

Inflow Design Flood Control System Plan

Bottom Ash Pond

Sherburne County Generating Plant

Introduction

This report presents documentation and certification of the inflow design flood control system for the Bottom Ash Pond (BAP) at the Sherburne County Generating Plant (Sherco) in Becker, Minnesota. The BAP is an “existing” coal combustion residual (CCR) surface impoundment. This document addresses the requirements of 40 CFR Section 257.82, hydrologic and hydraulic capacity requirements for CCR surface impoundments.

Inflow Design Flood Control System

During storm events, the BAP does not receive any inflow from the surrounding native grades. The only source of stormwater inflow to the pond is by direct rainfall on the pond and runoff from the crest of the perimeter embankment. Non-stormwater pond inputs are pump-controlled, and consist of sluicing bottom ash solids.

Compliance with §257.82 (a)

Under the CCR rules §257.73(a); the BAP was determined to be a significant hazard potential CCR surface impoundment and must comply with the 1000-year flood event specified in §257.82(a)(3)(ii). The National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 8, Version 2, 24-hour, 1000-year storm event for Becker, Minnesota is 9.78 inches, as shown on the attached table

The water level in the BAP is controlled by adding or removing concrete stop logs located in the discharge structure. The water level in the BAP is generally between the elevations of 962 feet MSL and 978 feet MSL to control CCR deposition. The invert elevation of the bottom ash sluice pipes is approximately 992 feet MSL, which is the maximum operating water level. The crest of the BAP is at 1000 feet MSL.

The attached figure shows the BAP inflow area and the maximum ponding area at 1000 feet MSL. Using aerial measurements from Figure 1, the increase in water elevation from the prescribed flood event was calculated.

Inflow Design Calculations

BAP Inflow Area: 20.4 Acres

Volume of water generated from a 1000 year flood event (assuming direct rainfall on the BAP water surface and 100 percent runoff from embankment crests):

$$20.4 \text{ Acres} * \frac{43560 \text{ Square Feet}}{\text{Acre}} * 9.78 \text{ inch rain} * \frac{1 \text{ foot}}{12 \text{ inches}} = 724,000 \text{ Cubic Feet}$$

Current Maximum Ponding Area: 17.7 Acres (771,000 Square Feet)

Increase in water elevation from flood event: $\frac{724,000 \text{ Cubic Feet of stormwater}}{771,000 \text{ Square Feet of ponding}} = 0.94 \text{ feet}$

Results

The BAP can collect and control a 1,000-year flood event using the freeboard remaining at maximum operating level.

Compliance with §257.82 (b)

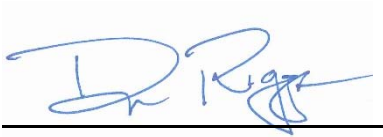
BAP does not discharge CCR to a surface water (impounded water is used for plant processes), and is not subject to the surface water discharge requirements of §257.3-3.

Conclusion

Based on aerial measurements and flood event calculations, the Inflow Design Flood Control System for the Bottom Ash Pond at the Sherburne County Generating Plant is able to collect and control the peak discharge resulting from the inflow design flood specified in §257.82(a)(3)(ii) for a significant hazard potential surface impoundment and complies with the requirements of §§257.82(a) through (c).

Certification

I hereby certify under penalty of law that this report was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment.



Daniel J. Riggs, PE
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October 17, 2016

Date

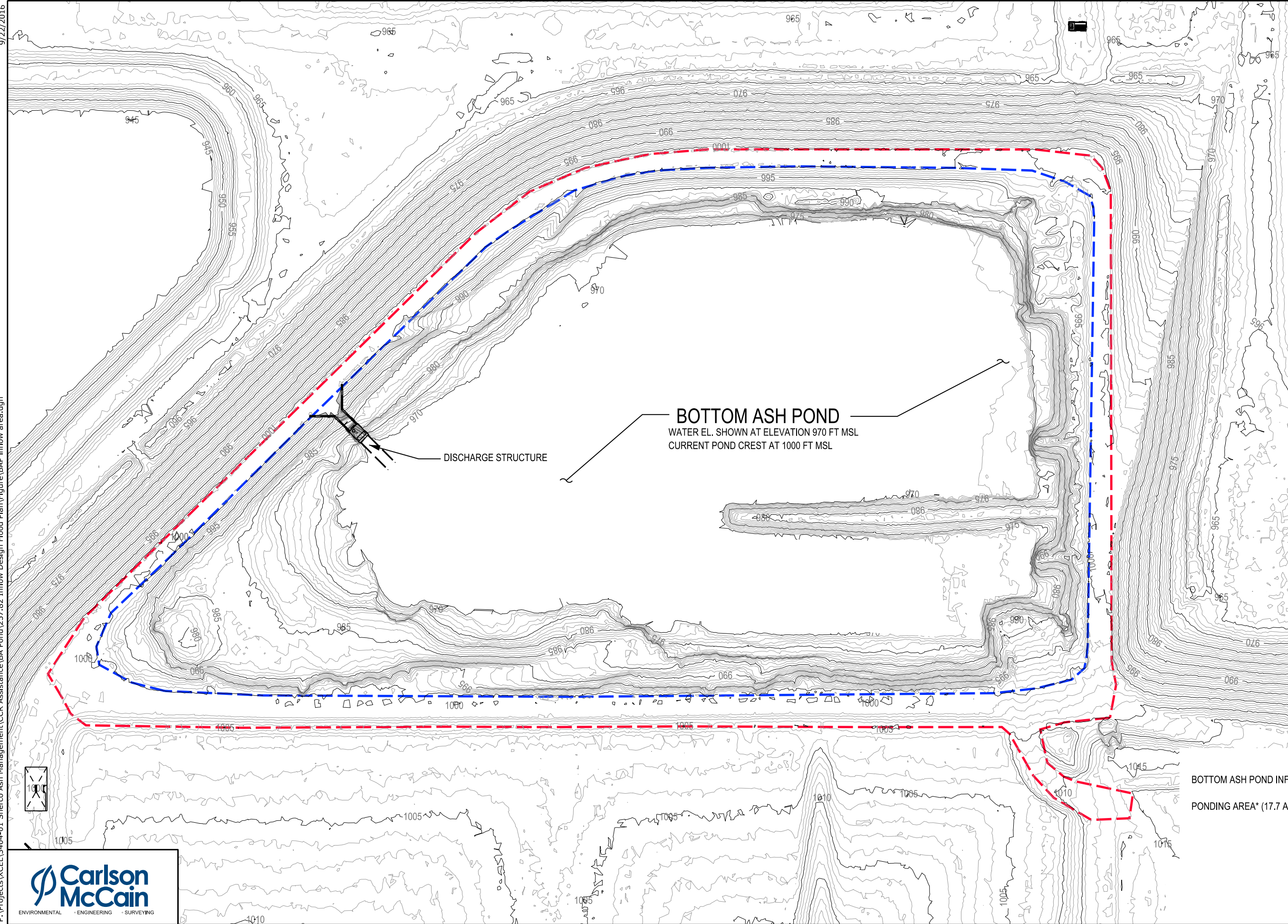
References

National Oceanic and Atmospheric Administration, Atlas 14, Volume 8, Version 2, "Point Precipitation Frequency Estimates", Becker, Minnesota.

References (included in Operating Record and Website)

Carlson McCain, Inc. (July 2016). "Hazard Potential Classification Assessment, Bottom Ash Pond, Sherburne Country Generating Plant", CCR Compliance Document, Plymouth, Minnesota.

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SCALE IN FEET

*NOTE: PONDING AREA CONTOURS GENERATED FROM
NOVEMBER 2015 GROUND SURVEY

BOTTOM ASH POND INFLOW AREA (20.9 ACRES) ———
PONDING AREA* (17.7 ACRES) ———



BOTTOM ASH POND
INFLOW FLOOD CONTROL PLAN