



# **2020 Annual Surface Impoundment Inspection**

## **Cell 3**

Prepared for  
Minnkota Power Cooperative, Inc.  
Milton R. Young Station

January 2021

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## Certifications

I hereby certify that I have examined the facility and, being familiar with the provisions of 40 CFR 257 Subp. D, attest that this Annual Surface Impoundment Inspection report has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and the requirements of 40 CFR §257.83.



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Seth W. Hueckman  
Barr Engineering Co.  
ND Registration Number PE-10057

Dated this 11<sup>th</sup> day of January, 2021

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## 1.0 Introduction

Minnkota Power Cooperative, Inc. (MPC) operates the Milton R. Young Station (MRY), near Center, North Dakota. MRY operates two lignite-fired cyclone boilers, resulting in production of coal combustion residuals (CCR). CCR management is subject to Federal Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments per 40 CFR 257 Subpart D (CCR Rule). Cell 3 at MRY is considered a CCR surface impoundment. Under 40 CFR §257.83 CCR surface impoundments are subject to annual inspections by a qualified professional engineer (QPE). This report documents the annual inspection performed by Seth W. Hueckman, P.E. on September 22, 2020, as required by the CCR Rule. Other annual inspection duties, including a review of the available information regarding the status and condition of the CCR unit and storage capacity evaluations, were performed prior and following the on-site inspection.

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## 2.0 Review of Existing Information

A review of existing information was performed to ensure that the design, construction, operation and maintenance of the surface impoundment is consistent with recognized and generally accepted good engineering standards. The existing information reviewed is described in the following subsections.

### 2.1 Design and Construction

Cell 3 was designed by Barr Engineering Co. (Barr) and was constructed in four phases. Below is a summary of construction events for Cell 3:

- Phase IA (2011)
- Phase IB (2012)
- Phase 2 (2013)
- Phase 3 (initiated in 2015 and completed in 2016)

The following construction documentation reports were reviewed in conjunction with the annual inspection:

- Construction Documentation Report – Cell 3 – Phase IA, Barr Engineering, December 2011
- Construction Documentation Report – Cell 3 – Phase IB, Barr Engineering, December 2012
- Construction Documentation Report – Cell 3 – Phase 2, Barr Engineering, December 2013
- Construction Documentation Report – Cell 3 – Phase 3, Barr Engineering, September 2016

No deficiencies were found.

### 2.2 Previous Periodic Structural Assessments

The following initial structural assessments as required by 40 CFR §257.73 were prepared by Barr and reviewed as part of this annual inspection:

- Initial Hazard Potential Classification for Cell 3, Barr Engineering, September 2016
- Initial Structural Stability Assessment for Milton R. Young Station CCR Surface Impoundment Cell 3, Barr Engineering, October 2016
- Initial Safety Factor Assessment for Cell 3, Barr Engineering, October 2016

No deficiencies were found.

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## **2.3 Results of Weekly Inspections**

Weekly inspection reports from December 30, 2019 through December 28, 2020 were reviewed as part of this annual inspection. No deficiencies were found.

## **2.4 Results of Monthly Instrumentation Monitoring**

The surface impoundment is a clay and geomembrane lined surface impoundment with relatively flat 4.5 horizontal-to-1.0 vertical (4.5h:1.0v) exterior slopes and 2.5h:1.0v interior slopes and, per previously performed slope stability evaluations, acceptable slope stability factors of safety. As a result, the surface impoundment does not have any instrumentation installed in the perimeter embankments and therefore, no results of monthly monitoring were reviewed.

## **2.5 Results of Previous Annual Inspections**

The annual inspection performed in September 2019 documented the following visual observations and associated remedial activities:

- Occasional mounds of un-vegetated soil on west slope from potential animal burrow activity, but no active burrows observed. MPC to periodically monitor and repair if needed.

## 3.0 Structural Integrity Review

An on-site inspection was performed to visually identify signs of distress or malfunction of the CCR unit and appurtenant structures. The results of the inspection are included in the following subsections.

### 3.1 Visual Inspection of CCR Unit

The surface impoundment was visually inspected for structural weakness. Inspection consisted of on-foot inspection of impoundment embankments, including toe-of-slope, mid-slope, and crest-of-slope of embankments. Visual inspection items and results are summarized in the following table:

**Table 3-1 Summary of Visual Inspection**

Item	Structural Weakness Description	Visibly Present/Deficient (Yes/No)	Notes
1	Excessive, turbid, or sediment-laden seepage	No	No seepage present.
2	Signs of piping and other internal erosion	No	No piping present.
3	Transverse, longitudinal, and desiccation cracking	No	No significant cracking present.
4	Slides, bulges, boils, sloughs, scarps, sinkholes, or depressions	No	No structural weaknesses identified.
5	Changes in geometry of impounding structure	No	No geometry changes observed.
6	Damage to liner systems	No	No liner system damage or defects observed at time of inspection.
7	Abnormally high or low pool levels	No	Normal pool level at time of inspection.
8	Animal burrows	No – Except as noted	No burrows of significance; few small 2"-4" dia. burrows with loose soil observed near the lower-to-mid slope on east embankment; MPC to monitor burrows and repair if they become more significant/frequent.
9	Excessive or lacking vegetative cover	No	Vegetation appeared well established and well maintained.
10	Slope erosion	No – Except as noted	No significant erosion present. Erosion observed on interior slope above the geomembrane liner on north and south embankments; MPC to monitor and repair if they become more significant/frequent.
11	Debris	No	No debris of significance present.

### 3.2 Visual Inspection of Hydraulic Structures

The surface impoundment includes subsurface drainage features to prevent hydraulic pressure build-up in a nearby Hagel coal bed seam wherein if such pressure build-up had occurred and went unchecked during initial liner construction, it potentially could have interfered with liner and embankment construction activities. One drainage feature on the interior slope of the impoundment, consisting of a 6-

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inch diameter high density polyethylene (HDPE) pipe embedded in drainage aggregate, is of small enough diameter that, even if it failed, would not be expected to have a detrimental impact on performance of the overlying 8-foot thick clay liner and geomembrane liner. An additional drainage feature, consisting of a minimum 4-foot wide by 4-foot tall granular finger drain, was constructed through the embankment and day-lighted at the toe of the exterior slope in areas where the Hagel coal bed seam outcropped within the embankment fill. These drainage features were not designed to be inspected and inspection is not warranted. The surface impoundment does not have any other hydraulic structures underlying the base or passing through the dike and therefore, no visual inspection of hydraulic structures was performed.

### **3.3 Other Changes**

No other changes to the surface impoundment design, maintenance, or operations were observed that could affect the stability or operation of the impounding structure.

## 4.0 Impoundment Storage Capacity

A bathymetric survey of the surface impoundment was performed in conjunction with the on-site annual inspection to calculate volumes of impounded water and CCR. Additional information was provided by MPC for the estimated minimum and maximum depths experienced this past year. The following table summarizes the storage capacity of Cell 3 over the last year.

**Table 4-1 Approximate Minimum, Maximum, and Present Depth and Elevation of Impounded Water and CCR**

Water Level	Approx. Elevation	Approx. Depth of Impounded CCR and Water	Approx. Volume of Impounded CCR and Water	Approx. Volume of CCR	Design Volume of Cell 3 (assumes 5ft of freeboard at el. 2093)	Approx. Percentage of Storage Capacity Remaining
Minimum	2085.0	65.0 ft	1.83 MCY	-	2.03 MCY	10%
Maximum	2088.5	68.5 ft	1.89 MCY	-	2.03 MCY	7%
Inspection	2088.5	68.5 ft	1.89 MCY	1.79 MCY	2.03 MCY	7%