



Inflow Design Flood Control System Plan

Slag Pond

Otter Tail Power Company - Coyote Station

Introduction

This plan presents the Inflow Design Flood Control System Plan for the Slag Pond at Coyote Station located near Beulah, North Dakota. The Slag Pond is considered an existing coal combustion residual (CCR) impoundment. This document addresses the requirements of 40 CFR §257.82.

Inflow Design Flood Control System Plan §257.82(c)

The Slag Pond is considered an incised CCR surface impoundment and must comply with the prescribed 25-year flood event. Coyote Station is located in a type II rainfall distribution region. According to the National Oceanic and Atmospheric Administration, a 25- year, 24-hour storm event yields 3.65 inches of rainfall for the geographic location of the Slag Pond.

Inflow Management §257.82(a)(1)

The Slag Pond receives inflows from various plant processes including but not limited to: air heater cleaning water, boiler cleaning water, ash and slag sluice water, floor drains, reverse osmosis reject water, and yard drain wastewater. In addition to plant processes, the Slag Pond receives stormwater runoff from 88 acres of surrounding area. The Slag Pond is 6.5 acres in area and maintains a freeboard of 2.5 feet, for a total storage volume of 16.25 acre-feet.

A 25-year, 24-hour storm event for Coyote Station’s geographic location yields 3.65 inches of rainfall. Using the NRCS curve number method for calculating total runoff results in an average of 1.85 inches of runoff over the drainage area.

Cover Type	CN (ARC II Group C)	Area (acres)	% of Total Drainage Area	Weighted CN
Open space: good condition	74	33	37.5	27.8
Paved areas, roofs	98	5	5.7	5.6
Gravel roads & other surfaces	89	28	31.8	28.3
Slag Pond footprint including slopes	100	7	8.0	8.0
Coal pile, boiler slag surfaces (Group A, Open space, poor condition)	68	15	17.0	11.6
		88	100.0	81.3

Soil Storage Capacity: (S_{inches}) = $1000/CN - 10$

$$S = 1000/81.3 - 10$$

$$S = 2.3 \text{ inches}$$

Total Runoff: $(Q) = ((P - 0.2S)^2)/(P + 0.8S)$

Where: $P = \text{Precipitation (inches)}$

$Q = \text{Run-off (inches)}$

$$Q = ((3.65 \text{ inches} - (0.2) * (2.3 \text{ inches}))^2) / (3.65 \text{ inches} + (0.8) * (2.3 \text{ inches}))$$

$$Q = (10.18 \text{ inches}^2) / (5.49 \text{ inches})$$

$$Q = 1.85 \text{ inches}$$

Total Runoff to the Slag Pond: $(1.85 \text{ inches}) / (12 \text{ inches per foot}) * (88 \text{ acres}) = 13.57 \text{ acre-feet}$.

There is 13.57 acre-feet of runoff to the Slag Pond and 16.25 acre-feet of storage.

Outflow Management §257.82(a)(2)

The Slag Pond has one outlet; a discharge pipe located on the south end of the pond. The discharge pipe is controlled by pumps and provides water for plant processes and to maintain minimum freeboard requirements.

Discharges §257.82(b)

The Slag Pond does not discharge into waters of the United States. All discharges occur through withdrawal of water for use in plant processes.

Amendment of Inflow Design Flood Control System Plan §257.82(c)(2) and (4)

If any event or change affects the plan, a modified Inflow Design Flood Control System Plan will be prepared and placed in the facility's operating record and posted on the CCR website. At a minimum, the Inflow Design Flood Control System Plan will be reviewed and updated every five years beginning with this version of the Plan.

Certification § 257.82(c)(5)

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.



John McCain, PE Date
License No. PE-4345

October 17, 2016

Slag Pond Drainage Area

Otter Tail Power Company - Coyote Station

Slag Pond Drainage Area - 88 Acres

Slag Pond - 6.5 Acres

Discharge Pipe



1000 ft

