

Periodic Structural Stability Assessment for Cell 3

Coal Combustion Residuals (CCR) Rule Compliance



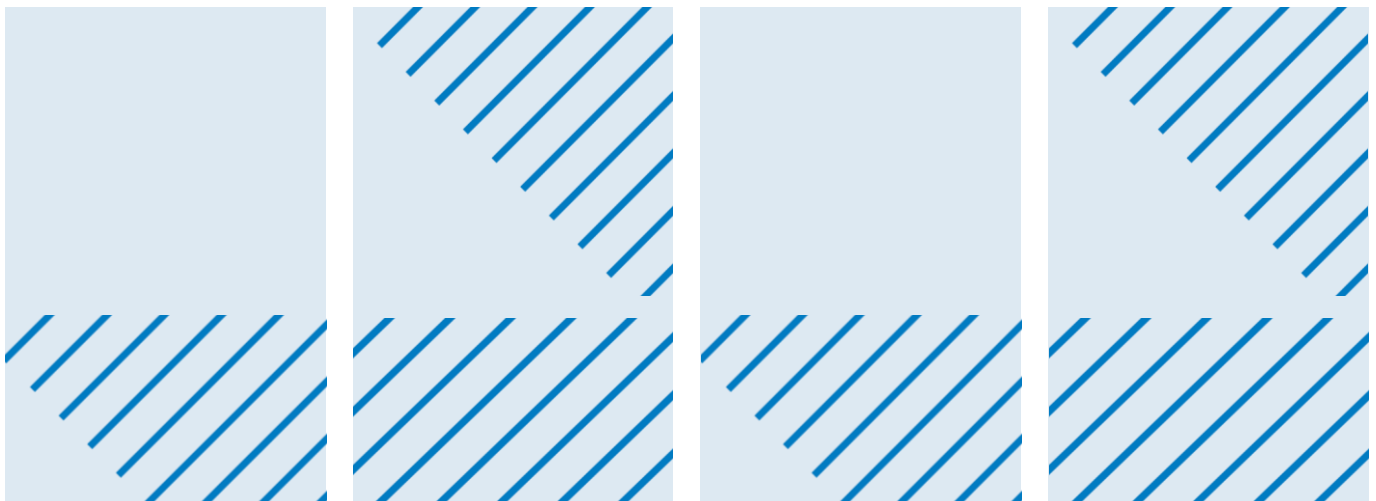
Prepared for
Minnkota Power Cooperative, Inc.
Milton R. Young Station

Prepared by
Barr Engineering Co.

September 22, 2026

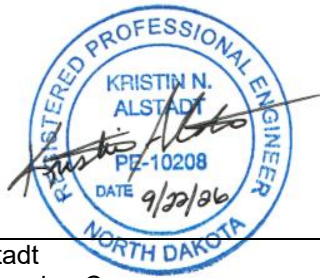
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Certification

I hereby certify that I have examined the facility and, being familiar with the provisions of NDAC 33.1-20, attest that this Coal Combustion Residuals (CCR) surface impoundment periodic structural stability assessment has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and the requirements of NDAC 33.1-20-08-04. I certify that the assessment is adequate for this facility and that procedures for recordkeeping and reporting have been established.



Kristin Alstadt
Barr Engineering Co.
ND Registration Number PE-10208

September 22, 2026
Date

Revision	Date	Summary of Revisions
0	October 13, 2016	Initial Structural Stability Assessment for Cell 3
1	September 24, 2021	Periodic Structural Stability Assessment for Cell 3
2	September 22, 2026	Periodic Structural Stability Assessment for Cell 3



Periodic Structural Stability Assessment for Cell 3

September 22, 2026

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1 Introduction

Minnkota Power Cooperative, Inc. (MPC) operates the Milton R. Young Station (MRYS), near Center, North Dakota. MRYS operates two lignite-fired cyclone boilers, resulting in production of coal combustion residuals (CCR). CCR management is subject to the State of North Dakota Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments per North Dakota Administrative Code (NDAC) 33.1-20-08.

This periodic structural stability assessment for the MRYS surface impoundment Cell 3 has been developed to satisfy the requirements described NDAC 33.1-20-08-04.3.d.

Cell 3 was constructed in phases with Phase 1A completed in 2011 and Phase 1B completed in 2012, Phase 2 completed in 2013, and Phase 3 (final) completed in 2016. Cell 3 is a composite lined facility with a compacted clay liner overlain by geomembrane liner. Cell 3 dewatering activities were initiated in 2020 and are ongoing.

1.1 Requirements

Section 33.1-20-08-04.3.d(1) of the CCR Rule indicates this initial structural assessment is to include review of whether the CCR unit has been designed, constructed, operated and maintained with:

- a) Stable foundations and abutments
- b) Adequate slope protection to protect against surface erosion, wave action, and adverse effects of sudden drawdown
- c) Dikes mechanically compacted to a density sufficient to withstand the range of loading conditions for the CCR unit
- d) Vegetated slopes of dikes and surrounding areas
- e) A single spillway or a combination of spillways designed, constructed, operated, and maintained to adequately manage flow during and following the peak discharge from the event specified below:
 - 1 All spillways must be:
 - a. Of non-erodible construction and designed to carry sustained flows; or
 - b. Earth- or grass-lined and designed to carry short-term, infrequent flows at non-erosive velocities where sustained flows are not expected.
 - 2 The combined capacity of all spillways must adequately manage flow during and following the peak discharge from a:
 - a. Probable maximum flood (PMF) for a high hazard potential CCR surface impoundment; or
 - b. 1000-year flood for a significant hazard potential CCR surface impoundment; or
 - c. 100-year flood for a low hazard potential CCR surface impoundment.

- f) 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 hydraulic structure; and
- g) 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 the low pool of the adjacent water body or sudden drawdown of the adjacent water body.

An excerpt of the related NDDEQ CCR rule is in the Appendix A. The periodic structural assessment must identify any structural stability deficiencies associated with the CCR unit in addition to recommending corrective measures. Written certification from a qualified professional engineer is required and is satisfied by this document.

2 Periodic Structural Stability Assessment

2.1 Stable Foundations and Abutments

Cell 3 was constructed on stable foundation soils as documented in the Site Characterization Investigation Report and Environmental Monitoring System Proposal for Modification to North Dakota Department of Environmental Quality (NDDEQ) Solid Waste Permit No. 0159 report that was reviewed and approved by the NDDEQ. This report is included in the History of Construction for Cell 3 report posted on the MPC CCR website. Prior to Cell 3 excavation and embankment construction the upper topsoil and subsoil layers were stripped, exposing suitable subgrade foundation soils. Topsoil and subsoil were stockpiled for future use in closure/reclamation. The subgrade soil properties, embankment fill procedures, and construction photographs are included in the construction documentation reports prepared for each phase of construction and are posted on the MPC CCR website.

2.2 Slope Protection/Vegetated Slopes

Annual and weekly Cell 3 inspections have documented dense grassy vegetation covering the exterior slopes with minimal erosion. The exterior slopes are periodically mowed to promote thick vegetation and control tree growth. The interior slope of Cell 3 is covered by CCR deposited within the Cell and by the Cell 3 geomembrane liner, which provides adequate slope protection.

2.3 Embankment Compaction

The Cell 3 embankment was constructed with native random fill materials that were placed in maximum 12-inch loose lifts. Each lift was compacted to at least 95 percent of the Standard Proctor maximum dry density and moisture content at the time of material placement was within the acceptable range per the specifications. The Cell 3 embankment materials were tested in accordance with the Construction Quality Assurance/ Quality Control Plan. Test results are documented in the construction documentation reports for each phase of construction; these documents are included in the History of Construction for Cell 3 report posted on the MPC CCR website.

2.4 Spillways

The Cell 3 surface impoundment does not include any spillways. Per the Cell 3 Inflow Design Flood Control System Plan (Barr, 2021) posted to the MPC CCR website; even in the event of a 1,000-year, 24-hour storm event, there would still be 3.93 feet of freeboard between the computed peak water surface elevation and the top of the composite liner for the Cell 3 dike, and 5.93 feet of freeboard to the crest of the Cell 3 dike. Based on these Cell 3 design characteristics, freeboard for the inflow design flood event is adequate and a spillway is not required.

2.5 Hydraulic Structures

To control possible hydraulic pressure within the Hagel bed coal seam, a 6-inch HDPE perforated pipe was installed along the south interior slope of Cell 3, directly beneath the compacted clay liner. Possible hydraulic pressure beneath the compacted clay liner is only a concern during initial construction and filling of the surface impoundment until the pool elevation exceeds the Hagel bed elevation. Failure of this pipe would not cause any impact to the stability of Cell 3 because the outlet of the pipe is at an elevation always above the maximum pool elevation and does not penetrate the embankment. Therefore, the pipe

is not configured in a manner that would facilitate pore water pressure build-up in the Cell 3 dike and reduced slope stability factor of safety that might result from increased pore water pressure.

A second hydraulic structure consists of 4-foot wide by 4-foot-tall granular finger drains, constructed through the Cell 3 embankment and daylighting at the toe of the exterior slope. The finger drains were installed within the east/west embankments where the Hagel bed coal seam lies directly adjacent to the clay liner. The drains prevent pore water pressure behind the Cell 3 liner system and within the embankment that, if it occurred, might have affected cell construction activities and embankment stability. Further, inspections are completed of the exterior slopes, which include the day-light locations of the finger drains, to confirm that no unanticipated drainage is occurring.

2.6 Downstream Slope Inundation

No lakes or rivers are present at the toe of the perimeter dikes at the MPC ash pond facility. Nelson Lake is approximately 1 mile north of Cell 3. The top of the Nelson Lake dam is approximately elevation 1936 and the Cell 3 toe of embankment is approximately elevation 2010; nearly 74 feet above the lake. The closest named tributaries to Cell 3 are the Hagel Creek to the west and the Square Butte Creek to the east. Both lie greater than 3,000 feet from the toe of the embankment.

3 Summary and Conclusions

The purpose of this report is to document and certify results of the structural stability assessment for the Cell 3 surface impoundment at MPC. Through review of the Cell 3 surface impoundment at MPC, the requirements for structural stability criteria for existing CCR surface impoundments as defined by NDAC 33.1-20-08-04.3.d are satisfied.



Appendices





Appendix A

NDDEQ Rule NDAC 33.1-20-08- 04.3 Excerpt – Structural Integrity Criteria for Existing CCR Surface Impoundments, new CCR Surface Impoundments, and Lateral Expansions of CCR Surface Impoundments

- c. The owner or operator of the CCR unit shall obtain a certification from a qualified professional engineer or a qualified environmental professional stating that the demonstration meets the requirements of subdivision a.
- d. The owner or operator of the CCR unit shall complete the demonstration required by subdivision a by the date specified in paragraph 1.
 - (1) For a new CCR landfill or surface impoundment or any lateral expansion of a CCR landfill or surface impoundment, the demonstration must be included with the application for a new permit or permit modification.
 - (2) The demonstration is considered complete when the demonstration is approved by the department and placed in the facility's operating record.
 - (3) For owners or operators of an existing CCR surface impoundment or CCR landfill that fails to demonstrate compliance, the CCR landfill is subject to the requirements in paragraph 1 of subdivision b of subsection 2 of section 33.1-20-08-07 or paragraph 1 of subdivision d of subsection 2 of section 33.1-20-08-07, respectively.
 - (4) For owners or operators of new CCR units and lateral expansions of existing CCR units that fail to demonstrate compliance, waste is prohibited from being placed into the CCR landfill.

History: Effective July 1, 2020; amended effective October 1, 2024.

General Authority: NDCC 23.1-08-03

Law Implemented: NDCC 23.1-08-03, 23.1-08-04

33.1-20-08-04. Design criteria.

- 1. New CCR landfills and any lateral expansion of a CCR landfill must be designed, constructed, operated, and maintained with the appropriate hydraulic barrier and leachate management system capable of collecting and removing leachate and contaminated surface water within the disposal unit during the operating period and postclosure period.
 - a. Prior to construction of an overfill, the underlying CCR surface impoundment must meet the requirements of subdivision d of subsection 3 of section 33.1-20-08-07.
 - b. Prior to construction of the CCR landfill or any lateral expansion of the CCR landfill, the owner or operator shall obtain a certification from a qualified professional engineer and approval by the department that the design of the composite liner (or, if applicable, alternative composite liner) and the leachate collection and removal system meets the requirements of this subsection.
 - c. Upon completion of construction of the CCR landfill or any lateral expansion of the CCR landfill, the owner or operator shall obtain a certification from a qualified professional engineer and approval by the department that the composite liner (or, if applicable, alternative composite liner) and the leachate collection and removal system has been constructed in accordance with the requirements of this subsection.
 - d. A composite liner is required. The liner must consist of at least two feet [60.9 centimeters] of recompacted clay with a hydraulic conductivity not to exceed 1×10^{-7} centimeters per second overlain with at least a sixty mil flexible membrane liner. The composite liner must be:
 - (1) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients, including static head and external hydrogeologic forces, physical contact with the CCR or leachate

to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;

- (2) Constructed of materials that provide appropriate shear resistance of the upper and lower component interface to prevent sliding of the upper component including on slopes;
 - (3) Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and
 - (4) Installed to cover all surrounding earth likely to be in contact with the CCR or leachate.
- e. The department may consider an alternative composite liner if all of the requirements of this subdivision are met. A certification must be obtained from a qualified professional engineer stating that:
- (1) The alternative composite liner consists of two components; the upper component consisting of, at a minimum, a sixty-mil flexible membrane liner, and a lower component, that is not a flexible membrane liner. If the lower component of the alternative liner is compacted soil, the flexible membrane liner must be installed in direct and uniform contact with the compacted soil.
 - (2) The liquid flow rate through the lower component of the alternative composite liner is no greater than the liquid flow rate through two feet [60.9 centimeters] of compacted soil with a hydraulic conductivity of 1×10^{-7} centimeters per second.
 - (3) The hydraulic conductivity for the two feet [60.9 centimeters] of compacted soil used in the comparison shall be no greater than 1×10^{-7} centimeters per second.
 - (4) The hydraulic conductivity of any alternative to the two feet [60.9 centimeters] of compacted soil must be determined using recognized and generally accepted good engineering practices.
 - (5) The liquid flow rate comparison must be made using this equation, which is derived from Darcy's Law for gravity flow through porous media:

$$\frac{Q}{A} = q = k \left(\frac{h}{t} + 1 \right)$$

Where:

Q = flow rate (cubic centimeters/second);

A = surface area of the liner (squared centimeters);

q = flow rate per unit area (cubic centimeters/second/squared centimeter);

k = hydraulic conductivity of the liner (centimeters/second);

h = hydraulic head above the liner (centimeters); and

t = thickness of the liner (centimeters).

- (6) The alternative composite liner must meet the requirements specified in paragraphs 1 through 4 of subdivision d.

- f. The drainage layer must be designed and operated to minimize clogging during the active life and post-closure care period and have a hydraulic conductivity of 1×10^{-3} centimeters per second or greater throughout. The drainage layer must have a sufficient thickness to provide a transmissivity of 3×10^{-2} centimeters squared per second or greater.
 - g. The liner and leachate removal system must be compatible with the waste and leachate.
 - h. The liner and leachate removal system must maintain its integrity during the operating period and through postclosure period.
 - i. The system must have a collection efficiency of ninety percent or better and must be capable of maintaining a hydraulic head of less than twelve inches [30.5 centimeters] above the liner.
 - j. The liner and leachate removal system in combination with the final cover must achieve a site efficiency of at least ninety-eight and one-half percent or better for collection or rejection of the precipitation that falls on the site.
2. Liner design criteria for CCR surface impoundments.
- a. For existing CCR surface impoundments:
 - (1) The owner or operator of an existing CCR surface impoundment shall include with the application for a permit that meets the requirements of this chapter, documentation that such CCR unit was constructed with a composite liner that meets the requirements of subdivision d of subsection 1.
 - (2) The hydraulic conductivity of the compacted soil must be determined using recognized and generally accepted good engineering practices.
 - (3) An existing CCR surface impoundment is considered to be an existing unlined CCR surface impoundment if:
 - (a) The owner or operator of the CCR unit determines that it is not constructed with a liner that meets the requirements of paragraph 1; or
 - (b) The owner or operator of the CCR unit fails to document whether the CCR unit was constructed with a liner that meets the requirements of paragraph 1.
 - (4) All existing unlined CCR surface impoundments are subject to the requirements of subdivision a of subsection 2 of section 33.1-20-08-07.
 - (5) The owner or operator of the CCR unit shall obtain a certification from a qualified professional engineer and approval from the department that an existing CCR unit meets the requirements of this section.
 - b. New CCR surface impoundments and lateral expansions of existing and new CCR surface impoundments must be designed, constructed, operated, and maintained with a composite liner that meets the requirements of subdivision d of subsection 1. The department may consider an alternative liner that meets the requirements of subdivision e of subsection 1:
 - (1) Any liner specified in this section must be installed to cover all surrounding earth likely to be in contact with CCR. Dikes must not be constructed on top of the composite liner.

- (2) The owner or operator shall include certification from a qualified professional engineer that the design of the composite liner or, if applicable, the design of an alternative composite liner complies with the requirements of this section, with the application for a new permit or permit modification.
 - (3) Upon completion, the owner or operator shall obtain certification from a qualified professional engineer that the composite liner or if applicable, the alternative composite liner has been constructed in accordance with the requirements of this section.
 3. Structural integrity criteria for existing CCR surface impoundments, new CCR surface impoundments, and lateral expansions of CCR surface impoundments.
 - a. The requirements of paragraph 1 in this subdivision apply to all CCR surface impoundments. The requirements in paragraphs 2 through 4 of this subdivision apply to all CCR surface impoundments, except for those CCR surface impoundments that are incised CCR units. If an incised CCR surface impoundment is subsequently modified (e.g., a dike is constructed) such that the CCR unit no longer meets the definition of an incised CCR unit, the CCR unit is subject to the requirements of this section.
 - (1) The owner or operator of the CCR unit shall place on or immediately adjacent to the CCR unit a permanent identification marker, at least six feet [1.8 meters] high, showing the permit number of the CCR unit, the name associated with the CCR unit, and the name of the owner or operator of the CCR unit.
 - (2) Periodic hazard potential classification assessments:
 - (a) The owner or operator of the CCR unit shall conduct initial and periodic hazard potential classification assessments of the CCR unit according to the time frames specified in subdivision f. The owner or operator shall document the hazard potential classification of each CCR unit as either a high-hazard potential CCR surface impoundment, a significant-hazard potential CCR surface impoundment, or a low-hazard potential CCR surface impoundment. The owner or operator also shall document the basis for each hazard potential classification.
 - (b) The owner or operator of the CCR unit shall obtain a certification from a qualified professional engineer stating that the hazard potential classifications specified in this section were conducted in accordance with the requirements of this section.
 - (3) Emergency action plan (EAP):
 - (a) Development of the plan. No later than the time frames specified in subdivision f, the owner or operator of a CCR unit determined to be either a high-hazard potential or significant-hazard potential CCR surface impoundment under periodic hazard potential classification assessments shall prepare and maintain a written EAP. The original EAP and any amendments to the EAP must be approved by the department and placed in the facility's operating record. At a minimum, the EAP must:
 - [1] Define the events or circumstances involving the CCR unit that represent a safety emergency, along with a description of the procedures that will be followed to detect a safety emergency in a timely manner;

- [2] Define responsible persons, their respective responsibilities, and notification procedures in the event of a safety emergency involving the CCR unit;
 - [3] Provide contact information of emergency responders;
 - [4] Include a map which delineates the downstream area that would be affected in the event of a CCR unit failure and a physical description of the CCR unit; and
 - [5] Include provisions for an annual face-to-face meeting or exercise between representatives of the owner or operator of the CCR unit and the local emergency responders.
- (b) Amendment of the plan:
- [1] The owner or operator of a CCR unit that is required to have a written EAP may amend the written EAP at any time. The owner or operator shall amend the written EAP whenever there is a change in conditions that would substantially affect the EAP in effect.
 - [2] The written EAP must be evaluated, at a minimum, every five years to ensure the required information is accurate. As necessary, the EAP must be updated and a revised EAP placed in the facility's operating record.
- (c) Changes in hazard potential classification:
- [1] If the owner or operator of a CCR unit determines during a periodic hazard potential assessment that the CCR unit is no longer classified as either a high-hazard potential CCR surface impoundment or a significant-hazard potential CCR surface impoundment, then the owner or operator of the CCR unit is no longer subject to the requirement to prepare and maintain a written EAP beginning on the date the periodic hazard potential assessment documentation is placed in the facility's operating record.
 - [2] If the owner or operator of a CCR unit classified as a low-hazard potential CCR surface impoundment subsequently determines that the CCR unit is properly reclassified as either a high-hazard potential CCR surface impoundment or a significant-hazard potential CCR surface impoundment, then the owner or operator of the CCR unit shall prepare a written EAP for the CCR unit within six months of completing such periodic hazard potential assessment.
- (d) The owner or operator of the CCR unit shall submit the written EAP, and any subsequent amendment of the EAP to the department for approval.
- (e) Activation of the EAP. The EAP must be implemented once events or circumstances involving the CCR unit that represent a safety emergency are detected, including conditions identified during periodic structural stability assessments, annual inspections, and inspections by a qualified person.
- (4) The slopes and pertinent surrounding areas of the CCR unit must be designed, constructed, operated, and maintained with one of the forms of slope protection specified in subparagraph a that meets all of the performance standards of subparagraph b.

- (a) Slope protection must consist of one of the following:
 - [1] A vegetative cover consisting of grassy vegetation;
 - [2] An engineered cover consisting of a single form or combination of forms of engineered slope protection measures; or
 - [3] A combination of vegetative cover and engineered cover.
- (b) Any form of cover for slope protection must meet all of the following performance standards:
 - [1] The cover must be installed and maintained on the slopes and pertinent surrounding areas of the CCR unit;
 - [2] The cover must provide protection against surface erosion, wave action, and adverse effects of rapid drawdown;
 - [3] The cover must be maintained to allow for the observation of and access to the slopes and pertinent surrounding areas during routine and emergency events;
 - [4] Woody vegetation must be removed from the slopes or pertinent surrounding areas. Any removal of woody vegetation with a diameter greater than one-half inch [12.7 millimeters] must be directed by a person familiar with the design and operation of the unit and in consideration of the complexities of removal of a tree or a shrubbery, who must ensure the removal does not create a risk of destabilizing the unit or otherwise adversely affect the stability and safety of the CCR unit or personnel undertaking the removal; and
 - [5] The vegetative height of grassy and woody vegetation must be maintained at a height that will not be detrimental to the native grass cover.
- b. The requirements of subdivisions c through e apply to an owner or operator of a CCR surface impoundment that:
 - (1) Has a height of five feet [1.5 meters] or more and a storage volume of twenty acre-feet [24670 cubic meters] or more; or
 - (2) Has a height of twenty feet [6.1 meters] or more.
- c. No later than in the time frames specified in subdivision f for an existing impoundment, or included with the application for a permit for a new CCR unit or permit modification for lateral expansion of a CCR unit, the owner or operator of the CCR unit shall compile, to the extent feasible, the information specified below:
 - (1) The name and address of the owner or operator of the CCR unit, the name associated with the CCR unit, and the permit number.
 - (2) The location of the CCR unit identified on the most recent United States geological survey 7.5-minute or 15-minute topographic quadrangle map, or a topographic map of equivalent scale if a United States geological survey map is not available.
 - (3) A statement of the purpose for which the CCR unit is being used.
 - (4) The name and size in acres of the watershed within which the CCR unit is located.

- (5) A description of the physical and engineering properties of the foundation and abutment materials on which the CCR unit is constructed.
- (6) A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; the method of site preparation and construction of each zone of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.
- (7) At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or misoperation.
- (8) A description of the type, purpose, and location of existing instrumentation.
- (9) Area-capacity curves for the CCR unit.
- (10) A description of each spillway and diversion design features and capacities and calculations used in their determination.
- (11) The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.
- (12) Any record or knowledge of structural instability of the CCR unit.
- (13) Changes to the history of construction. If there is a significant change to any information required in this subdivision, the owner or operator of the CCR unit shall update the relevant information, notify the department, and place it in the facility's operating record.

d. **Periodic structural stability assessments.**

- (1) The owner or operator of the CCR unit shall conduct initial and periodic structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded therein. The assessment must, at a minimum, document whether the CCR unit has been designed, constructed, operated, and maintained with:
 - (a) Stable foundations and abutments;
 - (b) Slope protection consistent with the requirements under paragraph 4 of subdivision a;
 - (c) Dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit;
 - (d) Vegetated slopes of dikes and surrounding areas must be maintained at a height above the slope of the dike that will not be detrimental to the native

grass cover, except for slopes which have an alternate form or forms of slope protection;

- (e) A single spillway or a combination of spillways configured as stated below. The combined capacity of all spillways must be designed, constructed, operated, and maintained to adequately manage flow during and following the peak discharge from the event specified below.

- [1] All spillways must be:

- [a] Of nonerodible construction and designed to carry sustained flows; or

- [b] Earth- or grass-lined and designed to carry short-term, infrequent flows at nonerosive velocities where sustained flows are not expected.

- [2] The combined capacity of all spillways must adequately manage flow during and following the peak discharge from a:

- [a] Probable maximum flood for a high-hazard potential CCR surface impoundment;

- [b] One thousand-year flood for a significant-hazard potential CCR surface impoundment; or

- [c] One hundred-year flood for a low-hazard potential CCR surface impoundment.

- (f) 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; and

- (g) 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.

- (2) The periodic structural stability assessment described in this subdivision must identify any structural stability deficiencies associated with the CCR unit in addition to recommending corrective measures. If a deficiency or a release is identified during the periodic assessment, the owner or operator of the CCR unit must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken.

- (3) The owner or operator of the CCR unit shall obtain a certification from a qualified professional engineer stating that the initial assessment and each subsequent periodic assessment was conducted in accordance with the requirements of this section.

e. Periodic safety factor assessments.

- (1) The owner or operator shall conduct an initial and periodic safety factor assessments for each CCR unit and document whether the calculated factors of safety for each CCR unit achieve the minimum safety factors specified below for the

critical cross section of the embankment. The critical cross section is the cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments must be supported by appropriate engineering calculations.

- (a) The calculated static factor of safety under the long-term, maximum storage pool loading condition must equal or exceed 1.50.
 - (b) The calculated static factor of safety under the maximum surcharge pool loading condition must equal or exceed 1.40.
 - (c) The calculated seismic factor of safety must equal or exceed 1.00.
 - (d) For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety must equal or exceed 1.20.
 - (e) For new CCR surface impoundments and lateral expansions of a CCR impoundment, the calculated static factor of safety under the end-of-construction loading condition must equal or exceed 1.30. The assessment of this loading condition is only required for the initial safety factor assessment and is not required for subsequent assessments.
 - (2) The owner or operator of the CCR unit shall obtain a certification from a qualified professional engineer stating that the initial assessment and each subsequent periodic assessment specified in this section meets the requirements of this section.
- f. Time frames for periodic assessments.
- (1) Initial assessment. Except as provided in this subdivision, the owner or operator of an existing CCR unit shall complete and include the initial assessments required by this section with the application for a permit, or for a new CCR unit or lateral expansion of a CCR unit, with the application for a new permit or permit modification. The owner or operator has completed an initial assessment when the assessment has been approved by the department and placed in the facility's operating record.
 - (2) The owner or operator of an existing CCR surface impoundment may elect to use a previously completed assessment to serve as the initial assessment required by this section, provided that the previously completed assessment:
 - (a) Was completed no earlier than April 17, 2013; and
 - (b) Meets the applicable requirements of this section.
 - (3) Frequency for conducting periodic assessments. The owner or operator of the CCR unit shall conduct and complete the assessments required by this section every five years. The date of completing the initial assessment is the basis for establishing the deadline to complete the first subsequent assessment. If the owner or operator elects to use a previously completed assessment in lieu of the initial assessment, the date of the report for the previously completed assessment is the basis for establishing the deadline to complete the first subsequent assessment. The owner or operator may complete any required assessment prior to the required deadline provided the owner or operator places the completed assessment into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent assessments is based on the date of completing the previous assessment. For purposes of this section, the owner or operator has

completed an assessment if the relevant assessment has been approved by the department and placed in the facility's operating record.

- (4) Failure to document minimum safety factors during the initial assessment for new CCR surface impoundments or lateral expansions of a CCR surface impoundment. Until an owner or operator of a CCR unit documents that the calculated factors of safety achieve the minimum safety factors specified in paragraph 1 of subdivision e, the owner or operator is prohibited from placing CCR in such unit.
- (5) Closure of the CCR unit. An owner or operator of a CCR unit who either fails to complete a timely safety factor assessment or fails to demonstrate minimum safety factors as required by this section is subject to the closure requirements of subdivision b of subsection 2 of section 33.1-20-08-07.

History: Effective July 1, 2020; amended effective October 1, 2024.

General Authority: NDCC 23.1-08-03

Law Implemented: NDCC 23.1-08-03, 23.1-08-04

33.1-20-08-05. Operating criteria.

1. Air criteria.

- a. The owner or operator of a CCR landfill, CCR surface impoundment, or any lateral expansion of a CCR unit shall adopt measures that will effectively minimize CCR from becoming airborne at the facility, including CCR fugitive dust originating from CCR units, roads, and other CCR management and material handling activities.
- b. The CCR fugitive dust control plan. The owner or operator of the CCR unit shall prepare and operate in accordance with a CCR fugitive dust control plan as specified in paragraphs 1 through 6. This requirement applies in addition to, not in place of, any applicable standards under the Occupational Safety and Health Act.
 - (1) The CCR fugitive dust control plan shall identify and describe the CCR fugitive dust control measures the owner or operator will use to minimize CCR from becoming airborne at the facility. The owner or operator shall select, and include in the CCR fugitive dust control plan, the CCR fugitive dust control measures that are most appropriate for site conditions, along with an explanation of how the measures selected are applicable and appropriate for site conditions. Examples of control measures that may be appropriate include: Locating CCR inside an enclosure or partial enclosure; operating a water spray or fogging system; reducing fall distances at material drop points; using wind barriers, compaction, or vegetative covers; establishing and enforcing reduced vehicle speed limits; paving and sweeping roads; covering trucks transporting CCR; reducing or halting operations during high wind events; or applying a daily cover.
 - (2) If the owner or operator operates a CCR landfill or any lateral expansion of a CCR landfill, the CCR fugitive dust control plan must include procedures to emplace CCR as conditioned CCR. Conditioned CCR means wetting CCR with water to a moisture content that will prevent wind dispersal but will not result in free liquids. In lieu of water, CCR conditioning may be accomplished with an appropriate chemical dust suppression agent.
 - (3) The CCR fugitive dust control plan must include procedures to log citizen complaints received by the owner or operator involving CCR fugitive dust events at the facility.