

Initial Structural Stability Assessment

Nelsen Pond

Otter Tail Power Company – Coyote Station

Introduction

This report presents the assessment and certification of structural stability for the Nelsen Pond at Coyote Station near Beulah, North Dakota. The Nelsen Pond is an “existing” surface impoundment. This document addresses the requirements of 40 CFR Section 257.73(d), Periodic structural stability assessments.

Stability Assessment §257.73(d)

Assess if the Nelsen Pond was designed, constructed, operated and maintained with:

(i) *Stable foundations and abutments:*

The Nelsen Pond is located in the Missouri Slope District of the Glaciated Missouri Plateau Section of the Central Lowland Province. The native soils of the Nelsen pond consist of approximately 60-100 feet of glacially-derived Cole Harbor Till deposits underlain by the Sentinel Butte Formation.

This surficial geology provides a stable foundation and good source of dike construction materials. The safety assessment of the Nelsen Pond determined the factor of safety for global dike failure was satisfactory for all conditions.

(ii) *Adequate slope protection to protect against surface erosion, wave action, and adverse effect of sudden drawdown.*

The Nelsen Pond is approximately 700 feet long by 360 wide. It is used to dewater hydraulically dredged CCR from the Slag Pond and only contains water for 2 to 3 months at a time every 2 or 3 years. These factors limit the size and erosive force of waves, and the duration that surface erosion can occur. Additionally, the Nelsen Pond is lined with compacted clay which is resistant to erosion due to the cohesive properties of the soil.

The Nelsen Pond is designed to dewater dredged CCR over several weeks and does not generally experience sudden drawdown. The 3 horizontal to 1 vertical (3H:1V) interior slopes provide a stable geometry that is not prone to sloughing or damage from sudden drawdown

- (iii) *Dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit*

The dikes were designed and analyzed to withstand the range of loading conditions from the initial to maximum water elevation. All soils used to construct the pond dikes were mechanically compacted during construction.

- (iv) *Vegetated slopes of dikes and surrounding areas not to exceed a height of six inches above the slope of the dike, except for slopes which have an alternate form or forms of slope protection*

The Nelsen Pond is located in a region that does not experience rapid vegetative growth. The embankments are periodically mowed to improve vegetation and limit growth of woody vegetation.

- (v) *A single spillway or a combination of spillways configured as specified in paragraph (d)(1)(v)(A) of this section.*

The Nelsen Pond has two outlets; a primary and secondary. The primary is located on the bottom of the pond and flows via gravity to the downstream Sluice Outfall. The secondary outlet is an emergency overflow structure constructed using concrete and ductile iron pipe and is designed to carry sustained flows if needed.

The Nelsen Pond can collect and contain a 100-year flood event without discharging, however the spillway can adequately manage flow following a prescribed flood event.

- (vi) *Hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure.*

The Nelsen Pond can be inspected after it is dewatered and the CCR material has been mechanically excavated. There have been no signs of damage to either outlet that would negatively affect the operation of the pond


- (vii) *For CCR units with downstream slopes which can be inundated by the pool of an adjacent water body, such as a river, stream or lake, downstream slopes that maintain structural stability during low pool of the adjacent water body or sudden drawdown of the adjacent water body.*

The Sluice Outfall CCR unit is located downstream of the Nelsen Pond. When the Nelsen Pond is periodically full of CCR and/or water, it gravity drains to the Sluice Outfall, raising the water level of that unit. Drawdown of the Sluice Outfall only occurs while the Nelsen Pond is empty and embankment stability is not an issue.

The CCR unit was designed, constructed, and is operated and maintained with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded.

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 on 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.



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October 17th, 2016
Date _____