Geosyntec consultants

1 McBride and Son Center Drive, Suite 202
Chesterfield, MO 63005
PH 636-812-0800
www.geosyntec.com

October 11, 2021

Kincaid Generation, LLC
199 IL-104
Kincaid, Illinois 62540

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

At the request of Kincaid Generation, LLC (KG), 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)-(3), (c), (d[1]), (e) and §257.82 ASH POND

Kincaid Power Plant

Kincaid, Illinois

Submitted to

Kincaid Generation, LLC

199 IL-104
Kincaid, Illinois 62540

Submitted by

Geosyntec consultants

engineers | scientists | innovators

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

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[1] Except for §257.73(d)(1)(vi).

TABLE OF CONTENTS

Executive Summary 1
SECTION 1 Introduction and Background 3
1.1 Ash Pond Description 4
1.2 Report Objectives 6
SECTION 2 Comparison of Initial and Periodic Site Conditions 8
2.1 Overview 8
2.2 Review of Annual Inspection Reports 8
2.3 Review of Instrumentation Data 8
2.4 Comparison of Initial to Periodic Surveys 9
2.5 Comparison of Initial to Periodic Aerial Photography 9
2.6 Comparison of Initial to Periodic Site Visits 9
2.7 Interview with Power Plant Staff 10
SECTION 3 Hazard Potential Classification - §257.73(a)(2) 12
3.1 Overview of Initial HPC 12
3.2 Review of Initial HPC 12
3.3 Summary of Site Changes Affecting the Initial HPC 13
SECTION 4 History of Construction Report - §257.73(c) 14
4.1 Overview of Initial HoC 14
4.2 Summary of Site Changes Affecting the Initial HoC 14
SECTION 5 Structural Stability Assessment - §257.73(d) 16
5.1 Overview of Initial SSA 16
5.2 Review of Initial SSA 17
5.3 Summary of Site Changes Affecting the Initial SSA 17
5.4 Periodic SSA 17
SECTION 6 Safety Factor Assessment - §257.73(e)(1) 18
6.1 Overview of Initial SFA 18
6.2 Review of Initial SFA 18
6.3 Summary of Site Changes Affecting the Initial SFA 19
SECTION 7 Inflow Design Flood ConTrol System Plan - §257.82 20
7.1 Overview of Initial IDF 20
7.2 Review of Initial IDF 20
7.3 Summary of Site Changes Affecting the Initial IDF 21
7.4 Periodic IDF 21
SECTION 8 Conclusions 23
SECTION 9 Certification Statement 24

SECTION 10 References.....25

LIST OF FIGURES

Figure 1 Site Location Map
Figure 2 Site Plan

LIST OF TABLES

Table 1 Periodic Certification Summary
Table 2 Initial to Periodic Survey Comparison
Table 3 Water Levels from Updated Periodic IDF

LIST OF DRAWINGS

Drawing 1 Initial to Periodic Survey Comparison
Drawing 2 Survey Comparison Isopach
Drawing 3 Initial to Periodic Aerial Imagery Comparison

LIST OF ATTACHMENTS

Attachment A Ash Pond Piezometer Data Plots
Attachment B Ash Pond Site Visit Photolog
Attachment C Periodic History of Construction Report Update Letter
Attachment D Periodic Inflow Design Flood Control System Plan Analyses

EXECUTIVE SUMMARY

This Periodic United States Environmental Protection Agency (USEPA) Coal Combustion Residuals (CCR) Rule [1] certification report (Periodic Certification Report) for the Ash Pond (AP) at the Kincaid Power Plant (KPP)[2], also known as the Kincaid Power Station (KIN), 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 impoundment, completed in 2016 and subsequently posted on Kincaid Generation, LLC (KG) 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 Ash Pond relative to the 2016 and 2017 initial certifications. These tasks determined that updates are not required for the Initial Hazard Potential Classification and Initial Safety Factor Assessment. However, due to changes at the site, updates were required and were performed for the:

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

Geosyntec's evaluations of the initial certification reports and updated analyses determined that the KPP Ash Pond meets all requirements for hazard potential classification, history of construction reporting, structural stability, safety factor assessment, and hydrologic and hydraulic control. **Table 1** provides a summary of the initial 2016 certifications and the updated 2021 periodic certifications.

[2] The Ash Pond is also referred to as ID Number W0218140002-01, Ash Pond by the Illinois Environmental Protection Agency (IEPA); CCR unit ID 141 by KG; and IL50706 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 AP.

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 Ash Pond [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	Yes	Foundations were found to be stable [9].	Yes	No changes were identified that may affect this requirement.
	§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	No changes were identified that may affect this requirement.
	§257.73(d)(1)(iv)	Presence and Condition of Slope Vegetation	Yes	Vegetation was present on exterior slopes and is maintained [9].	Yes	No substantial bare or overgrown areas were observed.
	§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 manage flow during the 1,000-year flood, after performing updated hydrologic and hydraulic analyses, if the starting water surface elevation does not exceed El. 602.8 ft.
	§257.73(d)(1)(vi)	Structural Integrity of Hydraulic Structures	No	Requirement could not be certified in 2016 due to inability to complete a CCTV inspection of the recycle intake structure pipe. AECOM recommended inspecting this pipe as soon as feasible to address the issue [9].	Periodic certification of §257.73(d)(1)(vi) was performed independently Luminant in 2020 [10].	
	§257.73(d)(1)(vii)	Stability of Downstream Slopes Inundated by Waterbody	Yes	A sudden drawdown factor of safety was determined to satisfy §257.73(d)(1)(vii) [9].	Yes	No changes were identified that may affect this requirement.
Safety Factor Assessment						
7	§257.73€(1)(i)	Maximum storage pool safety factor must be at least 1.50	Yes	The safety factor was calculated to be 1.57 [6].	Yes	No changes were identified that may affect this requirement.
	§257.73€(1)(ii)	Maximum surcharge pool safety factor must be at least 1.40	Yes	The safety factor was calculated to be 1.57 [6].	Yes	No changes were identified that may affect this requirement.
	§257.73(e)(1)(iii)	Seismic safety factor must be at least 1.00	Yes	Safety factor was calculated to be 1.27 [6].	Yes	No changes were identified that may affect this requirement.
	§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, if the starting water surface elevation does not exceed El. 602.8 ft.
	§257.82(b)	Discharge from CCR Unit	Yes	Discharge from the CCR Unit is routed through an NPDES-permitted outfall during both normal and 1,000-year, 24-hour Inflow Design Flood conditions [7].	Yes	Discharge in pollutants in violation of the NPDES permit were found to not be expected to occur during both normal and 1,000-year, 24-hour Inflow Design Flood conditions, after performing updated hydrologic and hydraulic analyses, if the starting water surface elevation does not exceed El. 602.8 ft.

SECTION 1

INTRODUCTION AND BACKGROUND

This Periodic United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule [1] Certification Report was prepared by Geosyntec Consultants (Geosyntec) for Kincaid Generation, LLC (KG) to document the periodic certification of the Ash Pond (AP) at the Kincaid Power Plant (KPP), also known as the Kincaid Power Station, located at 199 IL-104, Kincaid, Illinois, 62540. The location of KPP is provided in **Figure 1**, and a site plan showing the location of the Ash Pond (AP) is provided in **Figure 2**.

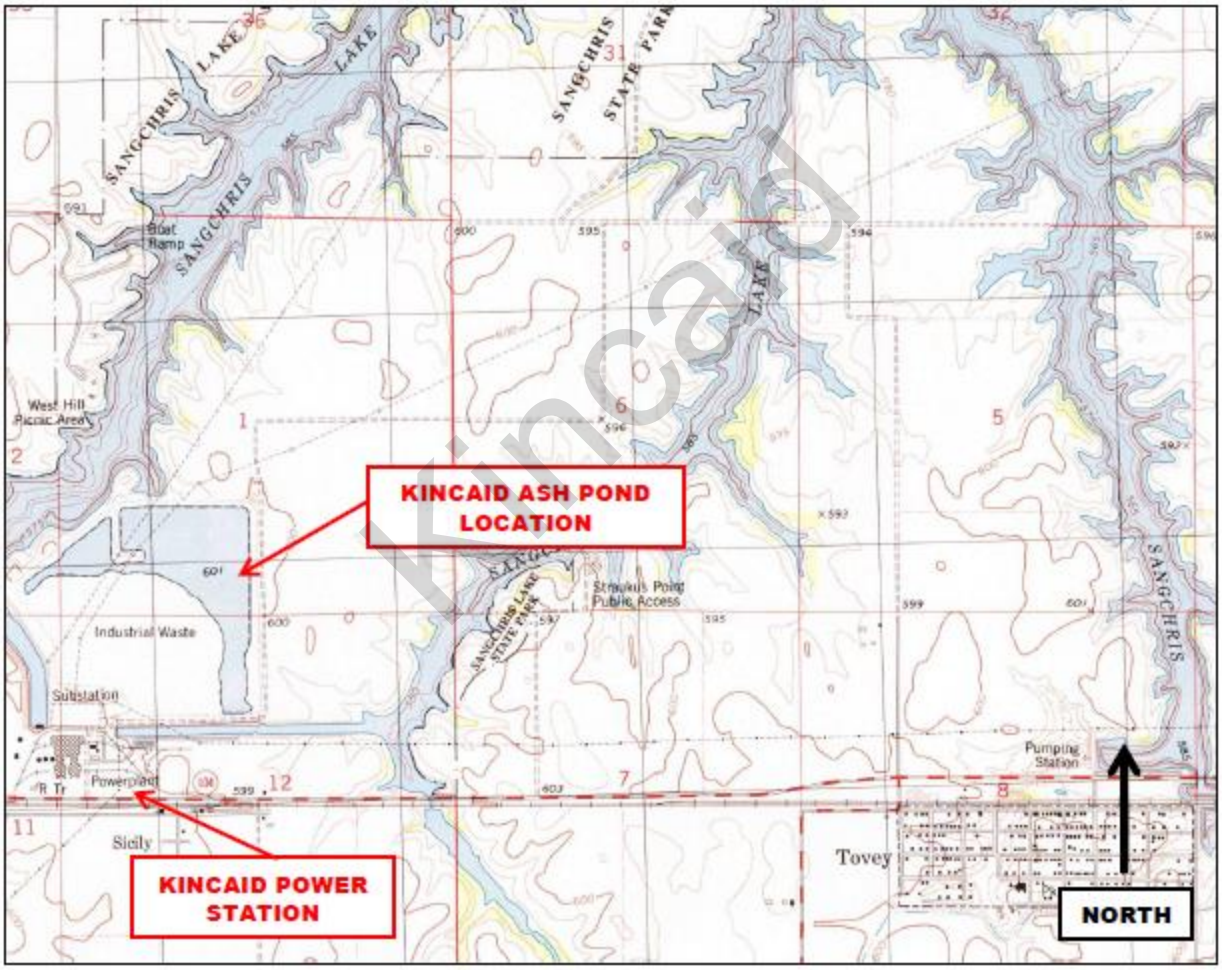


Figure 1 – Kincaid Power Plant Location Map (from AECOM, 2016)

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

1.1 Ash Pond Description

The Kincaid Ash Pond serves as the wet ash impoundment basin and contains materials such as bottom ash, fly ash, and miscellaneous non-CCR process water from the Kincaid Power Plant. The Kincaid Ash Pond receives sluiced bottom ash from the power plant through eight sluice pipes, which discharge into the southwest side of the basin. A third-party recycling company recovers acceptable ash for beneficial reuse, and unacceptable materials are left in the Kincaid Ash Pond. Due to the volumes of ash removed for beneficial reuse, the quantity of ash within the Kincaid Ash Pond does not significantly change from year to year [9].

Normal outflow from the Kincaid Ash Pond is conveyed into the recycle intake structure (screen house) located at the southeast corner of the embankment. This structure is comprised of a concrete headwall, a fiberglass and steel grating system to control (screen) debris, and a 60-in. diameter reinforced concrete recycle pipe (RCP) with an obvert centerline elevation of 589.45 feet[3], which is used to convey water approximately 2,000 feet westward to the recycle pump house, where it is recycled for use in plant processes or is diverted to the onsite wastewater treatment plant. Outflow

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

from the Kincaid Ash Pond into the recycle pipe is controlled by a steel gate valve installed on the pipe inlet, which can be operated from inside the screen house. A concrete weir is also present in front of the recycle pipe but has a top elevation of 595.21 feet, which is lower than the maximum normal operating pool of the Kincaid Ash Pond (El. 603.3 feet). Therefore, the weir is completely submerged during normal operations [9].

An emergency outlet (effluent) structure is also located at the southeast corner of the impoundment and serves to discharge pond water into the adjacent discharge flume during emergency or upset conditions. The discharge flume feeds into Sangchris Lake. The emergency outlet structure consists of a square concrete riser structure with an exterior steel 3-foot circular gate valve (invert El. 597.21 feet) and opening discharging into the center of the concrete riser structure, which leads into an open 48-inch corrugated metal pipe (CMP) emergency outlet (approximate centerline elevation of 529.5 feet, based on historic drawings). The gate valve can be operated from an access walkway leading to the emergency outlet structure. The top of the emergency outlet structure is open to the Kincaid Ash Pond on three sides, with open dimensions of 3-foot square. The opening effectively acts as a 9-foot-wide overflow weir that is activated when the pool level in the Kincaid Ash Pond exceeds El. 604.3 feet. As the 48-inch CMP is ungated, flow is transmitted freely into the emergency outlet structure when the pond level exceeds El. 604.3 feet and outflows to the discharge flume via the 48-inch CMP, without needing to manually operate the exterior gate valve [9].

An approximately 1,100-foot-long section of the south embankment, adjacent to the discharge flume, has a crest elevation around 6 to 17 feet lower than the rest of the embankment, with typical elevation of 605 ft, and is intended to act as a secondary emergency spillway. Outside of the gravel crest access road and riprap erosion protection at the embankment toe adjacent to the discharge channel, this area is not lined [9].

An engineered liner system is not present beneath the Kincaid Ash Pond. The surface area of the impoundment is approximately 178 acres, and the embankment portion of the Kincaid Ash Pond has a total length of approximately 11,000 feet and a maximum height above the exterior grade of 30 feet. The embankment was constructed as a homogenous earthen structure with well-compacted clayey fill. Portions of the north embankment adjacent to Sangchris Lake include crushed stone near the waterline for erosion protection. The north, northwest, and south embankment sections exhibit approximately 1.4H:1V (horizontal: vertical) downstream slopes, and the south embankment sections near the southeast corner exhibit a 6H:1V slope. Upstream slopes are typically around 3H:1V. Embankment crest width ranges from approximately 10 to 25 feet, and the crest is covered with a gravel access road [9].

As currently operated, the normal pool elevation ranges from 601.8 to 602.5 feet during non-winter conditions. A maximum pool elevation of 603.3 feet may be used during winter conditions to alleviate problems with freezing that may affect flow into the recycle intake structure. Dike crest

elevations range from approximately 604.5 to 607 feet for the south embankment and 614 to 622 feet for all other embankments with erosion-resistant material [9].

Initial certifications for the AP 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 KG's CCR Website ([2], [3], [4], [5], [6], [7]). Additional documentation for the initial certifications included 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 KG's CCR Website.

1.2 Report Objectives

These following are the objectives of 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 for 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]), Inundation Map [3], Structural Stability Assessment ([5], [9]), Safety Factor Assessment ([6], [9]), and Inflow Design Flood Control System Plan ([7], [9]) reports to assess 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 KPP 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.
- If updates are required, they will be performed and documented within this report.

- Confirm that the AP meets all the requirements associated with §257.73(a)(2)-(3), (c), (d), (e), and §257.82, or, if the AP does not meet all requirements, provide recommendations for compliance with these sections of the CCR Rule [1].

SECTION 2

COMPARISON OF INITIAL AND PERIODIC SITE CONDITIONS

2.1 Overview

This section describes the comparison of conditions at the Ash Pond (AP) 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 AP were performed between 2016 and 2020 ([11], [12], [13], [14], [15]) and 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 Ash Pond between 2015 and 2020. No signs of instability, structural weakness, or changes which may have affected the operation or stability of the AP were noted in the inspection reports.

2.3 Review of Instrumentation Data

Fifteen piezometers are present at the AP and were monitored monthly by KG between August 23, 2015 and June 16, 2021 [16]. These piezometers consist of KIN-P001 through KIN-P012 and PZ-4A through PZ-4C. 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. Phreatic levels typically varied by five feet on average. Changes in these phreatic levels do

not significantly differ from those utilized in 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 Ash Pond, conducted by Weaver Consultants Group (Weaver) in 2015 [17], was compared to the periodic survey of the AP, conducted by IngenAE, LLC (IngenAE) in 2020 [18], using AutoCAD Civil3D 2021 software. This comparison quantified changes in the volume of CCR placed within the AP 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 view of the surveys in **Drawing 1** and a plan view isopach map denoting changes in ground surface elevation in **Drawing 2**. 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)	602.6
Periodic Surveyed Pool Elevation (ft)	602.4
Initial §257.82 Starting Water Surface Elevation (SWSE) (ft)	603.3
Total Change in CCR Volume (CY)	-77,671
Change in CCR Volume Above SWSE (CY)	-49,042
Change in CCR Volume Below SWSE (CY)	-28,819

The comparison indicated that approximately 78,000 CY of CCR may have been removed from the Ash Pond between the initial and periodic surveys. The periodic survey also indicated dike crest elevations of initial and periodic surveys on the order of two feet lower than the initial survey, with the minimum crest elevation being 604.5 feet, compared to 605.2 ft in the initial survey.

2.5 Comparison of Initial to Periodic Aerial Photography

Initial aerial photographs of the Ash Pond collected by Weaver in 2015 [17] were compared to periodic aerial photographs collected by IngenAE in 2020 [18] 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**. No significant changes were identified.

2.6 Comparison of Initial to Periodic Site Visits

An initial site visit to the Ash Pond was conducted by AECOM in 2015 and documented with a Site Visit Summary and corresponding photographs [19].

A periodic site visit was conducted by Geosyntec on June 10, 2021, with Mr. Thomas Ward, P.E. and Ms. Crystal Luttrell conducting the site visit. The site visit was intended to evaluate potential changes at the site since the initial certifications were prepared (i.e., modification to the embankment, outlet structures or other appurtenances, limits of CCR, maintenance programs, repairs), in addition to performing visual observations of the AP to evaluate if the structural stability requirements (§257.73(d)) were met. The site visit included walking the perimeter of the

AP, visually observing conditions, recording filed notes, and collecting photographs. The site visit is documented in a field observation form and photographic log provided in **Attachment B**.

2.7 Interview with Power Plant Staff

An interview with Mr. Tim Arnold of KPP was conducted by Mr. Thomas Ward, P.E. and Ms. Crystal Luttrell of Geosyntec on June 10, 2021. Mr. Arnold was employed at KPP between 2019 and 2021 as the manager of environmental, with the responsibility of managing the Ash Pond from an environmental standpoint. The interview included a discussion of potential changes that may have occurred at the Ash Pond since development of the initial certifications ([2], [3], [4], [5], [6], [7]).

A summary of the interview is provided below.

- Were any construction projects completed for the CCR Surface Impoundment since 2015, and, if so, can you please describe the work, reason for the work, and provide any design drawings and/or details available?
    - No.
- Were there any changes to the purpose of the CCR Surface Impoundment since 2015?
    - No.
- Were there any changes to the instrumentation program and/or physical instruments for the CCR Surface Impoundment between 2015 and 2021, and, if so, are records available?
    - No.
- Have any area-capacity curves for the CCR Surface Impoundment been prepared since 2015?
    - No.
- Were there any changes to spillways and/or diversion features for the CCR Surface Impoundment completed since 2015, and, if so, are records available?
    - No.
- Were there any changes to construction specifications, surveillance, maintenance, and repair procedures for the CCR Surface Impoundment since 2015, and, if so, are records available?
    - No.
- Were there any instances of dike and/or structural instability for the CCR Surface Impoundment since 2015, and, if so, are records available?

- 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 breach analysis to evaluate the potential hazards associated with a failure of the AP's perimeter containment dike, along the east embankment and the lowest crest elevation on the AP embankment [2].

- 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 included within the §257.73(a)(3) Initial Emergency Action Plan [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 an infrequently used gravel site access road and a breach to the north would inundate the leachate pond. 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 onto farmland, thereby causing environmental damage. The Initial HPC therefore recommended a "Significant" hazard potential classification for the Ash Pond [2].

3.2 Review of Initial HPC

Geosyntec performed a review of the Initial HPC ([2], [8]) in terms of technical approach, input parameters, assessment of the results, and applicable requirements of the CCR Rule [1]. Some technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations. The review included the following tasks:

- Review of all report documentation and figures

- Check that correct CCR Rule guidance is referenced and followed

- 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

Geosytnec recommends retaining the "Significant" hazard potential classification for the Ash Pond, 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 the CCR surface impoundment, AP, at KPP. The Initial HoC included the following information for the 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 Changes Affecting the Initial HoC

Several significant changes were identified at the site that occurred after development of the Initial HoC report [4] and are described below:

- A state identification number (ID) of W0218140002-01 was assigned to the AP by the Illinois Environmental Protection Agency (IEAP).

- Revised area-capacity curves and spillway design calculations for the AP were prepared as part of the Periodical Inflow Design Flood Control System Plan Assessment, as described in **Section 7.**

A letter documenting changes to the HoC report is provided in **Attachment C**.

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, slope protection, dike compaction, and slope vegetation,
- Spillway stability including capacity, structural stability and integrity; and
- Downstream slope stability under sudden drawdown conditions for a downstream water body.

The Initial SSA concluded that the AP met all structural stability requirements for §257.73(d)(1)(i) through (v) and (vii), but recommended inspection of the recycle intake structure pipe in the southeast corner of the AP in order to verify that the AP meets the stability and structural integrity criteria for hydraulic outfall structures, per §257.73(d)(1)(vi). An inspection of this intake pipe was not previously performed due to high pipe flows required for operation precluding closed-circuit television (CCTV) inspections.

A periodic certification of the structural stability and structural integrity for hydraulic outfall structures (§257.73(d)(1)(vi)) was performed by Luminant in 2020 [10]. This certification independently determined that the criteria was met due to the condition of the spillway pipes and the soil types within the embankment. Therefore, the review and certification of §257.73(d)(1)(vi) is not included within the scope of this report.

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.

Additionally, the Initial SSA included a sudden drawdown slope stability analysis to evaluate the effect of a drawdown event in adjacent Sangchris Lake from normal pool to empty pool, as required by §257.73(d)(1)(vii) for CCR units where the downstream slopes are inundated by an adjacent water body. The minimum factor of safety for this loading condition was assumed to be 1.3 based on U.S. Army Corps of Engineers guidance [20].

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:

- Review of 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); sufficiency of dike compaction, per §257.73(d)(1)(iii); and downstream slope stability, per §257.73(d)(1)(vii). Supporting geotechnical investigation and testing data, input parameters, analysis methodology, selection of critical cross-sections, and loading conditions were reviewed.

- 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.

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

5.3 Summary of Site Changes Affecting the Initial SSA

One change at the site that occurred after development of the Initial SSA was identified. This change required an update to the Initial SSA and is 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**.

5.4 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 storm 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 independently performed by Luminant [10].

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 five slope stability cross-sections for limit equilibrium stability analysis utilizing GeoStudio SLOPE/W software; and
- The analysis of the critical cross-sections for maximum storage pool, maximum surcharge pool, and seismic loading conditions.
    - Liquefaction loading conditions were evaluated via post-earthquake analysis as liquefaction-susceptible soil layers were identified in the soft clay layer located between the foundation clay and glacial till layer in the Kincaid Ash Pond.

The Initial SFA concluded that the Ash Pond 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
    - Analyzed loading conditions relative to the applicable CCR Rule [1] requirements and site-specific conditions.
    - Input parameters, analysis methodology, selection of critical cross-sections, loading conditions, and piezometric/groundwater levels utilized for slope stability analyses.

- Reviewing the contents vs. the applicable CCR Rule requirements [1].

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

6.3 Summary of Site Changes Affecting the Initial SFA

No changes since development of the Initial SFA were identified that would require updates to the Initial SFA ([6], [9]). Although normal and peak (i.e., flood) water levels within the AP have changed as a result of the Periodic IDF (**Section 7**), water levels are lower than those utilized in the Initial SFA. Therefore, the water levels utilized in the Initial SFA are conservative relative to current conditions.

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 8.08 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 603.3 feet.

The Initial IDF concluded that the Ash Pond met the requirements of §257.82, as the peak water surcharge elevation estimated by the HydroCAD model was 605.1 feet, relative to a minimum Ash Pond dike crest elevation of 605.2 feet. Therefore, overtopping was not expected. The Initial IDF also evaluated the potential for discharge from the CCR unit and concluded that discharge in violation of the existing NDPES for the Ash Pond was not expected, as all discharge from the Ash Pond during both normal and inflow design flood conditions was expected to be routed back to KPP for use in plant operations, is discharged via a NPDES-permitted outfall after treatment or is routed through the emergency outlet structure and NDPES-permitted outfall to Sangchris Lake [7].

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

- The Initial IDF utilized the National Resource Conservation Service (NRCS) Type II rainfall distribution type [21]. Geosyntec recommends utilizing the Huff 3rd Quartile distribution for areas less than 10 square miles [22] for the reasons listed below.

    - Huff 3rd Quartile distribution was identified to be a more appropriate representation of a 1,000-year, 24-hour storm event per the Illinois State Water Survey (ISWS) Circular 173 [22] which developed standardized rainfall distributions from compiled rainfall data at sites throughout Illinois.

    - Illinois Department of Natural Resources, Office of Water Resources (IDNR-OWR) [23] recommends use of the Huff Quartile distributions in Circular 173 when using frequency events to determine the spillway design flood inflow hydrograph, "*The suggested method to distribute this rainfall is described in the ISWS publication, Circular 173, "Time Distributions of Heavy Rainstorms in Illinois".*

7.3 Summary of Site Changes Affecting the Initial IDF

Two changes at the site that occurred since development of the Initial IDF were identified. These changes required updates to the Initial IDF and are described below:

- The minimum elevation of the perimeter dike is estimated to be 604.5 feet based on the 2020 survey [18], which is 0.7 ft lower than the El. 605.2 ft perimeter dike elevation estimated from the 2015 survey [17].

- Approximately 78,000 CY of CCR were removed above the SWSE utilized for the Initial IDF certification, thereby altering the stage-storage curve, relative to the Initial IDF.

7.4 Periodic IDF

Geosyntec revised the HydroCAD model associated with the Initial IDF to account for the changes in the drainage area, changes in the time of concentration, changes in CCR volume, revised rainfall distribution type, and changes in the lowest point of the perimeter dike elevation, as described in **Section 7.3**.

The following approach and input data were used for the revised analyses:

- The SWSE was lowered from El. 603.3 ft to El. 602.8 ft, in order to provide additional capacity.

- The AP drainage area was updated from 178 acres to 171 acres to reflect the 2020 site survey.

- Time of concentration was updated from 5 minutes to 6 minutes in accordance with the recommended minimum time of concentration for direct entry of rainfall [24].

- The stage-storage (i.e., area-capacity) curve for the AP was updated based on the 2020 site survey [18].
    - A revised stage-volume curve for the AP was prepared based on measuring the storage volume of the AP at every one-foot increment of depth from an elevation at the bottom of the AP (594 ft) to the approximate minimum perimeter dike embankment crest elevation (605 ft). This analysis identified an overall increase of 90,378 CY (56 ac-ft) of storage volume at the AP from the storage used in the 2016 Initial IDF Certification.
- The rainfall distribution type was updated to the "Huff 3rd Quartile" storm type provided by HydroCAD [22].
- The minimum dike crest elevation was updated from 605.2 ft to 604.5 ft based on the 2020 site survey.
- 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, analysis time span and analysis time step.

The results of the Periodical IDF Assessment are summarized in **Table 3** and confirm that the AP sill meets the requirements of §257.82(a)-(b) if the SWSE is maintained no higher than El. 602.8 ft, as the peak water surface elevation does not exceed the minimum perimeter dike crest elevations. Additionally, all discharge from the AP is routed through the existing spillway system to the NPDES-permitted outfall, during both normal and IDF conditions. Updated area-capacity curves and HydroCAD model output is provided in **Attachment D**.

Table 3 – Water Levels from Periodical IDF Assessment

Analysis	Starting Water Surface Elevation (ft)	Peak Water Surface Elevation (ft)	Minimum Dike Crest Elevation (ft)
Initial IDF	603.3	605.1	605.2
Periodical IDF Assessment	602.8	604.4	604.5
Initial to Periodic Change[1]	-0.5	-0.7	

Notes:
[1]Postive change indicates increase in the WSE, negative change indicates decrease in the WSE.

SECTION 8 CONCLUSIONS

The Ash Pond at KPP 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 independently certified by Luminant [10], and considering a starting water surface elevation no higher than El. 602.8 ft;
- Safety factor assessment (§257.73(e)); and
- Inflow design flood control system planning (§257.82), if the starting water surface elevation does not exceed El. 602.8 ft.

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

SECTION 9

CERTIFICATION STATEMENT

CCR Unit: Kincaid Generation, LLC, Kincaid Power Plant, 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 2016, 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 independently certified by others.

Thomas W. Ward

10/11/21

Date

Exp. 11/30/2021

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, Ash Pond, Kincaid Power Station, Christian County, Illinois," Fenton, MO, October 12, 2016.

[3] Stantec Consulting Services, Inc., "Kincaid Generation, LLC, Kincaid Power Station, Kincaid, Christian County, IL, Emergency Action Plan, Ash Pond (NID # IL50706)," Fenton, MO, April 13, 2017.

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

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

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

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

[8] Stantec Consulting Services, Inc., "Documentation of Initial Hazard Potential Classificaiton Assessment, Ash Pond, Kincaid Power Station, Christian County, Illinois," October 12, 2016.

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

[10] V. Modeer, *Office Memorandum: Ash Pond Structural Stability Assessment, Kincaid Generation, LLC, Kincaid Power Station,* Luminant, 2020.

[11] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Kincaid Power Station, Ash Pond,* August 30, 2016.

[12] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Kincaid Power Station, Ash Pond,* June 24, 2015.

[13] J. Knutelski, *Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Kincaid Generation, Ash Pond,* January 10, 2019.

[14] J. Knutelski, *Annual Inspection by a Qualified Professional Engineer, 40 CFR 257.83(b), Kincaid Generation, Ash Pond,* January 10, 2020.

[15] J. Knutelski, *Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Kincaid Generation, Ash Pond,* January 6, 2021.

[16] Kincaid Power Station, *2021 Piezometer Spreadsheet,* 2021.

[17] Weaver Consultants Group, "Dynegy, Collinsville, IL, 2015 - Kincaid Topography," Collinsville, IL, December 2015.

[18] IngenAE, "Luminant, Kincaid Generation, LLC, Kincaid Power Station, December 2020 Topography," Earth City, Missouri, February 26, 2021.

[19] AECOM, "Initial Station Site Visit Summary, Dynegy CCR Compliance Program," June 24, 2015.

[20] U.S. Army Corps of Engineers, "Slope Stability, EM 1110-2-1920," October 31, 2003.

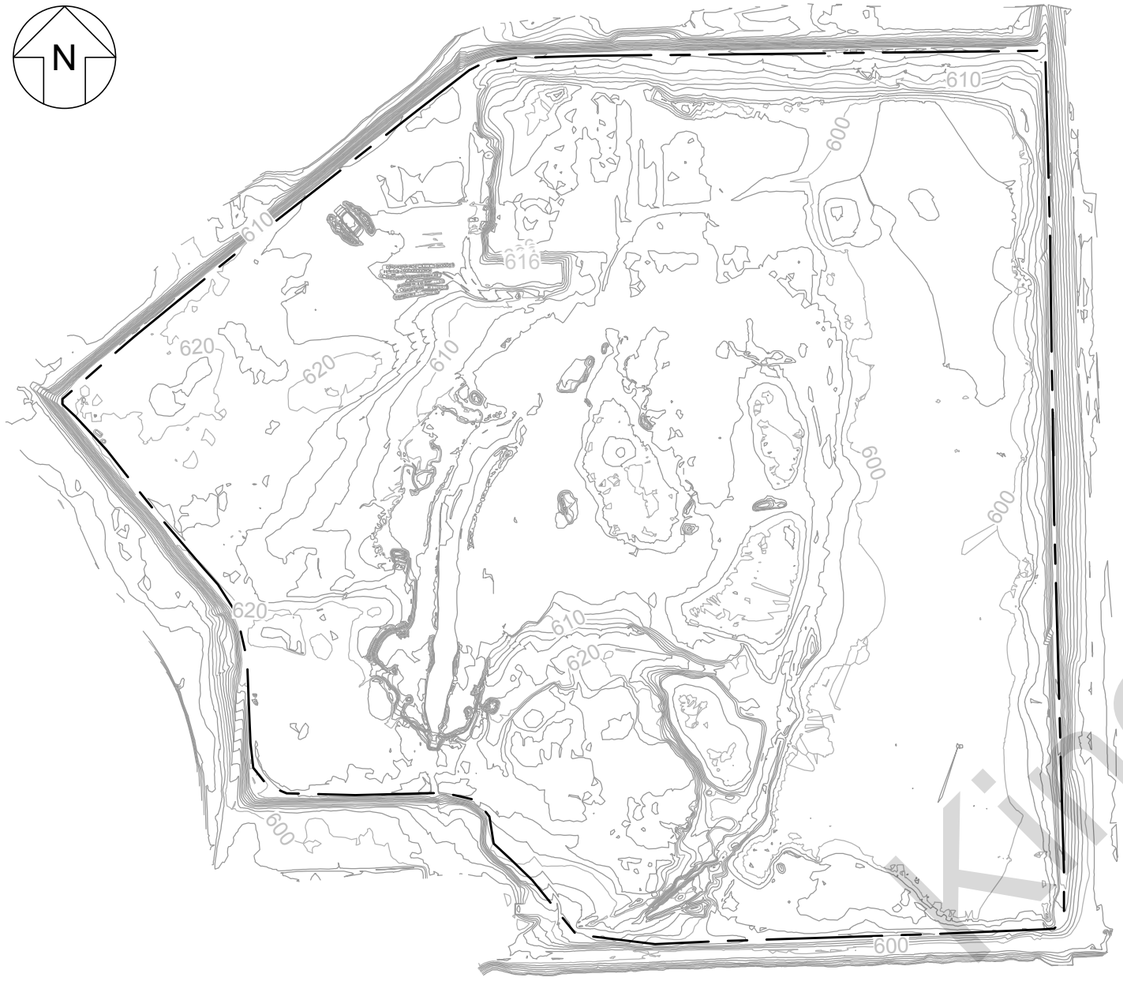
[21] C. E. D. Natural Resource Conservation Service, "Urban Hydrology for Small Watersheds (TR-55)," United States Department of Agriculture, 1985.

[22] State of Illinois Department of Energy and Natural Resources, "Time Distributions of Heavy Rainstorms in Illinois," State Water Survey Division, Champaign, Illinois, 1990.

[23] State of Illinois Department of Natural Resources, "Procedural Guidelines for Preparation of Technical Data to be Included in Applications for Permits for Construction and Maintenance of Dams," Springfield, Illinois.

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

DRAWINGS



INITIAL SURVEY
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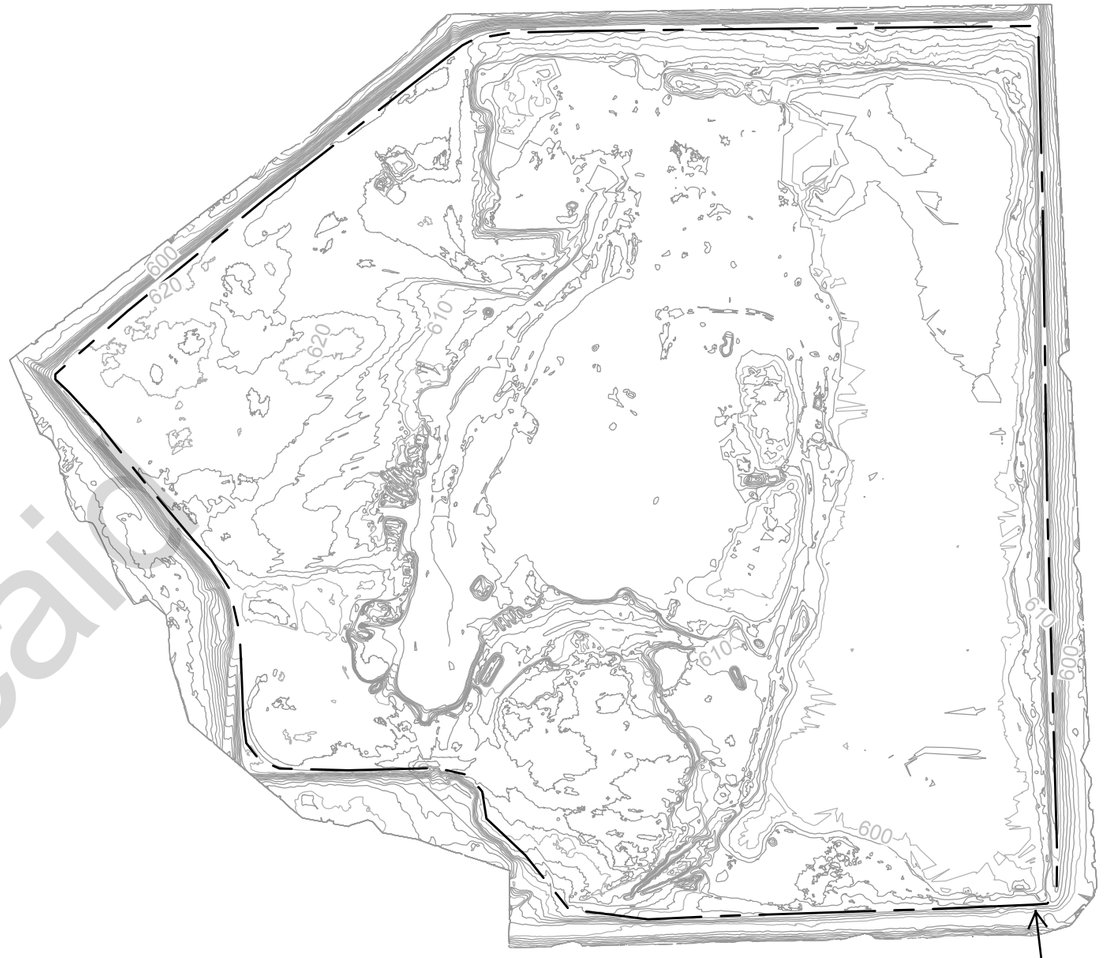

PERIODIC SURVEY
02-26-2021 TOPOGRAPHY

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NOTES:

1. THE INITIAL SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - KINCAID TOPOGRAPHY”, PREPARED BY WEAVER CONSULTANTS GROUP, DATED DECEMBER 1, 2015.
2. THE PERIODIC SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “LUMINANT, KINCAID GENERATION, LLC, KINCAID POWER STATION, DECEMBER 2020 TOPOGRAPHY”, PREPARED BY INGENAE, DATED FEBRUARY 26, 2021.
3. ALL SURVEY DATA WAS COLLECTED IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AND NORTH AMERICAN DATUM OF 1983 (NAD83) FOR VERTICAL AND HORIZONTAL COORDINATES, RESPECTIVELY.

INITIAL TO PERIODIC SURVEY COMPARISON
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

Geosyntec consultants

DRAWING 1

GLP8027.07 | JULY 2021

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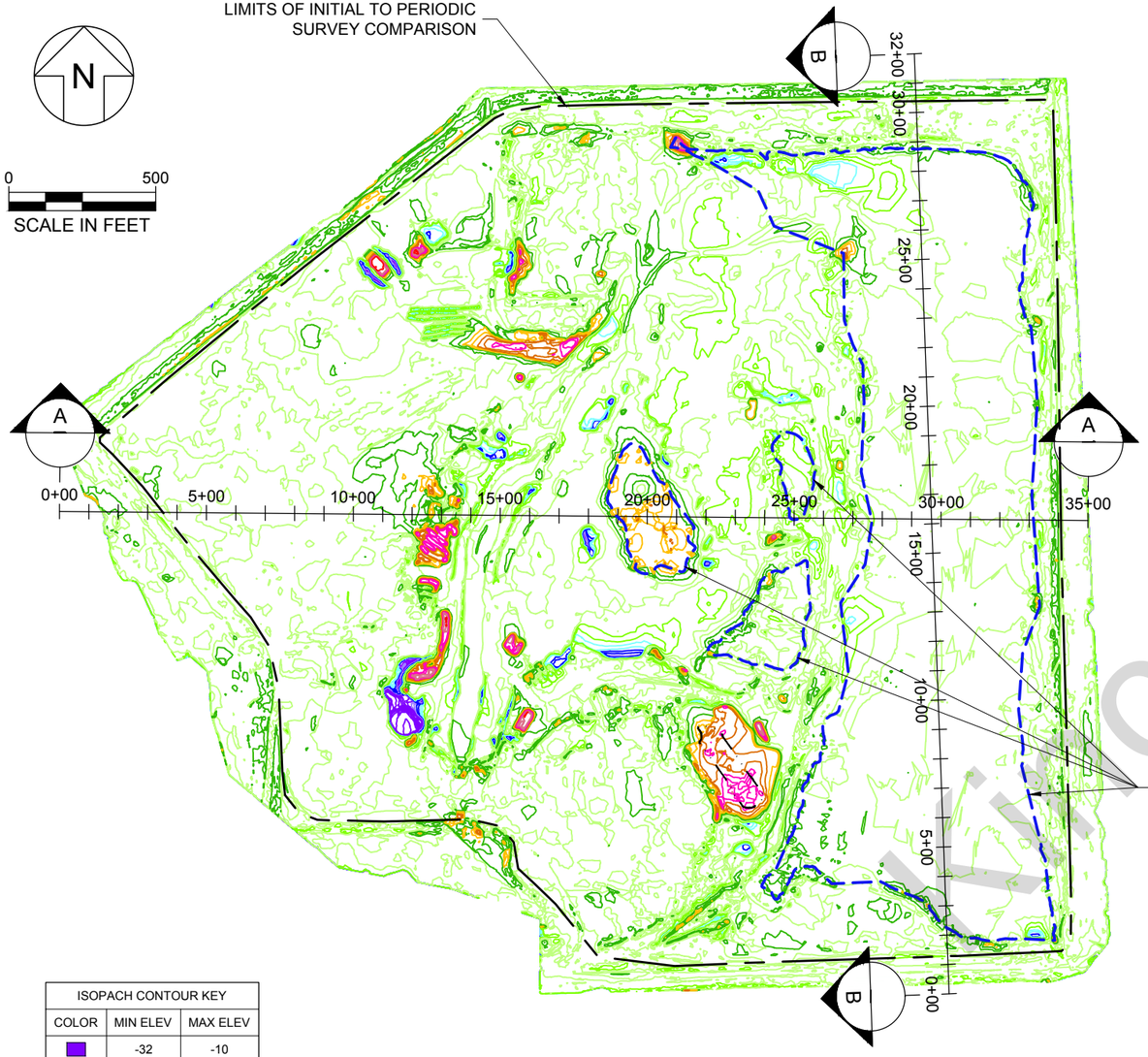
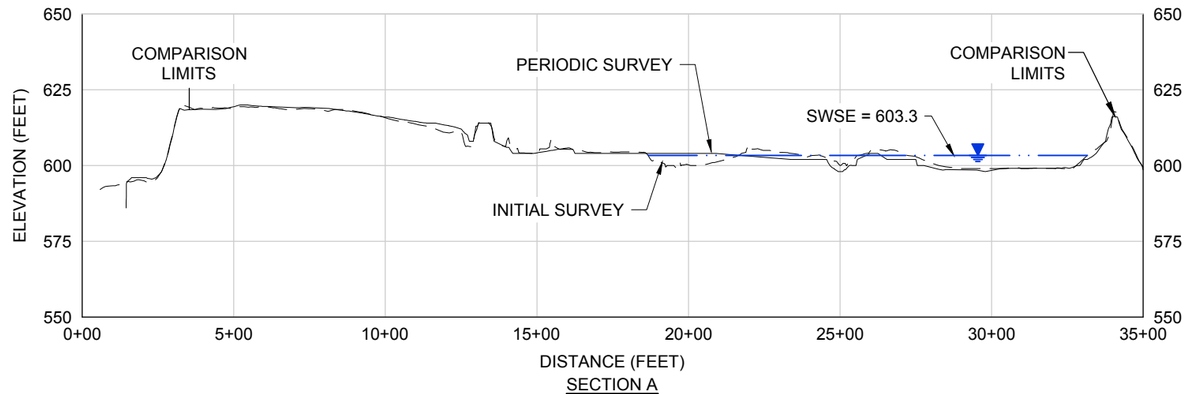
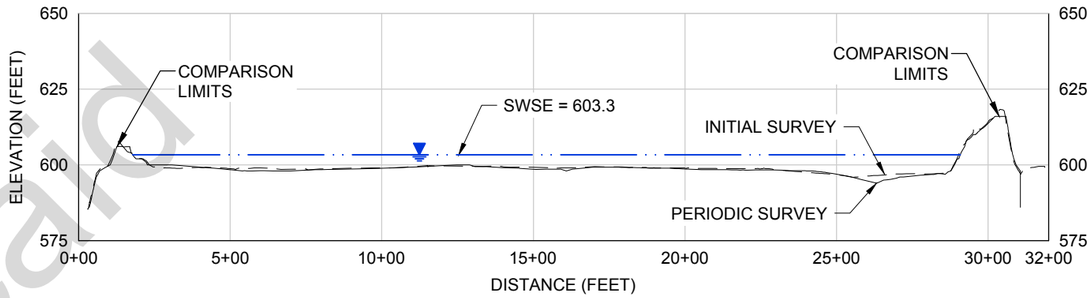




SECTION A



SECTION B

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ISOPACH CONTOUR KEY		
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	-10	-8
	-8	-6
	-6	-4
	-4	-2
	-2	0
	0	2
	2	4
	4	6
	6	8
	8	10
	10	12

NOTES:

1. THE INITIAL SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - KINCAID TOPOGRAPHY”, PREPARED BY WEAVER CONSULTANTS GROUP, DATED DECEMBER 1, 2015.
2. THE PERIODIC SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “LUMINANT, KINCAID GENERATION, LLC, KINCAID POWER STATION, DECEMBER 2020 TOPOGRAPHY”, PREPARED BY INGENAE, DATED FEBRUARY 26, 2021.
3. ALL SURVEY DATA WAS COLLECTED IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AND NORTH AMERICAN DATUM OF 1983 (NAD83) FOR VERTICAL AND HORIZONTAL COORDINATES, RESPECTIVELY.
4. THE STARTING WATER SURFACE ELEVATION (SWSE) OF THE KINCAID ASH POND IS EL. 603.3 FT, AS NOTED IN THE REPORT TITLED “CCR CERTIFICATION REPORT: INITIAL STRUCTURAL STABILITY ASSESSMENT, INITIAL SAFETY FACTOR ASSESSMENT, AND INITIAL INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN FOR KINCAID ASH POND AT KINCAID POWER STATION”, PREPARED BY AECOM, DATED OCTOBER, 2016.

INITIAL TO PERIODIC SURVEY COMPARISON SUMMARY			
SURFACE IMPOUNDMENT	CUT	FILL	NET (CU. YD.)
ASH POND	172,876	95,205	77671 (CUT)
ABOVE SWSE	116,014	66,972	49,042 (CUT)
BELOW SWSE	56,953	28,133	28,819 (CUT)

SURVEY COMPARISON ISOPACH ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

Geosyntec consultants

DRAWING 2

GLP8027.07 | JULY 2021

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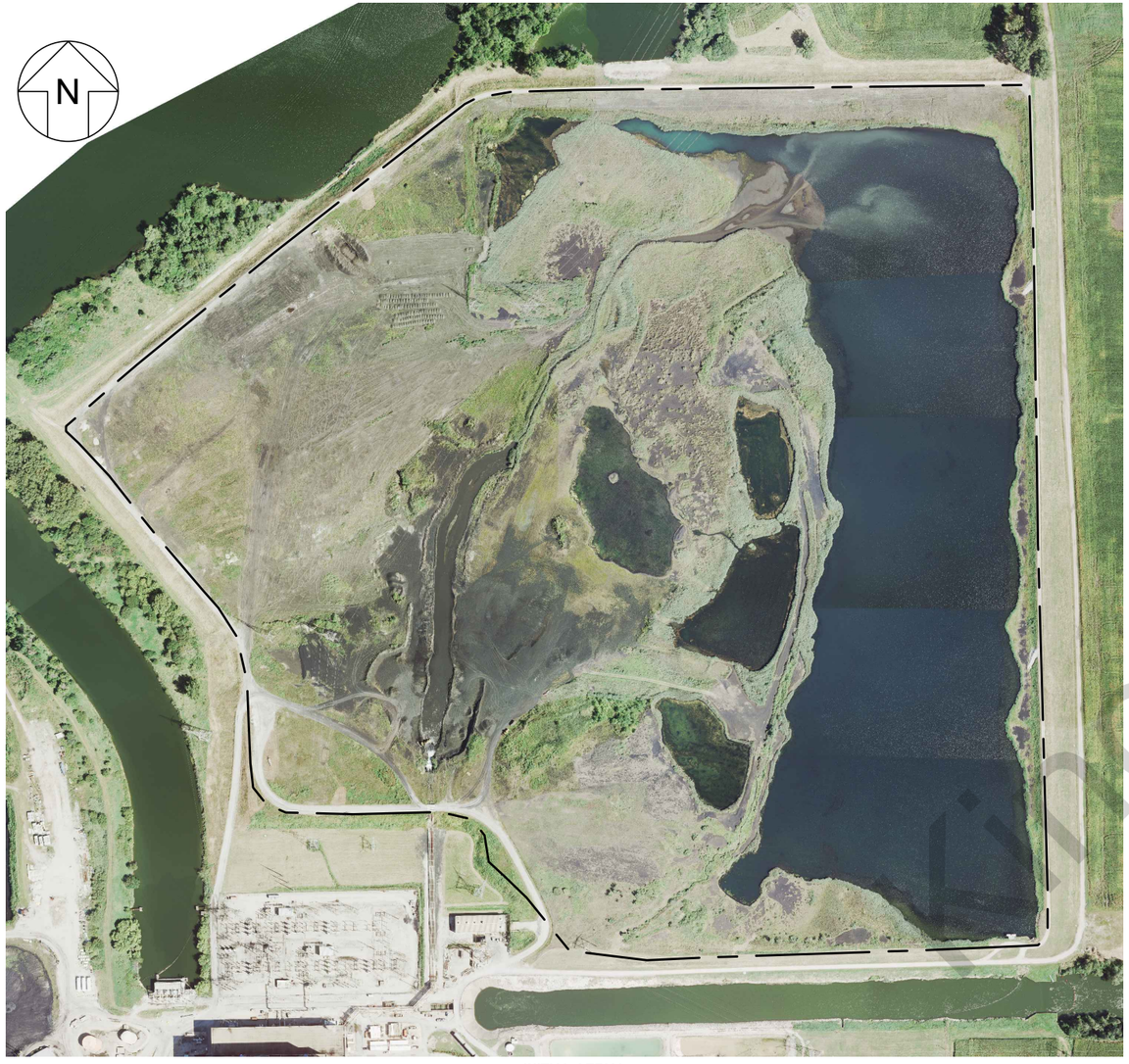

INITIAL AERIAL
12-01-2015 IMAGERY

PERIODIC AERIAL
02-26-2021 IMAGERY

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SCALE IN FEET

NOTES:

1. THE INITIAL IMAGERY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - KINCAID TOPOGRAPHY”, PREPARED BY WEAVER CONSULTANTS GROUP, DATED DECEMBER 1, 2015.
2. THE PERIODIC IMAGERY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “LUMINANT, KINCAID GENERATION, LLC, KINCAID POWER STATION, DECEMBER 2020 TOPOGRAPHY”, PREPARED BY INGENAE, DATED FEBRUARY 26, 2021.

INITIAL TO PERIODIC AERIAL IMAGERY COMPARISON
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

Geosyntec consultants

DRAWING 3

GLP8027.07 | MAY 2021

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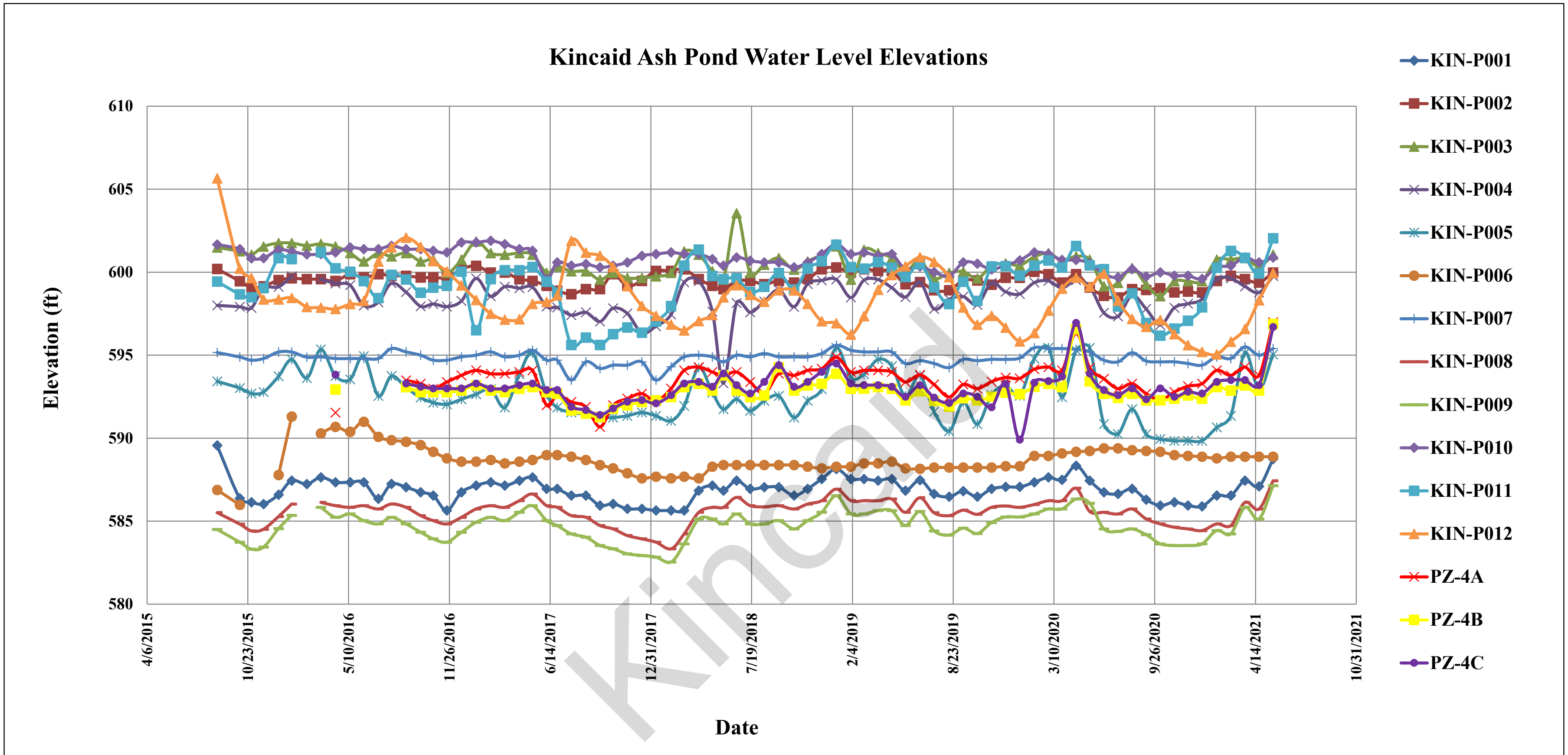
ATTACHMENTS

Attachment A

Ash Pond Piezometer Data Plots



NOTES:

1. Piezometer data was taken from the spreadsheet titled "2021 Piezometer Spreadsheet", provided by the Kincaid Power Station.

PIEZOMETER DATA PERIODIC CERTIFICATION KINCAID POWER STATION KINCAID, ILLINOIS		ATTACH.
Geosyntec consultants		A
GLP8027	6/24/2021	

Attachment B

Ash Pond Site Visit Photolog

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 01

Date: 06/10/2021

Direction Facing: West

Comments: Typical crest along the southern berm, north of the power station.

Photo: 02

Date: 06/10/2021

Direction Facing: South

Comments: Power station south of the ash pond.

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 03 **Date:** 06/10/2021 **Direction Facing:** West **Comments:** Crest view of steep and uneven slopes of the southern berm, north of the power plant. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.	
Photo: 04 **Date:** 06/10/2021 **Direction Facing:** West **Comments:** Erosion rills and bulging at southern berm toe. Straw laid. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.	

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 05

Date: 06/10/2021

Direction Facing: Northeast

Comments: 4- to 6-inch wide apparent animal borrows on slope. Straw laid in the area.

Photo: 06

Date: 06/10/2021

Direction Facing: West

Comments: Crest view of southern berm.

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 07

Date: 06/10/2021

Direction Facing: South

Comments: Typical perimeter berm slope along north-south access road.

Photo: 08

Date: 06/10/2021

Direction Facing: Northwest

Comments: Typical southwest perimeter berm slope. Slope is steep with some irregularities and some depressions. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 09 **Date:** 06/10/2021 **Direction Facing:** Northwest **Comments:** Location of settlement noted in the History of Construction (AECOM, 2016) and mitigated at the southwestern berm crest. No indication of settlement observed during this site observation.	
Photo: 10 **Date:** 06/10/2021 **Direction Facing:** Southwest **Comments:** 6-foot wide by 8-inch deep depression along the southwestern berm roughly 400 feet northwest of KIN-P006. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.	

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Kincaid Generation, LLC	**Project Number:** GLP8027
CCR Unit: Ash Pond	**Site Location:** Kincaid Power Plant

Photo: 11 **Date:** 06/10/2021 **Direction Facing:** Northeast **Comments:** Typical northwestern perimeter berm slope. Slopes are steep with areas of irregularity. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.	
Photo: 12 **Date:** 06/10/2021 **Direction Facing:** Southeast **Comments:** Steep slope and minor depression at the edge of the crest. Located roughly 800 feet southwest of KIN-P007. See Photo 13. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.	

GEOSYNTEC CONSULTANTS	
Site Owner: Dynegy Kincaid Generation, LLC	**Project Number:** GLP8027
CCR Unit: Ash Pond	**Site Location:** Kincaid Power Plant

Photo: 13 **Date:** 06/10/2021 **Direction Facing:** Southwest **Comments:** Crest view of depression and steep slope. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.	
Photo: 14 **Date:** 06/10/2021 **Direction Facing:** Southeast **Comments:** Steep slope and 8-foot by 6-inch depression located roughly 400 feet southwest of KIN-P007. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.	

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Kincaid Generation, LLC | **Project Number:** GLP8027

CCR Unit: Ash Pond | **Site Location:** Kincaid Power Plant

Photo: 15

Date: 06/10/2021

Direction Facing: Southwest

Comments: Disturbed area from apparent monitoring well installation.

Photo: 16

Date: 06/10/2021

Direction Facing: Northeast

Comments: Steep slope along the northwestern portion of the ash pond where the riverside bench is minimal. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 17

Date: 06/10/2021

Direction Facing: Northeast

Comments: Apparent riprap buttress along perimeter berm slope located along the northwestern portion of the ash pond where the riverside bench is minimal. The riprap appears to have been overgrown.

Photo: 18

Date: 06/10/2021

Direction Facing: Northeast

Comments: Riprap erosion protection.

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 19

Date: 06/10/2021

Direction Facing: Northeast

Comments: 20-foot long / wide depression of the perimeter berm slope located along the northwestern portion of the ash pond where the riverside bench is minimal. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.

Photo: 20

Date: 06/10/2021

Direction Facing: Southwest

Comments: Typical crest view of northwestern perimeter berm.

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 21 **Date:** 06/10/2021 **Direction Facing:** Northeast **Comments:** Typical crest view of northern perimeter berm.	
Photo: 22 **Date:** 06/10/2021 **Direction Facing:** Northeast **Comments:** Typical toe view of northern perimeter berm.	

GEOSYNTEC CONSULTANTS

Geosyntec consultants

Site Owner: Kincaid Generation, LLC	**Project Number:** GLP8027
CCR Unit: Ash Pond	**Site Location:** Kincaid Power Plant

Photo: 23 **Date:** 06/10/2021 **Direction Facing:** South **Comments:** Toe view of depressions and bulging along northern perimeter berm. Slopes previously noted in the initial site investigation by AECOM and not considered a change in site conditions.	
Photo: 24 **Date:** 06/10/2021 **Direction Facing:** N/A **Comments:** Straw and gravel filling on toe along northern perimeter berm.	

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Dynegy Kincaid Generation, LLC	**Project Number:** GLP8027
CCR Unit: Ash Pond	**Site Location:** Kincaid Power Plant

Photo: 25 **Date:** 06/10/2021 **Direction Facing:** South **Comments:** Crest view of eastern perimeter berm with straw on the slope and gravel along the toe.	
Photo: 26 **Date:** 06/10/2021 **Direction Facing:** South **Comments:** Crest view of eastern perimeter berm.	

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 27

Date: 06/10/2021

Direction Facing: East

Comments: Outfall east of ash pond.

Photo: 28

Date: 06/10/2021

Direction Facing: Northeast

Comments: Southeast corner of ash pond.

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 29

Date: 06/10/2021

Direction Facing: Northeast

Comments: Screen house at southeast corner of ash pond.

Photo: 30

Date: 06/10/2021

Direction Facing: South

Comments: Emergency spillway south of ash pond.

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Kincaid Generation, LLC **Project Number:** GLP8027

CCR Unit: Ash Pond **Site Location:** Kincaid Power Plant

Photo: 31

Date: 06/10/2021

Direction Facing: Northeast

Comments: Two busted outflow pipes south of the ash pond.

Attachment C

Periodic History of Construction Report Update Letter

Geosyntec consultants

1 McBride and Son Center Drive, Suite 202
Chesterfield, MO 63005
PH 636-812-0800
www.geosyntec.com

October 11, 2021

Kincaid Generation, LLC
199 IL-104
Kincaid, Illinois 62540

Subject: Periodic History of Construction Report Update Letter
USEPA Final CCR Rule, 40 CFR §257.73(c)
Kincaid Power Plant
Kincaid, Illinois

At the request of Kincaid Generation, LLC (KG), Geosyntec Consultants (Geosyntec) has prepared this Letter to document updates to the Initial History of Construction (HoC) report for the Kincaid Power Plant (KPP), also known as the Kincaid Power Station (KIN). The Initial HoC report was prepared by AECOM in October of 2016 [1] in accordance with 40 Code of Federal Regulations (CFR) §257.73(c) of the United States Environmental Protection Agency (USEPA) Coal Combustion Residuals Rule, known as the CCR Rule [2]. This letter also includes information required by Section 845.220(a)(1)(B) (Design and Construction Plans) of the state-specific Illinois Environmental Protection Agency (IEPA) Part 845 CCR Rule [3] that is not expressly required by §257.73(c).

BACKGROUND

The CCR Rule required that, by October 17, 2016, Initial HoC reports to be compiled for existing CCR surface impoundments with: (1) a height of five feet or more and a storage volume of 20 acre-feet or more, or (2) a height of 20 feet or more. The Initial HoC report was required to contain, to the extent feasible, the information specified in 40 CFR §257.73(c)(1)(i)-(xii). The Initial HoC report for KPP, which included the existing CCR surface impoundment, the Ash Pond (AP), was prepared and subsequently posted to KG's CCR Website prior to October 17, 2016.

The CCR Rule requires that the Initial HoC to be updated if there is a significant change to any information complied in the Initial HoC report, as listed below:

§ 257.73(c)(2): If there is a significant change to any information complied under paragraph (c)(1) of this section, the owner or operator of the CCR unit must update the relevant information and place it in the facility's operating record as required by § 257.105(f)(9).

KG retained Geosyntec to review the Initial HoC report, review reasonably and readily available information for the AP generated since the Initial HoC report was prepared, and perform a site visit to KPP to evaluate if significant changes may have occurred since the Initial HoC report was prepared. This Letter contains the results of Geosyntec's evaluation and documents significant changes that have occurred at the AP and KPP, as they pertain the requirements of §257.73(c)(1)(i)-(xii).

UPDATES TO HISTORY OF CONSTRUCTION REPORT

Geosyntec's evaluation for the KPP AP determined that no known significant changes requiring updates to the information in the Initial HoC report pertaining to §257.73(c)(1)(ii)-(viii) and §257.73(c)(1)(xi)-(xii) of the CCR Rule had occurred since the Initial HoC report was developed.

However, Geosyntec's evaluation determined that significant changes at the KPP AP pertaining to §257.73(c)(1)(i) and (ix)-(x) of the CCR Rule had occurred since the Initial HoC report had been developed. Additionally, information how long the CCR surface impoundments have been operating and the types of CCR in the surface impoundments, as required by Section 845.220(a)(1)(B) of the Part 845 Rule were not included in the Initial HoC report, as this information is not required by the CCR Rule. Each change and the subsequent updates to the Initial HoC report is described within this section.

Section 845.220(a)(1)(B): A statement of … how long the CCR surface impoundment has been in operation, and the types of CCR that have been placed in the surface impoundment.

East Ash Pond

The AP is in operation since 1965. As of the date of this report, the AP has been present for approximately 56 years [4].

CCR placed in the AP is being used to store and dispose of sluiced bottom ash and to clarify other non-CCR waste streams to be used as recycled water for plant operations. Newly placed ash is recovered by a third party and recycled for beneficial use. [4].

§ 257.73(c)(1)(i): The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state.

A State identification number (ID) for the AP has been assigned by the Illinois Environmental Protection Agency (IEPA). The ID is listed in **Table 1**.

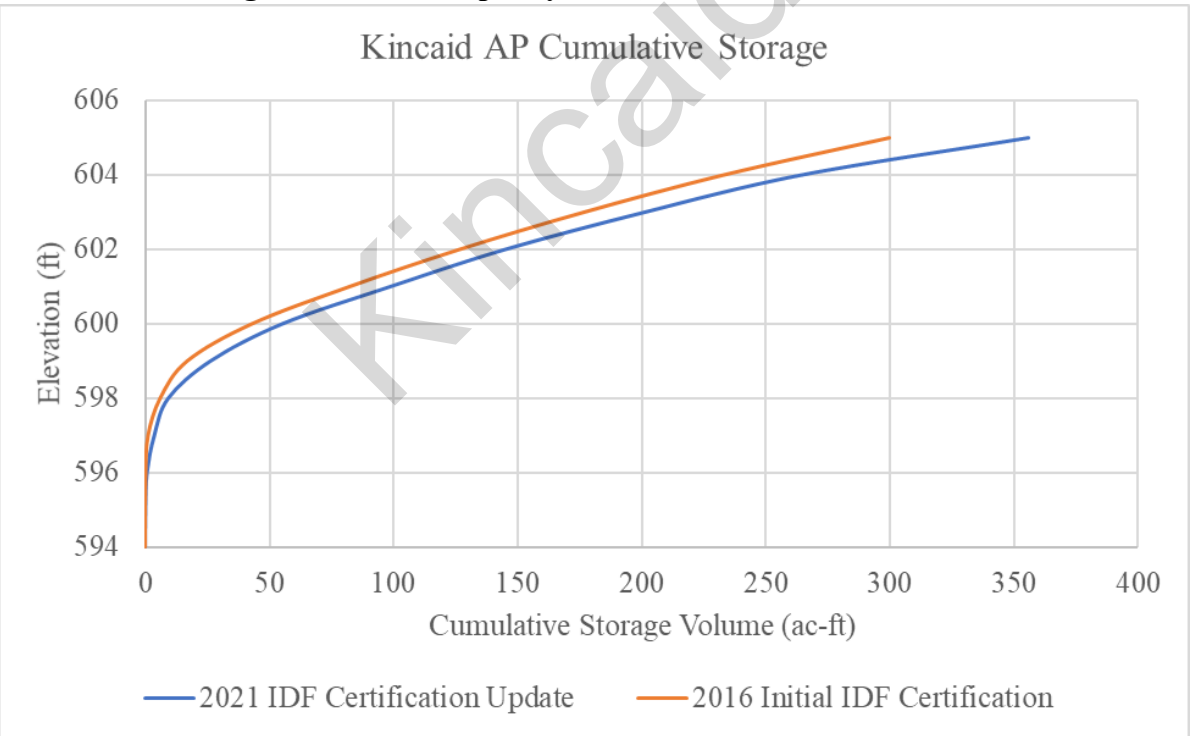
Table 1 – IEPA ID Numbers

CCR Surface Impoundment	State ID
Ash Pond (AP)	W0218140002-01

§ 257.73(c)(1)(ix): Area-capacity curves for the CCR unit.

An updated area-capacity curve was prepared for the AP in 2021. This curve is provided in **Figure 1**.

Figure 1 – Area-Capacity Curve for the Ash Pond



§ 257.73(c)(1)(x): A description of each spillway and diversion design features and capacities and calculations used in their determination.

Updated discharge capacity calculations for the existing spillway were prepared in 2021 using HydroCAD 10 modeling software. The calculations indicate that the AP has

sufficient storage capacity and will not overtop the embankments during the 1,000-year, 24-hour, storm event. The results of the calculations are provided in **Table 2**.

Table 2 – Results of Updated Discharge Capacity Calculations

	Ash Pond
Approximate Berm Minimum Elevation[1], ft	604.5
Approximate Emergency Spillway Elevation[1], ft	Not Applicable
Starting Water Surface Elevation[1] (SWSE), ft	601.8
Peak Water Surface Elevation[1] (PWSE), ft	603.8
Time to Peak, hr	16
Surface Area[2], ac	65.0
Storage[3], ac-ft	115.1

Notes:
[1]Elevations are based on the NAVD88 datum
[2]Surface Area is defined as the water surface area at the PWSE
[3]Storage is defined as the volume between the SWSE and PWSE

CLOSING

This letter has been prepared to document Geosyntec's evaluation of changes that have occurred at the AP at the KPP since the Initial HoC was developed, based on reasonably and readily available information provided by KG, observed by Geosyntec during the site visit, or generated by Geosyntec as part of subsequent calculations.

Sincerely,

Thomas Ward, P.E.
Senior Engineer

John Seymour, P.E.
Senior Principal

REFERENCES

[1] AECOM, "History of Construction, USEPA 40 CFR § 257.73(c), Kincaid Power Station, Kincaid, Illinois," October 2016.

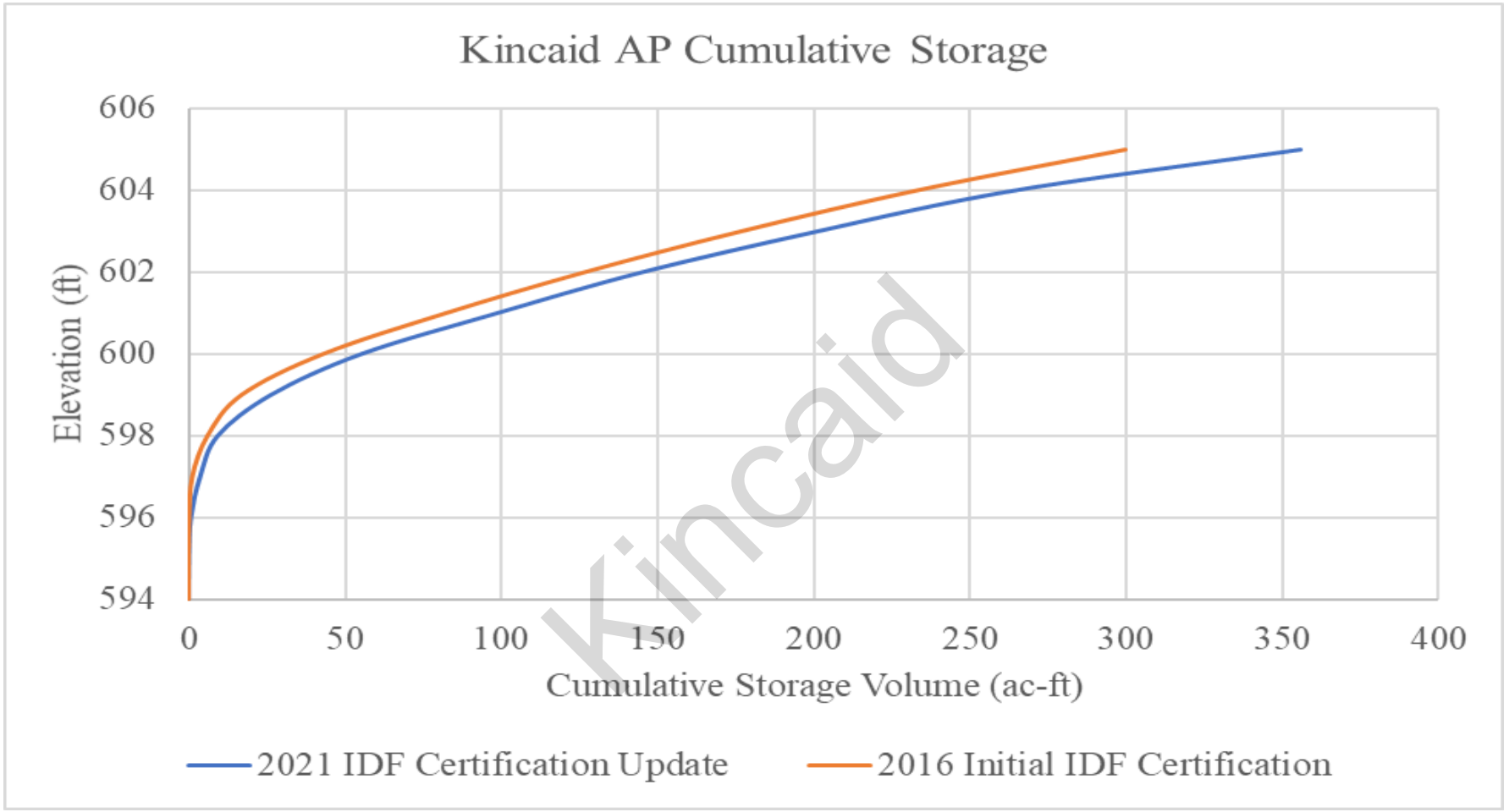
[2] United Stated Environmental Protection Agency, "40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities, Final Rule, 2015," 2015.

[3] Illinois Environmental Protection Agency, "35 Ill. Adm. Code Part 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments," Springfield, IL, 2021.

[4] AECOM, "History of Construction, USEPA Final CCR Rule, 40 CFR § 257.73(c), Hennepin Power Station, Hennepin, Illinois," October 2016.

Attachment D

Periodic Inflow Design Flood Control System Plan Analyses

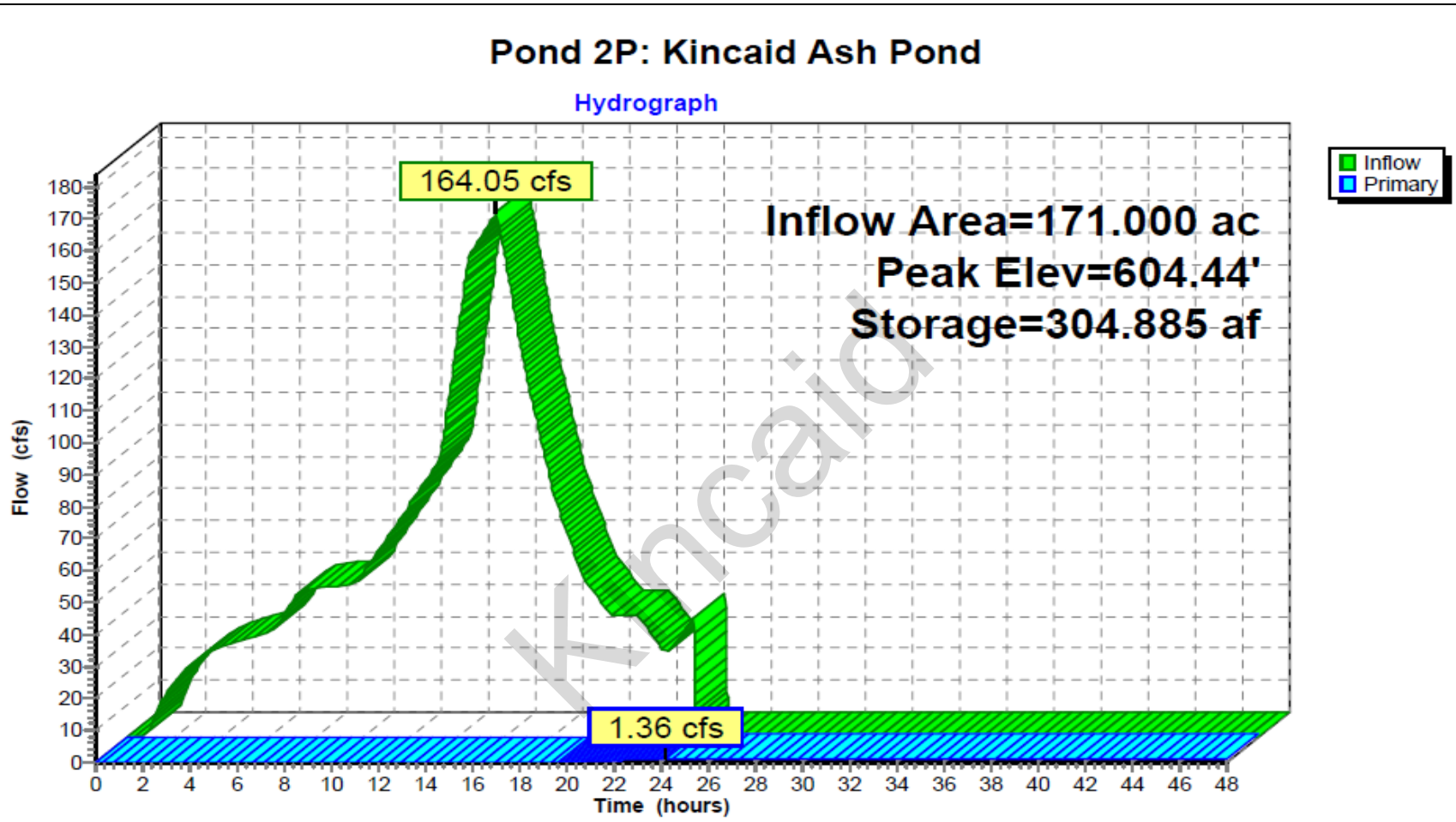


KINCAID AP CUMULATIVE STORAGE
PERIODIC CERTIFICATION
KINCAID POWER PLANT
KINCAID, ILLINOIS

Geosyntec consultants

Figure D-1

GLP8027 | 8/30/2021



ASH POND IDF HYDROGRAPH
PERIODIC CERTIFICATION
KINCAID POWER PLANT
KINCAID, ILLINOIS

Geosyntec consultants

Figure D-2

GLP8027 | 8/30/2021

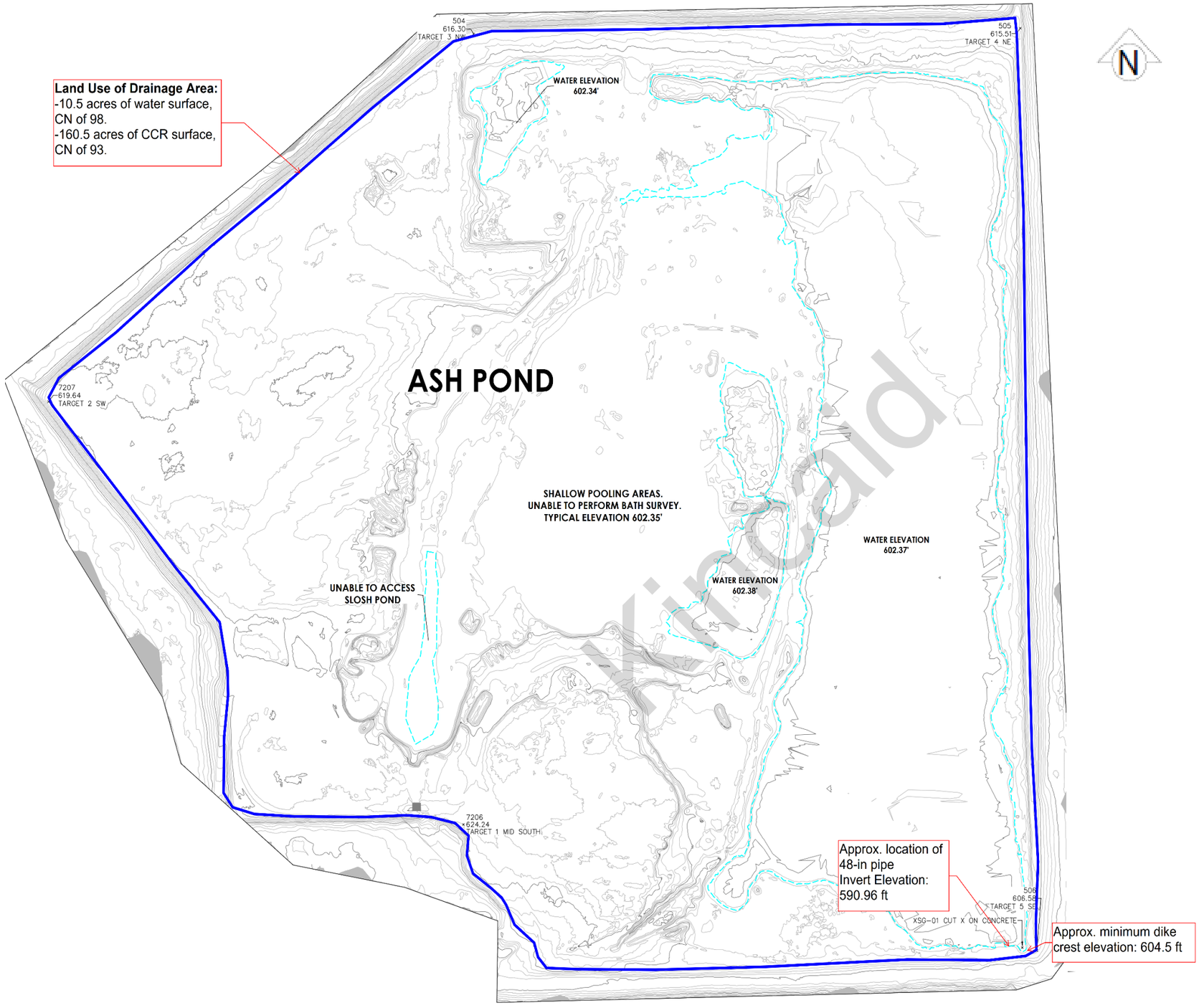


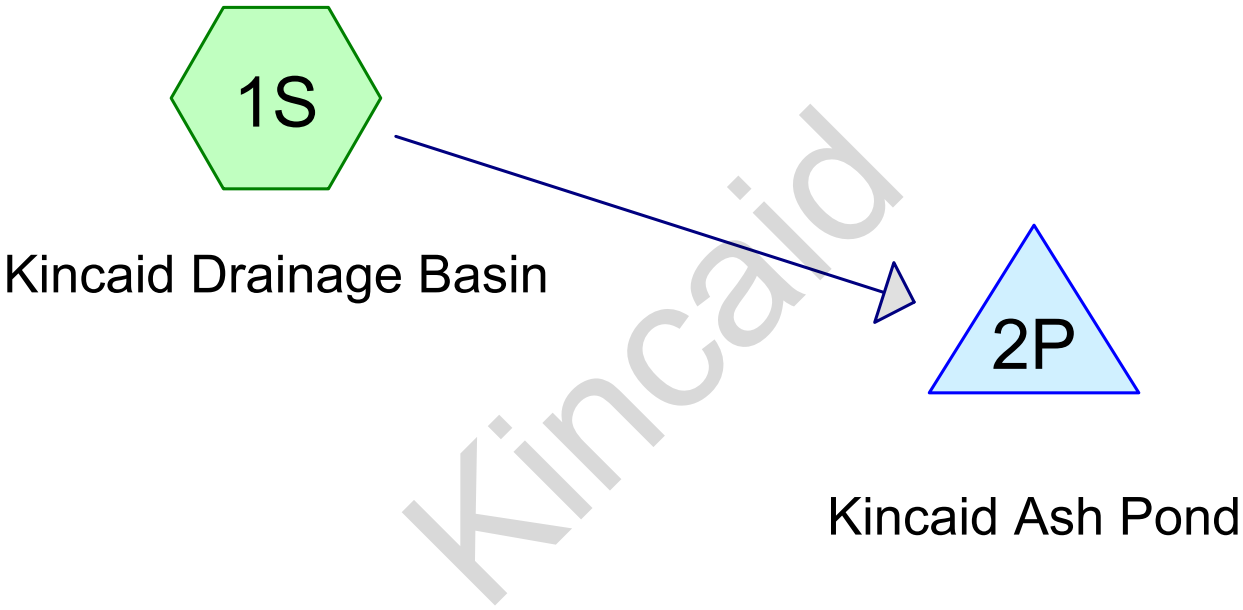
Figure based on IngenAE 2020 Site Topo

NOT TO SCALE

Kincaid Power Station Ash Pond
Hydrologic Workmap

Geosyntec consultants

GLP8027	August 2021	**Figure D-3**



Subcat Reach Pond Link

Routing Diagram for 2021-08_Kincaid_H&H Model_Periodic Review_SWSE_602.8

Prepared by SCCM, Printed 8/26/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
160.500	93	CCR Surface (1S)
10.500	98	Water Surface (1S)
171.000	**93**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
171.000	Other	1S
171.000		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	160.500	160.500	CCR Surface	1S
0.000	0.000	0.000	0.000	10.500	10.500	Water Surface	1S
0.000	**0.000**	**0.000**	**0.000**	**171.000**	**171.000**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2P	590.96	590.00	158.0	0.0061	0.025	48.0	0.0	0.0

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Kincaid Drainage Basin Runoff Area=171.000 ac 6.14% Impervious Runoff Depth=8.08"
Tc=6.0 min CN=93 Runoff=164.05 cfs 115.093 af

Pond 2P: Kincaid Ash Pond Peak Elev=604.44' Storage=304.885 af Inflow=164.05 cfs 115.093 af
Outflow=1.36 cfs 2.632 af

Total Runoff Area = 171.000 ac Runoff Volume = 115.093 af Average Runoff Depth = 8.08"
93.86% Pervious = 160.500 ac 6.14% Impervious = 10.500 ac

Summary for Subcatchment 1S: Kincaid Drainage Basin

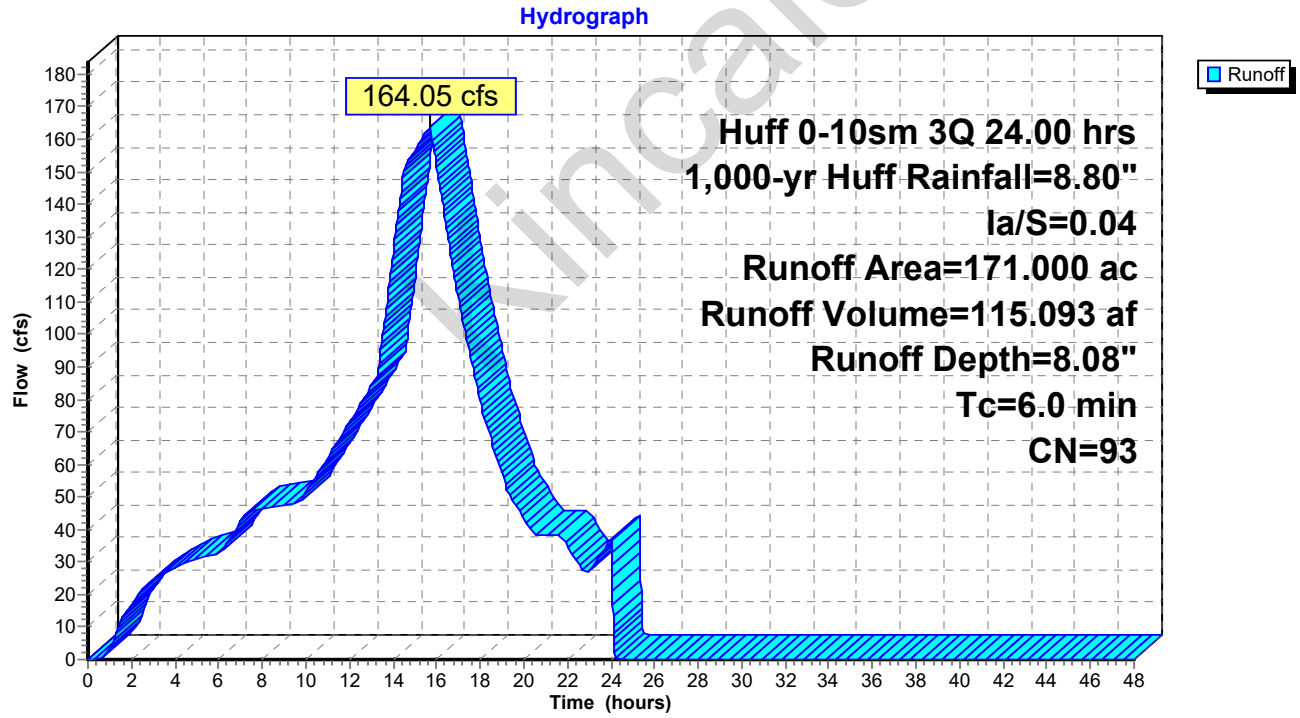
Runoff = 164.05 cfs @ 15.66 hrs, Volume= 115.093 af, Depth= 8.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Huff 0-10sm 3Q 24.00 hrs 1,000-yr Huff Rainfall=8.80", Ia/S=0.04

	Area (ac)	CN	Description
*	10.500	98	Water Surface
*	160.500	93	CCR Surface
	171.000	93	Weighted Average
	160.500		93.86% Pervious Area
	10.500		6.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Rainfall Directly Into Impoundment**

Subcatchment 1S: Kincaid Drainage Basin



Summary for Pond 2P: Kincaid Ash Pond

Inflow Area = 171.000 ac, 6.14% Impervious, Inflow Depth = 8.08" for 1,000-yr Huff event
Inflow = 164.05 cfs @ 15.66 hrs, Volume= 115.093 af
Outflow = 1.36 cfs @ 24.19 hrs, Volume= 2.632 af, Atten= 99%, Lag= 512.0 min
Primary = 1.36 cfs @ 24.19 hrs, Volume= 2.632 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 602.80' Surf.Area= 0.000 ac Storage= 190.055 af
Peak Elev= 604.44' @ 24.19 hrs Surf.Area= 0.000 ac Storage= 304.885 af (114.830 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 1,227.5 min (2,062.4 - 834.9)

Volume	Invert	Avail.Storage	Storage Description
#1	594.00'	452.335 af	**Custom Stage Data_2021** Listed below

Elevation (feet)	Cum.Store (acre-feet)
594.00	0.000
595.00	0.141
596.00	0.766
597.00	3.702
598.00	9.361
599.00	26.387
600.00	55.333
601.00	98.783
602.00	145.198
603.00	201.269
604.00	264.392
605.00	355.929
606.00	452.335

Device	Routing	Invert	Outlet Devices
#1	Primary	590.96'	**48.0" Round Culvert** L= 158.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 590.96' / 590.00' S= 0.0061 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 12.57 sf
#2	Device 1	604.30'	**9.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.35 cfs @ 24.19 hrs HW=604.44' (Free Discharge)
↑—**1=Culvert** (Passes 1.35 cfs of 155.52 cfs potential flow)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.35 cfs @ 1.06 fps)

Pond 2P: Kincaid Ash Pond