
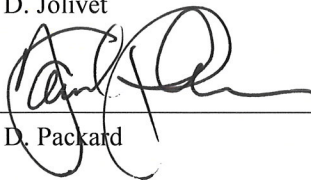





Closure Plan for CCR Surface Impoundments

Prepared for Interstate Power and Light Company
Ottumwa Generating Station
Ottumwa, IA

Issue Date: September 8, 2016
Issue Purpose: For Use

| | | |
|--------------|--|------------|
| Prepared by: |  | 09/07/2016 |
| | D. Jolivet | Date |
| Reviewed by: |  | 09/07/2016 |
| | D. Packard | Date |
| Approved by: |  | 09/08/2016 |
| | J. Staehlin | Date |



Certification and Seal:

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa:

55 East Monroe Street
Chicago, IL 60603-5780 USA

Project No. 13391-034

Report No. SL-013390
Revision: 0

James H. Staehlin
My license renewal date is December 31, 2016
Pages covered by this seal: All

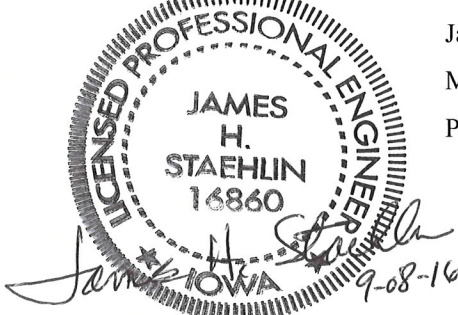




TABLE OF CONTENTS

| | |
|--|---|
| 1. INTRODUCTION | 1 |
| 2. PROPOSED CCR IMPOUNDMENTS CLOSURE PROCEDURE | 3 |
| 3. PROPOSED COVER SYSTEM..... | 4 |
| 4. ESTIMATED MAXIMUM INVENTORY OF CCR..... | 4 |
| 5. ESTIMATED MAXIMUM AREA OF COVER..... | 5 |
| 6. SCHEDULE..... | 5 |
| 7. COMPLETION OF CLOSURE ACTIVITIES..... | 7 |
| 8. CERTIFICATIONS | 7 |
| 9. REFERENCES | 7 |

LEGAL NOTICE

This report ("Deliverable") was prepared by Sargent & Lundy, L.L.C. ("S&L"), expressly for the sole use of Alliant Energy ("Client") in accordance with the agreement between S&L and Client. This Deliverable was prepared using the degree of skill and care ordinarily exercised by engineers practicing under similar circumstances. Client acknowledges: (1) S&L prepared this Deliverable subject to the particular scope limitations, budgetary and time constraints, and business objectives of the Client; (2) information and data provided by others may not have been independently verified by S&L; and (3) the information and data contained in this Deliverable are time sensitive and changes in the data, applicable codes, standards, and acceptable engineering practices may invalidate the findings of this Deliverable. Any use or reliance upon this Deliverable by third parties shall be at their sole risk.

1. INTRODUCTION

Interstate Power and Light Company (IPL) – a wholly owned subsidiary of Alliant Energy – operates the single 726-MW unit Ottumwa Generating Station (OGS), approximately 9 miles northwest of Ottumwa, Iowa. This facility operates two CCR surface impoundments: the Zero Liquid Discharge (ZLD) Pond and the Bottom Ash (BA) Pond. Additional details on each of these impoundments are given below. The overall layout of the facility is shown in Figure 1.

To comply with the requirements of the USEPA Final CCR Rule (40 CFR §257.50 thru §257.107), Alliant Energy, on behalf of its subsidiary IPL, submits the following Closure Plan detailing the steps to be undertaken to close the existing Bottom Ash Pond by leaving the CCR in place and the ZLD Pond by removal of CCR, in accordance with §257.102(b) of the CCR Rule.

This document provides the following required information:

- Facility information
- Estimate of the maximum inventory of CCR on-site
- Proposed CCR surface impoundment closure procedure
- Description of the proposed final cover system over the CCR material
- Schedule for completing all closure activities

The Bottom Ash Pond, still in use, is managed as an *existing* CCR impoundment under the provisions of the CCR Rule. Additionally, a temporary bottom ash storage pile is located within the confines of the Bottom Ash Pond. The ZLD Pond is currently managed as an *inactive* CCR impoundment since it has not received CCR on or after October 19, 2015. The Station maintains a stockpile of hydrated fly ash, adjacent to the ZLD Pond, which has not received CCR on or after October 19, 2015, and it is beneficially used. The Coal Runoff Pond does not meet the definition of a CCR surface impoundment per the CCR Rule, and as such is not further discussed in this Plan.

BOTTOM ASH POND

The Bottom Ash Pond is located about 800 feet east of the generating unit, and receives sluiced bottom ash and economizer ash, in addition to SCU blowdown flows, oil/water separator discharge, boiler seal water, air heater wash water, sanitary plant effluent, cooling tower blowdown, CCR leachate from the off-site Ottumwa Midland Landfill (OML) and other low volume wastewater (LVWW) streams in addition to collected storm water runoff. The pond also recycles part of its water to feed ash water storage tanks, used in several plant processes. Water from the pond eventually discharges through NPDES Outfall 001 into a tributary to the Des Moines River. The overall impounded pond area occupies approximately 39 acres, however the surface area of the impounded water is only approximately 15 acres with the balance being CCR – OGS stores bottom ash within the overall confines of the Bottom Ash Pond. Station personnel estimate that approximately 50,000 tons of bottom ash are currently stored therein.

It is expected that this surface impoundment will cease receiving CCR flows once the bottom ash conversion is completed on the generating unit by December 2020.

ZERO LIQUID DISCHARGE (ZLD) POND

The ZLD Pond is located northeast of the power block and has been historically used to store sluiced fly ash, stormwater runoff, boiler and air heater wash water, and turbine cleaning wastewater. The surface impoundment does not discharge any of the water it contains, but may contain CCR from historical activities. The area of impounded water is approximately 19 acres.

HYDRATED FLY ASH STOCKPILE

The hydrated fly ash stockpile is situated north of the power block and this stockpile occupies an area of approximately 8 acres.



Figure 1: Overall Layout at Ottumwa Generating Station

2. PROPOSED CCR IMPOUNDMENTS CLOSURE PROCEDURE

IPL has chosen closure-in-place for the Bottom Ash (BA) Pond and closure through removal of CCR for the Zero Liquid Discharge (ZLD) Pond. The proposed closure of the CCR impoundments at Ottumwa will be done according to the following steps:

Zero Liquid Discharge Pond:

- Installation of groundwater monitoring well network and collection of background samples,
- Dewatering of ZLD Pond by transfer of water to BA Pond,
- Construction of earthen isolation berm around the eastern slope of the fly ash stockpile,
- Closure by removal of residual CCR in ZLD Pond bottom ¹,
- Stripping of in-situ soil in impoundment bottom that may be intermixed with CCR,
- Transfer of CCR and intermixed soil from ZLD Pond to west half of BA Pond,
- Visual examination of area formerly occupied by the surface impoundment to confirm CCR removal,
- Conversion of cleaned out surface impoundment to a storm water and LVWW detention pond, and
- Implementing required post-closure groundwater monitoring program.

Bottom Ash Pond:

- Installation of groundwater monitoring well network and collection of background samples,
- Dewatering of BA Pond (following completion of bottom ash handling system and diversion of low volume wastewater flows),
- Consolidation of fly ash stockpile and CCR removed from ZLD Pond as fill in BA Pond,
- Consolidation of CCR material from east half of BA Pond into west half,
- Maintain cleaned-out east half of BA Pond for storm water runoff and LVWW detention,
- Grading of CCR material to final slopes for drainage,
- Installation of cover system materials,
- Installation of drainage control features and,
- Implementing required groundwater monitoring program.

Proposed final grades for the capped area over the former Bottom Ash Pond will range from a minimum 3% over the upper portion of the cap to a maximum of 4H:1V near the outer edges of the cover, to allow adequate material storage volume. These slopes will allow for adequate drainage of rainwater off the cover system described in Section 3.

The final objective of the closure procedure in the Bottom Ash Pond is to create a consolidated mound of CCR capped by a cover system west of the existing overhead power lines.

¹ §257.102(c) of the Rule considers closure by removal of CCR to be complete when constituent concentrations throughout the CCR unit and any areas affected by releases from the unit have been removed and groundwater monitoring concentrations do not exceed the groundwater protection standards established pursuant to §257.95(h) for constituents listed in Appendix IV to the CCR Rule.

The basin to the east will serve as storm water runoff and LVWW detention. These two distinct areas will be separated by a new earthen isolation berm with a gravel access road along its crest.

Storm runoff from the cover system will be directed via ditches and culverts, as required, toward the detention basin. These ditches and outlets will be designed per the requirements of the Iowa Erosion Control Manual published by the Iowa Department of Natural Resources, latest edition.

3. PROPOSED COVER SYSTEM

The final cover will meet the minimum requirements of 40 CFR §257.102(b)(3)(i)(A) thru (D). It will consist, from bottom to top, of a compacted 18" thick "infiltration layer" of appropriate low-permeability material having a hydraulic conductivity of no more than 1×10^{-5} cm/s, followed by a 6" thick "erosion layer" of uncompacted soil capable of sustaining a vegetative cover, with a suitable seed mixture.

The underlying CCR material will be graded, stabilized and compacted as required to be able to support the cover system. The overlying final cover materials will be placed and compacted as required to minimize infiltration, limit erosion and future maintenance, and maintain positive drainage. Soil properties, compaction, permeability, and thickness testing will be performed to confirm compliance with the CCR Rule. Regular maintenance of the seeding will take place until the vegetative cover is established and self-sustaining, in order to limit erosion of the topmost layer. All other areas that are disturbed during the pond closure activities will be restored, either by providing a vegetative cover or an aggregate surface.

4. ESTIMATED MAXIMUM INVENTORY OF CCR

Based on existing information provided to S&L in the preparation of this Plan, including original plant construction drawings and recent survey data, it is estimated that approximately 1,068,000 cubic yards of CCR are present onsite. This quantity includes the amount of CCR in the hydrated fly ash stockpile. Some variability in the total amount may exist due to fluctuations in the amount of bottom ash stored in the impoundment, and CCR removed for beneficial re-use. A breakdown of this total quantity is given in Table 1.

TABLE 1: ESTIMATED QUANTITIES OF CCR

| Impoundment / Area | Estimated CCR Quantity |
|--|-------------------------|
| ZLD Pond (impounded area) | 165,000 cy |
| Bottom Ash Pond (excl. temporary bottom ash stockpile) | 417,000 cy |
| Hydrated fly ash stockpile (as of Dec. 2015) | 440,000 cy ² |
| Temporary bottom ash stockpile | 46,000 cy ³ |
| TOTAL | 1,068,000 cy |

² Based on 475,000 tons with a unit weight of 1.08T/cy or 80lbs/ft³

³ Based on 50,000 tons with same unit weight as Note 1

In the above table, the total amount of estimated CCR was determined by comparing the original contours of the ash disposal area to contours from more recent surveys. Changes in the amount of CCR since these surveys is unknown however bathymetric and topographic surveys are being planned at this time. Results of the new survey will be incorporated into the next revision of this document.

5. ESTIMATED MAXIMUM AREA OF COVER

Per the above proposed closure sequence, it is estimated that approximately 20 acres of the western half of the Bottom Ash Pond will require a cover system over the CCR material.

6. SCHEDULE

Closure of the existing Zero Liquid Discharge Pond and the Bottom Ash Pond is anticipated to require approximately 2 years. The schedule provided in Table 2 estimates a closure initiation date of March 1, 2021, following bottom ash handling conversion that is anticipated by the end of 2020, with a completion of closure by the end of 2022. Alliant Energy will obtain certification from an Iowa licensed professional engineer that each impoundment was closed in compliance with the approved Closure Plan. These certifications will be placed in the Station's operating record within 30 days of completing closure.

TABLE 2: PLANNING LEVEL SCHEDULE FOR CLOSURE OF ZLD AND BA PONDS

| Task Description | Anticipated Start Date | Anticipated Completion Date |
|---|------------------------|-----------------------------|
| Pre-Design Activities | | |
| Preparation of <i>Closure Plan</i> for compliance with Federal CCR Rule | 04/16/2016 | 10/16/2016 |
| Post <i>Closure Plan</i> in the Station's Operating Record | 10/16/2016 | 10/16/2016 |
| Send a Notification of the availability of the Closure Plan to the Relevant State Director and post <i>Closure Plan</i> to the Station's Internet Website | 10/16/2016 | 11/15/2016 |
| Place <i>Post-Closure Plan</i> in the Station's Operating Record | 10/16/2016 | 10/16/2016 |
| Send Notification of availability of <i>Post-Closure Plan</i> to the State Director and post <i>Post-Closure Plan</i> to the Station's Internet Website | 10/16/2016 | 11/15/2016 |
| Design / Bidding / Permitting | | |
| Site Survey & Bathymetric Survey | 08/01/2016 | 09/30/2016 |
| Engineering / Preparation of Bid docs / Closure Permit Application | 04/01/2020 | 07/31/2020 |
| Issue Request for Bids | 08/01/2020 | 08/01/2020 |
| Bids due | 08/31/2020 | 08/31/2020 |
| Bid Evaluation Period | 09/01/2020 | 09/31/2020 |
| Issue Award and Notice to Proceed | 11/01/2020 | 12/31/2020 |



| Task Description | Anticipated Start Date | Anticipated Completion Date |
|---|------------------------|-----------------------------|
| Construction | | |
| Place a <i>Notification of Intent to Close</i> the Surface Impoundments in the Station's Operating Record | 01/2021 | 01/2021 |
| Send <i>Notification of Intent to Close</i> to State Director and post Notification to the Station's Internet Website | 02/2021 | 02/2021 |
| <i>Initiation of ZLD Pond Closure</i> | 03/2021 | 03/2021 |
| Contractor Mobilization | 03/2021 | 03/2021 |
| Dewatering of CCR Impoundment | 03/2021 | 07/2021 |
| (Optional) Transfer of Fly Ash Pile to BA Pond | 04/2021 | 09/2021 |
| Removal of CCR from ZLD impoundment – transfer to BA Pond | 07/2021 | 10/2021 |
| Restoration of Fly Ash Pile Area (final vegetated cover) | 09/2021 | 11/2021 |
| Groundwater monitoring to complete closure | 11/2021 | 03/2022 |
| <i>Initiation of BA Pond Closure</i> | 03/2022 | 03/2022 |
| Dewatering of CCR impoundment | 03/2022 | 07/2022 |
| Consolidation of CCR in west half of impoundment - grading | 04/2022 | 09/2022 |
| Installation of final vegetated cover system | 06/2022 | 10/2022 |
| Post-closure groundwater monitoring | 11/2022 | 11/2052 |
| Post-Construction Administration – ZLD Pond | | |
| Certification verifying the completion of closure in accordance with the Closure Plan | 03/2022 | 03/2022 |
| Place a Notification of Pond Closure Completion in the Station's Operating Record and post Closure Completion to the Station's Internet Website | 03/2022 | 03/2022 |
| Send Notification of availability of Closure Completion to Relevant State Director | 03/2022 | 03/2022 |
| Post-Construction Administration – BA Pond | | |
| Certification verifying the completion of closure in accordance with the Closure Plan | 12/2022 | 12/2022 |
| Place a Notification of Pond Closure Completion in the Station's Operating Record and post Closure Completion to the Station's Internet Website | 12/2022 | 12/2022 |
| Send Notification of availability of Closure Completion to Relevant State Director | 12/2022 | 12/2022 |
| Record a Notation of the CCR Impoundment Closure on the Deed of the Property | 12/2022 | 12/2022 |
| Place a Notification of the Deed Notation in the Station's Operating Record | 12/2022 | 12/2022 |



| Task Description | Anticipated Start Date | Anticipated Completion Date |
|---|-------------------------------|------------------------------------|
| Send Notification of availability of Deed Notation to Relevant State Director / place Deed Notation to the Station's Internet Website | 12/2022 | 12/2022 |
| Place a Notification of Completion of the Post-Closure Care in the Station's Operating Record | 12/2052 | 12/2052 |
| Send a Notification of the availability of the Post-Closure Care to the Relevant State Director and place Post-Closure Care to the Station's Internet Website | 12/2052 | 12/2052 |

7. COMPLETION OF CLOSURE ACTIVITIES

To confirm completion of the surface impoundment closures, IPL will retain a qualified professional engineer licensed in the State of Iowa to verify that the existing CCR surface impoundments have been closed in accordance with this Closure Plan and the requirements of 40 CFR §257.102. The qualified engineer will provide IPL with written certifications stating compliance as required in 40 CFR §257.102(f)(3). A Post-Closure Plan is presented in a separate document.

8. CERTIFICATIONS

It is S&L's opinion that this written closure plan meets the requirements of 40 CFR §257.102(b).

It is also S&L's opinion that the proposed final cover system as described herein meets the design requirements of 40 CFR §257.102(d)(3)(i).

9. REFERENCES

1. 40 CFR Part 257, Subtitle D – Environmental Protection Agency Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, Federal Register, Vol. 80, No. 74.