2021 USEPA CCR RULE PERIODIC OPERATING RECORD RUN-ON AND RUN-OFF CONTROL PLAN REVIEW REPORT §257.81 CCR LANDFILL Hennepin Power Plant Hennepin, Illinois

Submitted to

Dynegy Midwest Generation, LLC

1500 Eastport Plaza Drive Collinsville, Illinois 62234

Submitted by



consultants

engineers | scientists | innovators

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

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EXECUTIVE SUMMARY

This Periodic Operating Record Run-on and Run-off Control Plan Review Report (Report) for the CCR Landfill (LF) at the Hennepin Power Plant (HPP), also referred to as Hennepin Power Station (HEN), 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 run-on and run-off control system plans for existing CCR landfills, completed in 2016 [2], be updated on a five-year basis. All reviews are to be posted on the Dynegy Midwest Generation, LLC (DMG) CCR Website.

The review concluded that no significant updates to the existing run-on and run-off control plan are required. The initial run-on and run-off control system plan developed in 2016 [2] was independently reviewed by Geosyntec. Field observations, interviews with plant staff, and evaluations were performed to evaluate conditions in 2021 relative to the 2016 initial run-on and run-off control plan [2]. The current conditions do not indicate changes are necessary because there are no significant observed changes at the LF since development of the initial plan that would potentially affect the runoff control system plan. **Table 1** provides a summary of the initial 2016 run-on and run-off control plan [2] and conditions observed in 2021.

		2016 Initial Certification		2021 Periodic Certification	
CCR Rule Requirement		Requirement		Requirement	
Reference	Summary	Met?	Comments	Met?	Comments
§257.81	Prevent flow onto	Yes	The LF is separated from adjacent water bodies	Yes	No changes were identified that may affect this
(a)(1)	the active portion of		and other CCR units by stormwater ditches; these		requirement.
	the CCR unit during		structures are designed based on hydraulic		
	peak discharge		calculations for at least the 25-yr, 24-hr storm		
	from a 24-hr, 25-yr		event [2].		
	storm.				
§257.81	Collect and control	Yes	Run-off from active portions of the LF drained	Yes	No changes were identified that may affect this
(a)(1)	run-off from the		into the leachate collection system and is routed		requirement.
	active portion of the		into the Leachate Pond; these structures are		
	CCR unit during the		designed based on hydraulic calculations to		
	24-hr, 25-yr storm.		convey flow for at least the 25-yr, 24-hr storm		
			event [2].		
§257.82(b)	Handle run-off	Yes	Run-off from the LF is routed to NPDES-	Yes	No changes were identified that may affect this
	from the active		permitted Outfall 003, which includes specific		requirement.
	portion of the CCR		permit requirements related to §257.3-3 [2].		
	Unit in accordance				
	with surface water				
	requirements under				
	the Clean Water				
	Act (40 CFR				
	§257.3-3)				

Table 1 – Periodic Run-on and Run-off Control System Plan Review

INTRODUCTION AND BACKGROUND

This Periodic Operating Record Run-on and Run-off Control Plan Review Report (Report) was prepared by Geosyntec Consultants (Geosyntec) for Dynegy Midwest Generation, LLC (DMG). The review is required by the United States Environmental Protection Agency (USPA) Coal Combustion Residual (CCR) Rule [1] to document compliance with the CCR Rule for the CCR Landfill (LF) [2] at the Hennepin Power Plant (HPP), which is also known as the Hennepin Power Station (HEN).

HPP is located at 13498 East 800th Street in Hennepin, Illinois, 61327. The location of HPP is illustrated in **Figure 1**, and a site plan showing the location of the LF, among other closed and open CCR and non-CCR surface impoundments, is provided in **Figure 2**.



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

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Figure 2 – Site Plan

1.1 Landfill Description

The LF is approximately 4.5 acres in size and was constructed in 2011 over an inactive portion of East Ash Pond No. 2 (EAP#2). The LF has a composite liner, including a secondary 3-ft thick compacted clay liner with a hydraulic conductivity of no more than 1×10^{-7} cm/sec and an overlying a 60-mil high-density polyethylene (HDPE) geomembrane primary liner. A leachate collection system (LCS) was installed on top of the liner to direct leachate from the LF into the adjacent Leachate Pond (a non-CCR surface impoundment) [3]; the LCS consists of a 12-in thick layer of sand with embedded perforated collection pipes.

The LF was constructed for the disposal of CCR generated at HPP. However, CCR was never placed in the LF for disposal ([4], [5], [6], [7], [8], [9]). Approximately 7,500 cubic yards (CY)

of bottom ash was placed over the top of the leachate collection layer in 2011 to reduce the potential for frost damage to the underlying compacted clay secondary liner system. The bottom ash was placed to a thickness of at least one foot in all areas and placed up to two feet thick over leachate collection pipes. A filter fabric geosynthetic separator was placed between the bottom ash and the existing leachate collection system [10]. No material has been placed in the LF since the bottom ash was placed.

The initial run-on and run-off control system plan (§257.81) was completed by Hanson Professional Services, Inc. (Hanson) in 2016 and subsequently posted to DMG's CCR Website [2]. Additional documentation for the initial plan, including calculations and other information, was prepared by Hanson [11] but not posted to DMG's CCR Website.

1.2 <u>Report Objectives</u>

The objectives of this report are to:

- Compare site conditions from 2015/2016, when the initial run-on and run-off control system plan ([2], [11]) was prepared, to current site conditions in 2020/2021, and evaluate if updates are required to the initial plan based on changes at the site.
- Independently review the initial run-on and run-off control plan ([2], [11]) to determine if updates may be required based on technical considerations.
- Confirm that the LF meets all of the requirements associated with §257.81, or, if the LF does not meet any of the requirements, provide recommendation for compliance with that section of the CCR Rule [1].

COMPARISION OF INITIAL AND PEROIDIC SITE CONDITIONS

2.1 <u>Overview</u>

This section describes the comparison of conditions at the LF 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 <u>Review of Annual Inspection Reports</u>

Annual onsite inspections of the LF were performed between 2015 and 2020 ([4], [5], [6], [7], [8], [9]) and were certified by a licensed professional engineer in accordance with §257.84(b). Each inspection report stated that the following information, relative to the previous inspection:

- No changes in geometry were present,
- The LF did not receive any new CCR,
- No appearances of actual or potential structural weakness of the CCR were observed,
- No existing conditions were occurring that were or had the potential to disrupt the operation or safety of the LF, and
- No other changes were observed which may have affected the ability or operation of the LF.

In summary, the reports did not indicate any significant changes to the LF between 2015 and 2020. No CCR or other material was observed to have been placed in the LF during this time.

2.3 <u>Comparison of Initial and Periodic Surveys</u>

The initial survey of the LF, conducted at the site by Weaver Consultants (Weaver) in 2015 [12], was compared to the periodic survey of the LF, conducted by IngenAE, LLC (IngenAE) in 2020 [13], using AutoCAD Civil3D 2021 software. This comparison was intended to quantify changes in the volume of CCR placed within the LF, evaluate potential changes in surface stormwater drainage around the LF, and evaluate if CCR may have been placed outside of the grades of the LF used for the existing run-on, run-off control plan [2]. This comparison is presented in a plan view side-by-side of the surveys in **Drawing 1** and an isopach map denoting changes in ground surface elevation in **Drawing 2**. A summary of the changes in CCR volumes is provided in **Table 2**.

Tuble 2 Comparison of Initial to Ferroure Sur	vey
Total Change in CCR Volume (CY)	-2,304 (Cut)
Were there significant changes in exterior stormwater drainage?	Yes
Was CCR placed outside of the design grades of the LF?	No

The comparison indicated that there was approximately 2,300 CY less CCR in 2015 compared to 2021. However, no known waste was removed from the LF during this time, as indicated by the annual inspection reports ([4], [5], [6], [7], [8], [9]). Therefore, the apparent difference in CCR volumes may be due to differences in the survey data which was collected utilizing by different methods. Changes in surface grades in adjacent EAP#2 did occur, as EAP#2 was closed in 2020 [14], however stormwater flow within EAP#2 is directed away from the LF and is routed towards a series of ditches, channels, and downchutes within EAP#2 that drain away from the LF [14]. The comparison did not indicate that CCR had been placed outside the design grades of the LF [15].

2.4 <u>Comparison of Initial to Periodic Aerial Photography</u>

Initial aerial photographs of the LF collected by Weaver Consultants in 2015 [12] were compared to periodic aerial photographs collected by IngenAE, LLC in 2020 [13] to visually evaluate if potential site changes (i.e., construction of new ditches, changes in site operations, or changes to other appurtenances) may have occurred between 2015 and 2020. A comparison of these aerial photographs is provided in **Drawing 3**, and the following changes were identified:

- Adjacent CCR surface impoundments, including EAP#2 and EAP#4, were closed. This included tying in the final cover system of EAP#2 into the bottom liner of the LF and constructing a new gravel access road along the western side of the LF.
 - These changes are not expected to affect run-on, run-off control at the LF as they occurred outside of the perimeter ditches and these other CCR surface impoundments drain away from the LF [14].

2.5 <u>Comparison of Initial to Periodic Site Visits</u>

An initial site visit to the LF was conducted by AECOM in 2015 and documented in a Site Visit Summary and corresponding photographs [16]. A periodic site visit was conducted by Geosyntec on May 27, 2021, with Mr. Lucas P. Carr, P.E. conducting the site visit. The site visit was intended to evaluate potential changes at the site since development of the initial run-on and run-off control plan [2] (i.e., modifications to stormwater drainage system(s), modifications to adjacent structures that may route run-on towards the landfill), in addition to performing visual observations of the LF and surrounding area to evaluate if potential maintenance to existing run-on and run-off control systems were required. The site visit is documented in a photographic log provided in **Appendix A**. A summary of significant findings from the site visit is provided below:

- Overall site maintenance appeared similar to conditions in 2015 and no changes to the LF were observed.
- Closures were completed for adjacent CCR surface impoundments EAP#2 and EAP#4, These changes are not expected to affect run-on, run-off control at the LF as they occurred outside of the perimeter ditches and these other CCR surface impoundments drain away from the LF [14].

2.6 Interview with Power Plant Staff

An interview with Mr. Jason Stuckey and Mr. Mike Olle of HPP was conducted by Mr. Lucas Carr of Geosyntec on May 27, 2021. At the time of the interview, Mr. Stuckey had been employed at HPP for 14 years and Mr. Olle had been employed at HPP for 13 years. Mr. Stuckey's responsibilities have included performing weekly inspections, managing maintenance, and operating the LF since HPP closed in 2019, and Mr. Olle has supported these efforts. The interview included a discussion of potential changes that may have occurred at the LF since development of the initial run-on and run-off control plans ([2], [11]). A summary of the interview is provided below.

- Were any construction projects completed for the LF since 2015, and, if so, are design drawings and/or details available?
 - o No.
- Have there been any changes to operational and/or maintenance programs for the LF since 2015?
 - o No.
- Have any other changes and the LF occurred since 2015 that may substantially affect the existing run-on and run-off control plan [2]?
 - No, other than the EAP #2 closure, but EAP #2 is lower in elevation than the perimeter of the LF.
- Have there been any instances of uncontrolled stormwater run-on to the LF since 2015?
 - None known.
- Have there been any instances of uncontrolled stormwater run-off from the LF since 2015?
 - None known.

RUN-ON AND RUN-OFF CONTROL PLAN - §257.81

3.1 <u>Overview of Initial RRCSP</u>

The Initial Run-on and Run-off Control System Plan (Initial RRCSP) was prepared by Hanson in 2016 ([2], [11]), following the requirements of §257.81. The Initial RRCSP included the following information

- A description of the run-on control features designed for a 25-year, 24-hour storm event;
- A description of the run-off control features designed for a 24-year, 24-hour storm event;
- Detailed discussion of the calculations supporting the design of the control features; and
- A discussion of National Pollutant Discharge Elimination System (NPDES) permitting for the HPP, as it pertained run-off management; and
- Operation and maintenance procedures to be followed.

The Initial IDF concluded that the LF met the requirements of §257.81, as the run-on control system was designed to prevent flow into the LF, the run-off control system was designed to control and collect water from within the LF, and discharge from the LF was routed to a NPDES-permitted outfall during the 25-year, 24-hour design storm event.

3.2 <u>Review of Initial RRCSP</u>

Geosyntec performed a review of the Initial RRCSP ([2], [11]), in terms of technical approach, input parameters, and assessment of the results. The review included the following tasks:

- Reviewing the rainfall depth and distribution for appropriateness;
- Performing a high-level review of the inputs to the hydrologic modeling;
- Performing a high-level review of the design approach to the hydrologic modeling;
- Reviewing the adequacy of stormwater control features versus the appliable requirements of the CCR Rule; and
- Performing a high-level review of the network of stormwater control features.

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 <u>Summary of Site Changes Affecting Initial RRCSP</u>

No changes between 2015 and 2021 were identified that would require updates to the Initial RRCSP. Updates to the Initial RRCSP are not recommended at this time.

CONCLUSIONS

The LF run-on and run-off controls system plan (§257.81) was evaluated relative to the USEPA CCR Rule periodic assessment requirements. Based on these evaluations, the referenced requirements are satisfied for run-on and run-off control system planning, and updates to the initial run-on and run-off control plan ([2], [11]) are not required at this time.

CERTIFICATION STATEMENT

CCR Unit: Electric Energy Incorporated, Hennepin Power Station, CCR Landfill

I, Lucas P. Carr, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this 2021 USEPA CCR Rule Periodic Certification Report, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the periodic assessment of the run-on and run-off control system plan, dated October 2021, was conducted in accordance with the requirements of 40 CFR §257.81.



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] Hanson Professional Services, Inc., "CCR Rule Report: Run-on and Run-off Control System Plan, Hennepin Power Station CCR Landfill, Putnam County, Illinois," October 2016.
- [3] Civil & Environmental Consultants, Inc., "Phase 1 As-Built Drawings for Hennepin Power Station CCW Landfill, Hennepin, Illinois," Solon, OH, December, 2010.
- [4] D. B. Hoots, Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.84(b), CCR Landfill, Hennepin Power Station, January 15, 2016.
- [5] D. B. Hoots, Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.84(b), CCR Landfill, Hennepin Power Station, January 12, 2017.
- [6] D. B. Hoots, Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.84(b), CCR Landfill, Hennepin Power Station, December 14, 2017.
- [7] D. B. Hoots, Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.84(b), CCR Landfill, Hennepin Power Station, December 10, 2018.
- [8] D. B. Hoots, Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.84(b), CCR Landfill, Hennepin Power Station, January 15, 2015.
- [9] D. B. Hoots, Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.84(b), CCR Landfill, Hennepin Power Station, October 18, 2020.
- [10] Civil & Enviornmental Consultants, Inc., "Construction Documentation, Hennepin Station - Phase 1 Landfill Frost Protection Layer Installation," February 28, 2011.
- [11] Hanson Professional Services, "CCR Rule Report: Run-on and Run-off Documentation Report, Hennepin Power Station CCR Landfill, Putnam County, Illinois," October 2016.
- [12] Weaver Consultants Group, "Dynegy, Collinsville, IL, 2015 Hennepin Topography," Collinsville, IL, December 2015.
- [13] IngenAE, "Luminant, Dynegy Midwest Generation, LLC, Hennepin Power Station, December 2020 Topography," Earth City, Missouri, March 10, 2021.
- [14] Geosyntec Consultants, "DRAFT Construction Certification Report, Closure of Eash Ash Pond No. 2 & No. 4, Hennepin Power Station, Hennepin, Illinois," Chesterfield, MO, March 25, 2021.
- [15] Civil & Environmental Consultants, Inc., "Initial Facility Report, New Coal Combustion Waste Landfill, Hennepin Power Station, Hennepin, Putnam County, Illinois, Engineering & Related Evaluations," Solon, OH, December 2010.
- [16] AECOM, "CCR Unit Initial Site Visit Summary, Dynegy CCR Compliance Program, Hennepin Ash Pond No. 2 and Hennepin Landfill," July 2, 2015.

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DRAWINGS

 $GLP8027 \ HEN_LF_Full_2021_Cert_Report_20211011$





INITIAL TO PERIODIC SURVEY COMPARISON
LANDFILL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Geosynt	DRAWING	
GLP8027.05	MAY 2021	



INITIAL TO PERIODIC SURVEY COMPARISON SUMMARY				
CCR LANDFILL	CUT	FILL	NET (CU. YD.)	
LANDFILL	4,512	2,207	2,304 (CUT)	



INITIAL AERIAL 12-01-2015 IMAGERY PERIODIC AERIAL 03-10-2021 IMAGERY

NOTES:

- 1. THE INITIAL IMAGERY WAS TAKEN FROM THE DRAWING PACKAGE TITLED "DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - HENNEPIN TOPOGRAPHY", PREPARED BY WEAVER CONSULTANTS GROUP, DATED DECEMBER 1, 2015.
- 2. THE PERIODIC IMAGERY WAS TAKEN FROM THE DRAWING PACKAGE TITLED "LUMINANT, DYNEGY MIDWEST GENERATION, LLC, HENNEPIN POWER STATION, DECEMBER 2020 TOPOGRAPHY", PREPARED BY INGENAE, DATED MARCH 10, 2021.





INITIAL TO PERIODIC AERIAL IMAGERY COMPARISON LANDFILL HENNEPIN POWER PLANT HENNEPIN, ILLINOIS Geosyntec[▶] DRAWING consultants 3

GLP8027.05

MAY 2021

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ATTACHMENTS

Attachment A

LF Site Visit Photolog







