

CCR Rule Report:

Run-on Run-off Control System Plan

Joppa Power Station
CCR Landfill, Massac County,
Illinois

*Submitted to Electric Energy, Inc.
October 2016*

Table of Contents

1. Introduction..... 1
 1.1 Site Description 1
 1.2 Design Criteria..... 1
2. Run-on Control 2
3. Run-off Control 2
4. Surface Water Management Structures 3
5. Operation and Maintenance 4
6. NPDES Permitting 4
7. Conclusion 4
8. References 4
9. Certification Page 5

Appendices

Appendix A CCR Landfill Layout Figure

Copyright © 2016 by Hanson Professional Services Inc. All rights reserved. This document is intended solely for the individual or the entity to which it is addressed. The information contained in this document shall not be duplicated, stored electronically, or distributed, in whole or in part, by anyone other than the recipient without the express written permission of Hanson Professional Services Inc., 1525 S. Sixth St., Springfield, IL 62703, (217) 788-2450, www.hanson-inc.com. Unauthorized reproduction or transmission of any part of this document is a violation of federal law. Any concepts, designs and project approaches contained herein are considered proprietary. Any use of these concepts and approaches by others is considered a violation of copyright law.

Run-on and Run-off Control System Plan

1. Introduction

In accordance with 40 CFR 257.81(c), the owner or operator of a Coal Combustion Residuals (CCR) landfill must prepare an initial surface water run-on and run-off control system plan no later than October 17, 2016, and revise the plan every five years. This plan addresses the surface water management for the Joppa Power Station's Coal Combustion Residuals CCR Landfill (CCR Landfill). The surface water controls are designed to collect and route run-off from the final landfill cover and from the CCR Landfill during operation in accordance with 40 CFR 257.81.

1.1 Site Description

The CCR Landfill is located northwest of Joppa, Illinois, and the Joppa Generating Station, and north of the Ohio River in Massac County, Illinois. More specifically, the facility is located within the Southwest quarter of Section 10 of Township 15 South, Range 3 East of the Third Principal Meridian.

The CCR Landfill design consists of approximately 28 acres. At the present time, only 14 acres (Cell L1) of the CCR Landfill have been constructed and these acres remain inactive. The remaining 14 acres (Cell L2) have not yet been developed as a CCR landfill. Refer to Appendix A for a figure of the CCR Landfill layout.

Surface water management features for the CCR Landfill include:

- Run-on from undisturbed areas;
- Run-off from disturbed areas;
- Run-on/run-off from temporary and intermediate CCR Landfill cover;
- Haul road culverts; and
- HDPE-lined Detention Pond and associated discharge structures.

The CCR Landfill is a permit-exempt facility designed, constructed and operated in compliance with all applicable requirements of 35 Ill. Adm. Code 811, 812 and 815. An initial facility report is on file with the Illinois Environmental Protection Agency (IEPA). The stormwater management design of the CCR Landfill was done in compliance with IEPA regulations found in 35 Ill. Adm. Code Section 811.103. These regulations are equal to or more stringent than the requirements set forth in 40 CFR 257.81. Design calculations were performed for the interim and fully constructed and closed conditions, allowing for phased expansion as needed.

1.2 Design Criteria

The 40 CFR 257.81 requirements for run-on and run-off controls for CCR landfills follow.

The owner or operator of an existing or new CCR landfill or any lateral expansion of a CCR landfill must design, construct, operate and maintain:

1. A run-on control system to prevent flow onto the active portion of the CCR unit during the peak discharge from a 25-year, 24-hour storm; and

2. A run-off control system from the active portion of the CCR unit to collect and control at least the water volume resulting from a 25-year, 24-hour storm.

In addition, run-off from the active portion of the CCR unit must be handled in accordance with U.S. Environmental Protection Agency (USEPA) rules governing the discharge of surface water (see 40 CFR Part 257.3-3).

The CCR Landfill is designed, constructed, operated and maintained using criteria either equivalent to or in exceedance of the requirements of 40 CFR 257.81.

2. Run-on Control

The CCR Rule defines run-on to mean any liquid that drains over land onto any part of a CCR landfill or any lateral expansion of a CCR landfill. In surface water hydrology, run-on is a quantity of surface run-off, or excess rain, snowmelt or other sources of water that flows from an upstream catchment area onto a specific downstream location. The CCR Rule requires that a CCR landfill be designed, constructed, operated and maintained to prevent flow onto the active portion of a CCR landfill during the peak discharge from a 25-year, 24-hour storm. The USEPA has adopted this requirement to minimize the amount of surface water entering a CCR landfill and minimize disruption of a CCR landfill's operation because of stormwater inflow.

Surface water run-on is prohibited from entering the active area of the CCR Landfill by perimeter berms and a Temporary Separation Berm, which allow flow to be directed around the active CCR Landfill area. The Temporary Separation Berm is located between Cell L1 (inactive) and Cell L2 (undeveloped).

3. Run-off Control

The CCR Rule defines run-off to mean any liquid that drains over land from any part of a CCR landfill. Effectively, run-off is the portion of rainwater, snowmelt or other liquid that does not infiltrate CCR material and travels overland. Typically, run-off is the product of the inability of water to infiltrate into soil because of the saturation or infiltration rate capacity being exceeded. The CCR Rule requires that a CCR landfill be designed, constructed, operated and maintained to collect and control at least the water volume resulting from a 25-year, 24-hour storm. The owner or operator must design, construct, operate and maintain a CCR landfill in such a way that the maximum run-off rate generated from a 25-year, 24-hour storm must be collected through hydraulic structures, such as drainage ditches, toe drains, swales or other means, and controlled so as to not adversely affect the condition of the CCR landfill. The USEPA has promulgated these requirements to minimize the detention time of run-off on a CCR landfill and minimize infiltration into a CCR landfill, to dissipate stormwater run-off velocity and minimize erosion of CCR landfill slopes.

The CCR Landfill was designed to be constructed in two stages. The west half (Cell L1) was constructed in 2009. A Temporary Separation Berm was constructed in a north-south direction to separate the two stages of the CCR Landfill. The purpose of the Temporary Separation Berm is to contain surface water run-off from Cell L1 during operation, and also during construction of the east half of the CCR Landfill (Cell L2). A Temporary Transfer Channel was constructed to convey run-off from the Temporary Separation Berm Ditch along the toe of the Temporary Separation Berm to the high density polyethylene (HDPE)-geomembrane-lined Detention Pond. The Temporary Transfer Channel will be abandoned when Cell L2 is constructed. Design calculations for the Separation Berm Ditch are

provided in Appendix G of the “Run-on Run-off Control System Documentation for Joppa CCR Landfill” in the Joppa Power Station operating record. A typical section through the Separation Berm Ditch is shown on Drawing No. IFR35374 in Appendix H of the “Run-on Run-off Control System Documentation for Joppa CCR Landfill” in the Joppa Power Station operating record.

The CCR Landfill perimeter ditches are contained within the earthen perimeter berms of the CCR Landfill. During CCR Landfill operation, the perimeter ditches will be formed by the CCR side slope abutting the earthen perimeter berms. Perimeter ditch design calculations are included in Appendix C of the “Run-on Run-off Control System Documentation for Joppa CCR Landfill” in the Joppa Power Station operating record. The earthen perimeter berms will be covered by a HDPE geomembrane rain flap to protect the earthen perimeter berms outside the CCR placement boundary from exposure to surface water run-off that has been in contact with the CCR. Culverts have been installed across the perimeter ditches to allow hauling of CCR material into the active area. Design calculations for the culverts are included in Appendix F of the “Run-on Run-off Control System Documentation for Joppa CCR Landfill” in the Joppa Power Station operating record.

Once the CCR Landfill reaches design capacity, a final cover system will be installed and the perimeter ditches will be replaced with lined post-closure perimeter ditches. The post-closure perimeter ditches will discharge to the Detention Pond. The post-closure perimeter ditches will be grass lined. Culverts that were installed during the CCR placement and temporary intermediate cover stages will be removed during final cover system placement. Design Calculations for the Surface Water Transfer Channel are included in Appendix D of the “Run-on Run-off Control System Documentation for Joppa CCR Landfill” in the Joppa Power Station operating record.

Once Cell L2 is constructed, run-off from the perimeter ditches from Cell L1 will be extended and directed toward the Detention Pond via the Surface Water Transfer Channel (not yet constructed) at the southeast corner of Cell L2 of the CCR Landfill.

Run-off from the CCR Landfill will be routed through the Detention Pond for sediment settling prior to discharge through the Principal Spillway, a 4-foot-diameter concrete riser (drop inlet). Energy dissipation for the Principal Spillway is achieved through the use of a 10-foot-diameter stilling well. The Emergency Spillway consists of an 80-foot-wide, grass-lined channel. Details of the Principal Spillway and the Emergency Spillway are provided on Drawing No. IFR35370 in Appendix H of the “Run-on Run-off Control System Documentation for Joppa CCR Landfill” in the Joppa Power Station operating record. The HDPE-lined Detention Pond stage/storage relationship, the spillway rating curve and the stilling well design calculations are provided in Appendix E of the “Run-on Run-off Control System Documentation for Joppa CCR Landfill” in the Joppa Power Station operating record.

Once the CCR Landfill reaches design capacity, a final cover system will be installed, allowing clean stormwater to discharge into post-closure perimeter ditches. The post-closure perimeter ditches will discharge to the Detention Pond. Culverts and associated haul roads, that were installed during the CCR placement and temporary intermediate cover stages will be removed during final cover system placement to allow for the flow to go to the Detention Pond.

4. Surface Water Management Structures

Calculations for perimeter ditches, Detention Pond, Separation Berm Ditch, spillway structures and culverts are discussed in greater detail in Appendix B through Appendix G of the “Run-on Run-off Control System Documentation for Joppa CCR Landfill” in the Joppa Power Station operating record.

These stormwater management structures are designed, constructed, operated and maintained to safely carry at least the maximum run-off rate from the 25-year, 24-hour design event.

Once future expansions are constructed, updated calculations will be appended to this report to reflect as-built conditions.

5. Operation and Maintenance

Routine maintenance activities, including repair of scoured areas, removal of debris and excess sediment buildup and restoration or revegetation of areas to prevent erosion, are performed on an as-needed basis.

Inspections by site personnel are performed to identify areas having surface water scouring or excessive erosion. Areas observed to have excessive erosion or scouring are assessed to identify the cause of the erosion or scouring. Remedial measures such as regrading, reseeding and placement of more effective erosion control methods are implemented as necessary. Prior to reaching final grades, some areas may require additional channels, berms, straw bales or silt fences to provide temporary drainage and sediment control.

6. NPDES Permitting

Run-off from the CCR Landfill flows into the Detention Pond which discharges to the Ohio River via an unnamed ditch and unnamed tributary under National Pollutant Discharge Elimination System (NPDES) Permit No. IL0078751, thereby meeting the requirements of 40 CFR 257.3-3 as necessitated by 40 CFR 257.81(b).

7. Conclusion

The CCR Landfill design, construction, operation and maintenance is in compliance with the requirements of 40 CFR 257.81 for the following reasons:

- The run-on control system is designed to prevent flow onto the active portion of the CCR Landfill during at minimum, the 100-year, critical duration storm event. This exceeds the 25-year, 24-hour storm requirements of 40 CFR 257.81.
- The run-off control system for the active portion of the CCR Landfill is designed to collect and control the water volume resulting from at minimum, the 100-year, critical duration storm event. This exceeds the 25-year, 24-hour storm requirements of 40 CFR 257.81.
- Discharges to the Ohio River are permitted under NPDES Permit No. IL0078751, thereby satisfying the requirement that run-off from the CCR Landfill is handled according to USEPA rules governing the discharge of surface water (see 40 CFR Part 257.3-3).

This document serves as the initial plan. The plan and revisions must be certified by a qualified Professional Engineer and entered into Joppa Power Station's operating record.

8. References

Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule, 40 CFR 257 (April 17, 2015).

9. Certification Page

**JOPPA POWER STATION CCR LANDFILL
ELECTRIC ENERGY, INC.
INITIAL RUN-ON AND RUN-OFF CONTROL SYSTEM SUMMARY AND CERTIFICATION**

40 CFR 257.81 requires the owner or operator of an existing CCR landfill to design, construct, operate and maintain:

- A run-on control system to prevent flow onto the active portion of the CCR unit during the peak discharge from a 25-year, 24-hour storm; and
- A run-off control system from the active portion of the CCR unit to collect and control at least the water volume resulting from a 25-year, 24-hour storm.

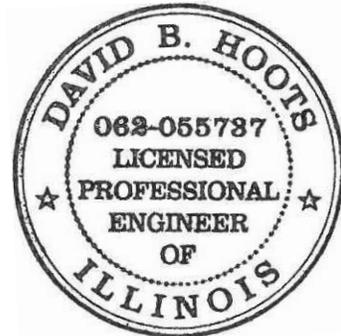
In addition, run-off from the active portion of the CCR unit must be handled in accordance with the surface water requirements under 40 CFR Part 257.3-3.

As a qualified Professional Engineer as defined by 40 CFR 257 Subpart D, I certify that I have personally examined and am familiar with the design information contained in the Joppa Power Station's CCR Landfill Run-on and Run-off Control System Plan and supporting document, the Run-on Run-off Control System Documentation for the Joppa Power Station, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete.

I certify that the **Joppa Power Station CCR Landfill** Run-on and Run-off Control System Plan meets or exceeds the requirements set forth by 40 CFR 257.81 as published on April 17, 2015.

David B. Hoots, P.E.
Hanson Professional Services Inc.
1525 South Sixth Street
Springfield, IL 62703-2886
(217) 788-2450
Registration No. 062.055737

Seal:

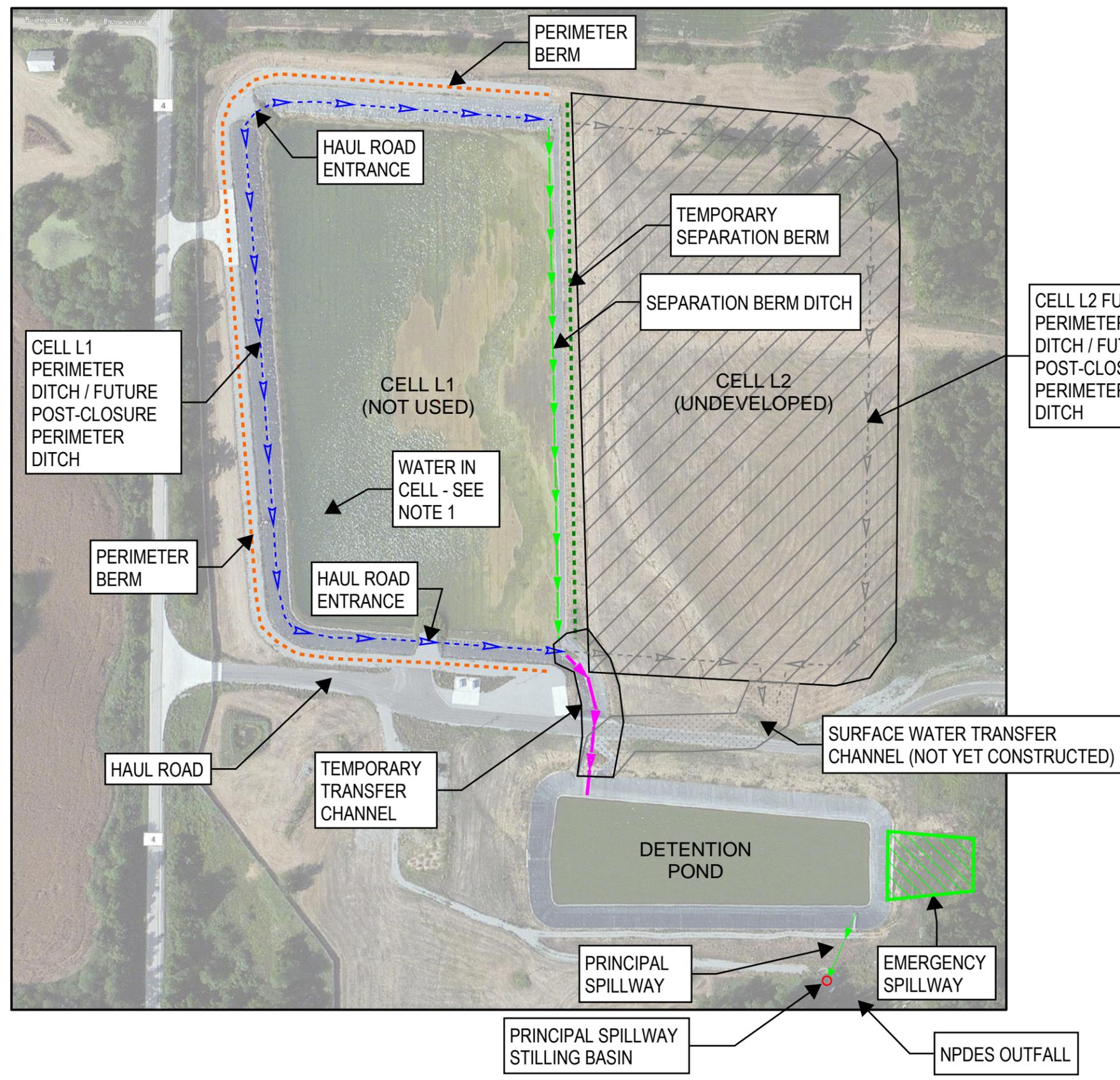


Signature: 

Date: 10/13/2016, LICENSE EXPIRES 11/30/2017

Appendix A
CCR Landfill Layout Figure

NOTE 1: CELL L1 IS CONSTRUCTED BUT NOT USED. WATER CURRENTLY RESIDING WITHIN THE CELL WILL BE REMOVED BY PUMPING PRIOR TO INITIAL CCR PLACEMENT.



© Copyright Hanson Professional Services Inc. 2016

CCR LANDFILL LAYOUT FIGURE

JOPPA CCR LANDFILL
JOPPA POWER STATION
MASSAC COUNTY, ILLINOIS

15E0143 -DATE: 10/13/2016 FIGURE NO. 1

SEP 27, 2016 7:25 PM H001S01267
I:\15\0BS\15E0143\CAD SITE\JOPPA NEWTON RORO MAP.DWG