

CHAPTER 33.1-20-08
DISPOSAL OF COAL COMBUSTION RESIDUALS IN
LANDFILLS AND SURFACE IMPOUNDMENTS

Section

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33.1-20-08-01. Definitions.

The terms used in this chapter have the same meaning as in North Dakota Century Code section 23.1-08-02 and section 33.1-20-01.1-03, except:

1. "Active facility or active electric utilities or independent power producers" means any facility subject to the requirements of this article that is in operation on October 19, 2015. An electric utility or independent power producer is in operation if it is generating electricity that is provided to electric power transmission systems or to electric power distribution systems on or after October 19, 2015. An offsite disposal facility is in operation if it is accepting or managing CCR on or after October 19, 2015.
2. "Active life or in operation" means the period of operation beginning with the initial placement of solid waste in the solid waste management unit and ending at completion of closure activities in accordance with section 33.1-20-08-07.
3. "Active portion" means that part of the solid waste management unit that has received or is receiving solid waste and that has not completed closure in accordance with section 33.1-20-08-07.
4. "CCR landfill" means an area of land or an excavation that receives CCR and which is not a surface impoundment, an underground injection well, a salt dome formation, a salt bed formation, an underground or surface coal mine, or a cave. For purposes of this article, a CCR landfill also includes sand and gravel pits and quarries that receive CCR, CCR piles, and any practice that does not meet the definition of a beneficial use of CCR.
5. "CCR pile" means any noncontainerized accumulation of solid, nonflowing CCR that is placed on the land. Coal combustion residuals that is beneficially used offsite is not a CCR pile.
6. "CCR surface impoundment" means a natural topographic depression, manmade excavation, or diked area, which is designed to hold an accumulation of CCR and liquids, and the unit treats, stores, or disposes of CCR.
7. "CCR surface impoundment height" means the vertical measurement from the downstream toe of the CCR surface impoundment at its lowest point to the lowest elevation of the crest of the CCR surface impoundment.
8. "CCR unit" means a CCR landfill, CCR surface impoundment, or lateral expansion of a CCR unit, or a combination of more than one of these units, based on the context of the paragraphs in which it is used. This term includes both new and existing units, unless otherwise specified.
9. "Existing CCR landfill" means a CCR landfill that receives CCR both before and after October 19, 2015, or for which construction commenced prior to October 19, 2015, and

receives CCR on or after October 19, 2015. A CCR landfill has commenced construction if the owner or operator has obtained the federal, state, and local approvals or permits necessary to begin physical construction and a continuous onsite, physical construction program had begun prior to October 19, 2015.

10. "Existing CCR surface impoundment" means a CCR surface impoundment that receives CCR both before and after October 19, 2015, or for which construction commenced prior to October 19, 2015, and receives CCR on or after October 19, 2015. A CCR surface impoundment has commenced construction if the owner or operator has obtained the federal, state, and local approvals or permits necessary to begin physical construction and a continuous onsite, physical construction program had begun prior to October 19, 2015.
11. "Grading" means the placement of CCR only to the extent necessary to create sufficient differences in elevation to support stormwater drainage.
12. "Hazard potential classification" means the possible adverse incremental consequences that result from the release of water or stored contents due to failure of the diked CCR surface impoundment or misoperation of the diked CCR surface impoundment or its appurtenances. The hazardous potential classifications include high-hazard potential CCR surface impoundment, low-hazard potential CCR surface impoundment, and significant-hazard potential CCR surface impoundment, which terms mean:
 - a. "High-hazard potential CCR surface impoundment" means a diked surface impoundment where failure or misoperation will probably cause loss of human life.
 - b. "Low-hazard potential CCR surface impoundment" means a diked surface impoundment where failure or misoperation results in no probable loss of human life and low economic or environmental losses, or both. Losses are principally limited to the surface impoundment owner's property.
 - c. "Significant-hazard potential CCR surface impoundment" means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.
13. "Height" means the vertical measurement from the downstream toe of the CCR surface impoundment at its lowest point to the lowest elevation of the crest of the CCR surface impoundment.
14. "Inactive CCR surface impoundment" means a CCR surface impoundment that no longer receives CCR on or after October 19, 2015, and still contains both CCR and liquids on or after October 19, 2015.
15. "In operation" means the same as "active life".
16. "Maximum horizontal acceleration in lithified earth material" means the maximum expected horizontal acceleration at the ground surface as depicted on a seismic hazard map, with a ninety-eight percent or greater probability that the acceleration will not be exceeded in fifty years, or the maximum expected horizontal acceleration based on a site-specific seismic risk assessment.
17. "New CCR landfill" means a CCR landfill or lateral expansion of a CCR landfill that first receives CCR or commences construction after October 19, 2015. A new CCR landfill has commenced construction if the owner or operator has obtained the federal, state, and local approvals or permits necessary to begin physical construction and a continuous onsite, physical construction program had begun after October 19, 2015. Overfills also are considered new CCR landfills.

18. "New CCR surface impoundment" means a CCR surface impoundment or lateral expansion of an existing or new CCR surface impoundment that first receives CCR or commences construction after October 19, 2015. A new CCR surface impoundment has commenced construction if the owner or operator has obtained the federal, state, and local approvals or permits necessary to begin physical construction and a continuous onsite, physical construction program had begun after October 19, 2015.
19. "Nonground water releases" means releases from the CCR unit other than the releases directly to the ground water that are detected through the unit's ground water monitoring system. Examples of nonground water releases include seepage through the embankment, minor ponding of seepage at the toe of the embankment of the CCR unit, seepage at the abutments of the CCR unit, seepage from slopes, ponding at the toe of the unit, a release of fugitive dust and releases of a "catastrophic" nature such as the breaching of an impoundment.
20. "Overfill" means a new CCR landfill constructed over a closed CCR surface impoundment.
21. "Pertinent surrounding areas" means all areas of the CCR surface impoundment or immediately surrounding the CCR surface impoundment that have the potential to affect the structural stability and condition of the CCR surface impoundment, including the toe of the downstream slope, the crest of the embankment, abutments, and unlined spillways.
22. "Poor foundation conditions" mean those areas where features exist which indicate that a natural or human-induced event may result in inadequate foundation support for the structural components of an existing or new CCR unit. For example, failure to maintain static and seismic factors of safety as required in subsection 3 of section 33.1-20-08-04 would cause a poor foundation condition.
23. "Qualified person" means a person or persons trained to recognize specific appearances of structural weakness and other conditions that are disrupting or have the potential to disrupt the operation or safety of the CCR unit by visual observation and, if applicable, to monitor instrumentation.
24. "Retrofit" means to remove all CCR and contaminated soils and sediments from the CCR surface impoundment, and to ensure the unit complies with the requirements in subsection 2 of section 33.1-20-08-04.
25. "Seismic factor of safety" means the factor of safety (safety factor) determined using analysis under earthquake conditions using the peak ground acceleration for a seismic event with a two percent probability of exceedance in fifty years, equivalent to a return period of approximately two thousand five hundred years, based on the United States geological survey seismic hazard maps for seismic events with this return period for the region where the CCR surface impoundment is located.
26. "Seismic impact zone" means an area having a two percent or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10 g in fifty years.
27. "Slope protection" means measures installed on the slopes or pertinent surrounding areas of the CCR unit that protect the slope against wave action, erosion, or adverse effects of rapid drawdown. Slope protection includes grassy vegetation and engineered slope protection measures.

History: Effective July 1, 2020.

General Authority: NDCC 23.1-08-03

Law Implemented: NDCC 23.1-08-04

33.1-20-08-02. Applicability.

1. The requirements of this chapter apply to owners and operators of new and existing landfills and surface impoundments, including any lateral expansions of such units that dispose or otherwise engage in solid waste management of CCR generated from the combustion of coal at electric utilities and independent power producers. Unless otherwise provided in this chapter, these requirements also apply to disposal units located offsite of the electric utilities and independent power producers. This chapter also applies to any practice that does not meet the definition of a beneficial use of CCR.
2. This chapter does not apply to CCR landfills that have ceased receiving CCR prior to October 19, 2015.
3. This chapter does not apply to electric utilities and independent power producers that have ceased operating prior to October 19, 2015.
4. This chapter does not apply to wastes, including fly ash, bottom ash, boiler slag, and flue gas desulfurization materials generated at facilities that are not part of an electric utility or independent power producer, such as manufacturing facilities, universities, and hospitals. This chapter also does not apply to fly ash, bottom ash, boiler slag, and flue gas desulfurization materials, generated primarily from the combustion of fuels, including other fossil fuels, other than coal, for the purpose of generating electricity unless the fuel burned consists of more than fifty percent coal on a total heat input or mass input basis, whichever results in the greater mass feed rate of coal.
5. This chapter does not apply to practices that meet the definition of a beneficial use of CCR.
6. This chapter does not apply to CCR placement at active or abandoned underground or surface coal mines.
7. This chapter does not apply to municipal solid waste landfills that receive CCR.
8. Owners and operators of CCR units that are subject to this chapter are subject to the solid waste management requirements of this article, unless specifically excluded in other chapters.
9. The owner or operator of an existing CCR unit subject to this chapter, which has a permit that is in effect prior to July 1, 2020, shall apply to the department for a modified permit which meets the requirements of this chapter within twenty-four months of July 1, 2020.

History: Effective July 1, 2020.

General Authority: NDCC 23.1-08-03

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

33.1-20-08-03. Location standards.

In addition to the general location standards in section 33.1-20-04.1-01, the following must be met:

1. Placement above the uppermost aquifer. New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is a minimum of five feet [1.52 meters] above the upper limit of the uppermost aquifer or demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the landfill and the uppermost aquifer due to normal fluctuations in ground water elevations, including the seasonal high water table.
 - a. For a new CCR landfill or surface impoundment or any lateral expansion of a CCR unit, the demonstration that the unit meets the minimum requirements for placement above the uppermost aquifer must be included with the application for a new permit or permit

modification. For an existing CCR surface impoundment, the demonstration must be included with the application for a permit modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02.

- b. The demonstration is considered complete when the demonstration is approved by the department and placed in the facility's operating record.
- c. An owner or operator of an existing CCR surface impoundment who fails to make the demonstration shall begin closure as required by subparagraph a of paragraph 1 of subdivision b of subsection 2 of section 33.1-20-08-07.
- d. An owner or operator of a new CCR landfill, new CCR surface impoundment, or any lateral expansion of a CCR unit who fails to make the demonstration is prohibited from placing CCR in the CCR unit.

2. Wetlands.

- a. New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in wetlands unless the owner or operator demonstrates no later than the date specified in subdivision b that the CCR unit meets the following requirements:
 - (1) Where applicable under section 404 of the Clean Water Act or applicable state wetlands laws, a clear and objective rebuttal of the presumption that an alternative to the CCR unit is reasonably available that does not involve wetlands.
 - (2) The construction and operation of the CCR unit will not cause or contribute to any of the following:
 - (a) A violation of any applicable state or federal water quality standard;
 - (b) A violation of any applicable toxic effluent standard or prohibition under section 307 of the Clean Water Act; or
 - (c) Jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of a critical habitat, protected under the Endangered Species Act of 1973.
 - (3) The CCR unit will not cause or contribute to a significant degradation of wetlands by addressing all of the following factors:
 - (a) Erosion, stability, and migration potential of native wetland soils, muds, and deposits used to support the CCR unit;
 - (b) Erosion, stability, and migration potential of dredged and fill materials used to support the CCR unit;
 - (c) The volume and chemical nature of the CCR;
 - (d) Impacts on fish, wildlife, and other aquatic resources and their habitat from release of CCR;
 - (e) The potential effects of catastrophic release of CCR to the wetland and the resulting impacts on the environment; and
 - (f) Any additional factors, as necessary, to demonstrate that ecological resources in the wetland are sufficiently protected.

- (4) To the extent required under section 404 of the Clean Water Act or applicable state wetlands laws, steps have been taken to attempt to achieve no net loss of wetlands, as defined by acreage and function, by first avoiding impacts to wetlands to the maximum extent reasonable as required by paragraphs 1 through 3 of subdivision a of subsection 2 of section 33.1-20-08-08, then minimizing unavoidable impacts to the maximum extent reasonable, and finally offsetting remaining unavoidable wetland impacts through all appropriate and reasonable compensatory mitigation actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands); and
 - (5) Sufficient information is available to make a reasoned determination with respect to the demonstrations listed in paragraphs 1 through 4.
- b. The owner or operator of the CCR unit shall complete the demonstrations required by subdivision a by the date specified in either paragraph 1 or 2.
- (1) For an existing CCR surface impoundment, the owner or operator shall include the demonstration with the application for a permit modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02.
 - (2) For a new CCR landfill, new CCR surface impoundment, or any lateral expansion of a CCR unit, the owner or operator shall include the demonstration with the application for a new permit or permit modification.
 - (3) The demonstration is considered complete when the demonstration is approved by the department and placed in the facility's operating record.
 - (4) An owner or operator of an existing CCR surface impoundment who fails to make the demonstration showing compliance with the requirements of subdivision a by the date specified in paragraph 1 is subject to the closure requirements of paragraph 1 of subdivision b of subsection 2 of section 33.1-20-08-07.
 - (5) For owners or operators of new and lateral expansions of existing CCR units that fail to demonstrate compliance, waste is prohibited from being placed into the CCR unit.

3. Fault areas.

- a. New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within two hundred feet [60 meters] of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates by the dates specified in subdivision c that an alternative setback distance of less than two hundred feet [60 meters] will prevent damage to the structural integrity of the CCR unit.
- b. The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer or a qualified environmental professional stating that the demonstration meets the requirements of subdivision a.
- c. The owner or operator of the CCR unit shall complete the demonstration required by subdivision a by the date specified in either paragraph 1 or 2.
 - (1) For an existing CCR surface impoundment, the owner or operator shall include the demonstration with the application for a permit modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02.

- (2) For a new CCR landfill, new CCR surface impoundment, or any lateral expansion of a CCR unit, the owner or operator shall include the demonstration with the application for a new permit or permit modification.
- (3) The demonstration is considered complete when the demonstration is approved by the department and placed in the facility's operating record.
- (4) An owner or operator of an existing surface impoundment who fails to make the demonstration showing compliance with the requirements of subdivision a by the date specified in paragraph 1 is subject to the closure requirements of paragraph 1 of subdivision b of subsection 2 of section 33.1-20-08-07.
- (5) For owners or operators of new and lateral expansions of existing CCR units that fail to demonstrate compliance, waste is prohibited from being placed into the CCR unit.

4. Seismic impact zones.

- a. New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in seismic impact zones unless the owner or operator demonstrates by the dates specified in subdivision c that all structural components, including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.
- b. 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.
- c. The owner or operator of the CCR unit shall complete the demonstration required by subdivision a by the date specified in either paragraph 1 or 2.
 - (1) For an existing CCR surface impoundment, the owner or operator shall include the demonstration with the application for a permit modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02.
 - (2) For a new CCR landfill, new CCR surface impoundment, or any lateral expansion of a CCR unit, the owner or operator shall include the demonstration with the application for a new permit or permit modification.
 - (3) The demonstration is considered complete when the demonstration is approved by the department and placed in the facility's operating record.
 - (4) An owner or operator of an existing surface impoundment who fails to make the demonstration showing compliance with the requirements of subdivision a of this subsection by the date specified in paragraph 1 is subject to the closure requirements of paragraph 1 of subdivision b of subsection 2 of section 33.1-20-08-07.
 - (5) For owners or operators of new and lateral expansions of existing CCR units that fail to demonstrate compliance, waste is prohibited from being placed into the CCR unit.

5. Unstable areas.

- a. An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansions of an existing CCR unit must not be located in an unstable area unless the owner or operator demonstrates that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted.
- b. The owner or operator shall consider all of the following factors, at a minimum, when determining whether an area is unstable:
 - (1) Onsite or local soil conditions that may result in significant differential settling;
 - (2) Onsite or local geologic or geomorphologic features; and
 - (3) Onsite or local human-made features or events (both surface and subsurface)
- 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 either paragraph 1 or 2.
 - (1) For an existing CCR landfill or surface impoundment, the demonstration must be included with the application for a permit modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02.
 - (2) 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.
 - (3) The demonstration is considered complete when the demonstration is approved by the department and placed in the facility's operating record.
 - (4) For owners or operators of an existing CCR surface impoundment or CCR landfill that fails to demonstrate compliance by the date required in paragraph 1, 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.
 - (5) 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.

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 transmissivity through the lower component of the alternative composite liner is no greater than the transmissivity 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 transmissivity 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) No later than twenty-four months after July 1, 2020, the owner or operator of an existing CCR surface impoundment shall include with the application for a permit modification that meets the requirements of this chapter, as required by subsection 9 of section 33.1-20-08-02, documentation that such CCR unit was constructed with one of the following:
 - (a) A composite liner that meets the requirements of subdivision d of subsection 1;
 - (b) An alternative composite liner that meets the requirements of subdivision e of subsection 1 or is demonstrated, using recognized and generally accepted good engineering practices, to have a total flux rate through the liner equal to or less than the flux rate through a 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 either:
 - (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 shall 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 paragraph 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 paragraph 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 either:
 - (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 paragraph 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 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 either:
 - [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 modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02, 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 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 when 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.

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. Coal combustion residuals 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 shall 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.
 - (4) The CCR fugitive dust control plan must include a description of the procedures the owner or operator will follow to periodically assess the effectiveness of the control plan.
 - (5) The owner or operator of an existing CCR unit shall include an initial CCR fugitive dust control plan for the facility with the application for a permit modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02. For new CCR units or lateral expansions of CCR units, the fugitive dust control plan must be included with the application for a new permit or permit modification. The owner or operator has completed the initial CCR fugitive dust control plan when the plan has been approved by the department and placed in the facility's operating record.
 - (6) Amendment of the plan. The owner or operator of a CCR unit subject to the requirements of this section may amend the written CCR fugitive dust control plan at any time with approval by the department, provided the revised plan is placed in the facility's operating record. The owner or operator shall amend the written plan whenever there is a change in conditions that would substantially affect the written plan in effect, such as the construction and operation of a new CCR unit.
- c. Annual CCR fugitive dust control report. The owner or operator of a CCR unit shall prepare an annual CCR fugitive dust control report that includes a description of the actions taken by the owner or operator to control CCR fugitive dust, a record of all citizen complaints, and a summary of any corrective measures taken. The annual CCR fugitive dust control report shall be included with the facility's annual report required by subsection 4 of section 33.1-20-04.1-04. For purposes of this subdivision, the owner or operator has completed the annual CCR fugitive dust control report when the annual report has been submitted to the department and placed in the facility's operating record.

2. Run-on and runoff controls for CCR landfills.
 - a. The owner or operator of an existing or new CCR landfill or any lateral expansion of a CCR landfill shall design, construct, operate, and maintain:
 - (1) A run-on control system to prevent flow onto the active portion of the CCR unit during the peak discharge from a twenty-four-hour, twenty-five-year storm; and
 - (2) A run-off control system from the active portion of the CCR unit to collect and control at least the water volume resulting from a twenty-four-hour, twenty-five-year storm.
 - b. Run-off from the active portion of the CCR unit must be handled in accordance with the surface water requirements in chapters 33.1-16-01 and 33.1-16-02.1.
 - c. Run-on and run-off control system plan:
 - (1) Content of the plan. The owner or operator shall prepare initial and periodic run-on and run-off control system plans for the CCR unit according to the time frames specified in this subsection. These plans must document how the run-on and run-off control systems have been designed and constructed to meet the applicable requirements of this subsection. Each plan must be supported by appropriate engineering calculations. The owner or operator has completed the initial run-on and run-off control system plan when the plan has been approved by the department and placed in the facility's operating record.
 - (2) Amendment of the plan. The owner or operator may amend the written run-on and run-off control system plan at any time provided the revised plan is placed in the facility's operating record. The owner or operator shall amend the written run-on and run-off control system plan whenever there is a change in conditions that would substantially affect the written plan in effect.
 - (3) Time frames for preparing the initial plan.
 - (a) Existing CCR landfills. The owner or operator of the CCR unit shall include the initial run-on and run-off control system plan with the application for a permit modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02.
 - (b) New CCR landfills and any lateral expansion of a CCR landfill. The owner or operator shall include the initial run-on and run-off control system plan with the application for a new permit or permit modification.
 - (4) Frequency for revising the plan. The owner or operator of the CCR unit shall prepare periodic run-on and run-off control system plans required by paragraph 1 every five years. The date of completing the initial plan is the basis for establishing the deadline to complete the first subsequent plan. The owner or operator may complete any required plan prior to the required deadline provided the owner or operator places the completed plan into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing a subsequent plan is based on the date of completing the previous plan. The owner or operator has completed a periodic run-on and run-off control system plan when the plan has been approved by the department and placed in the facility's operating record.
3. Hydrologic and hydraulic capacity requirements for CCR surface impoundments.

- a. The owner or operator of an existing or new CCR surface impoundment or any lateral expansion of a CCR surface impoundment shall design, construct, operate, and maintain an inflow design flood control system as specified in paragraphs 1 and 2.
 - (1) The inflow design flood control system must adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood specified in paragraph 3.
 - (2) The inflow design flood control system must adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood specified in paragraph 3.
 - (3) The inflow design flood is:
 - (a) For a high-hazard potential CCR surface impoundment, as determined under subdivision a of subsection 3 of section 33.1-20-08-04, the probable maximum flood;
 - (b) For a significant-hazard potential CCR surface impoundment, as determined under subdivision a of subsection 3 of section 33.1-20-08-04, the one thousand-year flood;
 - (c) For a low-hazard potential CCR surface impoundment, as determined under subdivision a of subsection 3 of section 33.1-20-08-04, the one hundred-year flood; or
 - (d) For an incised CCR surface impoundment, the twenty-five-year flood.
- b. Discharge from the CCR unit must be handled in accordance with the surface water requirements under chapters 33.1-16-01 and 33.1-16-02.1.
- c. Inflow design flood control system plan:
 - (1) Content of the plan. The owner or operator shall prepare initial and periodic inflow design flood control system plans for the CCR unit according to the time frames specified in this subdivision. These plans must document how the inflow design flood control system has been designed and constructed to meet the requirements of this section. Each plan must be supported by appropriate engineering calculations. The owner or operator of the CCR unit has completed the inflow design flood control system plan when the plan has been approved by the department and placed in the facility's operating record.
 - (2) Amendment of the plan. The owner or operator of the CCR unit may amend the written inflow design flood control system plan at any time provided the revised plan is approved by the department and placed in the facility's operating record. The owner or operator must amend the written inflow design flood control system plan whenever there is a change in conditions that would substantially affect the written plan in effect.
 - (3) Time frames for preparing the initial plan:
 - (a) Existing CCR surface impoundments. The owner or operator of the CCR unit shall include the initial inflow design flood control system plan with the application for a permit modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02.

- (b) New CCR surface impoundments and any lateral expansion of a CCR surface impoundment. The owner or operator must include the initial inflow design flood control system plan with the application for a new permit or permit modification.
 - (4) Frequency for revising the plan. The owner or operator shall prepare periodic inflow design flood control system plans every five years. The date of completing the initial plan is the basis for establishing the deadline to complete the first periodic plan. The owner or operator may complete any required plan prior to the required deadline provided the owner or operator places the completed plan into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing a subsequent plan is based on the date of completing the previous plan. For purposes of this paragraph, the owner or operator has completed an inflow design flood control system plan when the plan has been approved by the department and placed in the facility's operating record.
4. Inspection requirements for CCR surface impoundments.
- a. Inspections by a qualified person.
 - (1) All CCR surface impoundments and any lateral expansion of a CCR surface impoundment must be examined by a qualified person as follows:
 - (a) Inspect at least once each calendar week for any appearances of actual or potential structural weakness and other conditions which are disrupting or have the potential to disrupt the operation or safety of the CCR unit;
 - (b) Inspect at least once each calendar week the discharge of all outlets of hydraulic structures which pass underneath the base of the surface impoundment or through the dike of the CCR unit for abnormal discoloration, flow, or discharge of debris or sediment; and
 - (c) Monitor at least once each calendar month all CCR unit instrumentation.
 - (d) The results of the inspection by a qualified person must be recorded in the facility's operating record.
 - (2) Time frames for inspections by a qualified person.
 - (a) Existing CCR surface impoundments. The owner or operator of the CCR unit shall initiate the inspections by a qualified person no later than one week after July 1, 2020, for weekly inspections and one month after July 1, 2020, for monthly inspections.
 - (b) New CCR surface impoundments and any lateral expansion of a CCR surface impoundment. The owner or operator of the CCR unit shall initiate the inspections by a qualified person upon initial receipt of CCR by the CCR unit.
 - b. Annual inspections by a qualified professional engineer.
 - (1) If the existing or new CCR surface impoundment or any lateral expansion of the CCR surface impoundment is subject to the periodic structural stability assessment requirements under subdivision d subsection 3 of section 33.1- 20-08-04, the CCR unit must additionally be inspected on a periodic basis by a qualified professional engineer to ensure the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices. The inspection, at a minimum, must include:

- (a) A review of available information regarding the status and condition of the CCR unit, including files available in the operating record (e.g., CCR unit design and construction information, previous periodic structural stability assessments, the results of inspections by a qualified person, and results of previous annual inspections);
 - (b) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures; and
 - (c) A visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation.
- (2) Inspection report. The qualified professional engineer shall prepare a report following each inspection that addresses:
- (a) Any changes in geometry of the impounding structure since the previous annual inspection;
 - (b) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection;
 - (c) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;
 - (d) The storage capacity of the impounding structure at the time of the inspection;
 - (e) The approximate volume of the impounded water and CCR at the time of the inspection;
 - (f) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit and appurtenant structures; and
 - (g) Any other changes which may have affected the stability or operation of the impounding structure since the previous annual inspection.
- (3) Time frames for conducting the initial inspection.
- (a) Existing CCR surface impoundments. The owner or operator of the CCR unit shall complete the initial inspection by a qualified professional engineer no later than one year after July 1, 2020.
 - (b) New CCR surface impoundments and any lateral expansion of a CCR surface impoundment. The owner or operator of the CCR unit shall complete the initial annual inspection by a qualified professional engineer no later than fourteen months following the date of initial receipt of CCR in the CCR unit.
- (4) Frequency of inspections.
- (a) Except as provided for in subparagraph b, the owner or operator of the CCR unit shall conduct the inspections required section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating

record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this paragraph, the owner or operator has completed an inspection when the inspection report has been submitted to the department and placed in the facility's operating record.

- (b) In any calendar year in which both the periodic inspection by a qualified professional engineer and the quinquennial (occurring every five years) structural stability assessment by a qualified professional engineer required by subdivision d of subsection 3 of section 33.1-20-08-04 are required to be completed, the annual inspection is not required, provided the structural stability assessment is completed during the calendar year. In the year following the quinquennial structural stability assessment, the deadline for completing the next annual inspection is one year from the date of completing the quinquennial structural stability assessment.
 - (5) If a deficiency or release is identified during an inspection, the owner or operator shall notify the department and remedy the deficiency or release in accordance with applicable requirements in subsections 6 through 9 of section 33.1-20-08-06.
5. Inspection requirements for CCR landfills.
- a. Inspections by a qualified person.
 - (1) All CCR landfills and any lateral expansion of a CCR landfill must be examined by a qualified person as follows:
 - (a) Inspect weekly for any appearances of actual or potential structural weakness and other conditions that are disrupting or have the potential to disrupt the operation or safety of the CCR unit; and
 - (b) The results of the inspection by a qualified person must be recorded in the facility's operating record.
 - (2) Time frames for inspections by a qualified person.
 - (a) Existing CCR landfills. The owner or operator of the CCR unit shall initiate the inspections by a qualified person no later than one week after July 1, 2020.
 - (b) New CCR landfills and any lateral expansion of a CCR landfill. The owner or operator of the CCR unit shall initiate the inspections by a qualified person upon initial receipt of CCR by the CCR unit.
 - b. Annual inspections by a qualified professional engineer.
 - (1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices. The inspection must, at a minimum, include:
 - (a) A review of available information regarding the status and condition of the CCR unit, including files available in the operating record (e.g., the results of inspections by a qualified person, and results of previous annual inspections); and

- (b) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.
- (2) Inspection report. The qualified professional engineer shall prepare a report following each inspection that addresses the following:
 - (a) Any changes in geometry of the structure since the previous annual inspection;
 - (b) The approximate volume of CCR contained in the unit at the time of the inspection;
 - (c) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and
 - (d) Any other changes which may have affected the stability or operation of the CCR unit since the previous annual inspection.
- (3) Time frames for conducting the initial inspection.
 - (a) Existing CCR landfills. The owner or operator of the CCR unit shall complete the initial inspection by a qualified professional engineer no later than one year after July 1, 2020.
 - (b) New CCR landfills and any lateral expansion of a CCR landfill. The owner or operator of the CCR unit shall complete the initial annual inspection by a qualified professional engineer no later than fourteen months following the date of initial receipt of CCR in the CCR unit.
- (4) Frequency of inspections. The owner or operator of the CCR unit shall conduct the inspection required by this subdivision on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this paragraph, the owner or operator has completed an inspection when the inspection report has been submitted to the department and placed in the facility's operating record.
- (5) If a deficiency or release is identified during an inspection, the owner or operator shall notify the department and remedy the deficiency or release in accordance with applicable requirements in subsections 6 through 9 of section 33.1-20-08-06.

History: Effective July 1, 2020.

General Authority: NDCC 23.1-08-03

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

33.1-20-08-06. Ground water monitoring and corrective action.

- 1. Applicability.
 - a. Existing CCR landfills, CCR surface impoundments, and lateral expansions of CCR units are subject to the ground water monitoring and corrective action requirements of this section, except as provided in subdivision f.
 - b. Initial time frames.

- (1) Existing CCR landfills and existing CCR surface impoundments. The owner or operator of the CCR unit shall include with the permit modification application required by subsection 9 of section 33.1-20-08-02, a ground water monitoring plan showing compliance with the following ground water monitoring requirements:
 - (a) Install the ground water monitoring system as required by subsection 2;
 - (b) Develop the ground water sampling and analysis program to include selection of the statistical procedures to be used for evaluating ground water monitoring data as required by subsection 3;
 - (c) Initiate the detection monitoring program to include obtaining a minimum of eight independent samples for each background and downgradient well as required by subsection 4; and
 - (d) Begin evaluating the ground water monitoring data for statistically significant increases over background levels for the constituents listed in appendix I of this chapter as required by subsection 4.
 - (2) New CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units. The owner or operator shall include a ground water monitoring plan with the application for a new permit or permit modification to show compliance with the ground water monitoring requirements specified in subparagraphs a and b of paragraph 1 prior to initial receipt of CCR by the CCR unit. In addition, the owner or operator of the CCR unit shall initiate the detection monitoring program to include obtaining a minimum of eight independent samples for each background well as required by subsection 4.
- c. Once a ground water monitoring system and ground water monitoring program has been established at the CCR unit as required by this section, the owner or operator shall conduct ground water monitoring and, if necessary, corrective action throughout the active life and postclosure care period of the CCR unit.
 - d. In the event of a release from a CCR unit, the owner or operator immediately shall take all necessary measures to control the source of the release so as to reduce or eliminate, to the maximum extent feasible, further releases of contaminants into the environment. The owner or operator of the CCR unit shall comply with all applicable requirements in subsections 6 through 8, or, if eligible, must comply with the requirements in subsection 9.
 - e. Annual ground water monitoring and corrective action report. For existing CCR landfills and existing CCR surface impoundments, no later than January thirty-first of the year following July 1, 2020, and January thirty-first of each year thereafter, the owner or operator must prepare an annual ground water monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual ground water monitoring and corrective action report no later than January thirty-first of the year following the calendar year a ground water monitoring system has been established, and January thirty-first of each year thereafter. For the preceding calendar year, the annual report must document the status of the ground water monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record. The annual report must be submitted to the department for approval and placed on the facility's publicly accessible internet site by March first of each year. At a minimum, the annual

ground water monitoring and corrective action report must contain the following information, to the extent available:

- (1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the ground water monitoring program for the CCR unit;
- (2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;
- (3) In addition to all the monitoring data obtained under this section, a summary including the number of ground water samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;
- (4) A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituents detected at a statistically significant increase over background levels); and
- (5) Other information required to be included in the annual report as specified in this section.

f. Suspension of ground water monitoring requirements.

- (1) The department may suspend the ground water monitoring requirements of this section for a CCR unit for up to ten years if the owner or operator provides written documentation that there is no potential for migration of the constituents listed in appendices I and II to this chapter from that CCR unit to the uppermost aquifer during the active life of the CCR unit and the postclosure care period. This demonstration must be certified by a qualified professional engineer and approved by the department, and must be based upon:
 - (a) Site-specific field collected measurements, sampling, and analysis of physical, chemical, and biological processes affecting contaminant fate and transport, including at a minimum, the information necessary to evaluate or interpret the effects of the following properties or processes on contaminant fate and transport:
 - [1] Aquifer characteristics, including hydraulic conductivity, hydraulic gradient, effective porosity, aquifer thickness, degree of saturation, stratigraphy, degree of fracturing and secondary porosity of soils and bedrock, aquifer heterogeneity, ground water discharge, and ground water recharge areas;
 - [2] Waste characteristics, including quantity, type, and origin;
 - [3] Climatic conditions, including annual precipitation, leachate generation estimates, and effects on leachate quality;
 - [4] Leachate characteristics, including leachate composition, solubility, density, the presence of immiscible constituents, Eh, and pH; and
 - [5] Engineered controls, including liners, cover systems, and aquifer controls (e.g., lowering the water table). These must be evaluated under design and failure conditions to estimate their long-term residual performance.

- (b) Contaminant fate and transport predictions that maximize contaminant migration and consider impacts on human health and the environment.
 - (2) The owner or operator of the CCR unit may secure an additional ten years for the suspension of the ground water monitoring requirements provided the owner or operator provides written documentation that there continues to be no potential for migration. The documentation must be supported by, at a minimum, by the same information required for the initial monitoring suspension and must be certified by a qualified professional engineer and approved by the department. The owner or operator shall submit the documentation of their re-demonstration for the department's review and approval of their extension one year before their ground water monitoring suspension is due to expire. If the existing ground water monitoring extension expires, the owner or operator shall begin ground water detection monitoring according to this section within ninety days. The owner or operator may obtain additional ten-year ground water monitoring suspensions provided the owner or operator continues to make the written demonstration. The owner or operator shall place each completed demonstration, if more than one ten-year suspension period is sought, in the facility's operating record.
2. Ground water monitoring systems.
- a. Performance standard. The owner or operator of a CCR unit shall install a ground water monitoring system that consists of a sufficient number of wells, installed at appropriate locations and depths, to yield ground water samples from the uppermost aquifer that:
 - (1) Accurately represent the quality of background ground water that has not been affected by leakage from a CCR unit. A determination of background quality may include sampling of wells that are not hydraulically upgradient of the CCR management area where:
 - (a) Hydrogeologic conditions do not allow the owner or operator of the CCR unit to determine what wells are hydraulically upgradient; or
 - (b) Sampling at other wells will provide an indication of background ground water quality that is as representative or more representative than that provided by the upgradient wells; and
 - (2) Accurately represent the quality of ground water passing the waste boundary of the CCR unit. The downgradient monitoring system must be installed at the waste boundary that ensures detection of ground water contamination in the uppermost aquifer. All potential contaminant pathways must be monitored.
 - b. The number, spacing, and depths of monitoring systems shall be determined based upon site-specific technical information that must include thorough characterization of:
 - (1) Aquifer thickness, ground water flow rate, ground water flow direction including seasonal and temporal fluctuations in ground water flow; and
 - (2) Saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the uppermost aquifer, including thicknesses, stratigraphy, lithology, hydraulic conductivities, porosities, and effective porosities.
 - c. The ground water monitoring system must include the minimum number of monitoring wells necessary to meet the performance standards specified in paragraph a, based on

the site-specific information specified in paragraph b. The ground water monitoring system must contain:

- (1) A minimum of one upgradient and three downgradient monitoring wells; and
 - (2) Additional monitoring wells as necessary to accurately represent the quality of background ground water that has not been affected by leakage from the CCR unit and the quality of ground water passing the waste boundary of the CCR unit.
- d. The owner or operator of multiple CCR units may install a multiunit ground water monitoring system instead of separate ground water monitoring systems for each CCR unit. The multiunit ground water monitoring system must be equally as capable of detecting monitored constituents at the waste boundary of the CCR unit as the individual ground water monitoring system for each CCR unit based on the following factors:
- (1) Number, spacing, and orientation of each CCR unit;
 - (2) Hydrogeologic setting;
 - (3) Site history; and
 - (4) Engineering design of the CCR unit.
- e. Monitoring wells must be cased in a manner that maintains the integrity of the monitoring well borehole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of ground water samples. The annular space (i.e., the space between the borehole and well casing) above the sampling depth must be sealed to prevent contamination of samples and the ground water.
- (1) The owner or operator of the CCR unit shall document and include in the ground water monitoring plan and the operating record the design, installation, development, and decommissioning of any monitoring wells; piezometers; and other measurement, sampling, and analytical devices.
 - (2) The monitoring wells; piezometers; and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to the design specifications throughout the life of the monitoring program.
- f. The owner or operator shall provide documentation in the ground water monitoring plan that the ground water monitoring system has been designed and constructed to meet the requirements of this section. If the ground water monitoring system includes the minimum number of monitoring wells specified in this subsection, the ground water monitoring plan must document the basis for supporting this determination. Any proposed changes to the ground water monitoring plan must be submitted to, and approved by, the department.
3. Ground water sampling and analysis requirements.
- a. The ground water monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide an accurate representation of ground water quality at the background and downgradient wells. The owner or operator of the CCR unit must develop a sampling and analysis program that includes procedures and techniques for:
- (1) Sample collection;
 - (2) Sample preservation and shipment;
 - (3) Analytical procedures;

- (4) Chain of custody control; and
 - (5) Quality assurance and quality control.
- b. The ground water monitoring program must include sampling and analytical methods that are appropriate for ground water sampling and that accurately measure hazardous constituents and other monitoring parameters in ground water samples. For purposes of this section, the term constituent refers to both hazardous constituents and other monitoring parameters listed in either appendix I or II of this chapter.
 - c. Ground water elevations must be measured in each well immediately prior to purging, each time ground water is sampled. The owner or operator of the CCR unit shall determine the rate and direction of ground water flow each time ground water is sampled. Ground water elevations in wells which monitor the same CCR management area must be measured within a period of time short enough to avoid temporal variations in ground water flow which could preclude accurate determination of ground water flow rate and direction.
 - d. The owner or operator of the CCR unit shall establish background ground water quality in hydraulically upgradient or background wells for each of the constituents required in the particular ground water monitoring program that applies to the CCR unit as determined under subsections 4 or 5. Background ground water quality may be established at wells that are not located hydraulically upgradient from the CCR unit if it meets the requirements of paragraph 1 of subdivision a of subsection 2.
 - e. The number of samples collected when conducting detection monitoring and assessment monitoring, for both downgradient and background wells, must be consistent with the statistical procedures chosen under subdivision f and the performance standards under subdivision g of this subsection. The sampling procedures must be those specified under subsection 4 for detection monitoring, subsection 5 for assessment monitoring, and subsection 6 for corrective action monitoring.
 - f. The owner or operator of the CCR unit shall select one of the statistical methods specified in paragraphs 1 through 5 to be used in evaluating ground water monitoring data for each specified constituent. The statistical test chosen must be conducted separately for each constituent in each monitoring well.
 - (1) A parametric analysis of variance followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.
 - (2) An analysis of variance based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.
 - (3) A tolerance or prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.
 - (4) A control chart approach that gives control limits for each constituent.
 - (5) Another statistical test method that meets the performance standards of subdivision g.

- (6) The owner or operator of the CCR unit shall include documentation in the ground water monitoring plan showing that the selected statistical method is appropriate for evaluating the ground water monitoring data for the CCR management area. The documentation must include a narrative description of the statistical method selected to evaluate the ground water monitoring data.
- g. Any statistical method chosen must comply with the following performance standards, as appropriate, based on the statistical test method used:
- (1) The statistical method used to evaluate ground water monitoring data must be appropriate for the distribution of constituents. Normal distributions of data values must use parametric methods. Nonnormal distributions must use nonparametric methods. If the distribution of the constituents is shown by the owner or operator of the CCR unit to be inappropriate for a normal theory test, then the data must be transformed or a distribution-free (nonparametric) theory test must be used. If the distributions for the constituents differ, more than one statistical method may be needed.
 - (2) If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a ground water protection standard, the test must be done at a type I error level no less than 0.01 for each testing period. If a multiple comparison procedure is used, the type I experiment wise error rate for each testing period must be no less than 0.05; however, the type I error of no less than 0.01 for individual well comparisons must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts.
 - (3) If a control chart approach is used to evaluate ground water monitoring data, the specific type of control chart and its associated parameter values must be such that this approach is at least as effective as any other approach in this section for evaluating ground water data. The parameter values must be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern.
 - (4) If a tolerance interval or a prediction interval is used to evaluate ground water monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain, must be such that this approach is at least as effective as any other approach in this section for evaluating ground water data. These parameters must be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern.
 - (5) The statistical method must account for data below the limit of detection with one or more statistical procedures that shall be at least as effective as any other approach in this section for evaluating ground water data. Any practical quantization limit that is used in the statistical method must be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.
 - (6) If necessary, the statistical method must include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.
- h. The owner or operator of the CCR unit shall determine if there is a statistically significant increase over background values for each constituent required in the particular ground water monitoring program that applies to the CCR unit.

- (1) In determining whether a statistically significant increase has occurred, the owner or operator shall compare the ground water quality of each constituent at each downgradient monitoring well to the background value of that constituent, according to the statistical procedures and performance standards specified under subdivisions f and g.
 - (2) Within ninety days after completing sampling and analysis, the owner or operator shall determine whether there has been a statistically significant increase over background for any constituent at each monitoring well.
 - i. The owner or operator must measure "total recoverable metals" concentrations in measuring ground water quality. Measurement of total recoverable metals captures both the particulate fraction and dissolved fraction of metals in natural waters. ground water samples may not be field-filtered prior to analysis.
4. Detection monitoring program.
- a. The owner or operator of a CCR unit shall conduct detection monitoring at all ground water monitoring wells consistent with this subsection. At a minimum, a detection monitoring program must include ground water monitoring for all constituents listed in appendix I to this chapter.
 - b. Except as provided in subdivision d, the monitoring frequency for the constituents listed in appendix I to this chapter must be at least semiannual during the active life of the CCR unit and the postclosure period. For existing CCR landfills and existing CCR surface impoundments, a minimum of eight independent samples from each background and downgradient well must be collected and analyzed for the constituents listed in appendices I and II to this chapter no later than six months after July 1, 2020. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, a minimum of eight independent samples for each background well must be collected and analyzed for the constituents listed in appendices I and II to this chapter during the first six months of sampling, if not already completed.
 - c. The number of samples collected and analyzed for each background well and downgradient well during subsequent semiannual sampling events must be consistent with subdivision e of subsection 3 and must account for any unique characteristics of the site, but must be at least one sample from each background and downgradient well.
 - d. The owner or operator of a CCR unit may demonstrate the need for an alternative monitoring frequency for repeated sampling and analysis for constituents listed in appendix I to this chapter during the active life and the postclosure care period based on the availability of ground water. If there is not adequate ground water flow to sample wells semiannually, the alternative frequency shall be no less than annual. The need to vary monitoring frequency shall be evaluated on a site-specific basis and approved by the department. The demonstration must be supported by:
 - (1) Information documenting that the need for less frequent sampling. The alternative frequency must be based on consideration of the following factors:
 - (a) Lithology of the aquifer and unsaturated zone;
 - (b) Hydraulic conductivity of the aquifer and unsaturated zone; and
 - (c) Ground water flow rates.

- (2) Information documenting that the alternative frequency will be no less effective in ensuring that any leakage from the CCR unit will be discovered within a time frame that will not materially delay establishment of an assessment monitoring program.
 - (3) The owner or operator must obtain approval by the department for an alternative ground water sampling and analysis frequency. The owner or operator shall include the demonstration providing the basis for the alternative monitoring frequency in the annual ground water monitoring and corrective action report required by this section.
- e. If the owner or operator of the CCR unit determines that there is a statistically significant increase over background levels for one or more of the constituents listed in appendix I to this chapter at any monitoring well at the waste boundary the owner or operator shall:
- (1) Except as provided for in paragraph 2, within ninety days of detecting a statistically significant increase over background levels for any constituent, notify the department and establish an assessment monitoring program meeting the requirements of subsection 5.
 - (2) The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in ground water quality. The owner or operator shall complete the written demonstration within ninety days of detecting a statistically significant increase over background levels. If a successful demonstration is completed within the ninety-day period, the owner or operator of the CCR unit shall continue with a detection monitoring program under this section, with approval by the department. If a successful demonstration is not completed within the ninety-day period, the owner or operator of the CCR unit shall initiate an assessment monitoring program as required under subsection 5. The owner or operator also shall include the demonstration in the annual ground water monitoring and corrective action report.
 - (3) The owner or operator of a CCR unit shall prepare a notification stating that an assessment monitoring program has been established. The owner or operator has completed the notification when the notification is submitted to the department and placed in the facility's operating record.

5. Assessment monitoring program.

- a. Assessment monitoring is required whenever a statistically significant increase over background levels has been detected for one or more of the constituents listed in appendix I to this chapter.
- b. Within ninety days of triggering an assessment monitoring program, and annually thereafter, the owner or operator of the CCR unit shall sample and analyze the ground water for all constituents listed in appendix II to this chapter. The number of samples collected and analyzed for each well during each sampling event must be consistent with subdivision e of subsection 3, and must account for any unique characteristics of the site, but must be at least one sample from each well.
- c. The owner or operator of a CCR unit may demonstrate the need for an alternative monitoring frequency for repeated sampling and analysis for constituents listed in appendix II to this chapter during the active life and the postclosure care period based on the availability of ground water. If there is not adequate ground water flow to sample wells semiannually, the alternative frequency shall be no less than annual. The need to

vary monitoring frequency must be evaluated on a site-specific basis. The demonstration must be supported by:

- (1) Information documenting the need for less frequent sampling. The alternative frequency must be based on consideration of the following factors:
 - (a) Lithology of the aquifer and unsaturated zone;
 - (b) Hydraulic conductivity of the aquifer and unsaturated zone; and
 - (c) Ground water flow rates.
 - (2) Information documenting that the alternative frequency will be no less effective in ensuring that any leakage from the CCR unit will be discovered within a time frame that will not materially delay the initiation of any necessary remediation measures.
 - (3) The owner or operator shall obtain approval by the department for an alternative ground water sampling and analysis frequency. The owner or operator shall include the demonstration providing the basis for the alternative monitoring frequency in the annual ground water monitoring and corrective action report required by this section.
- d. After obtaining the results from the initial and subsequent sampling events required in subdivision b, the owner or operator must:
- (1) Within ninety days of obtaining the results, and on at least a semiannual basis thereafter, resample all wells in the monitoring system, conduct analyses for all parameters in appendices I and II to this chapter that are detected in response to subdivision b, and record their concentrations in the facility operating record. The number of samples collected and analyzed for each background well and downgradient well during subsequent semiannual sampling events must be consistent with subdivision e of subsection 3, and must account for any unique characteristics of the site, but must be at least one sample from each background and downgradient well;
 - (2) Establish ground water protection standards for all constituents detected pursuant to subdivision b or d. The ground water protection standards must be established in accordance with subdivision h of this subsection; and
 - (3) Include the recorded concentrations required by the assessment monitoring program, identify the background concentrations established under the detection monitoring program, and identify the ground water protection standards in the annual ground water monitoring and corrective action report.
- e. If the concentrations of all constituents listed in appendices I and II to this chapter are shown to be at or below background values, using the statistical procedures in subdivision g of subsection 3, for two consecutive sampling events, the owner or operator may return to detection monitoring of the CCR unit with approval by the department. The owner or operator shall prepare a notification stating that detection monitoring is resuming for the CCR unit. The owner or operator has completed the notification when the notification is submitted to the department and placed in the facility's operating record.
- f. If the concentrations of any constituent in appendices I and II to this chapter are above background values, but all concentrations are below the established ground water protection standard, using the statistical procedures in subdivision g or subsection 3, the owner or operator must continue assessment monitoring in accordance with this section.

- g. If one or more constituents in appendix II to this chapter are detected at statistically significant levels above the established ground water protection standard in any sampling event, the owner or operator shall prepare a notification identifying the constituents in appendix II to this chapter that have exceeded the ground water protection standard. The owner or operator has completed the notification when the notification is submitted to the department and placed in the facility's operating record. The owner or operator of the CCR unit also shall:
- (1) Characterize the nature and extent of the release and any relevant site conditions that may affect the remedy ultimately selected. The characterization must be sufficient to support a complete and accurate assessment of the corrective measures necessary to effectively clean up all releases from the CCR unit pursuant to subsection 6. Characterization of the release includes the following minimum measures:
 - (a) Install additional monitoring wells necessary to define the contaminant plume or plumes;
 - (b) Collect data on the nature and estimated quantity of material released including specific information on the constituents listed in appendix II to this chapter and the levels at which they are present in the material released;
 - (c) Install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well in accordance with paragraph 1 of subdivision d; and
 - (d) Sample all wells in accordance with paragraph 1 of subdivision d to characterize the nature and extent of the release.
 - (2) Notify all persons who own the land or reside on the land that directly overlies any part of the plume of contamination if contaminants have migrated offsite. The owner or operator has completed the notifications when they are placed in the facility's operating record.
 - (3) Within ninety days of finding that any of the constituents listed in appendix II to this chapter have been detected at a statistically significant level exceeding the ground water protection standards the owner or operator must either:
 - (a) Initiate an assessment of corrective measures as required by subsection 6; or
 - (b) Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in ground water quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be approved by the department. If a successful demonstration is made, the owner or operator shall continue monitoring in accordance with the assessment monitoring program pursuant to this subsection and may return to detection monitoring if the constituents in appendices I and II to this chapter are at or below the established background. The owner or operator also shall include the demonstration in the annual ground water monitoring and corrective action report.
 - (4) If a successful demonstration has not been made at the end of the ninety-day period provided by subparagraph b of paragraph 3, the owner or operator of the CCR unit

shall initiate the assessment of corrective measures requirements under subsection 6.

- (5) If an assessment of corrective measures is required and if the CCR unit is an existing unlined CCR surface impoundment, then the CCR unit is subject to the closure requirements under subdivision a of subsection 2 of section 33.1-20-08-07 to retrofit or close. In addition, the owner or operator shall prepare a notification stating that an assessment of corrective measures has been initiated.
- h. The ground water protection standard for each constituent in appendix II to this chapter detected in the ground water must be:
- (1) The maximum contaminant level for constituents for which an maximum contaminant level has been established under chapter 33.1-17-01; or
 - (2) For the following constituents:
 - (a) Cobalt - 6 micrograms per liter (ug/ l);
 - (b) Lead - 15 ug/l;
 - (c) Lithium - 40 ug/l; and
 - (d) Molybdenum - 100 ug/l.; or
 - (3) The background concentration for constituents for which the background level is higher than the maximum contaminant level or the levels identified in paragraph 2 of this subdivision.
6. Assessment of corrective measures.
- a. Within ninety days of finding that any constituent listed in appendix II to this chapter has been detected at a statistically significant level exceeding the ground water protection standard, or immediately upon detection of a release from a CCR unit, the owner or operator shall initiate an assessment of corrective measures to prevent further releases, to remediate any releases and to restore affected areas to original conditions. The assessment of corrective measures must be completed within ninety days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measures due to site-specific conditions or circumstance and obtains approval by the department. The ninety-day deadline to complete the assessment of corrective measures may be extended for no longer than sixty days. The owner or operator also shall include the demonstration and approval in the annual ground water monitoring and corrective action report.
 - b. The owner or operator of the CCR unit shall continue to monitor ground water in accordance with the assessment monitoring program.
 - c. The assessment of corrective measures must include an analysis of the effectiveness of potential corrective measures in meeting all of the requirements and objectives of the remedy as described under subsection 7, addressing at least the following:
 - (1) The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;
 - (2) The time required to begin and complete the remedy;

- (3) The institutional requirements, such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy.
 - d. The assessment has been completed when it is approved by the department and placed in the facility's operating record.
 - e. The owner or operator shall discuss the results of the corrective measures assessment at least thirty days prior to the selection of remedy, in a public meeting with interested and affected parties.
7. Selection of remedy.
 - a. Based on the results of the corrective measures assessment, the owner or operator shall, as soon as feasible, select a remedy. This requirement applies to, not in place of, any applicable standards under the Occupational Safety and Health Act of 1970 [Public Law 91-596; 84 Stat. 1590]. The owner or operator shall prepare a semiannual report describing the progress in selecting and designing the remedy. Upon selection of a remedy, the owner or operator shall prepare a final report describing the selected remedy and how it meets the standards specified in this subsection. The report has been completed when it is approved by the department and placed in the operating record.
 - b. Remedies must:
 - (1) Be protective of human health and the environment;
 - (2) Attain the ground water protection standard as specified pursuant to subdivision h of subsection 5, or attain a risk-based ground water concentration that is protective of human health and the environment;
 - (3) Control the sources of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix II to this chapter into the environment;
 - (4) Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems;
 - (5) Comply with standards for management of wastes as specified in subdivision d of subsection 8.
 - c. In selecting a remedy that meets the standards of this subsection, the owner or operator of the CCR unit shall consider the following evaluation factors:
 - (1) The long- and short-term effectiveness and protectiveness of the potential remedies, along with the degree of certainty that the remedy will prove successful based on consideration of the following:
 - (a) Magnitude of reduction of existing risks;
 - (b) Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy;
 - (c) The type and degree of long-term management required, including monitoring, operation, and maintenance;
 - (d) Short-term risks that might be posed to the community or the environment during implementation of such a remedy, including potential threats to human

health and the environment associated with excavation, transportation, and redisposal of contaminant;

- (e) Time until full protection is achieved;
 - (f) Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, redisposal, or containment;
 - (g) Long-term reliability of the engineering and institutional controls; and
 - (h) Potential need for replacement of the remedy.
- (2) The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of the following factors:
- (a) The extent to which containment practices will reduce further releases; and
 - (b) The extent to which treatment technologies may be used.
- (3) The ease or difficulty of implementing a potential remedy based on consideration of the following types of factors:
- (a) Degree of difficulty associated with constructing the technology;
 - (b) Expected operational reliability of the technologies;
 - (c) Need to coordinate with and obtain necessary approvals and permits from other agencies;
 - (d) Availability of necessary equipment and specialists; and
 - (e) Available capacity and location of needed treatment, storage, and disposal services.
- (4) The degree to which community concerns are addressed by a potential remedy.
- d. The owner or operator shall specify as part of the selected remedy a schedule for implementing and completing remedial activities. Such a schedule must require the completion of remedial activities within a reasonable period of time, taking into consideration:
- (1) Extent and nature of contamination;
 - (2) Reasonable probabilities of remedial technologies in achieving compliance with ground water protection standards and other objectives of the remedy;
 - (3) Availability of treatment or disposal capacity for CCR managed during implementation of the remedy;
 - (4) Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy;
 - (5) Resource value of the aquifer, including:
 - (a) Current and future uses;
 - (b) Proximity and withdrawal rate of users;

- (c) Ground water quantity and quality;
 - (d) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to CCR constituents;
 - (e) The hydrogeologic characteristic of the facility and surrounding land; and
 - (f) The availability of alternative water supplies; and
- (6) Other relevant factors.
- e. The department may determine that remediation of a release of a constituent listed in appendix II to this chapter from a CCR unit is not necessary if the owner or operator demonstrates to the satisfaction of the department that:
- (1) The ground water is additionally contaminated by substances that have originated from a source other than a CCR unit and those substances are present in concentrations such that cleanup of the release from the CCR unit would provide no significant reduction in risk to actual or potential receptors; or
 - (2) The constituent is present in ground water that:
 - (a) Is not currently or reasonably expected to be a source of drinking water; and
 - (b) Is not hydraulically connected with waters to which the constituent is migrating or are likely to migrate in a concentration that would exceed the ground water protection standards; or
 - (3) Remediation of the release is technically impracticable; or
 - (4) Remediation results in unacceptable cross-media impacts.
- f. A determination by the department that remediation of a release is not necessary may not affect the requirement under subdivision b for the owner or operator to undertake source control measures or other measures, including closure if triggered, that may be necessary to eliminate or minimize further releases to the ground water, to prevent exposure to the ground water, or to remediate the ground water to concentrations that are technically feasible and significantly reduce threats to human health or the environment.
8. Implementation of the corrective action program.
- a. Within ninety days of selecting a remedy under subsection 7, the owner or operator shall initiate remedial activities. Based on the schedule established under subdivision d of subsection 7, for implementation and completion of remedial activities the owner or operator shall:
- (1) Establish and implement a corrective action ground water monitoring program that:
 - (a) Meets the requirements of an assessment monitoring program under subsection 5;
 - (b) Documents the effectiveness of the corrective action remedy; and
 - (c) Demonstrates compliance with the ground water protection standards.
 - (2) Implement the selected corrective action remedy; and

- (3) Take any interim measures necessary to reduce the contaminants leaching from the CCR unit and potential exposures to human or ecological receptors. Interim measures must, to the greatest extent feasible, be consistent with the objectives of, and contribute to the performance of, any remedy that may be required pursuant to subsection 7. The following factors must be considered by an owner or operator in determining whether interim measures are necessary:
 - (a) Time required to develop and implement a final remedy;
 - (b) Actual or potential exposure of nearby populations or environmental receptors to any of the constituents listed in appendix II to this chapter;
 - (c) Actual or potential contamination of drinking water supplies or sensitive ecosystems;
 - (d) Further degradation of the ground water that may occur if remedial action is not initiated expeditiously;
 - (e) Weather conditions that may cause any of the constituents listed in appendix II to this chapter to migrate or be released;
 - (f) Potential for exposure to any of the constituents listed in appendix II to this chapter as a result of an accident or failure of a container or handling system; and
 - (g) Other situations that may pose threats to human health and the environment.
- b. If an owner or operator of the CCR unit, determines, at any time, that compliance with the requirements of subdivision b of subsection 7 is not being achieved through the remedy selected, the owner or operator shall implement other methods or techniques that could feasibly achieve compliance with the requirements.
- c. Remedies selected pursuant to subsection 7 must be considered complete when:
 - (1) The owner or operator of the CCR unit demonstrates that compliance with the ground water protection standards has been achieved at all points within the plume of contamination that lie beyond the ground water monitoring well system established under subsection 2;
 - (2) Except as provided by paragraph 4, compliance with the ground water protection standards has been achieved by demonstrating that concentrations of constituents listed in appendix II to this chapter have not exceeded the ground water protection standards for a period of three consecutive years using the statistical procedures and performance standards in subdivisions f and g of subsection 3; and
 - (3) All actions required to complete the remedy have been satisfied.
 - (4) The department may specify an alternative length of time to that specified in paragraph 2 during which the owner or operator must demonstrate that concentrations of constituents listed in appendix II to this chapter have not exceeded the ground water protection standards taking into consideration:
 - (a) Extent and concentration of the release;
 - (b) Behavior characteristics of the constituents in the ground water;

- (c) Accuracy of monitoring or modeling techniques, including any seasonal, meteorological, or other environmental variabilities that may affect the accuracy; and
 - (d) Characteristics of the ground water.
 - d. All CCR that are managed pursuant to a remedy required under subsection 7, or an interim measure required under paragraph 3 of subdivision a, shall be managed in a manner that complies with all applicable requirements under this article and North Dakota Century Code chapter 23.1-08.
 - e. Upon completion of the remedy, the owner or operator shall prepare a notification stating that the remedy has been completed. The owner or operator shall obtain a certification from a qualified professional engineer or a qualified environmental professional that the remedy has been completed. The report has been completed when it is approved by the department and placed in the operating record.
- 9. Corrective action procedures to remedy eligible nonground water releases.
 - a. General. This subsection specifies the corrective action requirements that apply to nonground water releases from CCR units that can be completely remediated within one hundred eighty days from the detection of the release. A release is completely remediated when a qualified professional engineer or a qualified environmental professional completes the certification required in paragraph 3 of subdivision c and the corrective action report is approved by the department. If the owner or operator determines, at any time, that the release will not be completely remediated within this one hundred eighty-day time frame, the owner or operator shall comply with all additional requirements specified in subsections 6, 7, and 8.
 - b. Corrective action requirements. Upon detection of a nonground water release from a CCR unit, the owner or operator shall comply with all of the following requirements:
 - (1) Immediately take all necessary measures to control all sources of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of contaminants into the environment;
 - (2) Determine the corrective measures that will meet the substantive standards in subdivision a of subsection 6 to prevent further releases, to remediate any releases, and to restore the affected area to original conditions;
 - (3) Analyze the effectiveness of potential corrective measures in meeting all of the requirements and objectives of the remedy as described in subdivision c of subsection 6;
 - (4) Select the corrective action that will remedy the nonground water release, taking into account the results of the assessment in this subdivision and the factors specified in subdivision c of subsection 7;
 - (5) Remediate the nonground water release to meet the standards specified in subdivision b of subsection 7; and
 - (6) Complete the remedy within one hundred eighty days of the date of discovery of the release.
 - c. Required notices and reports. An owner or operator of a CCR unit that complies with the requirements of this subsection to remediate a nonground water release shall ensure that

the notices and reports specified in this subdivision are completed. All required notices and reports must be signed by the owner or operator.

- (1) Within fifteen days of discovering a nonground water release, the owner or operator shall prepare a notification of discovery of a nonground water release. The owner or operator has completed the notification when it has been placed in the facility's operating record and submitted to the department.
- (2) Within fifteen days of completing the analysis of the effectiveness of potential corrective measures, place the completed analysis in the facility's operating record and submit to the department.
- (3) Within thirty days of completion of a corrective action of a nonground water release, the owner or operator shall prepare a report documenting the completion of the corrective action. The report must describe the nature and extent of the nonground water release, the CCR units responsible for the nonground water release, and how the remedy selected achieves the corrective action requirements specified in this subsection. The notification must include a certification by a qualified professional engineer or a qualified environmental professional that the corrective action has been completed. The owner or operator has completed the report when it has been approved by the department and placed in the facility's operating record.

History: Effective July 1, 2020.

General Authority: NDCC 23.1-08-03

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

33.1-20-08-07. Closure and postclosure care.

1. Inactive CCR surface impoundments.

- a. Inactive CCR surface impoundments are subject to all of the requirements of this chapter applicable to existing CCR surface impoundments.
- b. The owner or operator of an inactive CCR surface impoundment shall include documentation of the requirements of this subdivision with the permit modification application required by subsection 9 of section 33.1-20-08-02.

(1) Recordkeeping, notification, and internet requirements.

- (a) The owner or operator must have prepared and placed a notification of intent to initiate closure of the inactive CCR surface impoundment in the facility's operating record;
- (b) The owner or operator must have provided notification of the intent to initiate closure of the inactive CCR surface impoundment to the department; and
- (c) The owner or operator must have placed the notification of intent to initiate closure of the inactive CCR surface impoundment on its CCR website.

(2) Location restrictions.

(a) The owner or operator of the inactive CCR surface impoundment shall:

- [1] Complete the demonstration for placement above the uppermost aquifer as set forth by subsection 1 of section 33.1-20-08-03;
- [2] Complete the demonstration for wetlands as set forth by subsection 2 of section 33.1-20-08-03;

- [3] Complete the demonstration for fault areas as set forth by subsection 3 of section 33.1-20-08-03;
 - [4] Complete the demonstration for seismic impact zones as set forth by subsection 4 of section 33.1-20-08-03;
 - [5] Complete the demonstration for unstable areas as set forth by subsection 5 of section 33.1-20-08-03.
- (b) An owner or operator of an inactive CCR surface impoundment who fails to demonstrate compliance with the requirements of subparagraph a is subject to the closure requirements of paragraph 1 of subdivision b of subsection 2.
- (3) Design criteria. The owner or operator of the inactive CCR surface impoundment shall:
- (a) Complete the documentation of liner type as set forth by subdivision a of subsection 2 of section 33.1-20-08-04.
 - (b) Place on or immediately adjacent to the CCR unit the permanent identification marker as set forth by paragraph 1 of subdivision a of subsection 3 of section 33.1-20-08-04.
 - (c) Prepare and maintain an emergency action plan as set forth by paragraph 3 of subdivision a of subsection 3 of section 33.1-20-08-04.
 - (d) Compile information relating to construction as set forth by subdivision c of subsection 3 of section 33.1-20-08-04.
 - (e) Complete the initial hazard potential classification, structural stability, and safety factor assessments as set forth by paragraph 2 of subdivision a and subdivisions d and e of subsection 3 of section 33.1-20-08-04.
- (4) Operating criteria. The owner or operator of the inactive CCR surface impoundment shall:
- (a) Prepare the initial CCR fugitive dust control plan as set forth in subsection 1 of section 33.1-20-08-05.
 - (b) Prepare the initial inflow design flood control system plan as set forth in subsection 3 of section 33.1-20-08-05.
 - (c) Initiate the inspections by a qualified person as set forth by subsection 4 of section 33.1-20-08-05.
 - (d) Complete the initial annual inspection by a qualified professional engineer set forth in subsection 4 of section 33.1-20-08-05.
- (5) Ground water monitoring and corrective action. The owner or operator of the inactive CCR surface impoundment shall:
- (a) Comply with ground water monitoring requirements set forth in subdivision b of subsection 1 of section 33.1-20-08-06 and subdivision b of subsection 4 of section 33.1-20-08-06; and
 - (b) Prepare the initial ground water monitoring and corrective action report as set forth in subdivision e of subsection 1 of section 33.1-20-08-06.

- (6) Closure and postclosure care. The owner or operator of the inactive CCR surface impoundment shall:
 - (a) Prepare an initial written closure plan as set forth in subdivision b of subsection 3; and
 - (b) Prepare an initial written postclosure care plan as set forth in subdivision d of subsection 5.
2. Closure or retrofit of CCR units.
 - a. The owner or operator of an existing unlined CCR surface impoundment, as determined under subdivision a of subsection 2 of section 33.1-20-08-04, is subject to the requirements of paragraph 1.
 - (1) Except as provided by paragraph 3, an owner or operator of an existing unlined CCR surface impoundment shall cease placing CCR and non-CCR waste streams into the unlined CCR surface impoundment and either retrofit or close the CCR unit in accordance with the requirements of subsection 3.
 - (2) An owner or operator of an existing unlined CCR surface impoundment that closes in accordance with paragraph 1 shall include a statement in the notification required under subdivision g of subsection 3 or paragraph 5 of subdivision j of subsection 3, that the CCR surface impoundment is closing or retrofitting under the requirements of paragraph 1.
 - (3) The time frame specified in paragraph 1 does not apply if the owner or operator complies with the alternative closure procedures specified in subsection 4.
 - (4) At any time after the initiation of closure under paragraph 1, the owner or operator may cease closure activities and initiate a retrofit of the CCR unit in accordance with the requirements of subdivision j of subsection 3.
 - b. The owner or operator of an existing CCR surface impoundment is subject to the requirements of paragraph 1.
 - (1) Noncompliance with location standards.
 - (a) Placement above the uppermost aquifer. Except as provided by paragraph 4, the owner or operator of an existing CCR surface impoundment that has not demonstrated compliance with the location standard specified in subsection 1 of section 33.1-20-08-03, shall cease placing CCR and non-CCR waste streams into such CCR unit no later than October 31, 2020, and close the CCR unit in accordance with the requirements of subsection 3.
 - (b) Wetlands, fault areas, seismic impact zones and unstable areas. Except as provided by paragraph 4, within six months of determining that an existing CCR surface impoundment has not demonstrated compliance with any location standard specified in subsections 2 through 5 of section 33.1-20-08-03, the owner or operator of the CCR surface impoundment shall cease placing CCR and non-CCR waste streams into such CCR unit and close the CCR unit in accordance with the requirements of subsection 3.
 - (2) Within six months of either failing to complete the initial or any subsequent periodic safety factor assessment required by subdivision e of subsection 3 of section 33.1-20-08-04 by the deadlines specified in subdivision f of subsection 3 of section 33.1-20-08-04 or failing to document that the calculated factors of safety for the

existing CCR surface impoundment achieve the minimum safety factors specified in subdivision e of subsection 3 of section 33.1-20-08-04, the owner or operator of the CCR surface impoundment shall cease placing CCR and non-CCR waste streams into such CCR unit and close the CCR unit in accordance with the requirements of subsection 3.

- (3) An owner or operator of an existing CCR surface impoundment that closes in accordance with paragraphs 1 or 2 shall include a statement in the closure notification required under subdivision g of subsection 3 that the CCR surface impoundment is closing under the requirements.
 - (4) The time frame specified in paragraph 1 does not apply if the owner or operator complies with the alternative closure procedures specified in subsection 4.
 - c. The owner or operator of a new CCR surface impoundment is subject to the requirements of paragraph 1.
 - (1) Within six months of either failing to complete the initial or any subsequent periodic safety factor assessment required by subdivision e of subsection 3 of section 33.1-20-08-04 by the deadlines specified in subdivision f of subsection 3 of section 33.1-20-08-04 or failing to document that the calculated factors of safety for the new CCR surface impoundment achieve the minimum safety factors specified in subdivision e of subsection 3 of section 33.1-20-08-04, the owner or operator of the CCR surface impoundment must cease placing CCR and non-CCR waste streams into such CCR unit and close the CCR unit in accordance with the requirements of subsection 3.
 - (2) An owner or operator of a new CCR surface impoundment that closes in accordance with paragraph 1 shall include a statement in the closure notification required under subdivision g of subsection 3 that the CCR surface impoundment is closing under the requirements of this subdivision.
 - d. The owner or operator of an existing CCR landfill is subject to the requirements of paragraph 1.
 - (1) Except as provided by paragraph 3, within six months of determining that an existing CCR landfill has not demonstrated compliance with the location restriction for unstable areas specified in subsection 5 of section 33.1-20-08-03, the owner or operator of the CCR unit must cease placing CCR and non-CCR waste streams into that landfill and close the CCR unit in accordance with the requirements of subsection 3.
 - (2) An owner or operator of an existing CCR landfill that closes in accordance with paragraph 1 shall include a statement in the closure notification required under subdivision g of subsection 3 of this section that the CCR landfill is closing under the requirements of this subdivision.
 - (3) The time frame specified in paragraph 1 does not apply if the owner or operator complies with the alternative closure procedures specified in subsection 4.
3. Criteria for conducting the closure or retrofit of CCR units.
 - a. Closure of a CCR landfill, CCR surface impoundment, or any lateral expansion of a CCR unit must be completed either by leaving the CCR in place and installing a final cover system or through removal of the CCR and decontamination of the CCR unit, as described in subdivisions b through i. Retrofit of a CCR surface impoundment must be completed in accordance with the requirements in subdivision j.

b. Written closure plan.

- (1) Content of the plan. The owner or operator of a CCR unit shall prepare a written closure plan that describes the steps necessary to close the CCR unit at any point during the active life of the CCR unit consistent with recognized and generally accepted good engineering practices. The written closure plan must include:
 - (a) A narrative description of how the CCR unit will be closed in accordance with this subsection.
 - (b) If closure of the CCR unit will be accomplished through removal of CCR from the CCR unit, a description of the procedures to remove the CCR and decontaminate the CCR unit in accordance with subdivision c.
 - (c) If closure of the CCR unit will be accomplished by leaving CCR in place, a description of the final cover system and the methods and procedures to be used to install the final cover. The closure plan must also discuss how the final cover system will achieve the performance standards specified in subdivision d.
 - (d) An estimate of the maximum inventory of CCR ever onsite over the active life of the CCR unit.
 - (e) An estimate of the largest area of the CCR unit ever requiring a final cover at any time during the CCR unit's active life.
 - (f) A schedule for completing all activities necessary to satisfy the closure criteria in this subsection, including an estimate of the year in which all closure activities for the CCR unit will be completed. The schedule should provide sufficient information to describe the sequential steps that will be taken to close the CCR unit, including identification of major milestones, such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of CCR surface impoundment closure, or installation of the final cover system, and the estimated time frames to complete each step or phase of CCR unit closure. When preparing the written closure plan, if the owner or operator of a CCR unit estimates that the time required to complete closure will exceed the time frames specified in paragraph 1 of subdivision f of this subsection, the written closure plan must include the site-specific information, factors and considerations that would support any time extension sought under paragraph 2 of subdivision f.
- (2) Time frames for preparing the initial written closure plan.
 - (a) Existing CCR units. The owner or operator of the CCR unit shall include the initial written closure plan consistent with the requirements specified in paragraph 1 with the application for a permit modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02.
 - (b) New CCR units and any lateral expansion of a CCR unit. The owner or operator shall include an initial written closure plan consistent with the requirements specified in paragraph 1 with the application for a new permit or permit modification.
 - (c) The owner or operator has completed the written closure plan when the plan, including the certification required by paragraph 4, has been approved by the department and placed in the facility's operating record.

- (3) Amendment of a written closure plan.
 - (a) The owner or operator may amend the initial or any subsequent written closure plan at any time with approval by the department.
 - (b) The owner or operator shall amend the written closure plan whenever:
 - [1] There is a change in the operation of the CCR unit that would substantially affect the written closure plan in effect; or
 - [2] Before or after closure activities have commenced, unanticipated events necessitate a revision of the written closure plan.
 - (c) The owner or operator shall amend the closure plan at least sixty days prior to a planned change in the operation of the facility or CCR unit, or no later than sixty days after an unanticipated event requires the need to revise an existing written closure plan. If a written closure plan is revised after closure activities have commenced for a CCR unit, the owner or operator shall amend the current closure plan no later than thirty days following the triggering event.
- (4) The owner or operator of the CCR unit shall obtain a written certification from a qualified professional engineer that the initial and any amendment of the written closure plan meets the requirements of this subsection.
- c. Closure by removal of CCR. An owner or operator may elect to close a CCR unit by removing and decontaminating all areas affected by releases from the CCR unit. Coal combustion residuals removal and decontamination of the CCR unit are complete when constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed and ground water monitoring concentrations do not exceed the established ground water protection standards for constituents listed in appendix II to this chapter.
- d. Closure performance standard when leaving CCR in place.
 - (1) The owner or operator of a CCR unit shall ensure that, at a minimum, the CCR unit is closed in a manner that will:
 - (a) Control, minimize, or eliminate, to the maximum extent feasible, postclosure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere;
 - (b) Preclude the probability of future impoundment of water, sediment, or slurry;
 - (c) Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and postclosure care period;
 - (d) Minimize the need for further maintenance of the CCR unit; and
 - (e) Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.
 - (2) Drainage and stabilization of CCR surface impoundments. Prior to installing the final cover system, the owner or operator of a CCR surface impoundment or any lateral expansion of a CCR surface impoundment shall:
 - (a) Eliminate free liquids by removing liquid wastes or solidifying the remaining wastes and waste residues.

- (b) Stabilize remaining wastes sufficiently to support the final cover system.
- (3) Final cover system. If a CCR unit is closed by leaving CCR in place, the owner or operator shall install a final cover system that is designed to minimize infiltration and erosion, and at a minimum, meets the requirements of subparagraph a, or the requirements of the alternative final cover system specified in subparagraph b. The design of the final cover system must be included in the written closure plan.
 - (a) The final cover system must be designed and constructed to meet these criteria:
 - [1] The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer that contains a minimum of eighteen inches [45.7 centimeters] of earthen material. The saturated hydraulic conductivity of the infiltration layer must be no greater than 1×10^{-7} centimeters per second.
 - [2] A second layer of twelve inches [30.5 centimeters] or more of clay-rich soil material suitable for serving as a plant root zone must be placed over the compacted layer. This layer is not required if the CCR unit contains only bottom ash.
 - [3] The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches [15.2 centimeters] of suitable plant growth material over the covered CCR unit and the facility planted with adapted grasses. The total depth of final cover must be three feet [91.4 centimeters] or more unless the CCR unit contains only bottom ash, in which case the total depth of final cover must be two feet [61.0 centimeters] or more.
 - [4] The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.
 - (b) The owner or operator may select an alternative final cover system design, provided the alternative final cover system is designed and constructed to meet these criteria:
 - [1] The design of the final cover system must include an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in items 1 and 2 of subparagraph a or an average long-term percolation rate less than 0.2 inches [5.0 millimeters] per year.
 - [2] The design of the final cover system must include an erosion layer that provides equivalent protection from wind or water erosion as the erosion layer specified in item 3 of subparagraph a.
 - [3] The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.
 - (c) The owner or operator of the CCR unit shall obtain a written certification from a qualified professional engineer that the design of the final cover system meets the requirements of this section.
- (4) Use of CCR in design and construction of final cover system.
 - (a) This paragraph specifies the allowable uses of CCR in the closure of CCR units closing pursuant to subsection 2. Coal combustion residuals may be

placed in such units with approval by the department, but only for the purposes of grading and contouring in the design and construction of the final cover system.

- (b) The owner or operator of a CCR unit shall meet all of the following criteria when placing CCR within a CCR unit for the purposes of grading or contouring:
 - [1] The CCR placed for construction of the final cover system must have been generated at the facility and be located at the facility at the time closure was initiated;
 - [2] For incised CCR surface impoundments the CCR must be placed entirely above the highest elevation of the surrounding natural ground surface where the CCR surface impoundment was constructed;
 - [3] For all other CCR units, CCR must be placed entirely above the highest elevation of CCR in the unit, following dewatering and stabilization;
 - [4] The CCR must not be placed outside the plane extending vertically from the line formed by the intersection of the crest of the CCR surface impoundment and the upstream slope of the CCR surface impoundment; and
 - [5] The final cover system must be constructed with either:
 - [a] A slope not steeper than five percent grade after allowance for settlement; or
 - [b] At a steeper grade, if the department determines that the steeper slope is necessary based on conditions at the site, to facilitate runoff and minimize erosion, and that side slopes are evaluated for erosion potential based on a stability analysis to evaluate possible erosion potential. The stability analysis, at a minimum, must evaluate the site geology; characterize soil shear strength; construct a slope stability model; establish ground water and seepage conditions, if any; select loading conditions; locate critical failure surface; and iterate until minimum factor of safety is achieved.
- e. Initiation of closure activities. Except as provided for in paragraph 5 and subsection 4, the owner or operator of a CCR unit must commence closure of the CCR unit no later than the applicable time frames specified in either paragraph 1, 2, or 3.
 - (1) The owner or operator shall commence closure of the CCR unit no later than thirty days after the date on which the CCR unit either:
 - (a) Receives the known final receipt of waste, either CCR or any non-CCR waste stream; or
 - (b) Removes the known final volume of CCR from the CCR unit for the purpose of beneficial use of CCR.
 - (2) Except as provided by paragraph 3, the owner or operator shall commence closure of a CCR unit that has not received CCR or any non-CCR waste stream or is no longer removing CCR for the purpose of beneficial use within two years of the last receipt of waste or within two years of the last removal of CCR material for the purpose of beneficial use.

(3) Notwithstanding paragraph 2, the owner or operator of the CCR unit may secure an additional two years to initiate closure of the idle unit provided the owner or operator provides written documentation to the department that the CCR unit will continue to accept wastes or will start removing CCR for beneficial use. The documentation must be supported by, at a minimum, the information specified in subparagraphs a and b. The owner or operator may obtain two-year extensions provided the owner or operator continues to be able to demonstrate that there is reasonable likelihood that the CCR unit will accept wastes in the foreseeable future or will remove CCR from the unit for beneficial use. The owner or operator shall submit each completed demonstration to the department and place it in the facility's operating record prior to the end of any two-year period.

(a) Information documenting that the CCR unit has remaining storage or disposal capacity or that the CCR unit can have CCR removed for the purpose of beneficial use; and

(b) Information demonstrating that there is a reasonable likelihood that the CCR unit will resume receiving CCR or non-CCR waste streams in the foreseeable future or that CCR can be removed for the purpose of beneficial use. The narrative must include a best estimate as to when the CCR unit will resume receiving CCR or non-CCR waste streams. The situations listed in items 1 through 4 are examples of situations that would support a determination that the CCR unit will resume receiving CCR or non-CCR waste streams in the foreseeable future.

[1] Normal plant operations include periods during which the CCR unit does not receive CCR or non-CCR waste streams, such as the alternating use of two or more CCR units whereby at any point in time one CCR unit is receiving CCR while CCR is being removed from a second CCR unit after its dewatering.

[2] The CCR unit is dedicated to a coal-fired boiler unit that is temporarily idled (e.g., CCR is not being generated) and there is a reasonable likelihood that the coal-fired boiler will resume operations in the future.

[3] The CCR unit is dedicated to an operating coal-fired boiler (i.e., CCR is being generated); however, no CCR is being placed in the CCR unit because the CCR is being entirely diverted to beneficial uses, but there is a reasonable likelihood that the CCR unit will again be used in the foreseeable future.

[4] The CCR unit currently receives only non-CCR waste streams and those non-CCR waste streams are not generated for an extended period of time, but there is a reasonable likelihood that the CCR unit will again receive non-CCR waste streams in the future.

(c) In order to obtain additional time extensions to initiate closure of a CCR unit beyond the first two years provided by paragraph 2, the owner or operator of the CCR unit shall include with the demonstration required by this subdivision the following statement signed by the owner or operator or an authorized representative:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted

information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

- (4) For purposes of this chapter, closure of the CCR unit has commenced if the owner or operator has ceased placing waste and completes any of the following actions or activities:
 - (a) Taken any steps necessary to implement the written closure plan required by paragraph b;
 - (b) Submitted a completed application for any required state or agency permit or permit modification; or
 - (c) Taken any steps necessary to comply with any state or other agency standards that are a prerequisite, or are otherwise applicable, to initiating or completing the closure of a CCR unit.
 - (5) The time frames specified in paragraphs 1 and 2 do not apply to any owners or operators of CCR units under closure as required by subdivisions a through d of subsection 2.
- f. Completion of closure activities.
- (1) Except as provided for in paragraphs 2 and 3, the owner or operator shall complete closure of the CCR unit:
 - (a) For existing and new CCR landfills and any lateral expansion of a CCR landfill, within six months of commencing closure activities.
 - (b) For existing and new CCR surface impoundments and any lateral expansion of a CCR surface impoundment, within five years of commencing closure activities.
 - (2) Extensions of closure time frames. With approval by the department, the time frames for completing closure of a CCR unit specified under paragraph 1 may be extended if the owner or operator can demonstrate that it was not feasible to complete closure of the CCR unit within the required time frames due to factors beyond the facility's control. If the owner or operator is seeking a time extension beyond the time specified in the written closure plan as required by subdivision b, the demonstration must include a narrative discussion providing the basis for additional time beyond that specified in the closure plan. The owner or operator shall place each completed demonstration, if more than one time extension is sought, in the facility's operating record prior to the end of any two-year period. Factors that may support such a demonstration include:
 - (a) Complications stemming from the climate and weather, such as unusual amounts of precipitation or a significantly shortened construction season;
 - (b) Time required to dewater a surface impoundment due to the volume of CCR contained in the CCR unit or the characteristics of the CCR in the unit;
 - (c) The geology and terrain surrounding the CCR unit will affect the amount of material needed to close the CCR unit; or
 - (d) Time required or delays caused by the need to coordinate with and obtain necessary approvals and permits from a state or other agency.

- (3) Maximum time extensions.
 - (a) CCR surface impoundments of forty acres [16.2 hectares] or smaller may extend the time to complete closure by no longer than two years.
 - (b) CCR surface impoundments larger than forty acres [16.2 hectares] may extend the time frame to complete closure of the CCR unit multiple times, in two-year increments. For each two-year extension sought, the owner or operator shall substantiate the factual circumstances demonstrating the need for the extension. No more than a total of five two-year extensions may be obtained for any CCR surface impoundment.
 - (c) CCR landfills may extend the time frame to complete closure of the CCR unit multiple times, in one-year increments. For each one-year extension sought, the owner or operator must substantiate the factual circumstances demonstrating the need for the extension. No more than a total of two one-year extensions may be obtained for any CCR landfill.
- (4) In order to obtain additional time extensions to complete closure of a CCR unit beyond the times provided by paragraph 1, the owner or operator of the CCR unit shall include with the demonstration required by paragraph 2 the following statement signed by the owner or operator or an authorized representative:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.
- (5) Upon completion, the owner or operator of the CCR unit shall obtain a certification from a qualified professional engineer verifying that closure has been completed in accordance with the closure plan specified in subdivision b and the requirements of this subsection.
- g. Before starting closure of a CCR unit, the owner or operator shall prepare a notification of intent to close a CCR unit. The notification must include the certification by a qualified professional engineer for the design of the final cover system as required by subparagraph c of paragraph 3 of subdivision d, if applicable. The owner or operator has completed the notification when it has been submitted to the department and placed in the facility's operating record.
- h. Within thirty days of completion of closure of the CCR unit, the owner or operator shall prepare a notification of closure of a CCR unit. The notification must include the certification by a qualified professional engineer required by paragraph 5 of subdivision f. The owner or operator has completed the notification when it has been submitted to the department and placed in the facility's operating record.
- i. Deed notations.
 - (1) Except as provided by paragraph 4, following closure of a CCR unit, the owner or operator shall record a notation on the deed to the property, or some other instrument that is normally examined during title search.
 - (2) The notation on the deed must in perpetuity notify any potential purchaser of the property that:

- (a) The land has been used as a CCR unit; and
 - (b) Its use is restricted under the postclosure care requirements as provided by subparagraph c of paragraph 1 of subdivision d of subsection 5.
- (3) Within sixty days of recording a notation on the deed to the property, the owner or operator shall submit a notification to the department stating that the deed notation has been recorded. The owner or operator has completed the notification when it has been placed in the facility's operating record.
- (4) An owner or operator that closes a CCR unit by removal of all CCR materials in accordance with subdivision c is not subject to the requirements of paragraphs 1 through 3.
- j. Criteria to retrofit an existing CCR surface impoundment.
- (1) To retrofit an existing CCR surface impoundment, the owner or operator must:
 - (a) First remove all CCR, including any contaminated soils and sediments from the CCR unit; and
 - (b) Comply with the requirements in subdivision b of subsection 2 of section 33.1-20-08-04.
 - (c) A CCR surface impoundment undergoing a retrofit remains subject to all other requirements of this chapter, including the requirement to conduct any necessary corrective action.
 - (2) Written retrofit plan.
 - (a) Content of the plan. The owner or operator shall prepare a written retrofit plan for approval by the department that describes the steps necessary to retrofit the CCR unit consistent with recognized and generally accepted good engineering practices. The written retrofit plan must include:
 - [1] A narrative description of the specific measures that will be taken to retrofit the CCR unit in accordance with this section.
 - [2] A description of the procedures to remove all CCR and contaminated soils and sediments from the CCR unit.
 - [3] An estimate of the maximum amount of CCR that will be removed as part of the retrofit operation.
 - [4] An estimate of the largest area of the CCR unit that will be affected by the retrofit operation.
 - [5] A schedule for completing all activities necessary to satisfy the retrofit criteria in this section, including an estimate of the year in which retrofit activities of the CCR unit will be completed.
 - (b) Time frames for preparing the initial written retrofit plan.
 - [1] No later than sixty days prior to the date of initiating retrofit activities, the owner or operator shall prepare the initial written retrofit plan. For purposes of this chapter, initiation of retrofit activities has commenced if the owner or operator has ceased placing waste in the unit and completes any of the following actions or activities:

- [a] Taken any steps necessary to implement the written retrofit plan;
 - [b] Submitted a completed application for a permit or permit modification; or
 - [c] Taken any steps necessary to comply with any state standards that are a prerequisite, or are otherwise applicable, to initiating or completing the retrofit of a CCR unit.
- [2] The owner or operator has completed the written retrofit plan when the plan, including the certification required by subparagraph d, has been approved by the department and placed in the facility's operating record.
- (c) Amendment of a written retrofit plan.
- [1] The owner or operator may amend the initial or any subsequent written retrofit plan at any time with approval by the department.
- [2] The owner or operator shall amend the written retrofit plan whenever:
- [a] There is a change in the operation of the CCR unit that would substantially affect the written retrofit plan in effect; or
 - [b] Before or after retrofit activities have commenced, unanticipated events necessitate a revision of the written retrofit plan.
- [3] The owner or operator shall amend the retrofit plan at least sixty days prior to a planned change in the operation of the facility or CCR unit, or no later than sixty days after an unanticipated event requires the revision of an existing written retrofit plan. If a written retrofit plan is revised after retrofit activities have commenced for a CCR unit, the owner or operator shall amend the current retrofit plan no later than thirty days following the triggering event.
- (d) The owner or operator of the CCR unit shall obtain a written certification from a qualified professional engineer that the activities outlined in the written retrofit plan, including any amendment of the plan, meet the requirements of this section.
- (3) Deadline for completion of activities related to the retrofit of a CCR unit. Any CCR surface impoundment that is being retrofitted must complete all retrofit activities within the same time frames and procedures specified for the closure of a CCR surface impoundment in subdivision f or, where applicable, subsection 4.
- (4) Upon completion, the owner or operator shall obtain a certification from a qualified professional engineer verifying that the retrofit activities have been completed in accordance with the retrofit plan.
- (5) Before initiating the retrofit of a CCR unit, the owner or operator shall prepare a notification of intent to retrofit a CCR unit. The owner or operator has completed the notification when it has been submitted to the department and placed in the facility's operating record.
- (6) Within thirty days of completing the retrofit activities the owner or operator shall prepare a notification of completion of retrofit activities. The notification must include the certification by a qualified professional engineer as required by paragraph 4.

The owner or operator has completed the notification when it has been submitted to the department and placed in the facility's operating record.

- (7) At any time after the initiation of a CCR unit retrofit, the owner or operator may cease the retrofit and initiate closure of the CCR unit in accordance with the requirements of this subsection.
4. Alternative closure requirements. The owner or operator of a CCR landfill, CCR surface impoundment, or any lateral expansion of a CCR unit that is subject to closure pursuant to subdivisions a, b, or d of subsection 2 may continue to receive CCR or non-CCR waste streams in the unit provided the owner or operator meets the requirements of either subdivision a, b, or c and receives approval by the department.
 - a. No alternative CCR disposal capacity.
 - (1) Notwithstanding the provisions of subdivisions a, b, or d of subsection 2, a CCR unit may continue to receive CCR if the owner or operator of the CCR unit certifies that the CCR shall continue to be managed in that CCR unit due to the absence of alternative disposal capacity both onsite and offsite of the facility. To qualify under this paragraph, the owner or operator of the CCR unit shall document that all of the following conditions have been met:
 - (a) No alternative disposal capacity is available onsite or offsite. An increase in costs or the inconvenience of existing capacity is not sufficient to support qualification under this section;
 - (b) The owner or operator has made, and continues to make, efforts to obtain additional capacity. Qualification under this subsection lasts only as long as no alternative capacity is available. Once alternative capacity is identified, the owner or operator shall arrange to use such capacity as soon as feasible;
 - (c) The owner or operator shall remain in compliance with all other requirements of this chapter, including the requirement to conduct any necessary corrective action; and
 - (d) The owner or operator shall prepare an annual progress report documenting the continued lack of alternative capacity and the progress towards the development of alternative CCR disposal capacity.
 - (2) Once alternative capacity is available, the CCR unit must cease receiving CCR and initiate closure following the time frames in subdivisions e and f of subsection 3.
 - (3) If no alternative capacity is identified within five years after the initial certification, the CCR unit must cease receiving CCR and close in accordance with the time frames in subdivisions e and f of subsection 3.
 - b. No alternative capacity for non-CCR waste streams.
 - (1) Notwithstanding the provisions of subdivisions a, b, or d of subsection 2, a CCR unit may continue to receive non-CCR waste streams if the owner or operator of the CCR unit certifies that the waste streams must continue to be managed in that CCR unit due to the absence of alternative capacity both onsite and offsite the facility. For these non-CCR waste streams, capacity means the capacity of impoundments, tanks, and other conveyances to manage daily flows currently handled by the unit. To qualify under this paragraph, the owner or operator of the CCR unit shall document that all of the following conditions have been met for each non-CCR waste stream that will continue to be received by the CCR unit:

- (a) No alternative disposal capacity is available. An increase in costs or the inconvenience of existing capacity is not sufficient to support qualification under this section;
 - (b) The owner or operator has made, and continues to make, efforts to obtain additional capacity. Qualification under this subsection requires that efforts to obtain additional capacity were made at the earliest date that an owner or operator knew, or had reason to know, that such a unit may become subject to closure under subdivisions a, b, or d of subsection 2. Qualification under this subsection lasts only as long as no alternative capacity is available. Once alternative capacity is identified, the owner or operator shall arrange to use such capacity as soon as feasible;
 - (c) The owner or operator shall remain in compliance with all other requirements of this chapter, including the requirement to conduct any necessary corrective action; and
 - (d) The owner or operator shall prepare an annual progress report documenting the continued lack of alternative capacity and the progress towards the development of alternative capacity for the given waste stream.
- (2) Once alternative capacity is available for a given waste stream, the CCR unit must cease receiving that waste stream, and in the case that alternate capacity has been found for all waste streams, the facility shall initiate closure of the CCR unit following the time frames in subdivisions e and f of subsection 3.
- (3) If no alternative capacity is identified within five years after the initial certification, the CCR unit must cease receiving all waste streams and close in accordance with the time frames in subdivisions e and f of subsection 3.
- c. Permanent cessation of a coal-fired boiler by a date certain.
- (1) Notwithstanding the provisions of subdivisions a, b, or d of subsection 2, a CCR unit may continue to receive CCR if the owner or operator certifies that the facility will cease operation of the coal-fired boilers within the time frames specified in paragraphs 2 through 4, but in the interim period, prior to closure of the coal-fired boiler, the facility must continue to use the CCR unit due to the absence of alternative disposal capacity both onsite and offsite of the facility. For wastewaters capacity means the capacity of impoundments, tanks, and other units to manage daily flows currently handled by the unit closing. To qualify under this paragraph, the owner or operator of the CCR unit shall document that all of the following conditions have been met:
- (a) No alternative disposal capacity is available onsite or offsite. An increase in costs or the inconvenience of existing capacity is not sufficient to support qualification under this section.
 - (b) The owner or operator shall remain in compliance with all other requirements of this chapter, including the requirement to conduct any necessary corrective action; and
 - (c) The owner or operator shall prepare an annual progress report documenting the continued lack of alternative capacity and the progress towards the closure of the coal-fired boiler.

- (2) For a CCR surface impoundment that is forty acres [16.2 hectares] or smaller, the coal-fired boiler must cease operation and the CCR surface impoundment must have completed closure no later than October 17, 2023.
 - (3) For a CCR surface impoundment that is larger than forty acres [16.2 hectares], the coal-fired boiler must cease operation, and the CCR surface impoundment must complete closure no later than October 17, 2028.
 - (4) For a CCR landfill, the coal-fired boiler must cease operation, and the CCR landfill must complete closure no later than April 19, 2021.
- d. Required notices and progress reports. An owner or operator of a CCR unit that closes in accordance with subparagraphs a, b, or c must complete the following notices and progress reports and submit them to the department:
- (1) Within six months of becoming subject to closure pursuant to subdivisions a, b, or d of subsection 2, the owner or operator shall prepare and place in the facility's operating record a notification of intent to comply with the alternative closure requirements of this subsection. The notification must describe why the CCR unit qualifies for the alternative closure provisions, in addition to providing the documentation and certifications required by subdivisions a, b, or c.
 - (2) The owner or operator shall prepare the periodic progress reports in addition to describing any problems encountered and a description of the actions taken to resolve the problems. The annual progress reports must be completed according to the following schedule:
 - (a) The first annual progress report must be prepared no later than thirteen months after completing the notification of intent to comply with the alternative closure requirements.
 - (b) The second annual progress report must be prepared no later than twelve months after completing the first annual progress report. Additional annual progress reports must be prepared within twelve months of completing the previous annual progress report.
 - (c) The owner or operator has completed the progress reports specified in this paragraph when the reports are placed in the facility's operating record.
 - (3) An owner or operator of a CCR unit also shall prepare the notification of intent to close a CCR unit as required by subdivision g of subsection 3.
5. Postclosure care requirements.
- a. Applicability.
 - (1) Except as provided by paragraph 2, this subsection applies to the owners or operators of CCR landfills, CCR surface impoundments, and all lateral expansions of CCR units that are subject to the closure criteria under subsection 3.
 - (2) An owner or operator of a CCR unit that elects to close a CCR unit by removing CCR as provided by subdivision c of subsection 3 is not subject to the postclosure care criteria under this subsection.
 - b. Postclosure care maintenance requirements. Following closure of the CCR unit, the owner or operator shall conduct postclosure care for the CCR unit, which must consist of at least the following:

- (1) Maintaining the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover;
 - (2) If the CCR unit is subject to the design criteria under subsection 1 of section 33.1-20-08-04, maintaining the integrity and effectiveness of the leachate collection and removal system and operating the leachate collection and removal system; and
 - (3) Maintaining the ground water monitoring system and monitoring the ground water in accordance with the requirements of section 33.1-20-08-06.
- c. Postclosure care period.
- (1) Except as provided by paragraphs 2 and 3, the owner or operator of the CCR unit shall conduct postclosure care for thirty years.
 - (2) If at the end of the postclosure care period the owner or operator of the CCR unit is operating under assessment monitoring in accordance with subsection 5 of section 33.1-20-08-06, the owner or operator shall continue to conduct postclosure care until the owner or operator returns to detection monitoring in accordance with subdivision e of subsection 5 of section 33.1-20-08-06 or subparagraph b of paragraph 3 of subdivision g of subsection 5 of section 33.1-20-08-06.
 - (3) The department may establish an alternate postclosure period upon a determination that the alternate period is sufficient to protect human health and the environment.
 - (a) To reduce the postclosure care period, the department must ensure that the postclosure care period is long enough to establish settlement behavior and to detect to wear-in defects in the cover system. At a minimum, the department must consider the type of cover placed on the unit (e.g., geosynthetic clay liner) and the placement of the ground water monitoring wells with respect to the waste management units and the ground water table.
 - (b) A determination that a reduced postclosure care period is warranted does not affect the obligation to comply with subdivision b.
- d. Written postclosure plan.
- (1) Content of the plan. The owner or operator of a CCR unit shall prepare a written postclosure plan that includes:
 - (a) A description of the monitoring and maintenance activities required in subdivision b for the CCR unit, and the frequency at which these activities will be performed;
 - (b) The name, address, telephone number, and email address of the person or office to contact about the facility during the postclosure care period; and
 - (c) A description of the planned uses of the property during the postclosure period. Postclosure use of the property may not disturb the integrity of the final cover, liner, or any other component of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements in this chapter. Any other disturbance is allowed if the owner or operator of the CCR unit demonstrates that disturbance of the final cover, liner, or other component of the containment system, including any removal of CCR, will not increase the potential threat to human health or the environment. The demonstration must

be certified by a qualified professional engineer, and notification must be provided to the department that the demonstration has been placed in the operating record and on the owner's or operator's publicly accessible internet site.

- (2) Deadline to prepare the initial written postclosure plan.
 - (a) Existing CCR landfills and existing CCR surface impoundments. The owner or operator of the CCR unit shall include the initial written closure plan consistent with the requirements specified in paragraph 1 with the application for a permit modification that meets the requirements of this chapter within twenty-four months of July 1, 2020, as required by subsection 9 of section 33.1-20-08-02.
 - (b) New CCR landfills, new CCR surface impoundments, and any lateral expansion of a CCR unit. The owner or operator shall include an initial written postclosure plan consistent with the requirements specified in paragraph 1 with the application for a new permit or permit modification.
 - (c) The owner or operator has completed the written postclosure plan when the plan has been approved by the department and placed in the facility's operating record.
 - (3) Amendment of a written postclosure plan.
 - (a) The owner or operator may amend the initial or any subsequent written postclosure plan developed pursuant to paragraph 1 at any time with approval by the department.
 - (b) The owner or operator shall amend the written closure plan whenever:
 - [1] There is a change in the operation of the CCR unit that would substantially affect the written postclosure plan in effect; or
 - [2] After postclosure activities have commenced, unanticipated events necessitate a revision of the written postclosure plan.
 - (c) The owner or operator shall amend the written postclosure plan at least sixty days prior to a planned change in the operation of the facility or CCR unit, or no later than sixty days after an unanticipated event requires the need to revise an existing written postclosure plan. If a written postclosure plan is revised after postclosure activities have commenced for a CCR unit, the owner or operator shall amend the written postclosure plan no later than thirty days following the triggering event.
 - (4) The owner or operator of the CCR unit shall obtain a written certification from a qualified professional engineer that the initial and any amendment of the written postclosure plan meets the requirements of this subsection.
- e. Notification of completion of postclosure care period. No later than sixty days following the completion of the postclosure care period, the owner or operator of the CCR unit shall prepare a notification verifying that postclosure care has been completed. The notification must include the certification by a qualified professional engineer verifying that postclosure care has been completed in accordance with the closure plan specified in subdivision d and the requirements of this subsection. The owner or operator has completed the notification when it has been approved by the department and placed in the facility's operating record.

History: Effective July 1, 2020.

General Authority: NDCC 23.1-08-03

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

33.1-20-08-08. Recordkeeping, notification, and posting of information to the internet.

1. Recordkeeping requirements.
 - a. Each owner or operator of a CCR unit subject to the requirements of this chapter shall maintain files of all information required by this section in a written operating record at their facility.
 - b. Unless specified otherwise, each file must be retained for at least five years following the date of each occurrence, measurement, maintenance, corrective action, report, record, or study.
 - c. An owner or operator of more than one CCR unit subject to the provisions of this chapter may comply with the requirements of this section in one recordkeeping system provided the system identifies each file by the name of each CCR unit. The files may be maintained on microfilm, on a computer, on computer disks, on a storage system accessible by a computer, on magnetic tape disks, or on microfiche.
 - d. The owner or operator of a CCR unit subject to this chapter shall submit to the department any demonstration or documentation required by this chapter, if requested.
 - e. Location standards. The owner or operator of a CCR unit subject to this chapter shall place the demonstrations documenting whether or not the CCR unit is in compliance with the requirements under subsections 1 through 5 of section 33.1- 20-08-03, as they become available, in the facility's operating record.
 - f. Design criteria. The owner or operator of a CCR unit subject to this chapter shall place the following information, as it becomes available, in the facility's operating record:
 - (1) The design and construction certifications as required by subdivisions b and c of subsection 1 of section 33.1-20-08-04.
 - (2) The documentation of liner type as required by paragraph 1 of subdivision a of subsection 2 of section 33.1-20-08-04.
 - (3) The design and construction certifications as required by paragraphs 2 and 3 of subdivision b of subsection 2 of section 33.1-20-08-04.
 - (4) Documentation prepared by the owner or operator stating that the permanent identification marker was installed as required by paragraph 1 of subdivision a of subsection 3 of section 33.1-20-08-04.
 - (5) The initial and periodic hazard potential classification assessments as required by paragraph 2 of subdivision a of subsection 3 of section 33.1-20- 08-04.
 - (6) The emergency action plan, and any amendment of the emergency action plan, as required by paragraph 3 of subdivision a of subsection 3 of section 33.1-20- 08-04, except that only the most recent emergency action plan must be maintained in the facility's operating record and publicly accessible CCR website.
 - (7) Documentation prepared by the owner or operator recording the annual face-to-face meeting or exercise between representatives of the owner or operator of the CCR

unit and the local emergency responders as required by item 5 of subparagraph a of paragraph 3 of subdivision a of subsection 3 of section 33.1-20-08-04.

- (8) Documentation prepared by the owner or operator recording all activations of the emergency action plan as required by subparagraph e of paragraph 3 of subdivision a of subsection 3 of section 33.1-20-08-04.
 - (9) The history of construction, including design and construction plans, and any revisions of it, as required by subdivision c of subsection 3 of section 33.1-20-08-04, except that these files must be maintained until the CCR unit completes closure of the unit in accordance with subsection 3 of section 33.1-20-08-07.
 - (10) The initial and periodic structural stability assessments as required by subdivision d of subsection 3 of section 33.1-20-08-04.
 - (11) Documentation detailing the corrective measures taken to remedy the deficiency or release as required by paragraph 2 of subdivision d of subsection 3 of section 33.1-20-08-04.
 - (12) The initial and periodic safety factor assessments as required by paragraph 2 of subdivision e of subsection 3 of section 33.1-20-08-04.
- g. Operating criteria. The owner or operator of a CCR unit subject to this chapter must place the following information, as it becomes available, in the facility's operating record:
- (1) The CCR fugitive dust control plan, and any subsequent amendment of the plan, required by subdivision b of subsection 1 of section 33.1-20-08-05, except that only the most recent control plan must be maintained in the facility's operating record and publicly accessible CCR website.
 - (2) The annual CCR fugitive dust control report required by subdivision c of subsection 1 of section 33.1-20-08-05.
 - (3) The initial and periodic run-on and run-off control system plans as required by subdivision c of subsection 2 of section 33.1-20-08-05.
 - (4) The initial and periodic inflow design flood control system plan as required by subdivision c of subsection 3 of section 33.1-20-08-05.
 - (5) Documentation recording the results of each impoundment inspection and instrumentation monitoring by a qualified person as required by subdivision a of subsection 4 of section 33.1-20-08-05.
 - (6) The periodic impoundment inspection report as required by paragraph 2 of subdivision b of subsection 4 of section 33.1-20-08-05.
 - (7) Documentation detailing the corrective measures taken to remedy the deficiency or release as required by paragraph 5 of subdivision b of subsection 4 of section 33.1-20-08-05 and by paragraph 5 of subdivision b of subsection 5 of section 33.1-20-08-05.
 - (8) Documentation recording the results of the weekly landfill inspection by a qualified person as required by subdivision a of subsection 5 of section 33.1-20-08-05.
 - (9) The periodic landfill inspection report as required by paragraph 2 of subdivision b of subsection 5 of section 33.1-20-08-05.

- h. Ground water monitoring and corrective action. The owner or operator of a CCR unit subject to this chapter shall place the following information, as it becomes available, in the facility's operating record:
- (1) The annual ground water monitoring and corrective action report as required by subdivision e of subsection 1 of section 33.1-20-08-06.
 - (2) Documentation of the design, installation, development, and decommissioning of any monitoring wells; piezometers; and other measurement, sampling, and analytical devices as required by paragraph 1 of subdivision e of subsection 2 of section 33.1-20-08-06.
 - (3) The ground water monitoring system certification as required by subdivision f of subsection 2 of section 33.1-20-08-06.
 - (4) The selection of a statistical method certification as required by paragraph 6 subdivision f of subsection 3 of section 33.1-20-08-06.
 - (5) Within thirty days of establishing an assessment monitoring program, the notification as required by paragraph 3 subdivision e of subsection 4 of section 33.1-20-08-06.
 - (6) The results of appendices I and II to this chapter constituent concentrations as required by paragraph 1 subdivision d of subsection 5 of section 33.1-20-08-06.
 - (7) Within thirty days of returning to a detection monitoring program, the notification as required by subdivision e of subsection 5 of section 33.1-20-08-06.
 - (8) Within thirty days of detecting one or more constituents in appendix II to this chapter at statistically significant levels above the ground water protection standard, the notifications as required by subdivision g of subsection 5 of section 33.1-20-08-06.
 - (9) Within thirty days of initiating the assessment of corrective measures requirements, the notification as required by paragraph 5 subdivision g of subsection 5 of section 33.1-20-08-06.
 - (10) The completed assessment of corrective measures as required by subdivision d of subsection 6 of section 33.1-20-08-06.
 - (11) Documentation prepared by the owner or operator recording the public meeting for the corrective measures assessment as required by subdivision e of subsection 6 of section 33.1-20-08-06.
 - (12) The semiannual report describing the progress in selecting and designing the remedy and the selection of remedy report as required by subdivision a of subsection 7 of section 33.1-20-08-06, except that the selection of remedy report must be maintained until the remedy has been completed.
 - (13) Within thirty days of completing the remedy, the notification as required by subdivision e of subsection 8 of section 33.1-20-08-06.
 - (14) The demonstration, including long-term performance data, supporting the suspension of ground water monitoring requirements as required by subdivision f of subsection 1 of section 33.1-20-08-06.
 - (15) The notification of discovery of a nonground water release as required by paragraph 1 subdivision c of subsection 9 of section 33.1-20-08-06.

- (16) The report documenting the completion of the corrective action as required by paragraph 2 of subdivision c of subsection 9 of section 33.1-20-08-06.
- i. Closure and postclosure care. The owner or operator of a CCR unit subject to this chapter shall place the following information, as it becomes available, in the facility's operating record:
 - (1) The notification of intent to initiate closure of the CCR unit as required by paragraph 1 of subdivision b of subsection 1 of section 33.1-20-08-07 and subdivision g of subsection 3 of section 33.1-20-08-07.
 - (2) The annual progress reports of closure implementation as required by paragraph 2 of subdivision d of subsection 4 of section 33.1-20-08-07.
 - (3) The notification of closure completion as required by subdivision h of subsection 3 of section 33.1-20-08-07.
 - (4) The written closure plan, and any amendment of the plan, as required by subdivision b of subsection 3 of section 33.1-20-08-07, except that only the most recent closure plan must be maintained in the facility's operating record and publicly accessible CCR website.
 - (5) The written demonstrations, including the certification required by paragraph 3 of subdivision e of subsection 3 of section 33.1-20-08-07, for a time extension for initiating closure as required by subparagraph c of paragraph 3 of subdivision e of subsection 3 of section 33.1-20-08-07.
 - (6) The written demonstrations, including the certification required by paragraph 4 of subdivision f of subsection 3 of section 33.1-20-08-07, for a time extension for initiating closure as required by subparagraph d of paragraph 2 of subdivision f of subsection 3 of section 33.1-20-08-07.
 - (7) The notification of intent to close a CCR unit as required by subdivision g of subsection 3 of section 33.1-20-08-07.
 - (8) The notification of completion of closure of a CCR unit as required by subdivision h of subsection 3 of section 33.1-20-08-07.
 - (9) The notification recording a notation on the deed as required by subdivision i of subsection 3 of section 33.1-20-08-07.
 - (10) The notification of intent to comply with the alternative closure requirements as required by paragraph 1 of subdivision d of subsection 4 of section 33.1-20-08-07.
 - (11) The annual progress reports under the alternative closure requirements as required by paragraph 2 of subdivision d of subsection 4 of section 33.1-20-08-07.
 - (12) The written postclosure plan, and any amendment of the plan, as required by subdivision d of subsection 5 of section 33.1-20-08-07, except that only the most recent closure plan must be maintained in the facility's operating record and publicly accessible CCR website.
 - (13) The notification of completion of postclosure care period as required by subdivision e of subsection 5 of section 33.1-20-08-07.

(14) The demonstration, including long-term performance data supporting the reduced postclosure care period as required by paragraph 3 of subdivision c of subsection 5 of section 33.1-20-08-07.

j. Retrofit criteria. The owner or operator of a CCR unit subject to this chapter shall place the following information, as it becomes available, in the facility's operating record:

(1) The written retrofit plan, and any amendment of the plan, as required by paragraph 2 of subdivision j of subsection 3 of section 33.1-20-08-07, except that only the most recent retrofit plan must be maintained in the facility's operating record and publicly accessible CCR website.

(2) The notification of intent that the retrofit activities will proceed in accordance with the alternative procedures as required by paragraph 1 of subdivision d of subsection 4 of section 33.1-20-08-07.

(3) The annual progress reports required under the alternative requirements as required by paragraph 2 of subdivision d subsection 4 of section 33.1-20-08- 07.

(4) The written demonstrations, including the certification in paragraph 4 of subdivision f of subsection 3 of section 33.1-20-08-07, for a time extension for completing retrofit activities as required by paragraph 3 of subdivision j of subsection 3 of section 33.1-20-08-07.

(5) The notification of intent to initiate retrofit of a CCR unit as required by paragraph 5 of subdivision j of subsection 3 of section 33.1-20-08-07.

(6) The notification of completion of retrofit activities as required by paragraph 6 of subdivision j of subsection 3 of section 33.1-20-08-07.

2. Record submission requirements.

a. The submittals required under subdivision e of this subsection must be sent to the department before the close of business on the day the submittal is required to be completed. For purposes of this section, before the close of business means the submittal must be postmarked or sent by electronic mail. If a deadline falls on a weekend or state holiday, the deadline is automatically extended to the next business day.

b. If any CCR unit is located in part within Indian country, notifications of submittals required by this section must be sent to the appropriate tribal authority.

c. Submittals may be combined as long as the deadline requirement for each submittal is met. Submittals may be included in a permit application, plan of operation, ground water monitoring plan, corrective action plan, report, or application for modification of any of these documents, as applicable.

d. Unless otherwise required in this section, the submittals specified in this section must be sent to the department within thirty days of placing in the facility's operating record. If the department does not approve any of the documents, the owner or operator of the CCR unit shall modify the document and resubmit it to the department for approval. The final approved document must be placed in the facility operating record and on the publicly accessible CCR website within thirty days of approval by the department and the unapproved document must be removed.

e. All documents, plans, assessments, demonstrations, certifications, and reports placed in the facility operating record and on the publicly accessible CCR website, as specified in subdivisions e through j of subsection 1, must be submitted to the department, except:

- (1) Documentation of the permanent identification marker specified under paragraph 4 of subdivision f of subsection 1.
- (2) Documentation of the results of each weekly impoundment inspection by a qualified person as specified under paragraph 5 of subdivision g of subsection 1.
- (3) Documentation of the results of each weekly landfill inspection by a qualified person as specified under paragraph 8 of subdivision g of subsection 1.
- (4) Documentation of the design, installation, development, and decommissioning of any monitoring wells; piezometers; and other measurement, sampling, and analytical devices as specified under paragraph 2 of subdivision h of subsection 1.
- (5) The results of appendices I and II to this chapter constituent concentrations as specified under paragraph 6 of subdivision h of subsection 1.
- (6) Documentation prepared by the owner or operator recording the public meeting for the corrective measures assessment specified under paragraph 11 of subdivision h of subsection 1.

3. Publicly accessible internet site requirements.

- a. Each owner or operator of a CCR unit subject to the requirements of this chapter shall maintain a publicly accessible internet site (CCR website) containing the information specified in subdivision e. The owner's or operator's website must be titled "CCR Rule Compliance Data and Information".
- b. An owner or operator of more than one CCR unit subject to the provisions of this chapter may comply with the requirements of this section by using the same Internet site for multiple CCR units provided the CCR website clearly delineates information by the name or identification number of each unit.
- c. Unless otherwise required in this chapter, the information required to be posted to the CCR website must be made available to the public for as long as it is required to be in the facility operating record.
- d. Unless otherwise required in this chapter, the information must be posted to the CCR website within thirty days of placing the pertinent information required by subsection 1 in the operating record.
- e. Each owner or operator shall place on the facility's publicly accessible CCR website all documents, plans, assessments, demonstrations, certifications, and reports placed in the facility operating record and approved by the department as specified in subdivisions e through j of subsection 1, except:
 - (1) Documentation of the permanent identification marker specified under paragraph 4 of subdivision f of subsection 1.
 - (2) Documentation of the results of each weekly impoundment inspection by a qualified person as specified under paragraph 5 of subdivision g of subsection 1.
 - (3) Documentation of the results of each weekly landfill inspection by a qualified person as specified under paragraph 8 of subdivision g of subsection 1.
 - (4) Documentation of the design, installation, development, and decommissioning of any monitoring wells, piezometers and other measurement, sampling, and analytical devices as specified under paragraph 2 of subdivision h of subsection 1.

- (5) The results of appendices I and II to this chapter constituent concentrations as specified under paragraph 6 of subdivision h of subsection 1.
- (6) Documentation prepared by the owner or operator recording the public meeting for the corrective measures assessment specified under paragraph 11 of subdivision h of subsection 1.

History: Effective July 1, 2020.

General Authority: NDCC 23.1-08-03

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

Appendix I to Chapter 33.1-20-08 - Constituents for Detection Monitoring

Common name ¹
Boron
Calcium
Chloride
Fluoride
pH
Sulfate
Total Dissolved Solids (TDS)

¹Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

Appendix II to Chapter 33.1-20-08 - Constituents for Assessment Monitoring

Common name ¹
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228 combined

¹Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.