underlying the base of the CCR surface impoundment or passing through the dike of the CCR surface impoundment for structural integrity and continued safe and reliable operation; D) The annual hazard potential classification certification, if applicable (see Section 845.440); E) The annual structural stability assessment certification, if applicable (see Section 845.450); F) The annual safety factor assessment certification, if applicable (see Section 845.460); and G) The inflow design flood control system plan certification (see Section 845.510(c)).

SITE INFORMATION	
Site Name / Address / Date of Inspection	Duck Creek Power Station Fulton County, Illinois 61520 10/19/2021
Operator Name / Address	Luminant Generation Company LLC 6555 Sierra Drive, Irving, TX 75039
CCR unit	Bottom Ash Basin

INSPECTION REPORT 35 IAC § 845.540 Date of Inspection 10/19/2021	
(b)(1)(D) The annual hazard potential classification certification, if applicable (see Section 845.440).	Based on a review of the CCR unit's annual hazard potential classification, the unit is classified as a Class II CCR surface impoundment.
(b)(2)(A) Any changes in geometry of the structure since the previous annual inspection.	Based on a review of the CCR unit's records and visual observation during the on-site inspection, no changes in geometry of the structure have taken place since the previous annual inspection.
(b)(2)(B) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection	None
b)(2)(C) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;	See the attached.
b)(2)(D) The storage capacity of the impounding structure at the time of the inspection	Approximately 18 acre-feet
(b)(2)(E) The approximate volume of the impounded water and CCR contained in the unit at the time of the inspection.	Zero
(b)(2)(F) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit	Based on a review of the CCR unit's records and visual observation during the on-site inspection, there was no appearance of an actual or potential structural weakness of the CCR unit, nor an existing condition that is disrupting or would disrupt the operation and safety of the unit.

INSPECTION REPORT 35 IAC § 845.540 Date of Inspection 10/19/2021	
(b)(2)(G) Any other changes that may have affected the stability or operation of the impounding structure since the previous annual inspection.	Based on a review of the CCR unit's records and visual observation during the on-site inspection, no other changes which may have affected the stability or operation of the CCR unit have taken place since the previous annual inspection.
(b)(1)(G) The inflow design flood control system plan certification (see Section 845.510(c))	Based on a review of the CCR unit's records, the CCR unit is designed, operated, and maintained to adequately manage the flow from the CCR impoundment and control the peak discharge from the inflow design flood.

35 IAC § 845.540 - Annual inspection by a qualified professional engineer.

I, James Knutelski, P.E., certify under penalty of law that the information submitted in this report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Illinois. The information submitted, is to the best of my knowledge and belief, true, accurate and complete. Based on the annual inspection, the design, construction, operation, and maintenance of the CCR Unit is consistent with recognized and generally accepted good engineering standards. Based on a review of the records for the CCR unit, the hazard potential classification was conducted in accordance with the requirements of Section 845.440 and the Safety Factor Assessment was conducted in accordance with the requirements of Section 845.460.

James Knutelski, PE
Illinois PE No. 062-054206, Expires: 11/30/2023
Date: 01/05/2022

Site Name: Duck Creek Power Station

CCR Unit: Bottom Ash Basin

35 IAC § 845.540 (b)(2)(B)		
Instrument ID #	Type	Maximum recorded reading since previous annual inspection (ft)
None		

35 IAC § 845.540 (b)(2)(C)						
	Approximate Depth / Elevation					
Since previous inspection:	Elevation (ft)			Depth (ft)		
	Minimum	Present	Maximum	Minimum	Present	Maximum
Impounded Water					0	
CCR				0		0

Geosyntec consultants

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October 11, 2021

Illinois Power Resources Generating, LLC
17751 North Cilco Road
Canton, Illinois 61520

Subject: USEPA CCR Rule and IEPA Part 845 Rule Applicability Cross-Reference
2021 USEPA CCR Rule Periodic Certification Report
Bottom Ash Basin, Duck Creek Power Plant, Canton, Illinois

At the request of Illinois Power Resources Generating, LLC (IPRG), Geosyntec Consultants (Geosyntec) has prepared this letter to document how the attached 2021 United States Environmental Protection Agency (USEPA) CCR Rule Periodic Certification Report (Report) was prepared in accordance with both the Federal USEPA CCR Rule[1] and the state-specific Illinois Environmental Protection Agency (IEPA) Part 845 Rule[2]. Specific sections of the report and the applicable sections of the USEPA CCR Rule and Illinois Part 845 Rule are cross-referenced in **Table 1**. A certification from a Qualified Professional Engineer for each of the CCR Rule sections listed in **Table 1** is provided in Section 5 of the attached Report. This certification statement is also applicable to each section of the Part 845 Rule listed in **Table 1.**

Table 1 – USEPA CCR Rule and Illinois Part 845 Rule Cross-Reference

Report Section	USEPA CCR Rule		Illinois Part 845 Rule	
3	§257.82 (a)(1-3)	Adequacy of Inflow Design Control System Plan	845.510(a), (c)(1), (c)(3)	Hydrologic and Hydraulic Capacity Requirements / Inflow Design Flood Control System Plan
	§257.82 (b)	Discharge from CCR Unit	845.510(b)	Discharge from CCR Surface Impoundment

[1] United Stated Environmental Protection Agency, 2015. *40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities, Final Rule.*
[2] State of Illinois, Joint Committee on Administrative Rule, Administrative Code (2021). *Title 35: Environmental Protection, Subtitle G: Waste Disposal, Chapter I: Pollution Control Board, Subchapter j: Coal Combustion Waste Surface Impoundment, Part 845 Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments.*

CLOSING

This letter has been prepared to demonstrate that the content and Qualified Professional Engineer Certification of the 2021 Periodic USEPA CCR Rule Certification Report fulfills the corresponding requirements of Part 845 of Illinois Administrative Code listed in **Table 1**.

Sincerely,

Lucas P. Carr, P.E.
Senior Engineer

John Seymour, P.E.
Senior Principal

2021 USEPA CCR RULE OPERATING RECORD PERIODIC CERTIFICATION REPORT
§257.82
BOTTOM ASH BASIN
Duck Creek Power Plant
Fulton County, Illinois

Submitted to

Illinois Power Resources Generating, LLC

17751 North Cilco Road
Canton, Illinois 61520

Submitted by

Geosyntec consultants

engineers | scientists | innovators

1 McBride and Son Center Drive, Suite 202
Chesterfield, Missouri 63005

October 11, 2021

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EXECUTIVE SUMMARY

This Periodic United States Environmental Protection Agency (USEPA) Coal Combustion Residuals (CCR) Rule [1] certification report (Periodic Certification Report) for the Bottom Ash Basin (BAB) Pond[1] at the Duck Creek Power Plant (DCPP), also referred to as Duck Creek Power Station (DUC) has been prepared in accordance with Rule 40, Code of Federal Regulations (CFR) §257, herein referred to as the "CCR Rule" [1]. The CCR Rule requires that initial certification for the existing CCR surface impoundment, completed in 2016 and subsequently posted on the Illinois Power Resources Generating, LLC (IPRG) CCR Website ([2]) be updated on a five-year basis. The BAB is an incised CCR surface impoundment, as defined by 40 CFR §257.53. Per §257.73(b); the requirements of §287.73(a)(2) (hazard potential classification), §257.73(a)(3) (emergency action plan), §257.73(2) (structural stability assessment) and §257.73(e) (safety factor assessment) are not applicable to incised CCR surface impoundments.

The initial certification reports developed in 2016 were independently reviewed by Geosyntec ([2], [3]). Additionally, field observations, interviews with plant staff, and evaluations were performed to compare conditions in 2021 at the BAB relative to the 2016 initial certifications. These tasks determined that the BAB meets all requirements for the Inflow Design Flood Control System Plan. **Table 1** provides a summary of the initial 2016 certifications and the updated 2021 periodic certifications.

[1] The BAB Pond is also referred to as ID Number W05780100001-03, BAB Pond by the Illinois Environmental Protection Agency (IEPA); CCR unit ID 205 by IPRG, and IL50716 within the National Inventory of Dams (NID) maintained by the Illinois Department of Natural Resources (IDNR). Within this document it is referred to as the BAB Pond or the BABP.

Table 1 – Periodic Certification Summary

	CCR Rule Reference	Requirement Summary	2016 Initial Certification		2021 Periodic Certification	
			Requirement Met?	Comments	Requirement Met?	Comments
Hazard Potential Classification						
3	§257.73(a)(2)	Document hazard potential classification	Not Applicable	The BAB is an incised CCR surface impoundment [3] and the requirement to perform a hazard potential classification does not apply under the criteria presented in §257.73(a)(2)..		
Emergency Action Plan						
4	§257.73(a)(3)(iv)	Prepare written Emergency Action Plan	Not Applicable	The BAB is an incised CCR surface impoundment [3] and the requirement to prepare an emergency action plan does not apply under the criteria presented in §257.73(a)(3).		
History of Construction						
5	§257.73(c)(1)	Compile a history of construction	Not Applicable	The BAB is an incised CCR surface impoundment [3] and the requirement to prepare an emergency action plan does not apply under the criteria presented in §257.73(c).		
Structural Stability Assessment						
6	§257.73(d)(1)(i)	Stable foundations and abutments	Not Applicable	The BAB is an incised CCR surface impoundment [3] and the requirement to prepare a structural stability assessment does not apply under the criteria presented in §257.73(d).		
	§257.73(d)(1)(ii)	Adequate slope protection				
	§257.73(d)(1)(iii)	Sufficiency of dike compaction				
	§257.73(d)(1)(iv)	Presence and condition of slope vegetation				
	§257.73(d)(1)(v)(A) and (B)	Adequacy of spillway design and management				
	§257.73(d)(1)(vi)	Structural integrity of hydraulic structures				
	§257.73(d)(1)(vii)	Stability of downstream slopes inundated by water body.				
Safety Factor Assessment						
7	§257.73(e)(1)(i)	Maximum storage pool safety factor must be at least 1.50	Not Applicable	The BAB is an incised CCR surface impoundment [3] and the requirement to prepare a structural stability assessment does not apply under the criteria presented in §257.73(e).		
	§257.73(e)(1)(ii)	Maximum surcharge pool safety factor must be at least 1.40				
	§257.73(e)(1)(iii)	Seismic safety factor must be at least 1.00				
	§257.73(e)(1)(iv)	For dike construction of soils that have susceptible to liquefaction, safety factor must be at least 1.20				
Inflow Design Flood Control System Plan						
8	§257.82(a)(1), (2), (3)	Adequacy of inflow design control system plan.	Yes	Flood control system adequately managed inflow and peak discharge during the 25-year, 24-hour, Inflow Design Flood [2].	Yes	Existing IDF reviewed and assessed to be conservative due to a lower normal pool elevation in 2021 due to process water flows no longer being sluiced into the BAB.
	§257.82(b)	Discharge from CCR Unit	Yes	Discharge from the CCR Unit is routed through a NPDES-permitted outfall during both normal and 100-year, 24-hour Inflow Design Flood conditions, after performing updated hydrologic and hydraulic analyses [2].	Yes	

SECTION 1

INTRODUCTION AND BACKGROUND

This Periodic United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule [1] Certification Report was prepared by Geosyntec Consultants (Geosyntec) for Dynegy Midwest Generation, LLC (Dynegy) to document the periodic certification of the Bottom Ash Basin (BAB) at the Duck Creek Power Plant (DUC), located at 17751 North Cilco Road in Canton, Illinois 61520. The location of DUC is provided in **Figure 1**, and a site plan showing the location of the BAB among other closed and open CCR units and non-CCR surface impoundments, is provided in **Figure 2**.

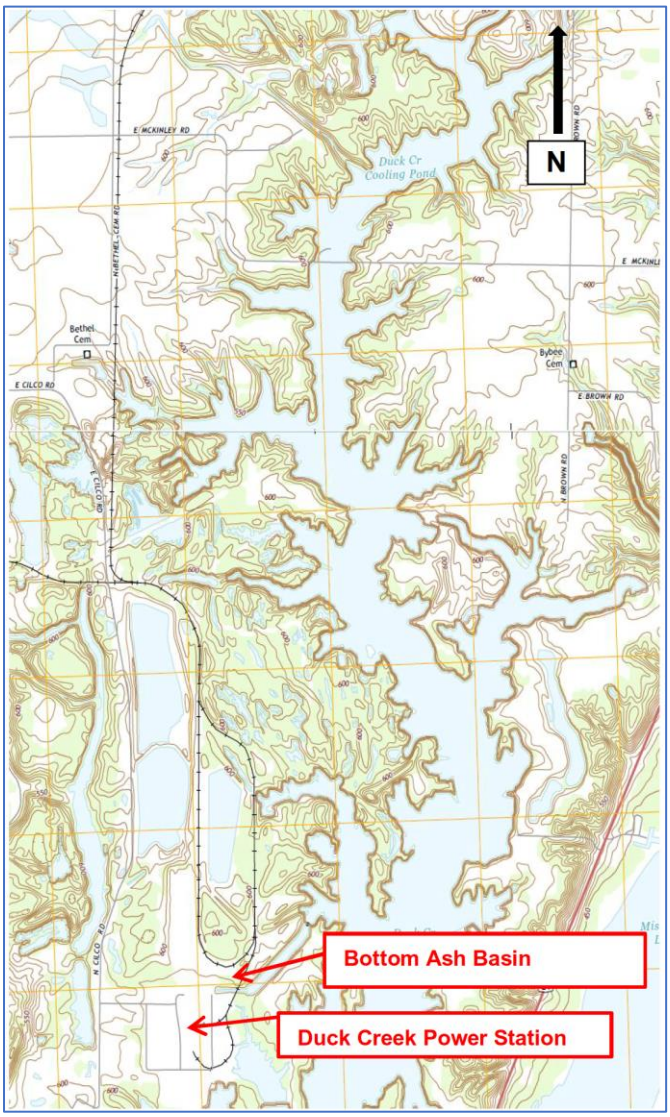

Figure 1 – Site Location Map (from AECOM, 2016)

Figure 2 – Site Plan (from AECOM, 2016)

1.1 BAB Description

The DUC power plant was retired in December of 2019. Prior to retirement, two active CCR surface impoundments – the BAB and the GMF Pond – and one CCR landfill – were used for managing CCRs generated at DUC. This certification report only pertains to the BAB. The BAB is an incised CCR surface impoundment; per §257.73, a hazard potential classification is not required for incised CCR surface impoundments [3].

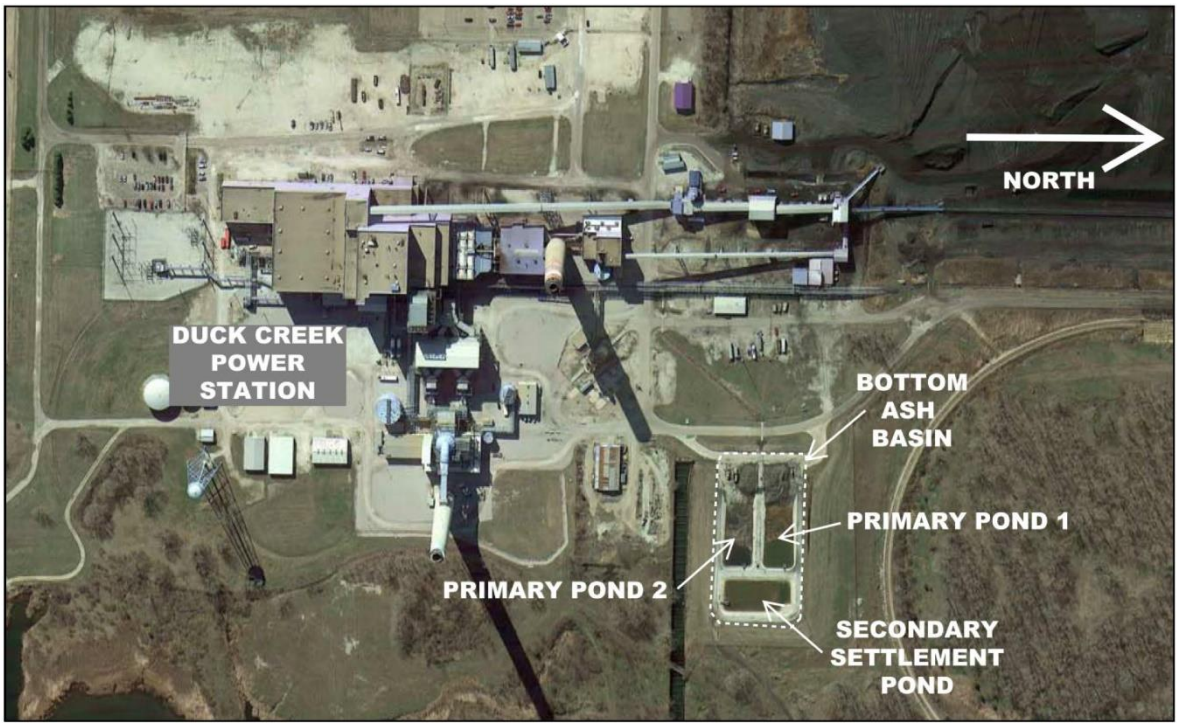

Figure 3 – Bottom Ash Basin Area Plan (from AECOM, 2016)

The BAB, which is sub-divided into Primary Pond 1, Primary Pond 2, and the Secondary Settlement Pond, as shown in **Figure 3**, served as the wet bottom ash impoundment basin. Within the BAB, Primary Ponds 1 and 2 are essentially identical in design and construction and received sluiced bottom ash from DUC. Prior to retirement of DUC, the Secondary Settlement Pond sub-basin operated as a polishing pond before discharging water into the plant's discharge channel, which led to the Duck Creek Reservoir and a NPDES-permitted outfall. The BAB consists of incised trapezoidal basins that were constructed in 2009. Primary Pond 1 and Primary Pond 2 operated alternatively which each sub-basin operating for approximately one week at a time. While one sub-basin was receiving bottom ash, the other sub-basin was dewatered and the ash was removed [3].

Sluiced bottom ash entered the BAB through Trewana precast modular trenches. Overflow water from the Primary Pond sub-basins flows into the Secondary Settlement Pond sub-basin through a stop-log weir. Outflow from the BAB was transmitted from the Secondary Settlement Pond through a stop-log structure into a 12-in. diameter corrugated high-density polyethylene (HDPE) pipe which flows by gravity into the discharge channel [3].

The BAB is lined with, from bottom to top, a 60-mil geomembrane, 12-in of compacted clay, and an 8-in. thick reinforced concrete slab. The interior side slopes of the BAB were graded at a 7% slope and were constructed to sidewall heights ranging from 5.7 to 9 ft (basin sidewalls below current existing grade) [3].

As formerly operated, the maximum operating pool of the BAB Primary Ponds 1 and 2 was El. 577.3 ft[2], and the normal pool elevation of the Secondary Settlement Pond was 573.5 ft. The pool elevation in each sub-basin is controlled by the stop log overflow weirs. Most CCR was removed from the BAB after closure; Primary Ponds 1 and 2 were observed by Geosyntec to be dry in May of 2020 and a nominal amount of impounded water was observed in the Secondary Settlement Pond. Only small amounts of CCR were observed to be present adjacent to the outfall structures in Primary Ponds 1 and 2. The BAB is approximately 1.9 acres in size and the perimeter (i.e. crest) length is approximately 1,100 ft. The minimum crest elevation of the BAB is 579.0 ft for Primary Pond 1 and Primary Pond 2 and 578.0 ft for the Secondary Settlement Pond.

The initial certification for the BAB Inflow Design Flood Control System Plan (§257.82) was completed by AECOM in 2016 and subsequently posted to IPRG's CCR Website [2]. Additional documentation for the initial certification included a detailed operating record report containing calculations and other information prepared for the inflow design flood control system plan by AECOM [3]. This operating record report was not posted to IPRG's CCR Website.

[2] All elevations are in the North American Vertical Datum of 1988 (NAVD88), unless otherwise noted.

1.2 Report Objectives

These following objectives are associated with this report:

- Compare site conditions from 2015/2016, when the initial certifications were developed, to site conditions in 2021, when data for the periodic certification was obtained, and evaluate if updates are required to the §257.82 Inflow Design Flood Control System Plan ([2], [3]).

- Independently review the Inflow Design Flood Control System Plan ([2], [3]) reports to determine if updates may be required based on technical considerations.

- Confirm that the BAB meets all of the requirements associated with §257.82, or, if the BAB does not meet all requirements, provide recommendations for compliance with these sections of the CCR Rule [1].

SECTION 2

COMPARISION OF INITIAL AND PEROIDIC SITE CONDITIONS

2.1 Overview

This section describes the comparison of conditions at the BAB between the start of the initial CCR certification program in 2015 and 2016 (initial conditions) and subsequent collection of periodic certification site data in 2021 (periodic conditions).

2.2 Review of Annual Inspection Reports

Annual onsite inspections for the BAB were performed between 2016 and 2020 ([4], [5], [6], [7], [8]) and were certified by a licensed professional engineer in accordance with §257.83(b). Each inspection report provided the following information, relative to the previous inspection:

- A statement that no changes in geometry of the impounding structure were observed since the previous inspection.
- A statement that no instrumentation was present.
- Approximate volumes of impounded water and CCR at the time of inspection.
- A statement that no appearances of actual or potential structural weakness or other disruptive conditions were observed.
- A statement that no other changes which may have affected the stability or operation of the impounding structure were observed.

In summary, the reports did not indicate any significant changes to the BAB between 2015 and 2020. No signs of instability, structural weakness, or changes which may have affected the operation or stability of the BAB were noted in the annual inspection reports.

2.3 Comparison of Initial to Periodic Site Visits

An initial site visit to the BAB was conducted by AECOM in 2015 and documented with a Site Visit Summary and corresponding photographs [9]. A periodic site visit was conducted by Geosyntec on May 27, 2021, with Mr. Lucas P. Carr, P.E. conducting the site visit. The site visit was intended to evaluate potential changes at the site since the initial certifications were prepared (i.e., modification to the outlet structures or other appurtenances, limits of CCR, maintenance programs, and repairs). The stie visit included walking the perimeter of the BAB visually observing conditions, recording field notes, and collecting photographs. The site visit is

documented in a field observation form and photographic log provided in **Appendix A**. A summary of significant findings from the periodic site visit is provided below:

- The DUC power plant was retired in December of 2019 and process water is no longer discharged to the BAB. No impounded water was observed in Primary Ponds 1 and 2, while a small amount of water (i.e., approximately one foot or less) was observed in the Polishing Pond.

- Most CCR was removed from the BAB, except for minor amounts of CCR located adjacent to the spillway structures in Primary Ponds 1 and 2.

- With the DUC power plant retirement, cooling water is no longer being discharged to the channel leading to the Duck Creek cooling pond. If discharge from the BAB were to occur it would be routed into the cooling channel.

2.4 Interview with Power Plant Staff

An interview with Mr. Daryl Johnson and Mr. Brandon Potter of the DUC power plant was conducted by Mr. Lucas P. Carr, P.E. of Geosyntec on May 27, 2021. Mr. Johnson, at the time of the interview, had been employed at DUC for 8 years and was responsible for environmental compliance and completed weekly CCR impoundment inspections on some years, including the BAB, in addition to managing vegetation maintenance. Mr. Potter, at the time of the interview, had been employed at DUC for 10 years and assisted in the inspection and operation of the various CCR impoundments, including the BAB. The interview included a discussion of included a discussion of potential changes that that may have occurred at the BAB since development of the initial certifications ([2], [3])

- Were any construction projects completed for the BAB since 2015, and, if so, are design drawings and/or details available?
    - No construction projects were completed.

- Were there any changes to the purpose of the BAB since 2015?
    - No changes, outside of the plant being closed in December of 2019 and the cessation of CCR disposal activities and process inflows.

- Were there any changes to the to the instrumentation program and/or physical instruments for the BAB since 2015?
    - The BAB does not have instrumentation.

- Have area-capacity curves for the BAB been prepared since 2015?
    - No known area capacity curves have been developed.
- Were there any changes to spillways and/or diversion features for the BAB completed since 2015?
    - No changes have occurred.
- Were there any changes to construction specifications, surveillance, maintenance, and repair procedures for the BAB since 2015?
    - No changes have occurred.

SECTION 3

INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN - §257.82

3.1 Overview of Initial IDF

The Initial Inflow Design Flood Control System Plan (Initial IDF) was prepared by AECOM in 2016 ([2], [3]), following the requirements of §257.82. The Initial IDF included the following information:

- A hydraulic and hydrologic analysis, performed for the 25-year design flood event because the BAB is an incised CCR surface impoundment, which corresponded to 5.25 inches of rainfall over a 24-hour period.
- The Initial IDF utilized a HydroCAD Version 10 model to evaluate spillway flows and pool level increases during the design flood, with a starting water surface elevation (SWSE) of 577.3 ft in Primary Ponds 1 and 2 and 573.5 ft in the Secondary Settlement Pond sub-basin.

The Initial IDF concluded that the BAB met the requirements of §257.82, as the peak water surface estimated by the HydroCAD model was El. 577.8 ft in Primary Pond 1, 577.7 ft in Primary Pond 21, and 574.2 ft in the Secondary Settlement Pond, relative to a minimum crest elevations of 579.0 ft from Primary Ponds 1 and 2 and 578.0 ft for the Secondary Settlement Pond. Therefore, overtopping was not expected.

The Initial IDF also evaluated the potential for discharge from the CCR unit and determined that discharge in violation of the existing NDPES permit for the BAB was not expected, as all discharge from the BAB during both normal and inflow design flood conditions was expected to be routed through the existing spillway and discharge channel to a NDPES-permitted outfall associated with the DUC Cooling Pond.

3.2 Review of Initial IDF

Geosyntec performed a review of the Initial IDF ([2], [3]) in terms of technical approach, calculation input parameters and methodology, recommendations, and completeness. The review included the following tasks:

- Reviewing the return interval used vs. the CCR Rule [1] requirements.
- Reviewing the rainfall depth and distribution for appropriateness.
- Performing a high-level review of the inputs to the hydrologic modeling.

- Reviewing the hydrologic model parameters for spill parameters, starting pool elevation, and storage vs. the reference data.

- Reviewing the overall Initial IDF vs. the applicable requirements of the CCR Rule [1].

The review noted that the BAB is currently not receiving process flows and does not retain a normal pool, due to the DUC power plant being retired. The review also noted that the discharge of the BAB outfall into the DUC cooling discharge channel was considered a free-discharge in the initial IDF hydrologic model; however the discharge channel is not currently active (see **Section 3.3**). Therefore, the review determined that the assumptions within the IDF are conservative, and no significant technical issues were noted within the technical review. However, a detailed review (e.g., check) of the calculations was not performed.

3.3 Summary of Site Changes Affecting the Initial IDF

The DUC power plant was retired in December of 2019. Retirement includes the cessation of process water pumping into the BAB and cooling water into the cooling discharge channel, in addition to reduced water levels in Primary Ponds 1 and 2 and the Secondary Settlement Pond. Most of the impounded CCR was removed from the BAB at the time of closure. However, these changes result in the Initial IDF ([2], [3]) being conservative, as the existing pool elevations are below the starting water surface elevations (SWSEs) of 577.3 ft for Primary Ponds 1 and 2 and 573.5 ft for the Secondary Settlement Pond.

3.4 Updated IDF

Geosyntec does not recommend updating the Initial IDF ([2], [3]) at this time. Although several changes at the site have occurred, these changes are expected to reduce the peak water surface elevation (PWSE) during the IDF, rather than increase it. Therefore, the PWSE within the Initial IDF ([2], [3]) should be considered conservative.

SECTION 4

CONCLUSIONS

The BAB at DUC was evaluated relative to the USEPA CCR Rule periodic assessment requirements for Inflow design flood control system planning (§257.82). Based on these evaluations presented herein the referenced requirements are satisfied for inflow design flood control system planning.

SECTION 5

CERTIFICATION STATEMENT

CCR Unit: Illinois Power Resources Generation, LLC; Duck Creek Power Plant, BAB Pond

I, Lucas P. Carr, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this 2021 USEPA CCR Rule Periodic Certification Report, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the periodic assessment of inflow design flood control system planning, dated October 2021, were conducted in accordance with the requirements of 40 CFR §257.82.

Lucas P. Carr

10/11/2021

Date

SECTION 6

REFERENCES

[1] United States Environmental Protection Agency, 40 CFR Parts 257 and 261; Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, 2015.

[2] AECOM, "CCR Ruel Report: Initial Inflwo Design Flood Control System Plan for Bottom Ash Basin at Duck Creek Power Station," St. Louis, MO, October 2016.

[3] AECOM, "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan for Bottom Ash Basin at Duck Creek Power Station," St. Louis, MO, October 2016.

[4] J. Knutelski and J. Campbell, "Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Duck Creek Power Station, Bottom Ash Basin," January 18, 2017.

[5] J. Knutelski and J. Campbell, "Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Duck Creek Power Station, Bottom Ash Basin," February 7, 2018.

[6] J. Knutelski, "Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Duck Creek Power Station, Bottom Ash Basin," January 10, 2019.

[7] J. Knutelski, "Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Duck Creek Power Station, Bottom Ash Basin," January 8, 2020.

[8] J. Knutelski, "Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Duck Creek Power Station, Bottom Ash Basin," January 6, 2021.

[9] AECOM, "CCR Unit Initial Site Visit Summary, Dynegy CCR Compliance Program, Duck Creek Bottom Ash Basin," June 23, 2015.

Section 3

Annual Groundwater Monitoring and Corrective Action Report (Section 845.610(e))

Prepared for
Illinois Power Resources Generating, LLC

Date
January 31, 2022

Project No.
1940100711-005

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

BOTTOM ASH BASIN

DUCK CREEK POWER PLANT

CANTON, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
DUCK CREEK POWER PLANT BOTTOM ASH BASIN

Project name	**Duck Creek Power Plant Bottom Ash Basin**
Project no.	**1940100711-005**
Recipient	**Illinois Power Resources Generating, LLC**
Document type	**Annual Groundwater Monitoring and Corrective Action Report**
Version	**FINAL**
Date	**January 31, 2022**
Prepared by	**Terra A. Dalton**
Checked by	**Lauren Cook**
Approved by	**Brian Hennings**
Description	**Annual Report in Support of Part 845**

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ACRONYMS AND ABBREVIATIONS

§	Section
35 I.A.C.	Title 35 of the Illinois Administrative Code
40 C.F.R.	Title 40 of the Code of Federal Regulations
BAB	Bottom Ash Basin
bgs	below ground surface
CCR	coal combustion residuals
DCPP	Duck Creek Power Plant
GMP	Groundwater Monitoring Plan
GWPS	groundwater protection standard
HCR	Hydrogeologic Site Characterization Report
ID	identification
IEPA	Illinois Environmental Protection Agency
IPRG	Illinois Power Resources Generating, LLC
NID	National Inventory of Dams
No.	number
Part 845	35 I.A.C. § 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments
PMP	potential migration pathway
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SI	surface impoundment
SSI	statistically significant increase
TDS	total dissolved solids
UA	uppermost aquifer

EXECUTIVE SUMMARY

This report has been prepared to provide the information required by Title 35 of the Illinois Administrative Code (35 I.A.C.) Section (§) 845.610(e) (*Annual Groundwater Monitoring and Corrective Action Report*) for the Bottom Ash Basin (BAB) located at Duck Creek Power Plant (DCPP) near Canton, Illinois.

An operating permit application for the BAB was submitted by Illinois Power Resources Generating, LLC (IPRG) to the Illinois Environmental Protection Agency (IEPA) by October 31, 2021 in accordance with the requirements specified in 35 I.A.C. § 845.230(d), and is pending approval. The BAB is recognized by Vistra identification (ID) Number (No.) 205, IEPA ID No. W0578010001-03, and National Inventory of Dams (NID) No. IL50716.

A Groundwater Monitoring Plan (GMP; Ramboll Americas Engineering Solutions, Inc. [Ramboll], 2021a), which included a Statistical Analysis Plan, was developed and submitted as part of the operating permit application to propose a monitoring well network and monitoring program specific to the BAB that will comply with 35 I.A.C. § 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (Part 845; IEPA, 2021). The proposed groundwater protection standards (GWPS), as presented in the GMP, are shown in **Appendix A**.

Groundwater concentrations observed from 2015 to 2021 were presented in the Hydrogeologic Site Characterization Report (HCR; Ramboll, 2021b) and evaluated in the presentation of the History of Potential Exceedances (Ramboll, 2021c) included in the operating permit application, as required by 35 I.A.C. § 845.230(d). Groundwater concentrations from 2015 to 2021 that exceeded the GWPS set forth in 35 I.A.C. § 845.600(a) are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan, which is pending IEPA approval. The determination of potential historical exceedances of 35 I.A.C. § 845.600(a) and a summary of potential historical exceedances of proposed GWPS are shown in **Appendix B**.

Evaluation of background groundwater quality was presented in the GMP (Ramboll, 2021a), and compliance with Part 845 will be determined after the first round of groundwater sampling following IEPA's issuance of an operating permit.

This report summarizes only the information presented in the operating permit application for the BAB, submitted to IEPA by October 31, 2021, which is pending IEPA approval.

1. INTRODUCTION

This report has been prepared by Ramboll on behalf of IPRG, to provide the information required by 35 I.A.C. § 845.610(e) for the BAB located at DCPP near Canton, Illinois. The owner or operator of a coal combustion residuals (CCR) surface impoundment (SI) must prepare and submit to IEPA by January 31st of each year an Annual Groundwater Monitoring and Corrective Action Report for the preceding calendar year as part of the Annual Consolidated Report required by 35 I.A.C. § 845.550. The Annual Groundwater Monitoring and Corrective Action Report shall document the status of the groundwater monitoring and corrective action plan for the CCR SI, summarize key actions completed, including the status of permit applications and Agency approvals, describe any problems encountered and 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 SI and all background (or upgradient) and downgradient monitoring wells, including the well ID Nos., that are part of the groundwater monitoring program for the CCR SI, and a visual delineation of any exceedances of the GWPS.
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. A potentiometric surface map for each groundwater elevation sampling event required by 35 I.A.C. § 845.650(b)(2).
4. In addition to all the monitoring data obtained under 35 I.A.C. §§ 845.600-680, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, and the dates the samples were collected.
5. A narrative discussion of any statistically significant increases (SSIs) over background levels for the constituents listed in 35 I.A.C. § 845.600.
6. Other information required to be included in the annual report as specified in 35 I.A.C. §§ 845.600-680.
7. A section at the beginning of the annual report that provides an overview of the current status of the groundwater monitoring program and corrective action plan for the CCR SI. At a minimum, the summary must:
    i. Specify whether groundwater monitoring data shows a SSI over background concentrations for one or more constituents listed in 35 I.A.C. § 845.600.
    ii. Identify those constituents having a SSI over background concentrations and the names of the monitoring wells associated with the SSI(s).
    iii. Specify whether there have been any exceedances of the GWPS for one or more constituents listed in 35 I.A.C. § 845.600.
    iv. Identify those constituents with exceedances of the GWPS in 35 I.A.C. § 845.600 and the names of the monitoring wells associated with the exceedance.
    v. Provide the date when the assessment of corrective measures was initiated for the CCR SI.

vi. Provide the date when the assessment of corrective measures was completed for the CCR SI.

vii. Specify whether a remedy was selected under 35 I.A.C. § 845.670 during the current annual reporting period, and if so, the date of remedy selection.

viii. Specify whether remedial activities were initiated or are ongoing under 35 I.A.C. § 845.780 during the current annual reporting period.

An operating permit application for the BAB was submitted by IPRG to IEPA by October 31, 2021 in accordance with the requirements specified in 35 I.A.C. § 845.230(d), and is pending approval. Therefore, the Part 845 groundwater monitoring program has not yet been initiated. This report summarizes the data collected for the BAB as it was presented in the operating permit application, and includes the following:

- A map showing the CCR SI and all proposed background (or upgradient) and downgradient monitoring wells, including their identification numbers, that are part of the proposed groundwater monitoring program for the CCR SI presented in the GMP included in the operating permit application (Ramboll, 2021a).
- Identification of monitoring wells that were installed during 2021 to fulfill the requirements of 35 I.A.C. § 845.620(b).
- Representative potentiometric surface maps from the independent sampling events conducted in 2021 to meet the requirements of 35 I.A.C. § 845.650(b)(1)(A), as presented in the HCR included in the operating permit application (Ramboll, 2021b).
- A summary from the independent sampling events completed in 2021, including the number of groundwater samples that were collected for analysis for each proposed background and downgradient well and the dates the samples were collected.
- The proposed GWPS as presented in the GMP.
- A summary of the History of Potential Exceedances included in the operating permit application (Ramboll, 2021c), as required by 35 I.A.C. § 845.230(d), summarizing groundwater concentrations from 2015 to 2021 that exceeded the proposed GWPS.
  - These are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan (Appendix A of the GMP), which is pending IEPA approval.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

The Part 845 groundwater monitoring program will commence the quarter following IEPA approval and issuance of the operating permit for the BAB.

3. KEY ACTIONS COMPLETED IN 2021

Work was completed in 2021 to meet the requirements of Part 845 and details were provided in the operating permit application submitted to IEPA. The boring logs and well construction forms are included in the HCR provided with the operating permit application (Ramboll, 2021b).

The proposed Part 845 monitoring well network is presented in **Figure 1** and summarized below in **Table A**. The proposed Part 845 monitoring well network also includes wells previously installed for other programs.

Table A. Proposed Part 845 Monitoring Well Network

Well ID	Monitored Unit	Well Screen Interval (feet bgs)	Well Type [1]
BA01	UA	33.1 - 37.7	Compliance
BA02	UA	23.6 - 28.4	Compliance
BA02L*	UA	7.0 - 11.7	Compliance
BA03	UA	16.1 - 25.6	Compliance
BA03L*	UA	5.3 - 10.0	Compliance
BA04	UA	24.6 - 29.4	Compliance
BA05	UA	36.5 - 46.1	Background
BA06	UA	32.3 - 41.9	Background

[1] Well type refers to the role of the well in the monitoring network.
* Well in the UA that has been identified to monitor the potential migration pathway (PMP).
bgs = below ground surface
UA = uppermost aquifer

Proposed Part 845 monitoring wells were sampled for eight rounds of independent groundwater samples from April to August 2021 and the results were analyzed for the parameters listed in 35 I.A.C. § 845.600. Select proposed Part 845 monitoring wells are also monitored as part of the monitoring system for the requirements of Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257. A summary of the samples collected from background and compliance monitoring wells for determination of the history of potential exceedances is included in **Table B** below. All groundwater elevation data and analytical results obtained in 2021 are presented in the HCR (Ramboll, 2021b). Groundwater elevation contour maps representative of the independent sampling events are presented in **Figure 2**.

Table B. Summary of Groundwater Samples Collected

Sampling Dates	Parameters Collected	Monitoring Wells Sampled [1]
February 19, 2021	Appendix III [2], field parameters [3]	BA01, BA02, BA03, BA04, BA05, and BA06
April 14, 2021	Metals [4], mercury, inorganic parameters [5], radium 226 and 228, field parameters [3]	BA01C, BA01L, BA02L, BA03L, BA05, and BA06
April 28 - 29, 2021	Metals [4], mercury, inorganic parameters [5], radium 226 and 228, field parameters [3]	BA01C, BA01L, BA02L, BA03L, BA05, and BA06
May 12 - 13, 2021	Metals [4], mercury, inorganic parameters [5], radium 226 and 228, field parameters [3]	BA01C, BA01L, BA02L, BA03L, BA05, and BA06
June 1, 2021	Metals [4], mercury, inorganic parameters [5], radium 226 and 228, field parameters [3]	BA01C, BA01L, BA02L, BA03L, BA05, and BA06
June 14, 2021	Metals [4], mercury, inorganic parameters [5], radium 226 and 228, field parameters [3]	BA01C, BA01L, BA02L, BA03L, BA05, and BA06
June 21, 2021	Metals [4], mercury, inorganic parameters [5], radium 226 and 228, field parameters [3]	BA02L, BA03L, BA05, and BA06
July 12, 2021	Metals [4], mercury, inorganic parameters [5], radium 226 and 228, field parameters [3]	BA02L, BA03L, BA05, and BA06
July 26 - 27, 2021	Metals [4], mercury, inorganic parameters [5], radium 226 and 228, field parameters [3]	BA02L, BA03L, BA05, and BA06

[1] In general, one sample was collected per monitoring well per event.
[2] Appendix III parameters include boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids (TDS).
[3] Field parameters include pH, dissolved oxygen, temperature, oxidation/reduction potential, specific conductance, and turbidity.
[4] Metals include antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, lead, lithium, molybdenum, selenium, and thallium.
[5] Inorganic parameters include fluoride, chloride, sulfate, and TDS.

Evaluation of background groundwater quality is presented in the GMP and the proposed GWPSs are included in **Appendix A.** Compliance with Part 845 will be determined after the first round of groundwater sampling following IEPA's issuance of the operating permit for the BAB.

Groundwater concentrations from 2015 to 2021 were presented in the HCR and evaluated in the presentation of the History of Potential Exceedances included in the operating permit application. Groundwater concentrations that exceeded the proposed GWPS are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan, which is pending IEPA approval. Tables summarizing how potential historical exceedances were determined and the potential exceedances themselves are provided in **Appendix B**.

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

The first round of groundwater sampling for compliance with the Part 845 groundwater monitoring program will commence the quarter following IEPA approval and issuance of the operating permit for the BAB, and in accordance with the GMP.

5. KEY ACTIVITIES PLANNED FOR 2022

The following key activities are planned for 2022:

- Groundwater sampling and reporting for compliance will be initiated the quarter following issuance of the operating permit at all monitoring wells in the approved monitoring well network as presented in the GMP and required by 35 I.A.C. § 845.610(b)(3), including:
  - Monthly groundwater elevations.
  - Quarterly groundwater sampling.

6. REFERENCES

Illinois Environmental Protection Agency (IEPA), 2021. *In the Matter of: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: Title 35 Illinois Administration Code 845, Addendum*. April 15, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021a. *Groundwater Monitoring Plan. Duck Creek Power Plant, Bottom Ash Basin, Canton, Illinois*. Illinois Power Resources Generating, LLC. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021b. *Hydrogeologic Site Characterization Report. Duck Creek Power Plant, Bottom Ash Basin, Canton, Illinois*. Illinois Power Resources Generating, LLC. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021c. *History of Potential Exceedances. Duck Creek Power Plant, Bottom Ash Basin, Canton, Illinois*. Illinois Power Resources Generating, LLC. October 25, 2021.

FIGURES

BACKGROUND WELL
COMPLIANCE WELL
PART 845 REGULATED UNIT (SUBJECT UNIT)

0 50 100 Feet

PROPOSED PART 845 GROUNDWATER MONITORING WELL NETWORK

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
BOTTOM ASH BASIN

DUCK CREEK POWER PLANT
CANTON, ILLINOIS

FIGURE 1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

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BACKGROUND WELL

MONITORING WELL

GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)

PART 845 REGULATED UNIT (SUBJECT UNIT)

0 50 100 Feet

NOTE
PARENTHESIS INDICATES WELL NOT USED FOR CONTOURING

POTENTIOMETRIC SURFACE MAP APRIL 28, 2021

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT BOTTOM ASH BASIN

DUCK CREEK POWER PLANT
CANTON, ILLINOIS

FIGURE 2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

APPENDICES

APPENDIX A
TABLE 3-1. BACKGROUND GROUNDWATER QUALITY AND STANDARDS

TABLE 3-1. BACKGROUND GROUNDWATER QUALITY AND STANDARDS
GROUNDWATER MONITORING PLAN
DUCK CREEK POWER PLANT
BOTTOM ASH BASIN
CANTON, ILLINOIS

Parameter	Background Concentration	845 Limit	Groundwater Protection Standard	Unit
Antimony, total	0.003	0.006	0.006	mg/L
Arsenic, total	0.024	0.010	0.024	mg/L
Barium, total	0.48	2.0	2.0	mg/L
Beryllium, total	0.0021	0.004	0.004	mg/L
Boron, total	7.9	2	7.9	mg/L
Cadmium, total	0.001	0.005	0.005	mg/L
Chloride, total	700	200	700	mg/L
Chromium, total	0.073	0.1	0.1	mg/L
Cobalt, total	0.03	0.006	0.03	mg/L
Fluoride, total	0.461	4.0	4.0	mg/L
Lead, total	0.042	0.0075	0.042	mg/L
Lithium, total	0.068	0.04	0.068	mg/L
Mercury, total	0.004	0.002	0.004	mg/L
Molybdenum, total	0.0055	0.1	0.1	mg/L
pH (field)	7.5 / 6.4	9.0 / 6.5	9.0 / 6.4	SU
Radium 226 and 228 combined	7.27	5	7.27	pCi/L
Selenium, total	0.0023	0.05	0.05	mg/L
Sulfate, total	890	400	890	mg/L
Thallium, total	0.001	0.002	0.002	mg/L
Total Dissolved Solids	2590	1200	2590	mg/L

Notes:
For pH, the values presented are the upper / lower limits
Groundwater protection standards for calcium and turbidity do not apply per 35 I.A.C. § 845.600(b)
mg/L = milligrams per liter
SU = standard units
pCi/L = picocuries per liter

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APPENDIX B
HISTORY OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES

This presentation of the History of Potential Exceedances, and any corrective action taken to remediate groundwater, is provided to meet the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.230(d)(2)(M) for the Duck Creek Power Plant Bottom Ash Basin, Illinois Environmental Protection Agency (IEPA) ID No. W0578010001-03.

Note

Groundwater concentrations from 2015 to 2021 presented in the Hydrogeologic Site Characterization Report (HCR) Table 4-1, and evaluated and summarized in the following tables, are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan (Appendix A to Groundwater Monitoring Plan [GMP]), which has not been reviewed or approved by IEPA at the time of submittal of the 35 I.A.C. § 845 Operating Permit application.

Alternate sources for potential exceedances as allowed by 35 I.A.C. § 845.650(e) have not yet been evaluated. These will be evaluated and presented in future submittals to IEPA as appropriate.

Table 1 summarizes how the potential exceedances were determined.

Background Concentrations

Background monitoring wells identified in the GMP include BA05 and BA06.

For monitoring wells that have been historically monitored in accordance with Title 40, Code of Federal Regulations, Part 257, Subpart D (Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments), background concentrations calculated from sampling events in 2015-2017 were compared to the standards identified in 35 I.A.C. § 845.600(a)(1). For constituents with calculated background concentrations in 2015-2017 greater than the standards in 35 I.A.C. § 845.600(a)(1), those calculated background concentrations were used as Groundwater Protection Standards (GWPSs) for comparing to statistical calculation results for each compliance well to determine potential exceedances. Compliance well statistical calculations consider concentrations from all sampling events in 2015-2021.

For all other monitoring wells, either newly constructed in 2021 or existing wells not monitored under Title 40, Code of Federal Regulations, Part 257, Subpart D, background concentrations calculated from the eight sampling events required by 35 I.A.C. § 845.650(b)(1)(A), to be collected within 180 days from April 21, 2021, were compared to the standards identified in 35 I.A.C. § 845.600(a)(1). For constituents with calculated background concentrations greater than the standards in 35 I.A.C. § 845.600(a)(1), those calculated background concentrations were used as GWPSs. Compliance well statistical calculations from that same time period were compared to the GWPSs to determine potential exceedances.

Corrective Action

No corrective actions are required to remediate the groundwater.

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
DUCK CREEK POWER PLANT
BOTTOM ASH BASIN
CANTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
BA01	UA	257	Antimony, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
BA01	UA	257	Arsenic, total	mg/L	02/05/2016 - 06/26/2017	CI around mean	0.00099	0.035	0.035	0.01	Background
BA01	UA	257	Barium, total	mg/L	02/05/2016 - 06/26/2017	CI around mean	0.14	2.0	0.67	2	Standard
BA01	UA	257	Beryllium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.001	0.004	0.0021	0.004	Standard
BA01	UA	257	Boron, total	mg/L	02/05/2016 - 02/19/2021	Future median	0.026	3.9	3.9	2	Background
BA01	UA	257	Cadmium,total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.001	0.005	0.001	0.005	Standard
BA01	UA	257	Chloride, total	mg/L	02/05/2016 - 02/19/2021	Future median	13	650	650	200	Background
BA01	UA	257	Chromium, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.004	0.10	0.073	0.1	Standard
BA01	UA	257	Cobalt, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.002	0.036	0.036	0.006	Background
BA01	UA	257	Fluoride, total	mg/L	02/05/2016 - 02/19/2021	CI around median	0.25	4.0	0.55	4	Standard
BA01	UA	257	Lead, total	mg/L	02/05/2016 - 06/26/2017	Future median	0.0089	0.042	0.042	0.0075	Background
BA01	UA	257	Lithium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.010	0.068	0.068	0.04	Background
BA01	UA	257	Mercury, total	mg/L	02/05/2016 - 06/26/2017	Most recent sample	0.0002	0.002	0.00026	0.002	Standard
BA01	UA	257	Molybdenum, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.0019	0.10	0.0081	0.1	Standard
BA01	UA	257	pH (field)	SU	02/05/2016 - 02/19/2021	CI around median	6.8	6.5/9.0	6.9/7.7	6.5/9	Standard/Standard
BA01	UA	257	Radium-226 + Radium 228, tot	pCi/L	02/05/2016 - 06/26/2017	CI around mean	0.38	20	20	5	Background
BA01	UA	257	Selenium, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.001	0.050	0.0023	0.05	Standard
BA01	UA	257	Sulfate, total	mg/L	02/05/2016 - 02/19/2021	CB around linear reg	138	613	613	400	Background
BA01	UA	257	Thallium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.001	0.002	0.001	0.002	Standard
BA01	UA	257	Total Dissolved Solids	mg/L	02/05/2016 - 02/19/2021	CI around mean	514	2240	2240	1200	Background
BA01C	BR	845	Antimony, total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
BA01C	BR	845	Arsenic, total	mg/L	04/14/2021 - 06/01/2021	Future median	0.0026	0.024	0.024	0.01	Background
BA01C	BR	845	Barium, total	mg/L	04/14/2021 - 06/01/2021	CI around mean	0.13	2.0	0.48	2	Standard
BA01C	BR	845	Beryllium, total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.001	0.004	0.0021	0.004	Standard
BA01C	BR	845	Boron, total	mg/L	04/14/2021 - 06/01/2021	Future median	0.086	7.9	7.9	2	Background
BA01C	BR	845	Cadmium,total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
DUCK CREEK POWER PLANT
BOTTOM ASH BASIN
CANTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
BA01C	BR	845	Chloride, total	mg/L	04/14/2021 - 06/01/2021	Future median	14	700	700	200	Background
BA01C	BR	845	Chromium, total	mg/L	04/14/2021 - 06/01/2021	CI around mean	-0.01	0.10	0.073	0.1	Standard
BA01C	BR	845	Cobalt, total	mg/L	04/14/2021 - 06/01/2021	CI around mean	-0.00278	0.030	0.030	0.006	Background
BA01C	BR	845	Fluoride, total	mg/L	04/14/2021 - 06/01/2021	CI around mean	0.18	4.0	0.46	4	Standard
BA01C	BR	845	Lead, total	mg/L	04/14/2021 - 06/01/2021	Future median	0.0021	0.042	0.042	0.0075	Background
BA01C	BR	845	Lithium, total	mg/L	04/14/2021 - 06/01/2021	Future median	0.020	0.068	0.068	0.04	Background
BA01C	BR	845	Mercury, total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.0002	0.004	0.004	0.002	Background
BA01C	BR	845	Molybdenum, total	mg/L	04/14/2021 - 06/01/2021	CI around mean	0.00285	0.10	0.0055	0.1	Standard
BA01C	BR	845	pH (field)	SU	04/14/2021 - 06/01/2021	CI around mean	7.1	6.4/9.0	6.4/7.5	6.5/9	Background/Standard
BA01C	BR	845	Radium-226 + Radium 228, tot	pCi/L	04/14/2021 - 06/14/2021	CI around mean	-2.57	7.3	7.3	5	Background
BA01C	BR	845	Selenium, total	mg/L	04/14/2021 - 06/01/2021	CI around mean	0.000429	0.050	0.0023	0.05	Standard
BA01C	BR	845	Sulfate, total	mg/L	04/14/2021 - 06/01/2021	Future median	140	890	890	400	Background
BA01C	BR	845	Thallium, total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
BA01C	BR	845	Total Dissolved Solids	mg/L	04/14/2021 - 06/01/2021	CI around mean	548	2590	2590	1200	Background
BA01L	UA/PMP	845	Antimony, total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
BA01L	UA/PMP	845	Arsenic, total	mg/L	04/14/2021 - 06/01/2021	Future median	0.0016	0.024	0.024	0.01	Background
BA01L	UA/PMP	845	Barium, total	mg/L	04/14/2021 - 06/01/2021	CI around mean	0.031	2.0	0.48	2	Standard
BA01L	UA/PMP	845	Beryllium, total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.001	0.004	0.0021	0.004	Standard
BA01L	UA/PMP	845	Boron, total	mg/L	04/14/2021 - 06/01/2021	Future median	0.18	7.9	7.9	2	Background
BA01L	UA/PMP	845	Cadmium,total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
BA01L	UA/PMP	845	Chloride, total	mg/L	04/14/2021 - 06/01/2021	Future median	7.8	700	700	200	Background
BA01L	UA/PMP	845	Chromium, total	mg/L	04/14/2021 - 06/01/2021	CI around median	0	0.10	0.073	0.1	Standard
BA01L	UA/PMP	845	Cobalt, total	mg/L	04/14/2021 - 06/01/2021	CI around median	0	0.030	0.030	0.006	Background
BA01L	UA/PMP	845	Fluoride, total	mg/L	04/14/2021 - 06/01/2021	CI around mean	0.22	4.0	0.46	4	Standard
BA01L	UA/PMP	845	Lead, total	mg/L	04/14/2021 - 06/01/2021	Future median	0.001	0.042	0.042	0.0075	Background
BA01L	UA/PMP	845	Lithium, total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.020	0.068	0.068	0.04	Background

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
DUCK CREEK POWER PLANT
BOTTOM ASH BASIN
CANTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
BA01L	UA/PMP	845	Mercury, total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.0002	0.004	0.004	0.002	Background
BA01L	UA/PMP	845	Molybdenum, total	mg/L	04/14/2021 - 06/01/2021	CI around median	0	0.10	0.0055	0.1	Standard
BA01L	UA/PMP	845	pH (field)	SU	04/14/2021 - 06/01/2021	CI around mean	6.6	6.4/9.0	6.4/7.5	6.5/9	Background/Standard
BA01L	UA/PMP	845	Radium-226 + Radium 228, tot	pCi/L	04/14/2021 - 06/14/2021	CI around mean	-0.711	7.3	7.3	5	Background
BA01L	UA/PMP	845	Selenium, total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.001	0.050	0.0023	0.05	Standard
BA01L	UA/PMP	845	Sulfate, total	mg/L	04/14/2021 - 06/01/2021	Future median	120	890	890	400	Background
BA01L	UA/PMP	845	Thallium, total	mg/L	04/14/2021 - 06/01/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
BA01L	UA/PMP	845	Total Dissolved Solids	mg/L	04/14/2021 - 06/01/2021	CI around mean	637	2590	2590	1200	Background
BA02	UA	257	Antimony, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
BA02	UA	257	Arsenic, total	mg/L	02/05/2016 - 06/26/2017	CI around mean	0.00093	0.035	0.035	0.01	Background
BA02	UA	257	Barium, total	mg/L	02/05/2016 - 06/26/2017	CI around mean	0.18	2.0	0.67	2	Standard
BA02	UA	257	Beryllium, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.001	0.004	0.0021	0.004	Standard
BA02	UA	257	Boron, total	mg/L	02/05/2016 - 02/19/2021	CB around linear reg	0.053	3.9	3.9	2	Background
BA02	UA	257	Cadmium,total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.001	0.005	0.001	0.005	Standard
BA02	UA	257	Chloride, total	mg/L	02/05/2016 - 02/19/2021	CB around linear reg	10	650	650	200	Background
BA02	UA	257	Chromium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.004	0.10	0.073	0.1	Standard
BA02	UA	257	Cobalt, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.002	0.036	0.036	0.006	Background
BA02	UA	257	Fluoride, total	mg/L	02/05/2016 - 02/19/2021	CI around median	0.25	4.0	0.55	4	Standard
BA02	UA	257	Lead, total	mg/L	02/05/2016 - 06/26/2017	Future median	0.0013	0.042	0.042	0.0075	Background
BA02	UA	257	Lithium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.010	0.068	0.068	0.04	Background
BA02	UA	257	Mercury, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.0002	0.002	0.00026	0.002	Standard
BA02	UA	257	Molybdenum, total	mg/L	02/05/2016 - 06/26/2017	CI around mean	0.00347	0.10	0.0081	0.1	Standard
BA02	UA	257	pH (field)	SU	02/05/2016 - 02/19/2021	CI around median	6.6	6.5/9.0	6.9/7.7	6.5/9	Standard/Standard
BA02	UA	257	Radium-226 + Radium 228, tot	pCi/L	02/05/2016 - 06/26/2017	CI around mean	0.47	20	20	5	Background
BA02	UA	257	Selenium, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.001	0.050	0.0023	0.05	Standard
BA02	UA	257	Sulfate, total	mg/L	02/05/2016 - 02/19/2021	CB around linear reg	14	613	613	400	Background

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
DUCK CREEK POWER PLANT
BOTTOM ASH BASIN
CANTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
BA02	UA	257	Thallium, total	mg/L	02/05/2016 - 06/26/2017	Most recent sample	0.001	0.002	0.001	0.002	Standard
BA02	UA	257	Total Dissolved Solids	mg/L	02/05/2016 - 02/19/2021	CI around mean	414	2240	2240	1200	Background
BA02L	UA/PMP	845	Antimony, total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
BA02L	UA/PMP	845	Arsenic, total	mg/L	04/14/2021 - 07/27/2021	Future median	0.012	0.024	0.024	0.01	Background
BA02L	UA/PMP	845	Barium, total	mg/L	04/14/2021 - 07/27/2021	CI around median	0.046	2.0	0.48	2	Standard
BA02L	UA/PMP	845	Beryllium, total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.001	0.004	0.0021	0.004	Standard
BA02L	UA/PMP	845	Boron, total	mg/L	04/14/2021 - 07/27/2021	CB around linear reg	0.091	7.9	7.9	2	Background
BA02L	UA/PMP	845	Cadmium,total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
BA02L	UA/PMP	845	Chloride, total	mg/L	04/14/2021 - 07/27/2021	Future median	3.9	700	700	200	Background
BA02L	UA/PMP	845	Chromium, total	mg/L	04/14/2021 - 07/27/2021	CI around median	0.004	0.10	0.073	0.1	Standard
BA02L	UA/PMP	845	Cobalt, total	mg/L	04/14/2021 - 07/27/2021	CI around median	0.002	0.030	0.030	0.006	Background
BA02L	UA/PMP	845	Fluoride, total	mg/L	04/14/2021 - 07/27/2021	CI around mean	0.59	4.0	0.46	4	Standard
BA02L	UA/PMP	845	Lead, total	mg/L	04/14/2021 - 07/27/2021	Future median	0.001	0.042	0.042	0.0075	Background
BA02L	UA/PMP	845	Lithium, total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.020	0.068	0.068	0.04	Background
BA02L	UA/PMP	845	Mercury, total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.0002	0.004	0.004	0.002	Background
BA02L	UA/PMP	845	Molybdenum, total	mg/L	04/14/2021 - 07/27/2021	CI around mean	0.011	0.10	0.0055	0.1	Standard
BA02L	UA/PMP	845	pH (field)	SU	04/14/2021 - 07/27/2021	CI around mean	7.4	6.4/9.0	6.4/7.5	6.5/9	Background/Standard
BA02L	UA/PMP	845	Radium-226 + Radium 228, tot	pCi/L	04/14/2021 - 07/27/2021	CI around mean	-0.185	7.3	7.3	5	Background
BA02L	UA/PMP	845	Selenium, total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.001	0.050	0.0023	0.05	Standard
BA02L	UA/PMP	845	Sulfate, total	mg/L	04/14/2021 - 07/27/2021	Future median	5.4	890	890	400	Background
BA02L	UA/PMP	845	Thallium, total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
BA02L	UA/PMP	845	Total Dissolved Solids	mg/L	04/14/2021 - 07/27/2021	CI around mean	195	2590	2590	1200	Background
BA03	UA	257	Antimony, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
BA03	UA	257	Arsenic, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.001	0.035	0.035	0.01	Background
BA03	UA	257	Barium, total	mg/L	02/05/2016 - 06/26/2017	CI around mean	0.18	2.0	0.67	2	Standard
BA03	UA	257	Beryllium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.001	0.004	0.0021	0.004	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
DUCK CREEK POWER PLANT
BOTTOM ASH BASIN
CANTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
BA03	UA	257	Boron, total	mg/L	02/05/2016 - 02/19/2021	Future median	0.028	3.9	3.9	2	Background
BA03	UA	257	Cadmium,total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.001	0.005	0.001	0.005	Standard
BA03	UA	257	Chloride, total	mg/L	02/05/2016 - 02/19/2021	Future median	6.3	650	650	200	Background
BA03	UA	257	Chromium, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.004	0.10	0.073	0.1	Standard
BA03	UA	257	Cobalt, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.002	0.036	0.036	0.006	Background
BA03	UA	257	Fluoride, total	mg/L	02/05/2016 - 02/19/2021	CI around median	0.25	4.0	0.55	4	Standard
BA03	UA	257	Lead, total	mg/L	02/05/2016 - 06/26/2017	Future median	0.001	0.042	0.042	0.0075	Background
BA03	UA	257	Lithium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.010	0.068	0.068	0.04	Background
BA03	UA	257	Mercury, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.0002	0.002	0.00026	0.002	Standard
BA03	UA	257	Molybdenum, total	mg/L	02/05/2016 - 06/26/2017	CI around mean	0.00202	0.10	0.0081	0.1	Standard
BA03	UA	257	pH (field)	SU	02/05/2016 - 02/19/2021	CI around mean	7.1	6.5/9.0	6.9/7.7	6.5/9	Standard/Standard
BA03	UA	257	Radium-226 + Radium 228, tot	pCi/L	02/05/2016 - 06/26/2017	CI around mean	0.37	20	20	5	Background
BA03	UA	257	Selenium, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.001	0.050	0.0023	0.05	Standard
BA03	UA	257	Sulfate, total	mg/L	02/05/2016 - 02/19/2021	CB around linear reg	14	613	613	400	Background
BA03	UA	257	Thallium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.001	0.002	0.001	0.002	Standard
BA03	UA	257	Total Dissolved Solids	mg/L	02/05/2016 - 02/19/2021	CI around mean	389	2240	2240	1200	Background
BA03L	UA/PMP	845	Antimony, total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
BA03L	UA/PMP	845	Arsenic, total	mg/L	04/14/2021 - 07/27/2021	Future median	0.001	0.024	0.024	0.01	Background
BA03L	UA/PMP	845	Barium, total	mg/L	04/14/2021 - 07/27/2021	CI around median	0.12	2.0	0.48	2	Standard
BA03L	UA/PMP	845	Beryllium, total	mg/L	04/14/2021 - 07/27/2021	CI around median	0.001	0.004	0.0021	0.004	Standard
BA03L	UA/PMP	845	Boron, total	mg/L	04/14/2021 - 07/27/2021	Future median	0.26	7.9	7.9	2	Background
BA03L	UA/PMP	845	Cadmium,total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
BA03L	UA/PMP	845	Chloride, total	mg/L	04/14/2021 - 07/27/2021	Future median	23	700	700	200	Background
BA03L	UA/PMP	845	Chromium, total	mg/L	04/14/2021 - 07/27/2021	CI around geomean	0.00304	0.10	0.073	0.1	Standard
BA03L	UA/PMP	845	Cobalt, total	mg/L	04/14/2021 - 07/27/2021	CI around median	0.002	0.030	0.030	0.006	Background
BA03L	UA/PMP	845	Fluoride, total	mg/L	04/14/2021 - 07/27/2021	CI around median	0.25	4.0	0.46	4	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
DUCK CREEK POWER PLANT
BOTTOM ASH BASIN
CANTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
BA03L	UA/PMP	845	Lead, total	mg/L	04/14/2021 - 07/27/2021	Future median	0.0023	0.042	0.042	0.0075	Background
BA03L	UA/PMP	845	Lithium, total	mg/L	04/14/2021 - 07/27/2021	Future median	0.020	0.068	0.068	0.04	Background
BA03L	UA/PMP	845	Mercury, total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.0002	0.004	0.004	0.002	Background
BA03L	UA/PMP	845	Molybdenum, total	mg/L	04/14/2021 - 07/27/2021	CI around median	0.001	0.10	0.0055	0.1	Standard
BA03L	UA/PMP	845	pH (field)	SU	04/14/2021 - 07/27/2021	CI around mean	6.8	6.4/9.0	6.4/7.5	6.5/9	Background/Standard
BA03L	UA/PMP	845	Radium-226 + Radium 228, tot	pCi/L	04/14/2021 - 07/27/2021	CI around geomean	0.22	7.3	7.3	5	Background
BA03L	UA/PMP	845	Selenium, total	mg/L	04/14/2021 - 07/27/2021	CI around median	0.001	0.050	0.0023	0.05	Standard
BA03L	UA/PMP	845	Sulfate, total	mg/L	04/14/2021 - 07/27/2021	Future median	350	890	890	400	Background
BA03L	UA/PMP	845	Thallium, total	mg/L	04/14/2021 - 07/27/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
BA03L	UA/PMP	845	Total Dissolved Solids	mg/L	04/14/2021 - 07/27/2021	CI around mean	936	2590	2590	1200	Background
BA04	UA	257	Antimony, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
BA04	UA	257	Arsenic, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.001	0.035	0.035	0.01	Background
BA04	UA	257	Barium, total	mg/L	02/05/2016 - 06/26/2017	CI around mean	0.11	2.0	0.67	2	Standard
BA04	UA	257	Beryllium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.001	0.004	0.0021	0.004	Standard
BA04	UA	257	Boron, total	mg/L	02/05/2016 - 02/19/2021	Future median	1.9	3.9	3.9	2	Background
BA04	UA	257	Cadmium,total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.001	0.005	0.001	0.005	Standard
BA04	UA	257	Chloride, total	mg/L	02/05/2016 - 02/19/2021	CB around linear reg	35	650	650	200	Background
BA04	UA	257	Chromium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.004	0.10	0.073	0.1	Standard
BA04	UA	257	Cobalt, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.002	0.036	0.036	0.006	Background
BA04	UA	257	Fluoride, total	mg/L	02/05/2016 - 02/19/2021	CI around mean	0.24	4.0	0.55	4	Standard
BA04	UA	257	Lead, total	mg/L	02/05/2016 - 06/26/2017	Future median	0.001	0.042	0.042	0.0075	Background
BA04	UA	257	Lithium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.010	0.068	0.068	0.04	Background
BA04	UA	257	Mercury, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.0002	0.002	0.00026	0.002	Standard
BA04	UA	257	Molybdenum, total	mg/L	02/05/2016 - 06/26/2017	CI around geomean	0.00158	0.10	0.0081	0.1	Standard
BA04	UA	257	pH (field)	SU	02/05/2016 - 02/19/2021	CI around mean	7.0	6.5/9.0	6.9/7.7	6.5/9	Standard/Standard
BA04	UA	257	Radium-226 + Radium 228, tot	pCi/L	02/05/2016 - 06/26/2017	CI around mean	0.38	20	20	5	Background

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
DUCK CREEK POWER PLANT
BOTTOM ASH BASIN
CANTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
BA04	UA	257	Selenium, total	mg/L	02/05/2016 - 06/26/2017	CI around median	0.001	0.050	0.0023	0.05	Standard
BA04	UA	257	Sulfate, total	mg/L	02/05/2016 - 02/19/2021	CB around linear reg	126	613	613	400	Background
BA04	UA	257	Thallium, total	mg/L	02/05/2016 - 06/26/2017	All ND - Last	0.001	0.002	0.001	0.002	Standard
BA04	UA	257	Total Dissolved Solids	mg/L	02/05/2016 - 02/19/2021	CB around T-S line	572	2240	2240	1200	Background

Notes:
Potential exceedance of GWPS (note: No potential exceedances were determined based on data collected from 2015 through 2021)
HSU = hydrostratigraphic unit:
BR = bedrock
UA = uppermost aquifer
UA/PMP = uppermost aquifer/potential migration pathway
Program = regulatory program data were collected under:
257 = 40 C.F.R. Part 257 Subpart D (Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments)
845 = 35 I.A.C. Part 845 (Sampling events completed to assess well locations for inclusion in the Part 845 monitoring well network)
mg/L = milligrams per liter
pCi/L = picocuries per liter
SU = standard units
Statistical Calculation = method used to calculate the statistical result:
All ND - Last = All results were below the reporting limit, and the last determined reporting limit is shown
CB around linear reg = Confidence band around linear regression
CB around T-S line = Confidence band around Thiel-Sen line
CI around geomean = Confidence interval around the geometric mean
CI around mean = Confidence interval around the mean
CI around median = Confidence interval around the median
Future median = Median of the three most recent samples
Most recent sample = Result for the most recently collected sample used due to insufficient data
Statistical Result = calculated in accordance with Statistical Analysis Plan using constituent concentrations observed at monitoring well during all sampling events within the specified date range
For pH, the values presented are the lower / upper limits
GWPS = Groundwater Protection Standard
GWPS Source:
Standard = standard specified in 35 I.A.C. § 845.600(a)(1)
Background = background concentration (see cover page for additional information)