Belle River Power Plant Retrofit Plan for Bottom Ash Impoundment

DTE Electric Company

Coal Combustion Residual Rule Compliance
Project No. 153316

Revision 0
2/10/2023

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prepared for

DTE Electric Company
Coal Combustion Residual Rule Compliance
China Township, Michigan

Project No. 153316

Revision 0
2/10/2023

prepared by

Burns & McDonnell Michigan, Inc.
Detroit, Michigan

INDEX AND CERTIFICATION

DTE Electric Company

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Report Index and Certification

Certification

I hereby certify, as a Professional Engineer in the State of Michigan, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by DTE Electric Company or others without specific verification or adaptation by the Engineer. The activities outlined in this plan meet the requirements of 40 CFR 257.102(k)(2).

Allyson Myers

Allyson Myers, P.E.
(Michigan License No. 6201312005)

Date: February 10, 2023

This document has been digitally signed and sealed. February 10, 2023

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
Belle River	Belle River Power Plant
Burns & McDonnell	Burns & McDonnell Michigan, Inc.
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
DTE	DTE Electric Company
GCL	geosynthetic clay liner
HDPE	high-density polyethylene

1.0 INTRODUCTION

DTE Electric Company (DTE) owns and operates the Belle River Power Plant (Belle River) located near East China, Michigan. Belle River produces coal combustion residuals (CCR) that must be managed by the requirements of 40 CFR § Part 257, Subpart D, Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments (CCR Rule). This Retrofit Plan outlines the construction activities required to retrofit the existing CCR Surface Impoundment, known as the Bottom Ash Impoundment, per the criteria outlined in 40 C.F.R § 257.102(k)(2). The Bottom Ash Impoundment will be retrofitted with an alternative composite liner system that complies with 40 CFR § 257.72 (and subsequently § 257.70(c)).

1.1 Site Information

Belle River is a two unit, 1,396-megawatt coal-fired facility located in China Township, Michigan. The Bottom Ash Impoundment, which includes the North and South Bottom Ash Basins, is located north of the generating units and is approximately 1.75 acres (see Figure 1-1 for site plan). A clay layer underlies the Bottom Ash Impoundment to a minimum depth of 82 feet. The impoundment receives CCR and non-CCR wastestreams for treatment prior to being discharged to the Diversion Basin and ultimately through NDPES Outfall 001B to the St. Clair River.

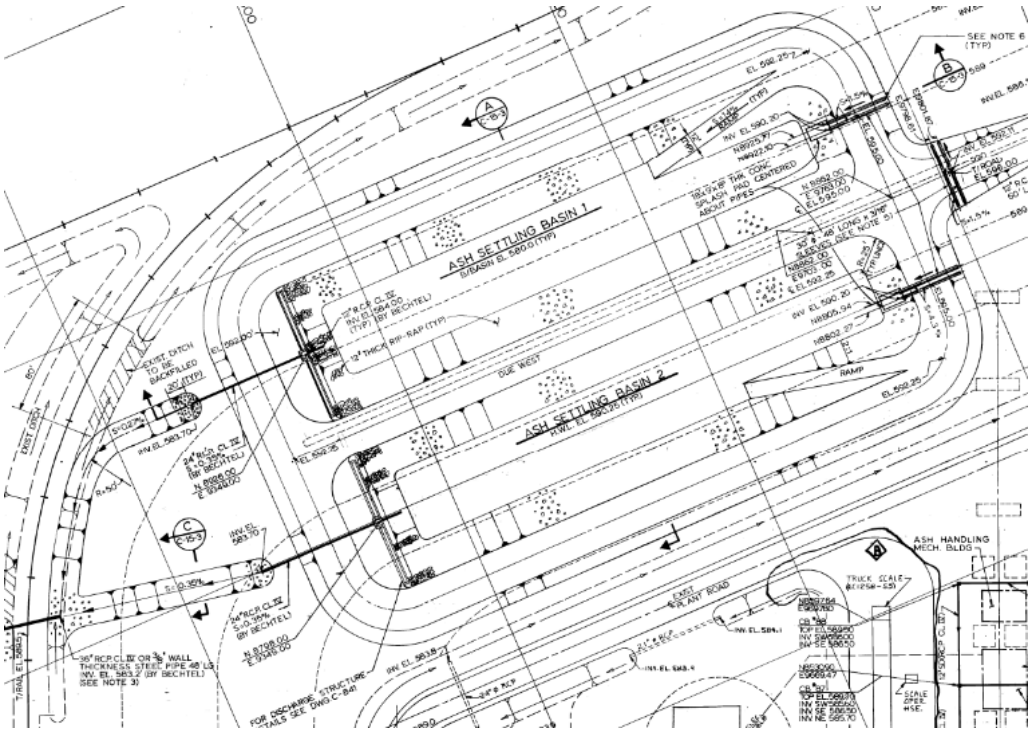


Figure 1-1: Site Plan

2.0 RETROFIT CONSTRUCTION PLAN

2.1 Narrative of Measures Taken to Retrofit - § 257.102(k)(2)(i)(A)

The Bottom Ash Impoundment will be retrofitted with an alternative composite liner consistent with 40 CFR § 257.102(k)(1). The North and South Basins will be retrofitted sequentially so that one basin may be retrofitted while the other remains in service. In order to optimize the retrofit schedule, the first basin retrofit will be completed following a routine maintenance dredging cycle completed by the plant prior to the contractor mobilizing to site. The free water from the basin to be retrofitted will be pumped to the operational basin using onsite equipment. Ponded sediment and CCR material will be dewatered and excavated from the impoundment, then hauled to the Range Road Landfill for disposal. A minimum of 6 inches and up to 24 inches of underlying clay material will be over-excavated from the pond subgrade in order to remove potentially impacted material and allow for installation of the liner and cover system per the design grades. CCR removal will be verified via visual inspection following the completion of the over-excavation activities. The remaining subgrade will be proofrolled and/or compacted and the impoundment will then be lined with an alternative composite liner system consisting of a geosynthetic clay liner (GCL) overlain with a 60-mil high-density polyethylene (HDPE) geomembrane liner, cushion geotextile, and 12 inches of protective cover. Above the protective cover, the slopes will receive 12 inches of riprap and the basin floor will receive 12 inches of crushed rock surfacing. Figure 2-1 provides a typical cross section of this liner system. Additional testing will be completed on the GCL prior to installation to confirm it provides adequate properties and meets the equivalency criteria in 40 CFR 257.70(b) and 40 CFR 257.70(c)(2), respectively.

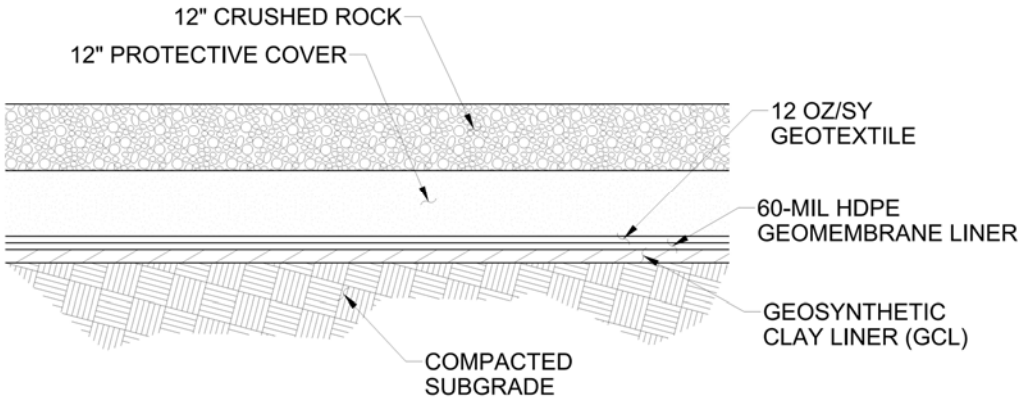


Figure 2-1: Typical Alternative Composite Liner Cross Section

2.2 Procedure for Removing CCR and Contaminated Soil and Sediment - § 257.102(k)(2)(i)(B)

As noted above, the Bottom Ash Impoundment will be retrofitted sequentially. Water removed from the basin to support retrofit construction will be pumped to the in-service basin. CCR material and an expected 6”-24” layer of underlying clay materials will be excavated using standard earthmoving equipment and loaded into dump trucks to be hauled to the Range Road Landfill north of the plant. Over-excavation will cease after visual inspection by a professional engineer confirms that CCR material is no longer present in the basin and CCR removal is considered complete. To date, the Bottom Ash Impoundment has not exceeded groundwater protection standards; therefore, no additional decontamination or corrective action activities are anticipated. In addition to visual inspection, a survey will be performed to document the CCR removal grade. The basin subgrade will then be restored and/or re-graded as required so that the finish grade (i.e., top of the liner system) will reflect the original design grade for the Bottom Ash Impoundment. In areas of cut, the basin subgrade will be proofrolled prior to liner installation. Where fill is placed to restore the basin subgrade, fill material will be placed and compacted in a controlled manner to support the liner system. The basin subgrade will be surveyed to confirm design grades are achieved.

Once the subgrade is approved, installation of the geosynthetic components of the composite liner system may begin. Per the October 2018 location restriction report prepared by TRC and posted on the DTE CCR Compliance Website, the Bottom Ash Impoundment has 82 feet of separation from the uppermost aquifer, so the specified over-excavation will not impact the required aquifer separation criteria and the base of the new liner may be placed directly on the approved subgrade without importing additional fill materials for placement below the new liner. As the GCL is installed, it will be covered with the HDPE geomembrane liner to help protect the GCL from becoming saturated. The HDPE geomembrane will be installed and

tested using manufacturer recommendations prior to placing the cushion geotextile and protective cover material. The protective cover will be placed in a controlled manner to prevent damage to the underlying layers. Finally, the riprap and crushed rock layers will be installed on the basin slopes and floor, respectively. In consideration of the aquifer separation, limited grading work within the basin footprint, compaction efforts, and historical operation of the basin that would have already consolidated the clay soils, future settlement of the liner subgrade is not anticipated. Additionally, the overlying protective cover and aggregate layers will prevent uplift of the liner. Once the retrofit of the first basin is complete, flows will be returned to the first basin and retrofit construction will begin in the second basin following the same procedure.

2.3 Estimated Quantities of CCR Materials Removed During Retrofit- § 257.102(k)(2)(i)(C)

It is estimated that 5,400 cubic yards of CCR material and 2,400 cubic yards of underlying subgrade soil (reflecting an average of 18” of subgrade material) will be removed from each of the North and South Basins.

2.4 Estimate of the Largest Area of the CCR Unit that Will be Affected by the Retrofit - § 257.102(k)(2)(i)(D)

The estimated maximum area of disturbance for the Bottom Ash Impoundment retrofit construction is 1.75 acres, or 100% of the existing CCR unit’s area.

2.5 Schedule for Completing All Retrofit Activities - § 257.102(k)(2)(i)(E)

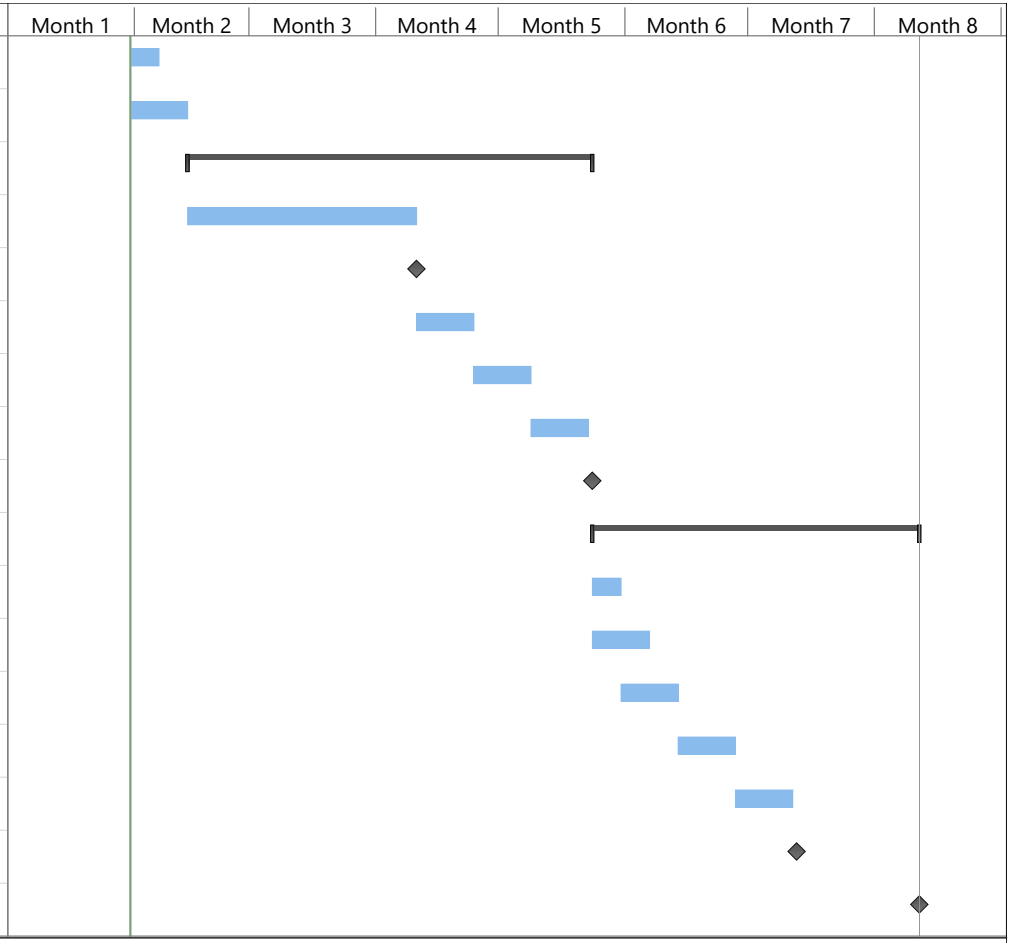
Retrofit construction is expected to begin in Spring of 2023 and to be completed in Summer of 2023. An expected schedule is included in Appendix A.

2.6 Notifications

In accordance with 40 CFR § 257.102(k)(2)(ii)(A), no later than 60 days prior to the date of initiating retrofit activities, DTE will post this Retrofit Plan to the operating record. DTE will also post a Notification of Intent to Retrofit no later than the date the retrofit is initiated per 40 CFR § 257.102(k)(5). A Notification of Completion of Retrofit Activities will be signed and sealed by the engineer of record licensed in Michigan and will be posted in the operating record within 30 days of completion of retrofit activities per 40 CFR § 257.102(k)(6). The retrofit documents will also be posted to DTE’s publicly accessible CCR website in accordance with 40 CFR § 257.107(j).

APPENDIX A – SCHEDULE

ID	Task Name	Duration
1	Dewatering (by plant, routine maintenance)	5 days
2	Excavate solids (by plant, routine maintenance)	10 days
3	**Retrofit Basin 1 (Flows Routed to Active Basin)**	**71 days**
4	Contractor Mobilization	40 days
5	Notification of Intent to Retrofit	0 days
6	Prep subgrade for liner installation	10 days
7	Install CCR-compliant liner system	10 days
8	Install protective cover	10 days
9	Begin discharge of all flows to Basin 1	1 day
10	**Retrofit Basin 2 (Flows Routed to Retrofitted Basin)**	**58 days**
11	Dewatering	5 days
12	Excavate solids	10 days
13	Prep subgrade for liner installation	10 days
14	Install CCR-compliant liner system	10 days
15	Install protective cover	10 days
16	Begin normal operation of Basin 2	1 day
17	Notification of Completion of Retrofit	0 days



Project: Belle River Bottom Ash Basin Retrofit
Date: Fri 2/10/23

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

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