Luminant

Dynegy Midwest Generation, 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: Baldwin Power Plant Bottom Ash Pond (IEPA ID W1578510001-06) Annual Consolidated Report

Dear Mr. LeCrone:

In accordance with 35 IAC § 845.550, Dynegy Midwest Generation, LLC (DMG) is submitting the annual consolidated report for the Baldwin Power Plant Bottom Ash Pond (IEPA ID W1578510001-06), as enclosed.

Sincerely,

Phil Morris
Senior Environmental Director

Enclosures

Annual Consolidated Report
Dynegy Midwest Generation, LLC
Baldwin Power Plant
Bottom Ash Pond; IEPA **ID W1578510001-06**

In accordance with 35 IAC § 845.550, Dynegy Midwest Generation, LLC (DMG) has prepared the annual consolidated report. The report is provided in three sections as follows:

<u>Section 1</u>
1) Annual CCR fugitive dust control report (Section 845.500(c))

<u>Section 2</u>
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.

<u>Section 3</u>
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

Baldwin Power Plant

Prepared for:

Luminant

Dynegy Midwest Generation, LLC

Baldwin Power Plant
10901 Baldwin Rd
Baldwin, IL 62217

December 2021

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

Completed by: John G Cooly — Plant Manager

Name — Title

This Annual CCR Fugitive Dust Control Report has been prepared for the Baldwin 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 Baldwin 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	Wet management of CCR bottom ash and CCR fly ash in CCR surface impoundments.
	Apply water and/or apply dust suppressant to areas of exposed CCR in CCR units, as necessary.
	Naturally occurring grass vegetation in areas of exposed CCR in CCR surface impoundments.
	Reduce or halt operations during high wind events as necessary.
Handling of CCR at the facility	Wet sluice CCR bottom ash and fly ash to CCR surface impoundments.
	Pneumatically convey dry CCR fly ash and CCR FGD materials to storage silos in an enclosed system.
	CCR scrubber ash to be emplaced in offsite third-party owned/operated landfill is conditioned before loading into trucks for transport to the landfill.
	Water is added to CCR fly ash at the loadout silos for on-site transport in a partially enclosed area.
	Load CCR transport trucks from the CCR fly ash and CCR FGD materials silos in a partially enclosed area.

CCR Activity	Actions Taken to Control CCR Fugitive Dust
Handling of CCR at the facility	Load CCR transport trucks from the CCR fly ash silos using a telescoping chute.
	Transfer CCR dry fly ash into rail cars using a railcar loading spout and associated dust filter collection system.
	Perform housekeeping, as necessary, in the fly ash loading area.
	Operate fly ash and CCR FGD materials handling system in accordance with good operating practices.
	Maintain and repair as necessary dust controls on the CCR fly ash handling system and the CCR fly ash rail load-out system.
	Reduce or halt operations during high wind events as necessary.
Transportation of CCR at the facility for onsite and offsite disposal	CCR fly ash to be transported offsite may be loaded into a fully-enclosed truck.
	Water is added to CCR fly ash at the loadout for on-site transport.
	CCR scrubber ash to be emplaced in offsite third-party owned/operated landfill is conditioned before loading into trucks for transport to the landfill.
	Cover or enclose trucks used to transport CCR material, as necessary.
	Limit the speed of vehicles to no more than 15 mph on facility roads.
	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. This included application of water on areas outside the silos and on unpaved roads. The addition of a chemical dust suppressant in June and September was used in anticipation of increased vehicle travel on limited unpaved roads. The old East/East and West FA ponds are closed, capped and have vegetation now. A revision to control measures was identified in the Plan and included reducing or halting operations during high wind events.

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.

Section 2 Record of Citizen Complaints

No citizen complaints were received regarding CCR fugitive dust at Baldwin Power Station 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	Baldwin Energy Complex Randolph County, Illinois 62217 11/3/2021
Operator Name / Address	Luminant Generation Company LLC 6555 Sierra Drive, Irving, TX 75039
CCR unit	Bottom Ash Pond

INSPECTION REPORT 35 IAC § 845.540 Date of Inspection 11/3/2021	
(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, the only change to the geometry of the structure was an approximate 18" raise of the emergency spillway crest elevation to provide additional freeboard for a design storm event.
(b)(2)(B) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection	See the attached.
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 5900 acre-feet
(b)(2)(E) The approximate volume of the impounded water and CCR contained in the unit at the time of the inspection.	Approximately 1800 acre-feet
(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 11/3/2021	
(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.

LICENSED PROFESSIONAL ENGINEER
JAMES P. KNUTELSKI
062-054206
OF ILLINOIS

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

Site Name:	Baldwin Energy Complex
CCR Unit:	Bottom Ash Pond

35 IAC § 845.540 (b)(2)(B)		
Instrument ID #	Type	Maximum recorded reading since previous annual inspection (ft)
P003	Piezometer	abandoned
P006	Piezometer	abandoned
P007	Piezometer	434.8'

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		418			20	
CCR	415		460	17		62

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October 13, 2021

Dynegy Midwest Generation, LLC
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

**Subject: USEPA CCR Rule and IEPA Part 845 Rule Applicability Cross-Reference
2021 USEPA CCR Rule Periodic Certification Report
Bottom Ash Pond, Baldwin Power Plant, Baldwin, Illinois**

At the request of Dynegy Midwest Generation, LLC (Dynegy), 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 9 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	§257.73 (a)(2)	Hazard Potential Classification	845.440	Hazard Potential Classification Assessment[3]
4	§257.73 (c)(1)	History of Construction	845.220(a)	Design and Construction Plans (Construction History)
5	§257.73 (d)(1)	Structural Stability Assessment	845.450 (a) and (c)	Structural Stability Assessment
6	§257.73 (e)(1)	Safety Factor Assessment	845.460 (a-b)	Safety Factor Assessment
7	§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.*
[3] "Significant" and "High" hazard, per the CCR Rule[1], are equivalent to Class II and Class I hazard potential, respectively, per Part 845[2].

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,

Thomas Ward, P.E.
Senior Engineer

John Seymour, P.E.
Senior Principal

2021 USEPA CCR RULE PERIODIC CERTIFICATION REPORT §257.73(a)(2), (c), (d[1]), (e) and §257.82 BOTTOM ASH POND Baldwin Power Plant Baldwin, Illinois

Submitted to

Dynegy Midwest Generation, LLC

1500 Eastport Plaza Drive
Collinsville, Illinois 62234

Submitted by

Geosyntec consultants

engineers | scientists | innovators

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

October 13, 2021

[1] Except for §257.73(d)(1)(vi).

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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 Pond (BAP) at the Baldwin Power Plant (BPP)[2] 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 certifications for existing CCR surface impoundments, completed in 2016 and subsequently posted on Dynegy Midwest Generation, LLC (DMG) CCR Website ([2], [3], [4], [5], [6], [7]) be updated on a five-year basis.

The initial certification reports developed in 2016 and 2017 were independently reviewed by Geosyntec ([2], [3], [4], [5], [6], [7], [8], [9]). Additionally, field observations, interviews with plant staff, updated engineering analyses, and evaluations were performed to compare conditions in 2021 at the BAP relative to the 2016 and 2017 initial certifications. These tasks determined that updates are not required for the Initial Hazard Potential Classification. However, due to changes at the site and technical review comments, updates were required and were performed for the:

- History of Construction Report,
- Initial Structural Stability Assessment,
- Initial Safety Factor Assessment, and
- Initial Inflow Design Flood Control System Plan.

Geosyntec's evaluations of the initial certification reports and updated analyses identified that the BAP meets all requirements for hazard potential classification, history of construction reporting, structural stability assessment, safety factor assessment, and inflow design flood control system plan with the exception of the structural integrity of hydraulic structures (§257.73(d)(1)(vi)), which was not included in the scope of this report. **Table 1** provides a summary of the initial 2016 certifications and the updated 2021 periodic certifications.

[2] The BAP is also referred to as ID Number W1578510001-06, Bottom Ash Pond by the Illinois Environmental Protection Agency (IEPA); CCR unit ID 601 by DMG; and IL50721 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 BAP.

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	Yes	Impoundment was determined to have Significant hazard potential classification [2].	Yes	No changes were identified that may affect this requirement.
History of Construction						
5	§257.73(c)(1)	Compile a history of construction	Yes	A history of Construction report was prepared for the BAP [4].	Yes	A letter listing updates to the History of Construction report is provided in **Attachment C**.
Structural Stability Assessment						
6	§257.73(d)(1)(i)	Stable foundations and abutments	Yes	Foundations and abutments were found to be stable [9].	Yes	Foundations and abutments were found to be stable after performing updated slope stability analyses.
	§257.73(d)(1)(ii)	Adequate slope protection	Yes	Slope protection was adequate [9].	Yes	No changes were identified that may affect this requirement.
	§257.73(d)(1)(iii)	Sufficiency of dike compaction	Yes	Dike compaction was sufficient for expected ranges in loading conditions [9].	Yes	Dike compaction was found to be sufficient after performing updated slope stability analyses.
	§257.73(d)(1)(iv)	Presence and condition of slope vegetation	Yes	Vegetation was present on exterior and interior slopes and is maintained.) [9].	Yes	No changes were identified that may affect this requirement.
	§257.73(d)(1)(v)(A) and (B)	Adequacy of spillway design and management	Yes	Spillways were adequately designed and constructed and were expected to adequately manage flow during 1,000-year flood [9].	Yes	Spillways were found to be adequately designed and constructed and are expected to adequately manage flow during the 1,000-year flood, after performing updated hydrologic and hydraulic analyses.
	§257.73(d)(1)(vi)	Structural integrity of hydraulic structures	Yes	Two CCTV inspections were performed. Overall, the investigation found the HDPE outflow pipe to be free of deterioration and deformation, and that deterioration. Operational and maintenance procedures are appropriate for maintaining the spillway. This inspection was approved via the full certification report [9].	Periodic certification of §257.73(d)(1)(vi) was not included in the scope of this report.	
	§257.73(d)(1)(vii)	Stability of downstream slopes inundated by water body.	Not Applicable	Inundation of exterior slopes was not expected; this requirement was not applicable [9].	Not Applicable	No changes were identified that may affect this requirement.
Safety Factor Assessment						
7	§257.73(e)(1)(i)	Maximum storage pool safety factor must be at least 1.50	Yes	Safety factors were calculated to be 2.04 [6].	Yes	Safety factors from updated slope stability analyses were calculated to be 2.04.
	§257.73(e)(1)(ii)	Maximum surcharge pool safety factor must be at least 1.40	Yes	Safety factors were calculated to be 2.04 [6].	Yes	Safety factors from updated slope stability analyses were calculated to be 2.04.
	§257.73(e)(1)(iii)	Seismic safety factor must be at least 1.00	Yes	Safety factors were calculated to be 1.44 [6].	Yes	Safety factors from updated slope stability analyses were calculated to be 1.45.
	§257.73(e)(1)(iv)	For dike construction of soils that have susceptible to liquefaction, safety factor must be at least 1.20	Not Applicable	Dike soils were not susceptible to liquefaction [6].	Not Applicable	No changes were identified that may affect this requirement.
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 1,000-year, 24-hour, Inflow Design Flood [9].	Yes	The flood control system was found to adequately manage inflow and peak discharge during the 1,000-year, 24-hour, Inflow Design Flood, after performing updated hydrologic and hydraulic analyses.
	§257.82(b)	Discharge from CCR Unit	Yes	Discharges from the BAP was routed through a NPDES-permitted outflow during both normal and 1,000-eyar, 24-hour Inflow Design Flood conditions [7].	Yes	Discharges from the BAP was routed through a NPDES-permitted outflow during both normal and 1,000-eyar, 24-hour Inflow Design Flood conditions.

SECTION 1

INTRODUCTION AND BACKGROUND

This Periodic United States Environmental Protection Agency (USPA) 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 Pond (BAP) at the Baldwin Power Plant (BPP), also known as the Baldwin Energy Complex (BEC)< located at 10901 Baldwin Rd in Baldwin, Illinois, 62217. The location of Baldwin Power Plant is provided in **Figure 1**, and a site plan showing the location of the BAP and the closed Fly Ash Pond System (FAPS), is provided in **Figure 2**. FAPS consists of the West Fly Ash Pond, Old East Ash Pond, and East Ash Pond (WFAP, OEAP, and EAP).

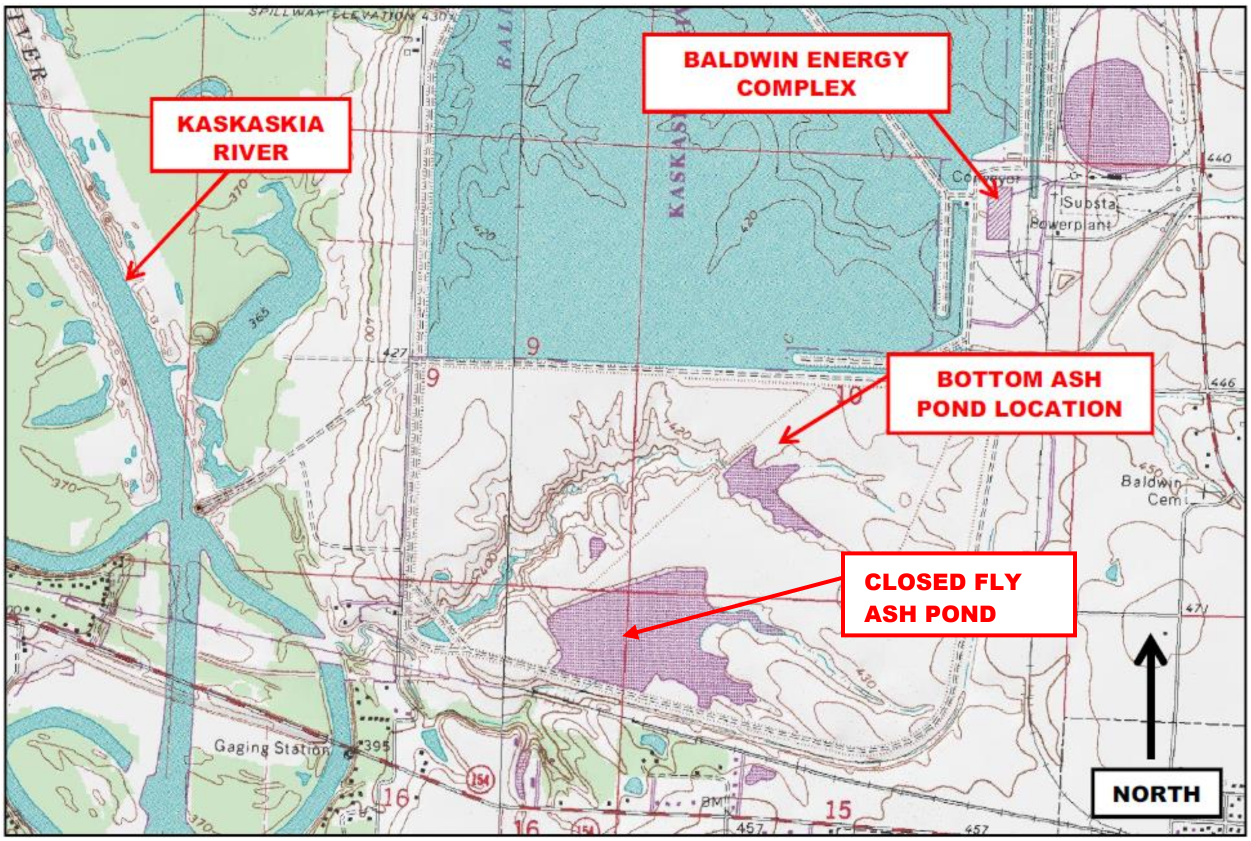

Figure 1 – Baldwin Power Plant Location Map (adapted from AECOM, 2016)

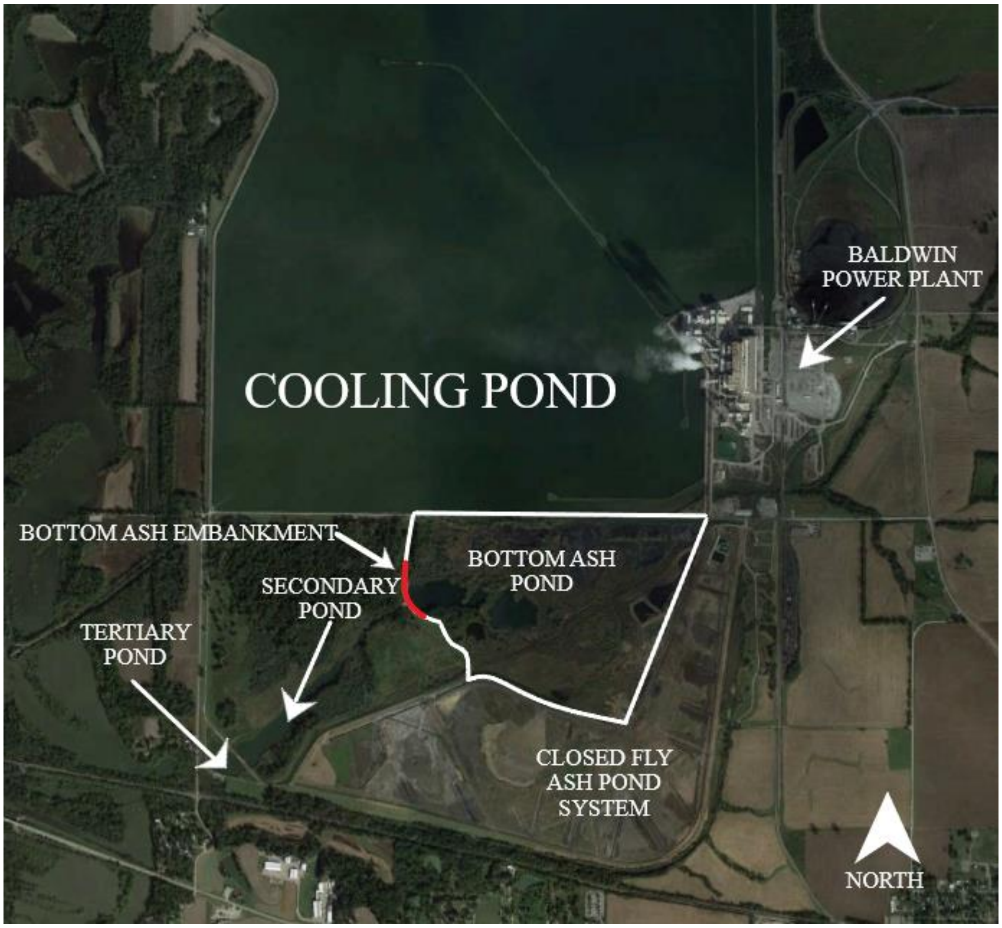

Figure 2 – Baldwin Power Plant Site Plan (adapted from Google Earth Pro, October, 2018)

1.1 BAP Description

The BAP serves as the primary wet impoundment for sluiced bottom ash, stacked fly ash, and other non-CCR wastewaters produced by the Baldwin Power Plant. Ash within Baldwin Power Plant is produced via three power units (U1, U2, and U3). The limits of the BAP, as well as the BAP embankment, are shown on **Figure 2**.

The BAP has three separate spillway/outfall structures: a riser pipe and drop inlet spillway used during normal operations, and a pump station and an emergency overflow spillway, which are used during high water conditions. Under normal conditions, clear water discharge from the BAP was routed through a 30-inch diameter, high-density polyethylene (HDPE) riser pipe and drop inlet spillway, with an invert elevation of 414.8 ft, to the non-CCR Secondary Pond. The Secondary Pond then drains to the non-CCR Tertiary Pond and ultimately to the Kaskaskia River via the site's NPDES- permitted outfall, which is located beyond the Tertiary Pond [9]. The BAP discharge pipe is installed at a 0.5% slope within the BAP embankment, with seepage collars. A metal walkway structure and debris screen are located directly over the invert of the riser.

The BAP is also fitted with an emergency pumping station, which was made to divert clear water from the impoundment to the Cooling Pond (a non-CCR surface impoundment) north of the BAP during heavy rainfall events [9]. The pumping station contains four pumps, two of which turn on at elevation 417.4 ft and two of which turn on at elevation 417.6 ft. The pumps turn off again when the water level in the impoundment drops to 417.2 ft. These pumps have the capacity to divert clear water to the Cooling Pond at a rate of approximately 12,350 gallons per minute. A portion of the BAP embankment crest also serves as a riprap-lined emergency spillway with a bottom width of 36 ft and an invert elevation of 417.7 ft.

The majority of the BAP interior, which is approximately 175 acres in size, is covered with stacked bottom ash and vegetation. Several interior ponding areas exist within the footprint of the BAP, but all drain to and are ultimately impounded by the BAP embankment. As currently operated, the maximum operating pool elevation of the BAP is 415.2 ft, as controlled by the spillway and plant process flow volume into the BAP. The crest length of the BAP embankment is approximately 450 ft, and the crest elevation ranges from a minimum of 417.7 ft at the emergency spillway to a maximum of 421 ft at the right abutment. Outside of the emergency spillway, the minimum crest elevation is 420.0 ft. The crest width of the embankment is approximately 30 ft and the crest height is up to 20 ft above the surrounding grade. The upstream slopes have orientations ranging from 1H:1V (horizontal to vertical) to 4H:1V and the downstream slopes have a typical orientation of 3H:1V.

Initial certifications for the BAP for Hazard Potential Classification (§257.73(a)(2)), History of Construction (§257.73(c)), Structural Stability Assessment (§257.73(d)), Safety Factor Assessment (§257.73(e)(1)), and Inflow Design Flood Control System Plan (§257.82) were completed by Stantec and AECOM in 2016 and 2017 and subsequently posted to DMG's CCR Website ([2], [3], [4], [5], [6], [7]). Additional documentation for the initial certifications included a detailed operating record reports containing calculations and other information prepared for the hazard potential classification by Stantec [8] and for the structural stability assessment, safety factor assessment, and inflow design flood control system plan by AECOM [9]. These operating record reports were not posted to DMG's CCR Website.

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 2020/2021, when data for the periodic certification was obtained, and evaluate if updates are required to the:
    - §257.73(a)(2) Hazard Potential Classification [2];
    - §257.73(c) History of Construction [4];
    - §257.73(d) Structural Stability Assessment [5];
    - §257.73(e) Safety Factor Assessment [6], and/or

  - §257.82 Inflow Design Flood Control System Plan [7].

- Independently review the Hazard Potential Classification ([2], [8]), Emergency Action Plan [3], Structural Stability Assessment ([5], [9]), Safety Factor Assessment ([6], [9]), and Inflow Design Flood Control System Plan ([7], [9]) reports to determine if updates may be required based on technical considerations.

  - The History of Construction report [4] was not independently reviewed for technical considerations, as this report contained historical information primarily developed prior to promulgation of the CCR Rule [1] for the CCR units at Baldwin Power Plant , and did not include calculations or other information used to certify performance and/or integrity of the impoundments under §257.73(a)(2)-(3), §257.73(c)-(e), or §257.82.

- Confirm that the BAP meets all of the requirements associated with §257.73(a)(2)-(3), (c), (d), (e), and §257.82, or, if the BAP 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 BAP between the start of the initial CCR certification program in 2015 and 2016 (initial conditions) and subsequent collection of periodic certification site data in 2020 and 2021 (periodic conditions).

2.2 Review of Annual Inspection Reports

Annual onsite inspections for the BAP were performed between 2016 and 2020 ([10], [11], [12], [13]) were certified by a licensed professional engineer in accordance with §257.83(b). Each inspection report stated 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;
- Information on maximum recorded instrumentation readings and water levels;
- 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; and
- 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 BAP between 2015 and 2020. No signs of instability, structural weakness, or changes which may have affected the operation or stability of the BAP were noted in the inspection reports.

2.3 Review of Instrumentation Data

Three piezometers, BAL-P001, BAL-P002, and BAL-P007 are present at the BAP and were monitored monthly by DMG between August 14, 2015 and May 19, 2021 [14]. Geosyntec reviewed the piezometer data to evaluate if significant fluctuations, partially increases in phreatic levels, may have occurred between development of the initial structural stability and factor of safety certifications ([9], [5], [6]) and May 19, 2021. Available piezometer readings are plotted in **Attachment A**.

In summary, only minor changes in phreatic conditions were observed in the available piezometric data. The phreatic level typically varied by less than five feet for these piezometers. These changes do not indicate significantly different phreatic levels than those utilized for the initial structural stability and factor of safety certifications ([9], [5], [6]).

2.4 Comparison of Initial to Periodic Surveys

The initial survey of the BAP, conducted by Weaver Consultants (Weaver) in 2015 [15], was compared to the periodic survey of the BAP, conducted by IngenAE, LLC (IngenAE) in 2020 [16], using AutoCAD Civil3D 2021 software. This comparison quantified changes in the volume of CCR placed within the BAP and considered volumetric changes above and below the starting water surface elevation (SWSE) used for the 2016 §257.82 inflow design flood control plan hydraulic analysis [9]. Potential changes to embankment geometry were also evaluated. This comparison is presented in a side-by-side comparison of the surveys in **Drawing 1** and a plan view isopach map denoting changes in ground surface elevation in **Drawing 1**. A summary of the water elevations and changes in CCR volumes is provided in **Table 2**.

Table 2 – Initial to Periodic Survey Comparison

Initial Surveyed Pool Elevation (ft)	415.32
Periodic Surveyed Pool Elevation (ft)	415.23
Initial §257.82 Starting Water Surface Elevation (SWSE) (ft)	415.80
Total Change in CCR Volume (CY)	+99,648 (fill)
Change in CCR Volume Above Initial SWSE (CY)	+82,731 (fill)
Change in CCR Volume Below Initial SWSE (CY)	+16,916 (fill)

The comparison indicated that approximately 99,600 CY of CCR was placed in the BAP between the initial and periodic surveys, thereby leading to a potential for the peak water surface elevation (PWSE) to increase during the inflow design 1,000-year flood event. Bottom ash was excavated for beneficial use in the closure construction for the FAPS from September 2016 to October 2020, which is indicated in the cut/fill volumes of 258,761/358,409 CY. The minimum crest elevation of the embankment dike appeared to have changed from El. 419 ft to El. 418 ft in the periodic survey, although the embankment crest was subsequently increased to El. 420 ft by the BPP in October of 2021. No other significant changes to embankment geometry appeared to have occurred between the initial and periodic surveys.

2.5 Comparison of Initial to Periodic Aerial Photography

Initial aerial photographs of the BAP collected by Weaver in 2015 [15] were compared to periodic aerial photographs collected by IngenAE in 2020 [16] to visually evaluate if potential site changes (i.e., changes to the embankment, outlet structures, limits of CCR, other appurtenances) may have occurred. A comparison of these aerial photographs is provided in **Drawing 3**, and the following changes were identified:

- Adjacent CCR surface impoundments within the FAPS, consisting of the Old East Ash Pond, East Ash Pond, and West Fly Ash Pond (OEAP, EAP, and WFAP) were closed.

- CCR was removed from the BAP for beneficial use.

- Non-contact stormwater discharge from post-closure the FAPS is now directed to the southern portion of the BAP through a 60-inch diameter reinforced concrete pipe (RCP).

2.6 Comparison of Initial to Periodic Site Visits

An initial site visit to the BAP was conducted by AECOM in 2015 and documented with a Site Visit Summary and corresponding photographs [17]. A periodic site visit was conducted by Mr. Thomas Ward P.E. of Geosyntec on May 21, 2021 and a follow-up site visit was performed by Mr. Ward on October 12, 2021. The site visit was intended to evaluate potential changes at the site since the initial certifications were prepared (i.e., modification to the embankment, outlet structures or other appurtenances, limits of CCR, maintenance programs, repairs), in addition to performing visual observations of the BAP to evaluate if the structural stability requirements (§257.73(d)) were still met. The stie visit included walking the perimeter of the BAP, visually observing conditions, recording filed notes, and collecting photographs. The site visit is documented in a photographic log provided in **Attachment B**. A summary of significant findings from the periodic site visit is provided below:

- Maintenance and operational conditions appeared similar between 2015 and 2021.

- No signs of structural instability were noted. Visual observations did not indicate insufficient slope vegetation and protection, compaction or instability at the dikes or abutments, sudden drawdown instability, or spillway erosion.

- The FAPS originally discharged to the BAP through a 6-inch pump and pipe system from the WFAP. Modifications to the BAP were observed including altering the inflow from the FAPS to a new 60-inch diameter RCP culvert as part of the FAPS closure construction and construction of a berm along the western hauling road for placement of fly ash and ash from economizer hoppers. Additionally, additional outfalls have been constructed that do not discharge to the BAP.

- DMG raised the crest elevation of the BAP perimeter dike to El. 420 ft in October of 2021. The dike raise included placing up to 2 ft of compacted crushed stone fill to a width of approximately 20 ft. The existing emergency spillway was left in-place (i.e. not modified) during this dike raise. Geosyntec conducted a site visit during the construction on October 12, 2021 and DMG provided photographs of the completed raise on October 13, 2021. DMG confirmed that the raise was completed to El. 420 ft and that the emergency spillway was not modified. Photographs of this raise are also provided in **Attachment B**.

2.7 Interview with Power Plant Staff

An interview with Ms. Kim Edmiaston of the BPP was conducted by Mr. Thomas W. Ward P.E. of Geosyntec on May 21, 2021. Ms. Kim Edmiaston was employed at Baldwin Power Plant between 2015 and 2021. The interview included a discussion of included a discussion of potential changes that that may have occurred at the BAP since development of the initial certifications ([2], [3], [4], [5], [6], [7]). A separate discussion was held on June 14, 2021 for the FAPS as it pertains to the certification of the BAP. A summary of the interview is provided below.

- Were any construction projects completed for the BAP since 2015, and, if so, are design drawings and/or details available?
  - Inflow from the FAPS is now going through a 60-inch diameter culvert and some flow is being directed to the Secondary Pond downstream of the BAP. Drawings are readily available.
  - A berm was constructed in 2021 for the BAP to separate Econ/SCR/Air Heater Ash from production Fly Ash. These materials are now being placed in the Bottom Ash Pond. This design was constructed onsite in 2020 and is located perpendicular to the Eastern perimeter of the Bottom Ash Pond.
- Were there any changes to the purpose of the BAP since 2015?
  - U3 was retired in [October] 2016 and is no longer generating ash. Fly Ash from U1 and U2 is now placed along the southern portion of the Eastern perimeter dike of the BAP by truck. Sluice lines still deposit Econ/SCR/Air Heater ash in the same area and is dipped/stacked along the midpoint of the Eastern perimeter dike of the BAP. No changes to U1 or U2 bottom ash slag area.
- Were there any changes to the to the instrumentation program and/or physical instruments for the BAP since 2015?
  - Yes, piezometers BAL-P003, BAL-P006, and BAL-P013, located between the FAPS and BAP, were abandoned as part of the FAPS closure construction.
- Have area-capacity curves for the BAP been prepared since 2015?
  - No.
- Were there any changes to spillways and/or diversion features for the BAP completed since 2015?

  - No.

- Were there any changes to spillways and/or diversion features for the BAP completed since 2015?
  - No.

- Were there any instances of dike and/or structural instability for the BAP since 2015?
  - No.

SECTION 3

HAZARD POTENTIAL CLASSIFICATION - §257.73(a)(2)

3.1 Overview of Initial HPC

The Initial Hazard Potential Classification (Initial HPC) was prepared by Stantec Consulting Services, Inc. (Stantec) in 2016 ([2], [8]), following the requirements of §257.73(a)(2). The Initial HPC included the following information:

- Performing a visual analysis to evaluate potential hazards associated with a breach failure along the west face of the BAP, and the southwest face of the tertiary pond. Locations were based on locations of nearby downstream structures and locations typically occupied by people.

- Evaluation of potential breach flow paths were evaluated using elevation data and aerial imagery to evaluate potential impacts to downstream structures, infrastructure, frequently occupied facilities/areas, and waterways [2].

- While a breach map is not included within the Initial HPC, it is included within the §257.73(a)(3) Initial Emergency Action Plan (Initial EmAP) [3].

The visual analysis indicated that none of the breach scenarios appeared to impact occupied structures, although a breach of the east embankment could impact Conservation Road from overland flow traveling south and west with discharge to the Kaskaskia River. The Initial HPC concluded that neither breach would be likely to result in a probable loss of human life, although the breach could cause CCR to be released into the Kaskaskia River, thereby causing environmental damage. The Initial HPC therefore recommended a "Significant" hazard potential classification for the BAP [2].

3.2 Review of Initial HPC

Geosyntec performed a review of the Initial HPC, in terms of technical approach, input parameters, assessment of the results, and applicable requirements of the CCR Rule [1]. No significant technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations was not performed.

Geosyntec performed a review of the Initial HPC ([2], [8]), in terms of technical approach, input parameters, and assessment of the results. The review included the following tasks:

- Review of all report documentation and figures

- Check that correct CCR Rule guidance is referenced and adhered to

- Review of appropriate failure mode selections
- Review for changes to the site and surrounding area
- Review that appropriate breach analysis methodology, model software, and inputs were utilized
- Check that selected HPC is appropriate per results of the breach analysis

No significant technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations was not performed.

3.3 Summary of Site Changes Affecting the Initial HPC

Geosyntec did not identify any changes at the site that may affect the HPC. No new structures, infrastructure, frequently occupied facilities/areas, or waterways were present in the probable breach area indicated in the Initial EmAP [3]. Additionally, no significant changes to the topography in the probable breach were identified.

3.4 Periodic HPC

Geosyntec recommends retaining the "Significant" hazard potential classification for the BAP, per §257.73(A)(2), based on the lack of site changes potentially affecting the Initial HPC occurring since the initial HPC was developed, as described in **Section 3.3**, and the lack of significant review comments, as described in **Section 3.2**. Updates to the Initial HPC reports ([2], [8]) are not recommended at this time.

SECTION 4

HISTORY OF CONSTRUCTION REPORT - §257.73(c)

4.1 Overview of Initial HoC

The Initial History of Construction report (Initial HoC) was prepared by AECOM in 2016 [4], following the requirements of §257.73(c), and included information on all CCR surface impoundments at Baldwin Power Plant. The Initial HoC included the following information for each CCR surface impoundment:

- The name and address of the owner/operator,
- Location maps,
- Statements of purpose,
- The names and size of the surrounding watershed,
- A description of the foundation and abutment materials,
- A description of the dike materials,
- Approximate dates and stages of construction,
- Available design and engineering drawings,
- A summary of instrumentation,
- A statement that area-capacity curves are not available,
- Information on spillway structures,
- Construction specifications,
- Inspection and surveillance plans,
- Information on operational and maintenance procedures, and
- A statement that historical structural instability had not occurred at any of the CCR surface impoundments.

4.2 Summary of Site Affecting the Initial HoC

Several changes at the site that occurred after development of the initial HoC report were identified. These changes required updates to the HoC report. Each change and the corresponding updates to the HoC report [4] are described below:

- A state identification number (ID) W1578510001-06 was assigned to the BAP by the Illinois Environmental Protection Agency (IEPA).
- A revised area-capacity curve and spillway design calculations for the BAP were prepared as part of the updated periodic Inflow Design Flood Control System Plan, as described in **Section 7.4**.
- The minimum crest elevation of the BAP perimeter dike was increased to El. 420.0 ft in October 2021.

SECTION 5

STRUCTURAL STABILITY ASSESSMENT - §257.73(d)

5.1 Overview of Initial SSA

The Initial Structural Stability Assessment (Initial SSA) was prepared by AECOM in 2016 ([5], [9]), following the requirements of §257.73(d)(1), and included the following evaluations:

- Stability of dike foundations, dike abutments, slope protection, dike compaction, and slope vegetation; and
- Spillway stability including capacity, structural stability and integrity.

The Initial SSA concluded that the structural stability requirements for §257.73(d)(1)(vii) were not applicable for the BAP, and the BAP met all requirements for§257.73(d)(1)(i)-(vi).

The Initial SSA referenced the results of the Initial Structural Factor Assessment (Initial SFA) ([6], [9]) to demonstrate stability of the stability of foundations and abutments (§257.73(d)(1)(i)) and sufficiency of dike compaction (§257.73(d)(1)(iii)) portions of the SSA criteria. This included stating that slope stability analyses for slip surfaces passing through the foundation met or exceeded the criteria listed in §257.73(e)(1), for the stability of foundations and abutments. For the sufficiency of dike compaction, this included stating that slope stability analyses for slip surfaces passing through the dike also met or exceeded the §257.73(e)(1) criteria.

5.2 Review of Initial SSA

Geosyntec performed a review of the Initial SSA ([5], [9]) in terms of technical approach, calculation input parameters and methodology, recommendations, and completeness. The review included the following tasks:

- Reviewing photographs collected in 2015 and used to demonstrate compliance with §257.73(d)(1)(i)-(vii),
- Reviewing geotechnical calculations used to demonstrate the stability of foundations, per §257.73(d)(1)(i) and sufficiency of dike compaction, per §257.73(d)(1)(iii). Supporting geotechnical investigation and testing data, input parameters, analysis methodology, selection of critical cross-sections, and loading conditions,
- Review of the methodology used to demonstrate that a downstream water body that could induce a sudden drawdown condition, per §257.73(d)(1)(vii), is not present, and

- Completeness and technical approach of closed-circuit television (CCTV) inspections used to evaluate the stability of hydraulic structures, per §257.73(d)(1)(vi).

No significant technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations was not performed.

5.3 Summary of Site Changes Affecting the Initial SSA

A number of changes at the site that occurred after development of the Initial SSA were identified. These changes required updates to the Initial SSA and are described below:

- The Initial SSA utilized the results of the Initial Inflow Design Flood Control System Plan (IDF) to demonstrate compliance with the adequacy of spillway design and management (§257.73(d)(1)(v)(A)-(B)). The Initial IDF was subsequently updated to develop a Periodic IDF, based on site changes, as discussed in **Section 7**.

- The Initial SSA utilized the slope stability analysis results of the Initial Safety Factor Assessment (SFA) as part of the compliance demonstration for the stability of foundations and abutments (§257.73(d)(1)(i)) and sufficiency of dike compaction (§257.73(d)(1)(iii)) as discussed in **Section 5.1**. The Initial SFA slope stability analyses were subsequently updated to develop a Periodic SFA, based on site changes, as discussed in **Section 6**.

- No known inspections of the spillway culvert have been completed since 2016. Therefore, the condition of the interior of the culvert, as it pertains to §257.73(d)(1)(vi), is currently unknown.

- The minimum crest elevation of the BAP perimeter dike was increased to El. 420.0 ft in October 2021 and after development of the Initial SFA.

5.4 Periodic SSA

The Periodic SFA (**Section 6**) indicates that foundations and abutments are stable and dike compaction is sufficient for expected ranges in loading conditions, as slope stability factors of safety were found to meet or exceed the requirements of §257.73(e)(1), including for static maximums storage pool conditions and maximum surcharge pool (i.e., flood) loading conditions. Therefore, the requirements of §257.73(d)(1)(i) and §257.73(d)(1)(iii) are met for the Periodic SSA.

The Periodic IDF (**Section 7**) indicates that spillways are adequately designed and constructed to adequately manage flow during the 1,000-year flood, as the spillways can adequately manage flow during peak discharge from the 1,000-year flood event without overtopping of the embankments. Therefore, the requirements of §257.73(d)(1)(v)(A)-(B) are met for the Periodic SSA. Certification of §257.73(d)(1)(vi) was not included in the scope of this report.

SECTION 6

SAFETY FACTOR ASSESSMENT - §257.73(e)(1)

6.1 Overview of Initial SFA

The Initial Safety Factor Assessment (Initial SFA) was prepared by AECOM in 2016 ([6], [9]), following the requirements of §257.73(e)(1). The Initial SFA included the following information:

- A geotechnical investigation program with in-situ and laboratory testing;
- An assessment of the potential for liquefaction in the dike and foundation soils;
- The development of two slope stability cross-sections for limit equilibrium stability analysis utilizing GeoStudio SLOPE/W software; and
- The analysis of both cross-sections for maximum storage pool, maximum surcharge pool, seismic loading conditions.
    - Liquefaction loading conditions were not evaluated as liquefaction-susceptible soil layers were not identified in either the embankments or foundation soils.

The Initial SFA concluded that the BAP met all safety factor requirements, per §257.73(e), as all calculated safety factors were equal to or higher than the minimum required values.

6.2 Review of Initial SFA

Geosyntec performed a review of the Initial SFA ([6], [9]) in terms of technical approach, calculation input parameters and methodology, recommendations, and completeness. The review included the following tasks:

- Reviewing geotechnical calculations used to demonstrate the acceptable safety factors, per §257.73(e)(1), in terms of:
    - Completeness and adequacy of supporting geotechnical investigation and testing data;
    - Completeness and approach of liquefaction triggering assessments; and
    - Input parameters, analysis methodology, selection of critical cross-sections, and loading conditions utilized for slope stability analyses.
    - Phreatic conditions based on piezometric data collected between August 14, 2021 and May 19, 2021, as discussed in **Section 2.3**.

No significant technical issues were noted within the technical reviewed, although a detailed review (e.g., check) of the calculations was not performed.

6.3 Summary of Site Changes Affecting the Initial SFA

Two changes at the site that occurred after development of the Initial SFA ([6], [9]) were identified. These changes required updates to the Initial SFA and are described below:

- The Periodic IDF (**Section 7)** found that the normal pool elevation within the BAP decreased from El. 415.8 to El. 415.2 ft. This resulted in 0.6 ft decrease of water loading on the embankment dikes than was considered in the Initial SFA for the maximum storage pool and seismic loading conditions (§257.73(e)(1)(i) and (iii)). Peak water surface elevations during the IDF increased from 418.7 to 419.2 ft within the BAP which could have resulted in an additional 0.5 ft of water loading on the embankment dikes than was considered in the Initial SFA for the maximum surcharge pool loading conditions (§257.73(e)(1)(i)).

- Ground surface geometry used in the Initial SFA analyses is based on a crest elevation of 419.0 ft while the minimum crest elevation of the BAP perimeter dike was increased in October 2021 to El. 420.0 ft , after development of the Initial SFA.

6.4 Periodic SFA

Geosyntec revised existing slope stability analyses associated with the Initial SFA ([6], [9]), for the single cross-section previously evaluated to account for site changes, as described in **Section 6.3**. The following approach and input data were used to revise the analyses:

- Ground surface geometry was revised for all the loading conditions, using the 2020 survey to account for the corrected dike crest elevation.

- Water levels in the BAP for the maximum storage pool, and seismic slope stability analysis loading conditions were decreased to El. 415.2, based on the Periodic IDF.

- Water levels in the impoundment for maximum surcharge pool slope stability analysis loading conditions were increased to El. 419.2 ft, as the result of Periodic IDF (**Section 7.4**).

- The October 2021 BAP perimeter dike crest raise was reportedly constructed to El. 420 ft, but the crest in the slope stability model was conservatively assumed to be El. 421 ft to account for potential variations in crest elevation.

- All other analysis input data and settings from the Initial SFA ([6], [9]) were utilized, including, but not limited to, subsurface stratigraphy and soil strengths, phreatic conditions, ground surface geometry, software package and version, slip surface search routines and methods, and input data for the seismic analyses.

Factors of safety from the Periodic SFA are summarized in Table 3 and confirm that the BAP meets the requirements of §257.73(e)(1). Slope stability analysis output associated with the Periodic SFA is provided in **Attachment D**.

Table 3 – Factors of Safety from Periodic SFA

	Structural Stability Assessment (§257.73(d)) and Safety Factor Assessment (§257.73(e))			
Cross-Section	**Maximum Storage Pool §257.73(e)(1)(i) Minimum Required = 1.50**	**Maximum Surcharge Pool[1] §257.73(e)(1)(ii) Minimum Required = 1.40**	**Seismic §257.73(e)(1)(iii) Minimum Required = 1.00**	**Dike Liquefaction §257.73(e)(1)(iv) Minimum Required = 1.20**
(9)	2.00	2.00	1.41	N/A

Notes:
N/A – Loading condition is not applicable.

SECTION 7

INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN - §257.82

7.1 Overview of Initial IDF

The Initial Inflow Design Flood Control System Plan (Initial IDF) was prepared by AECOM in 2016 ([7], [9]) following the requirements of §257.82. The Initial IDF included the following information:

- A hydraulic and hydrologic analysis, performed for the 1,000-year design flood event because of the hazard potential classification of “significant”, which corresponded to 11.2 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 SWSE of 415.8 ft.

The Initial IDF concluded that the BAP met the requirements of §257.82, as the peak water surface estimated by the HydroCAD model was El. 418.7 ft, relative to a minimum BAP dike crest elevation of 419.0 ft. 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 for the BAP was not expected, as all discharge from the BAP during both normal and inflow design flood conditions was expected to be routed through the existing spillway and NDPES-permitted outfall.

7.2 Review of Initial IDF

Geosyntec performed a review of the Initial IDF ([7], [9]) 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 hazard potential classification,

- Reviewing the rainfall depth and distribution for appropriateness,

- Performing a high-level review of the inputs to the hydrological modeling,

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

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

Several review comments were identified during review of the Initial IDF. The comments are described below:

- Hydrologic soil group types for some areas require updates based on conditions observed at BEC.
- The BAP emergency spillway invert elevation was reported to be higher than the elevation included within the hydrologic and hydraulic analysis file.
- Documentation of soil conditions (e.g., via NRCS Web Soil Survey) was not provided.

7.3 Summary of Site Changes Affecting the Initial IDF

For the purposes of this discussion the BAP refers to the sub-catchment immediately upstream of the 30-inch riser structure (and subject to the requirements of §257.82). The "BAP Complex" (also called the BAP interior in Section 1.1) refers to the BAP, the upstream interconnected impoundments (e.g., Middle BAP, Ponding Area 1, etc.), and the downstream interconnected impoundments (e.g., Secondary Pond and Tertiary Pond). The BAP Complex interconnected areas are delineated on Figure E-4 which is provided within Attachment E. Four changes at the site that occurred after development of the Initial IDF were identified. These changes required updates to the Initial IDF and are described below:

- Approximately 83,000 CY of CCR were placed above the Initial SWSE utilized for the Initial IDF certification in the BAP Complex, along with additional topographic changes. The placement of the fill has altered the stage-storage curve for the impoundments and the corresponding tributary areas, relative to the Initial IDF.
- The Fly Ash Pond System (FAPS) was closed, thereby altering the contributing drainage area to the BAP Complex relative to the Initial IDF through the routing of post-closure non-contact stormwater from approximately 32 acres of the FAP directly into the BAP. This stormwater was previously retained within the WFAP and was not previously routed into the BAP.
- As discussed in **Section 2.7**, plant power unit U3 was retired in 2016 and is no longer generating fly ash, thereby reducing the process flows to the BAP Complex relative to the Initial IDF.
- The minimum crest elevation of the BAP perimeter dike was raised to El. 420.0 ft in October 2021, after development of the Initial IDF, thereby increasing the minimum crest elevation by 1-foot relative to the Initial IDF.

7.4 Periodic IDF

Electronic HydroCAD model files associated with the Initial IDF were not available; therefore, Geosyntec recreated the HydroCAD model based on the HydroCAD output report provided in the Initial IDF [9]. The recreated model was checked against values reported in the Initial IDF; peak discharge rates at the BAP agreed within 1 cubic feet per second (cfs) and the PWSE at the BAP were the same.

Geosyntec revised the recreated HydroCAD model described above to account for the additional CCR placement and changes in site conditions as described in **Sections 7.2** and **7.3**. The following approach and input data were used for the revised analyses:

- The reach and pond routing methods were updated from "Storage Indication" to "Dynamic Storage Indication" to better represent the interflow of water between the interconnected ponds within the BAP Complex.
- Sub-catchments were re-delineated based on the 2020 site survey [16]. For simplicity, several sub-catchments were consolidated and/or renamed as described below.
    - "Ponding Area 2" and "Channel 3" were consolidated as "Ponding Area 2";
    - "2011 Berm" and "Channel 1" was consolidated and renamed as "Berm Pond – Exterior";
    - "Channel 2" was renamed as "Berm Pond – Interior"; and
    - "To Channel 3" was renamed as "Southeast Corner".
- A portion of the closed FAPS now drains to Ponding Area 2 (within the BAP Complex). A sub-catchment named "Closed FAP to Ponding Area 2" with the following characteristics was added to the model:
    - An area of 31.8 acres of the closed FAPS was estimated to drain to Ponding Area 2 based on the 2020 as-built survey for the FAPS [18].
    - A land cover of >75% grass cover, good condition, Hydrologic Soil Group (HSG) C [curve number (CN) of 74] was selected to represent the closed FAPS vegetated final cover.
    - The time of concentration (ToC) flow path was estimated based on the 2020 FAPS as-built survey [18].
    - A 60-inch reinforced concrete culvert outlet was set with an upstream invert elevation of 442.2 ft, downstream invert elevation of 434.4 ft, length of 95.5 ft, slope of 0.0818 ft/ft, and Manning's n of 0.011 was added based on the 2020 FAPS as-built survey [18].

- A portion of the closed FAPS now drains to the Secondary Pond (downstream of the BAP Complex). A sub-catchment named "Closed FAP to Secondary Pond" with the following characteristics was added to the model:
  - An area of 58.3 acres of the closed FAPS was estimated to drain to the Secondary Pond based on the as-built survey [18].
  - A land cover of >75% grass cover, good condition, Hydrologic Soil Group (HSG) C [curve number (CN) of 74] was selected to represent the closed FAPS vegetated cover.
  - The ToC flow path was estimated based on the 2020 as-built survey [18].
- The BAP was updated as follows:
  - The stage-storage (i.e., area-capacity) curve for the BAP was updated based on the 2020 site survey [16].
    - A revised stage-volume curve for the BAP was prepared based on measuring the storage volume of the BAP at every one-foot increment of depth from the normal pool elevation (414.8 ft) to a perimeter dike embankment crest elevation of 420.0 ft. This analysis identified an overall increase of 1,300 CY (0.8 ac-ft) of storage volume at the BAP from 2016 to 2021 relative to the SWSE used in the Initial IDF. See **Attachment E** for stage-volume (i.e. area-capacity) curve update figures for comparison with the initial IDF curve.
  - The sub-catchment boundary was updated based on the 2020 site survey [16]; this resulted in a decrease in total area from 47.2 acres to 47.0 acres.
  - The ToC flow path was updated to include 100 ft of sheet flow (dense grass, slope of 0.046 ft/ft) and 528 ft of shallow concentrated flow (short grass pasture, slope of 0.024 ft/ft). This update changed the ToC from 26.1 minutes to 18.2 minutes.
  - The BAP perimeter dike minimum crest elevation was updated from El. 419.0 ft to El. 420.0 ft per its documented October 2021 raise.
  - The SWSE within the BAP was updated from 415.8 ft to 415.2 ft to reflect the 2020 site survey [16] and reduction in process flows due to several power units no longer being operated. Automatic baseflow was selected in HydroCAD to set the baseflow to match the discharge rate at the SWSE.
  - The water surface area at the SWSE was updated from 6.2 acres to 7.7 acres to reflect the 2020 site survey [16].
  - The curve numbers for the BAP drainage areas were updated to reflect hydrologic soil group (HSG) D soils. The Initial IDF considered these areas as HSG C; however, the NRCS soil survey describes these areas as predominately "dumps, mine" and "dumps, slurry" with no HSG rating [19]. A HSG rating of D was selected for conservatism.

This resulted in a change of CN from 86 to 89 for the areas above the SWSE assuming <50% grass cover.

- The emergency spillway elevation was updated from 417.6 ft to 417.7 ft based on 30% Design Drawing C-1035 [20] and the 2020 site survey [16].
- The length of the emergency spillway (i.e., the dimension perpendicular to the direction of flow) was updated from 50 ft to 36 ft based on the 2020 site survey [16].
- The breadth of the emergency spillway (i.e., the dimension parallel to the direction of flow) was updated from 50 ft to 52 ft based on the 2020 site survey [16].
- The 30-inch diameter riser elevation was updated from 414.9 ft to 414.8 ft based on 30% Design Drawing C-1035 [20].

- The Middle BAP (see Figure E-4 in Attachment E for location within BAP Complex) was updated as follows:
  - The stage-storage (i.e., area-capacity) curve for the Middle BAP was updated based on the 2020 site survey [16].
    - A revised stage-volume curve for the Middle BAP was prepared based on measuring the storage volume of the Middle BAP at every one-foot increment of depth from the normal pool elevation (426.0 ft) to an elevation of 430.0 ft. This analysis identified an overall increase of 10,000 CY (6.2 ac-ft) of storage volume at the Middle BAP from 2016 to 2021 relative to the SWSE used in the Initial IDF, in part due to the revised sub-catchment boundary described below.
  - The sub-catchment boundary was updated based on the 2020 site survey [16]; this resulted in an increase in total area from 49.8 acres to 51.8 acres.
  - The ToC flow path was updated to include 100 ft of sheet flow (dense grass, slope of 0.026 ft/ft) and 1,073 ft of shallow concentrated flow (short grass pasture, slope of 0.009 ft/ft). This update changed the ToC from 37.0 minutes to 39.6 minutes.
  - The SWSE within the Middle BAP was updated from 428.3 ft to 426.0 ft to reflect the 2020 site survey [16].
  - The water surface area at the SWSE was updated from 8.2 acres to 7.7 acres to reflect the 2020 site survey [16].
  - The curve numbers for the Middle BAP drainage areas were updated to reflect HSG D soils. The Initial IDF considered these areas as HSG B; however, the NRCS soil survey describes these areas as predominately “Mines, slurries” with no HSG rating. A HSG rating of D was selected for conservatism. This resulted in a change of CN from 79 to 89 for the vegetated areas above the SWSE assuming <50% grass cover.

- The ToC was updated from 37.0 minutes to be direct entry with a total of 6 minutes in accordance with TR-20 [21].
- The broad-crested weir elevation was updated from 428.0 ft to 426.0 ft to reflect the 2020 site survey [16]. The breadth and length of the emergency spillway appear to be generally consistent with the dimensions utilized in the Initial IDF.

- Ponding Area 1 (see Figure E-4 in Attachment E for location within BAP Complex) was updated as follows:
  - The stage-storage (i.e., area-capacity) curve for Ponding Area 1 was updated based on the 2020 site survey [16].
    - A revised stage-volume curve for Ponding Area 1 was prepared based on measuring the storage volume of Ponding Area 1 at every one-foot increment of depth from the normal pool elevation (426.0 ft) to an elevation of 430.0 ft. This analysis identified an overall increase of 3,700 CY (2.3 ac-ft) of storage volume at Ponding Area 1 from 2016 to 2021 relative to the SWSE used in the Initial IDF, in part due to the revised sub-catchment boundary described below.
  - The sub-catchment boundary was updated based on the 2020 site survey [16]; this resulted in an increase in total area from 6.1 acres to 7.0 acres.
  - The broad-crested weir elevation was updated from 429.0 ft to 426.0 ft to reflect the 2020 site survey [16].
  - The SWSE within Ponding Area 1 was updated from 429.0 ft to 426.0 ft to reflect the broad-crested weir elevation.
  - The water surface area was updated from 3.0 acres to 1.4 acres to reflect the 2020 site survey [16].
  - The ToC flow path was updated to include 100 ft of sheet flow (short grass surface, slope of 0.04 ft/ft) and 220 ft of shallow concentrated flow (unpaved surface, slope of 0.004 ft/ft). This update changed the ToC from 15.0 minutes to 10.9 minutes.
- Ponding Area 2 (see Figure E-4 in Attachment E for location within BAP Complex) was updated as follows:
  - The stage-storage (i.e., area-capacity) curve for Ponding Area 2 was updated based on the 2020 site survey [16].
    - A revised stage-volume curve for Ponding Area 2 was prepared based on measuring the storage volume of Ponding Area 2 at every one-foot increment of depth from the overtopping elevation (432.0 ft) to an elevation of 435.0 ft. This analysis identified an overall increase of 19,300 CY (12.0 ac-ft) of storage

volume at Ponding Area 2 from 2016 to 2021 relative to the SWSE used in the Initial IDF, in part due to the revised sub-catchment boundary described below.

- The sub-catchment boundary was updated based on the 2020 site survey [16]; this resulted in an increase in total area from 12.2 acres to 26.8 acres.
- The ToC flow path was updated to include 100 ft of sheet flow (fallow surface, slope of 0.06 ft/ft), 695 ft of shallow concentrated flow (unpaved surface, slope of 0.004 ft/ft), and 715 ft of shallow concentrated flow (unpaved surface, slope of 0.005 ft/ft). This update changed the ToC from 24.9 minutes to 24.5 minutes.

- Berm Pond – Exterior (see Figure E-4 in Attachment E for location within BAP Complex) was updated as follows:
  - A stage-storage (i.e., area-capacity) curve for Berm Pond – Exterior was prepared based on the 2020 site survey [16].
    - A stage-volume curve for Berm Pond – Exterior was prepared based on measuring the storage volume of Berm Pond – Exterior at every one-foot increment of depth from the invert elevation of the 21-inch culverts (442.0 ft) to the overflow elevation of 444.0 ft. A comparison to the Initial IDF cannot be made due to the changes in site topography within this area from 2016 to 2021.
  - The sub-catchment boundary was updated based on the 2020 site survey [16]; this resulted in an increase in total area from 20.5 acres (for the "To 2011 Berm Pond" sub-catchment) to 21.7 acres.
  - The broad-crested weir elevation representing the emergency spillway was updated from 443.5 ft to 444 ft. to reflect the 2020 site survey [16].
  - The ToC was updated from 9.1 minutes (for "2011 Berm Pond") to be direct entry with a total of 6 minutes in accordance with TR-20 [21].
  - A base flow of 6.5 cfs was added to represent process flows from U1 and U2 based on information provided by BPP plant staff.
- Berm Pond – Interior (see Figure E-4 in Attachment E for location within BAP Complex) was updated as follows:
  - A stage-storage (i.e., area-capacity) curve for Berm Pond – Interior was prepared based on the 2020 site survey [16].
    - A stage-volume curve for Berm Pond – Interior was prepared based on measuring the storage volume at every one-foot increment of depth from the bottom pond elevation (448 ft) to the perimeter berm elevation (452 ft) to reflect the 2020 site survey [16]. A comparison to the Initial IDF cannot be made due to the changes in site topography within this area from 2016 to 2021.

- The sub-catchment boundary was updated based on the 2020 site survey [16]; this resulted in a decrease in total area from 9.0 acres (for the "To Channel 2" sub-catchment) to 7.0 acres.

- The water surface area was updated from 4.2 acres to 2.4 acres to reflect the 2020 site survey [16].

- The ToC was updated from 17.0 minutes (for "To Channel 2") to be direct entry with a total of 6 minutes in accordance with TR-20 [21].

- The Southeast Corner (see Figure E-4 in Attachment E for location within BAP Complex) was updated as follows:

  - The ToC flow path was updated to include 100 ft of sheet flow (fallow surface, slope of 0.034 ft/ft), 173 ft of shallow concentrated flow (unpaved surface, slope of 0.003 ft/ft), 226 ft of shallow concentrated flow (unpaved surface, slope of 0.04 ft/ft), 62 ft of shallow concentrated flow (unpaved surface, slope of 0.08 ft/ft), and 287 ft of shallow concentrated flow (unpaved surface, slope of 0.001 ft/ft). This update changed the ToC from 21.1 minutes to 15.1 minutes.

- Upstream of Secondary Pond was updated as follows:

  - The ToC flow path was updated to include 55 ft of sheet flow (woods: light underbrush, slope of 0.03 ft/ft), and 1,183 ft of shallow concentrated flow (woodland, slope of 0.005 ft/ft). This update changed the ToC from 80.7 minutes to 67.0 minutes.

- The Secondary Pond was updated as follows:

  - The water surface area was updated from 11.3 acres to 9.1 acres to reflect the 2020 site survey [16].

  - The curve number for the Secondary Pond drainage areas were updated to reflect HSG C soils. The Initial IDF considered these areas as HSG B; however, the NRCS soil survey describes these areas as HSG C. This resulted in a change of CN from 65 to 76 for the vegetated areas above the SWSE assuming woods/grass combination and fair condition.

- The Tertiary Pond was updated as follows:

  - The water surface area was updated from 2.4 acres to 2.3 acres to reflect the 2020 site survey [16].

  - The curve number for the Tertiary Pond drainage areas were updated to reflect HSG C soils. The Initial IDF considered these areas as HSG B; however, the NRCS soil survey describes these areas as HSG C. This resulted in a change of CN from 79 (for <50% grass cover) to 74 for the vegetated areas above the SWSE assuming >75% grass cover.

- All other input data and settings from the Initial IDF HydroCAD model were utilized, including, but not limited to software package and version, runoff method, pump information (e.g., pump curve, discharge diameter and length, on and off elevations), analysis time span and analysis time step. Additionally, an Antecedent Moisture Condition (AMC) II was selected under rainfall settings in the HydroCAD model.

The results of the Updated IDF are summarized in **Table 4** indicate that the BAP meets the requirements of §257.82(a), as the peak water surface elevation does not exceed the minimum perimeter dike crest elevation. The PWSE presented below assumes that the pumps in the BAP pump station are turned off during the IDF. If the pumps are turned on during the IDF, the PWSE will be less than the elevation presented in **Table 4**.

The results of the Updated IDF Update indicate that the BAP meets the requirements of §257.82(b). Discharge from the BAP Complex is expected to be routed through the existing spillway structures of the Secondary and Tertiary Ponds prior to discharge through the NDPES-permitted outfall during both normal and inflow design flood conditions. Updated area-capacity curves and HydroCAD model output is provided in **Attachment E**.

Table 4 – Water Levels from Updated Periodic IDF

	Bottom Ash Pond		
Analysis	**Starting Water Surface Elevation (ft)**	**Peak Water Surface Elevation (ft)**	**Minimum Dike Crest Elevation (ft)**
Initial IDF	415.8	418.7	419.0
Updated Periodic IDF	415.2	419.2	420.0
Initial to Periodic Change[1]	-0.5	+0.5	+1.0

Notes:
[1]Positive change indicates an increase relative to the Initial IDF; negative change indicates a decrease relative to the Initial IDF.

SECTION 8

CONCLUSIONS

The BAP at Baldwin Power Plant was evaluated relative to the USEPA CCR Rule periodic assessment requirements for:

- Hazard potential classification (§257.73(a)(2)),
- History of Construction reporting (§257.73(d)),
- Structural stability assessment (§257.73(d)), with the exception of §257.73(d)(1)(vi) that was not included in the scope of this report,
- Safety factor assessment (§257.73(e)), and
- Inflow design flood control system planning (§257.82).

Based on the evaluations presented herein, the referenced requirements are satisfied.

SECTION 9

CERTIFICATION STATEMENT

CCR Unit: Dynegy Midwest Generation, LLC, Baldwin Power Plant, Bottom Ash Pond

I, Thomas W. Ward, 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 the hazard potential classification, history of construction report, structural stability, safety factors, and inflow design flood control system planning, dated October 2021, were conducted in accordance with the requirements of 40 CFR §257.73(a)(2), (c), (d), (e), and §257.82, with the exception of §257.73(d)(1)(vi) that was not included in the scope of this certification.

LICENSED PROFESSIONAL ENGINEER
THOMAS WILLIAM WARD
062-069043
STATE OF ILLINOIS

Exp. 11/30/2021

Thomas W. Ward

10/13/21

Date

SECTION 10

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] Stantec Consulting Services, Inc., "Initial Hazard Potential Classification Assessment, EPA Final CCR Rule, Bottom Ash Pond, Baldwin Power Plant, Randolph County, Illinois," Fenton, MO, October 12, 2016.

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[4] AECOM, "History of Construction, USEPA Final CCR Rule, Baldwin Power Plant, Baldwin, Illinois," October 2016.

[5] AECOM, "CCR Rule Report: Initial Structural Stability Assessment For Bottom Ash Pond At Baldwin Power Plant," St. Louis, MO, October 2016.

[6] AECOM, "CCR Rule Report: Initial Safety Factor Assessment For Bottom Ash Pond At Baldwin Power Plant," St. Louis, MO, October 2016.

[7] AECOM, "CCR Rule Report: Initial Inflow Design Flood Control System Plan For Bottom Ash Pond At Baldwin Power Plant," St. Louis, MO, October 2016.

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[9] AECOM, "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan for Bottom Ash Pond at Baldwin Power Plant," St. Louis, MO, October 2016.

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[12] S. Arends, "Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Baldwin Power Plant, Bottom Ash Pond," September 5, 2018.

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[18] IngenAE, "Baldwin Power Plant Final Closure Plan Fly Ash Pond System As-Builts," Earth City, MO, October 2020.

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[21] USDA Natural Resources Conservation Service, "WinTR-20 Project Formulation Hydrology, Version 3.20".

Section 3

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

Prepared for
Dynegy Midwest Generation, LLC

Date
January 31, 2022

Project No.
1940100711-001

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT BALDWIN POWER PLANT BOTTOM ASH POND

Project name	**Baldwin Power Plant Bottom Ash Pond**
Project no.	**1940100711-001**
Recipient	**Dynegy Midwest Generation, LLC**
Document type	**Annual Groundwater Monitoring and Corrective Action Report**
Version	**FINAL**
Date	**January 31, 2022**
Prepared by	**Eric D. Plante**
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
BAP	Bottom Ash Pond
bgs	below ground surface
BPP	Baldwin Power Plant
CCR	coal combustion residuals
DMG	Dynegy Midwest Generation, LLC
GMP	Groundwater Monitoring Plan
GWPS	groundwater protection standard
HCR	Hydrogeologic Site Characterization Report
ID	identification
IEPA	Illinois Environmental Protection Agency
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
WLO	water level only

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 Pond (BAP) located at Baldwin Power Plant (BPP) near Baldwin, Illinois.

An operating permit application for the BAP was submitted by Dynegy Midwest Generation, LLC (DMG) 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 BAP is recognized by Vistra identification (ID) number (No.) 601, IEPA ID No. W1578510001-06, and National Inventory of Dams (NID) No. IL50721.

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 BAP 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 BAP, submitted to IEPA by October 31, 2021, which is pending IEPA approval.

1. INTRODUCTION

This report has been prepared by Ramboll on behalf of DMG, to provide the information required by 35 I.A.C. § 845.610(e) for the BAP located at BPP near Baldwin, 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 BAP was submitted by DMG 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 BAP 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).
- 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 BAP.

3. KEY ACTIONS COMPLETED IN 2021

The proposed Part 845 monitoring well network is presented in **Figure 1** and summarized below in **Table A**.

Table A. Proposed Part 845 Monitoring Well Network

Well ID	Monitored Unit	Well Screen Interval (feet bgs)	Well Type [1]
MW-304	UA	45 - 55	Background
MW-306	UA	72.7 - 87.7	Background
MW-356	UA	56 - 66	Compliance
MW-369	UA	56 - 66	Compliance
MW-370	UA	53 - 63	Compliance
MW-382	UA	56 - 66	Compliance
OW-256	PMP	28 - 32.5	Compliance
OW-257	PMP	34 - 38.5	Compliance
PZ-170	PMP	21.1 - 31.1	Compliance
PZ-182	PMP	24 - 34	Compliance
TPZ-164 [2]	CCR	5.2 - 9.7	WLO

[1] Well type refers to the role of the well in the monitoring network.
[2] Location is temporary pending implementation of impoundment closure per an approved construction permit application.
bgs = below ground surface
CCR = coal combustion residuals
PMP = potential migration pathway
UA = uppermost aquifer
WLO = water level only

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.

Table B. Summary of Groundwater Samples Collected

Sampling Dates	Parameters Collected	Monitoring Wells Sampled [1]
March 8 - 10, 2021	Appendix III [2], Appendix IV [3], field parameters [4]	MW-304, MW-306, MW-356, MW-369, MW-370, and MW-382
June 21 - 22, 2021	pH, total dissolved solids (TDS)	MW-304 and MW-306

[1] In general, one sample was collected per monitoring well per event.

[2] Appendix III parameters include boron, calcium, chloride, fluoride, pH, sulfate, and TDS.

[3] Appendix IV parameters include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, radium 226 and 228 combined, selenium, and thallium.

[4] Field parameters include pH, dissolved oxygen, temperature, oxidation/reduction potential, specific conductance, and turbidity.

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 BAP.

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 BAP, 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.

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Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021b. *Hydrogeologic Site Characterization Report. Baldwin Power Plant, Bottom Ash Pond, Baldwin, Illinois*. Dynegy Midwest Generation, LLC. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021c. *History of Potential Exceedances. Baldwin Power Plant, Bottom Ash Pond, Baldwin, Illinois*. Dynegy Midwest Generation, LLC. October 25, 2021.

FIGURES

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Baldwin\BAP\GMP\Figure 2-1_Proposed 845 GW Monitoring Well Network.mxd

PROJECT: 169000XXXX | DATED: 10/11/2021 | DESIGNER: STOLZSD

COMPLIANCE WELL
BACKGROUND WELL
SOURCE SAMPLE LOCATION

PART 845 REGULATED UNIT (SUBJECT UNIT)
FLY ASH POND SYSTEM (CLOSED)
SITE FEATURE
PROPERTY BOUNDARY

0 400 800 Feet

PROPOSED PART 845 GROUNDWATER MONITORING WELL NETWORK

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
BOTTOM ASH POND
BALDWIN POWER PLANT
BALDWIN, ILLINOIS

FIGURE 1

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
BALDWIN POWER PLANT
BOTTOM ASH POND
BALDWIN, ILLINOIS

Parameter	Background Concentration	845 Limit	Groundwater Protection Standard	Unit
Antimony, total	0.001	0.006	0.006	mg/L
Arsenic, total	0.015	0.010	0.015	mg/L
Barium, total	0.027	2.0	2.0	mg/L
Beryllium, total	0.001	0.004	0.004	mg/L
Boron, total	1.95	2	2	mg/L
Cadmium, total	0.001	0.005	0.005	mg/L
Chloride, total	161	200	200	mg/L
Chromium, total	0.0015	0.1	0.1	mg/L
Cobalt, total	0.001	0.006	0.006	mg/L
Fluoride, total	2	4.0	4.0	mg/L
Lead, total	0.001	0.0075	0.0075	mg/L
Lithium, total	0.0958	0.04	0.0958	mg/L
Mercury, total	0.0002	0.002	0.002	mg/L
Molybdenum, total	0.092	0.1	0.1	mg/L
pH (field)	11.5 / 7.4	9.0 / 6.5	11.5 / 6.5	SU
Radium 226 and 228 combined	1.5	5	5	pCi/L
Selenium, total	0.001	0.05	0.05	mg/L
Sulfate, total	208	400	400	mg/L
Thallium, total	0.002	0.002	0.002	mg/L
Total Dissolved Solids	1420	1200	1420	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 Baldwin Power Plant Bottom Ash Pond, Illinois Environmental Protection Agency (IEPA) ID No. W1578510001-06.

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 the 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. Table 2 is a summary of all potential exceedances.

Background Concentrations

Background monitoring wells identified in the GMP include MW-304 and MW-306.

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 have been taken to remediate the groundwater.

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
BALDWIN POWER PLANT
BOTTOM ASH POND
BALDWIN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
MW-356	UA	257	Antimony, total	mg/L	12/29/2015 - 03/09/2021	CI around median	0.001	0.006	0.001	0.006	Standard
MW-356	UA	257	Arsenic, total	mg/L	12/29/2015 - 03/09/2021	CI around median	0.001	0.010	0.0036	0.01	Standard
MW-356	UA	257	Barium, total	mg/L	12/29/2015 - 03/09/2021	CI around mean	0.030	2.0	0.028	2	Standard
MW-356	UA	257	Beryllium, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
MW-356	UA	257	Boron, total	mg/L	12/29/2015 - 03/09/2021	CI around mean	1.9	2.0	1.8	2	Standard
MW-356	UA	257	Cadmium,total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
MW-356	UA	257	Chloride, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	24	200	153	200	Standard
MW-356	UA	257	Chromium, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.0015	0.10	0.0015	0.1	Standard
MW-356	UA	257	Cobalt, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.006	0.001	0.006	Standard
MW-356	UA	257	Fluoride, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	1.9	4.0	1.9	4	Standard
MW-356	UA	257	Lead, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.0075	0.001	0.0075	Standard
MW-356	UA	257	Lithium, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	0.052	0.096	0.096	0.04	Background
MW-356	UA	257	Mercury, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
MW-356	UA	257	Molybdenum, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	0.000711	0.10	0.030	0.1	Standard
MW-356	UA	257	pH (field)	SU	12/29/2015 - 03/09/2021	Future median	7.8	6.5/12	7.4/11.5	6.5/9	Standard/Background
MW-356	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/29/2015 - 03/09/2021	CI around geomean	0.11	5.0	1.6	5	Standard
MW-356	UA	257	Selenium, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
MW-356	UA	257	Sulfate, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	37	400	208	400	Standard
MW-356	UA	257	Thallium, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.002	0.002	0.002	0.002	Standard
MW-356	UA	257	Total Dissolved Solids	mg/L	12/29/2015 - 03/09/2021	Future median	654	1420	1420	1200	Background
MW-369	UA	257	Antimony, total	mg/L	12/29/2015 - 03/08/2021	CB around linear reg	-0.000682	0.006	0.001	0.006	Standard
MW-369	UA	257	Arsenic, total	mg/L	12/29/2015 - 03/08/2021	CI around geomean	0.00155	0.010	0.0036	0.01	Standard
MW-369	UA	257	Barium, total	mg/L	12/29/2015 - 03/08/2021	CB around linear reg	0.082	2.0	0.028	2	Standard
MW-369	UA	257	Beryllium, total	mg/L	12/29/2015 - 03/08/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard

RAMBOLL

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HISTORY OF POTENTIAL EXCEEDANCES
BALDWIN POWER PLANT
BOTTOM ASH POND
BALDWIN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
MW-369	UA	257	Boron, total	mg/L	12/29/2015 - 03/08/2021	CI around mean	1.2	2.0	1.8	2	Standard
MW-369	UA	257	Cadmium,total	mg/L	12/29/2015 - 03/08/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
MW-369	UA	257	Chloride, total	mg/L	12/29/2015 - 03/08/2021	CI around mean	87	200	153	200	Standard
MW-369	UA	257	Chromium, total	mg/L	12/29/2015 - 03/08/2021	CI around median	0.001	0.10	0.0015	0.1	Standard
MW-369	UA	257	Cobalt, total	mg/L	12/29/2015 - 03/08/2021	CI around median	0.001	0.006	0.001	0.006	Standard
MW-369	UA	257	Fluoride, total	mg/L	12/29/2015 - 03/08/2021	CB around linear reg	-0.339	4.0	1.9	4	Standard
MW-369	UA	257	Lead, total	mg/L	12/29/2015 - 03/08/2021	CI around median	0.001	0.0075	0.001	0.0075	Standard
MW-369	UA	257	Lithium, total	mg/L	12/29/2015 - 03/08/2021	Future median	0.018	0.096	0.096	0.04	Background
MW-369	UA	257	Mercury, total	mg/L	12/29/2015 - 03/08/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
MW-369	UA	257	Molybdenum, total	mg/L	12/29/2015 - 03/08/2021	CB around T-S line	-0.0392	0.10	0.030	0.1	Standard
MW-369	UA	257	pH (field)	SU	12/29/2015 - 03/08/2021	CB around linear reg	6.0	6.5/12	7.4/11.5	6.5/9	Standard/Background
MW-369	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/29/2015 - 03/08/2021	CI around mean	0.28	5.0	1.6	5	Standard
MW-369	UA	257	Selenium, total	mg/L	12/29/2015 - 03/08/2021	CB around T-S line	-0.0335	0.050	0.001	0.05	Standard
MW-369	UA	257	Sulfate, total	mg/L	12/29/2015 - 03/08/2021	CB around linear reg	-27.5	400	208	400	Standard
MW-369	UA	257	Thallium, total	mg/L	12/29/2015 - 03/08/2021	All ND - Last	0.002	0.002	0.002	0.002	Standard
MW-369	UA	257	Total Dissolved Solids	mg/L	12/29/2015 - 03/08/2021	CB around linear reg	401	1420	1420	1200	Background
MW-370	UA	257	Antimony, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	-0.000418	0.006	0.001	0.006	Standard
MW-370	UA	257	Arsenic, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	0.0000367	0.010	0.0036	0.01	Standard
MW-370	UA	257	Barium, total	mg/L	12/29/2015 - 03/09/2021	CI around mean	0.037	2.0	0.028	2	Standard
MW-370	UA	257	Beryllium, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
MW-370	UA	257	Boron, total	mg/L	12/29/2015 - 03/09/2021	CI around mean	1.8	2.0	1.8	2	Standard
MW-370	UA	257	Cadmium,total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
MW-370	UA	257	Chloride, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	1320	200	153	200	Standard
MW-370	UA	257	Chromium, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.0015	0.10	0.0015	0.1	Standard

RAMBOLL

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HISTORY OF POTENTIAL EXCEEDANCES
BALDWIN POWER PLANT
BOTTOM ASH POND
BALDWIN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
MW-370	UA	257	Cobalt, total	mg/L	12/29/2015 - 03/09/2021	CI around median	0.001	0.006	0.001	0.006	Standard
MW-370	UA	257	Fluoride, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	2.9	4.0	1.9	4	Standard
MW-370	UA	257	Lead, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.0075	0.001	0.0075	Standard
MW-370	UA	257	Lithium, total	mg/L	12/29/2015 - 03/09/2021	Future median	0.14	0.096	0.096	0.04	Background
MW-370	UA	257	Mercury, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
MW-370	UA	257	Molybdenum, total	mg/L	12/29/2015 - 03/09/2021	CI around mean	0.016	0.10	0.030	0.1	Standard
MW-370	UA	257	pH (field)	SU	12/29/2015 - 03/09/2021	Future median	7.5	6.5/12	7.4/11.5	6.5/9	Standard/Background
MW-370	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/29/2015 - 03/09/2021	CI around geomean	0.38	5.0	1.6	5	Standard
MW-370	UA	257	Selenium, total	mg/L	12/29/2015 - 03/09/2021	Most recent sample	0.001	0.050	0.001	0.05	Standard
MW-370	UA	257	Sulfate, total	mg/L	12/29/2015 - 03/09/2021	CI around mean	239	400	208	400	Standard
MW-370	UA	257	Thallium, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.002	0.002	0.002	0.002	Standard
MW-370	UA	257	Total Dissolved Solids	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	2840	1420	1420	1200	Background
MW-382	UA	257	Antimony, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.006	0.001	0.006	Standard
MW-382	UA	257	Arsenic, total	mg/L	12/29/2015 - 03/09/2021	CI around median	0.001	0.010	0.0036	0.01	Standard
MW-382	UA	257	Barium, total	mg/L	12/29/2015 - 03/09/2021	CI around geomean	0.016	2.0	0.028	2	Standard
MW-382	UA	257	Beryllium, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
MW-382	UA	257	Boron, total	mg/L	12/29/2015 - 03/09/2021	CI around median	1.7	2.0	1.8	2	Standard
MW-382	UA	257	Cadmium,total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
MW-382	UA	257	Chloride, total	mg/L	12/29/2015 - 03/09/2021	CI around mean	35	200	153	200	Standard
MW-382	UA	257	Chromium, total	mg/L	12/29/2015 - 03/09/2021	CI around geomean	0.00147	0.10	0.0015	0.1	Standard
MW-382	UA	257	Cobalt, total	mg/L	12/29/2015 - 03/09/2021	CI around median	0.001	0.006	0.001	0.006	Standard
MW-382	UA	257	Fluoride, total	mg/L	12/29/2015 - 03/09/2021	CI around median	2.8	4.0	1.9	4	Standard
MW-382	UA	257	Lead, total	mg/L	12/29/2015 - 03/09/2021	CI around median	0.001	0.0075	0.001	0.0075	Standard
MW-382	UA	257	Lithium, total	mg/L	12/29/2015 - 03/09/2021	Future median	0.059	0.096	0.096	0.04	Background

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BALDWIN POWER PLANT
BOTTOM ASH POND
BALDWIN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
MW-382	UA	257	Mercury, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
MW-382	UA	257	Molybdenum, total	mg/L	12/29/2015 - 03/09/2021	CB around T-S line	0.00119	0.10	0.030	0.1	Standard
MW-382	UA	257	pH (field)	SU	12/29/2015 - 03/09/2021	Future median	7.8	6.5/12	7.4/11.5	6.5/9	Standard/Background
MW-382	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/29/2015 - 03/09/2021	CI around geomean	0.22	5.0	1.6	5	Standard
MW-382	UA	257	Selenium, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
MW-382	UA	257	Sulfate, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	361	400	208	400	Standard
MW-382	UA	257	Thallium, total	mg/L	12/29/2015 - 03/09/2021	All ND - Last	0.002	0.002	0.002	0.002	Standard
MW-382	UA	257	Total Dissolved Solids	mg/L	12/29/2015 - 03/09/2021	Future median	1100	1420	1420	1200	Background

Notes:
Potential exceedance of GWPS
HSU = hydrostratigraphic unit:
  UA = Uppermost Aquifer
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
Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result
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)

TABLE 2. SUMMARY OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
BALDWIN POWER PLANT
BOTTOM ASH POND
BALDWIN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
MW-369	UA	257	pH (field)	SU	12/29/2015 - 03/08/2021	CB around linear reg	6.0	6.5/12	7.4/11.5	6.5/9	Standard/Background
MW-370	UA	257	Chloride, total	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	1320	200	153	200	Standard
MW-370	UA	257	Lithium, total	mg/L	12/29/2015 - 03/09/2021	Future median	0.14	0.096	0.096	0.04	Background
MW-370	UA	257	Total Dissolved Solids	mg/L	12/29/2015 - 03/09/2021	CB around linear reg	2840	1420	1420	1200	Background

Notes:
HSU = hydrostratigraphic unit:
  UA = Uppermost Aquifer
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
Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result
Statistical Calculation = method used to calculate the statistical result:
  CB around linear reg = Confidence band around linear regression
  Future median = Median of the three most recent samples
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)