

US EPA ARCHIVE DOCUMENT

U.S. EPA Site Visit Report  
Coal Combustion Waste Minefill Management Practices  
- North Dakota -

Draft Final  
December 11, 2002

DISCLAIMER:

This document was prepared by SAIC for the U.S. Environmental Protection Agency (EPA) Office of Solid Waste. This draft is part of an information collection effort. This document has been reviewed by EPA and the State. The mention of company or product names is not to be considered an endorsement by the U.S. Government or by EPA.

**OBJECTIVE**

From September 2001 to October 2002, EPA conducted visits to selected states to collect information on coal combustion waste (CCW) minefill management practices. On July 9-10, 2002, EPA staff conducted an information collection visit to North Dakota. The purpose of this visit was to learn about North Dakota's regulatory program for mine placement of CCW and to observe operational practices. The visit consisted of two parts: a meeting with North Dakota State regulators, and visits to electric utility and mine sites where CCW is currently being placed. The CCW Minefill Management Practices Discussion Guide developed by EPA was used as a guide during the visit. A completed version of the Discussion Guide is attached to this report.

**PLACES AND DATES**

Bismarck, North Dakota

North Dakota Department of Health (NDDH),  
Division of Waste Management

July 9, 2002

Basin Electric Power Company Antelope Valley Station  
Freedom Mine

July 10, 2002

Dakota Gasification Company Great Plains Synfuel Plant  
Basin Electric Power Company Leland Olds (Stanton) Station  
Minnkota Power Cooperative Milton R. Young Station

**SUMMARY OF MEETINGS WITH NORTH DAKOTA STATE REGULATORS**

The information collection meeting was conducted on July 9, 2002, at the North Dakota Department of Health (NDDH), Division of Waste Management in Bismarck, North Dakota. In attendance at the meeting were:

- Steve Tillotson, NDDH
- Truett DeGeare, U.S. EPA
- Mike Clipper, U.S. EPA
- Kimery Vories, U.S. Department of Interior, Office of Surface Mining (OSM)
- Guy Padgett, OSM
- Jim Deutsch, North Dakota Public Service Commission, Mine Reclamation (PSC)
- Dave Bickel, PSC
- Lou Ogaard, PSC
- Christine Garrow, SAIC

It was evident that NDDH/PSC expended substantial effort in thorough preparations for the meetings and the site visits the following day. In particular, NDDH/PSC completed the CCW Minefill Management Practices Discussion Guide prior to our meeting. NDDH/PSC also

supplied hard copies of their applicable regulations for each participant. In addition, NDDH provided the following:

- A hard copy set of guidelines that supplement their regulations, as follows:
  - Guideline 2–Statistical Analysis of Ground-water Monitoring Data from Solid Waste Management Facilities
  - Guideline 3–Hydrogeologic Investigations, Ground-water Monitoring Networks, and Ground-water Sampling for Solid Waste Management Facilities
  - Guideline 5–Quality Assurance for construction of Landfill and Surface Impoundment Liners and Caps, and Leachate Collection Systems
  - Guideline 6–Corrective Action of Solid Waste Management Facilities
  - Guideline 11–Ash Utilization for Soil Stabilization, Filler Materials and Other Engineering Uses
  - Guideline 13–Information to Include with Disposal Facility Plat
  - Guideline 18–Financial Assurance Mechanisms for Closure and Postclosure for Publicly and Privately Owned Landfills Under Chapter 33-20-14 NDAC
  - Guideline 20–Guidelines for Closure and Postclosure Care Cost Estimates for Publicly and Privately Owned Landfills Under Chapter 33-20-14 NDAC
  - General Native Grass Seeding Guideline
- A white paper titled “North Dakota Regulatory Perspective” that summarizes their regulatory approach and requirements;
- A sample “Affidavit of Solid Waste Disposal Facility” regarding municipally-owned and operated inert solid waste disposal facilities;
- The NDDH, Division of Waste Management's “Solid Waste Disposal Facility Permit Processing Diagram”; and
- The NDDH, Division of Waste Management's list of Special Waste Landfills.

NDDH/PSC also prepared and presented a briefing, including slides, describing their regulatory programs. NDDH's/PSC's investment in thorough preparation contributed greatly to the productivity of the meeting and site visits.

North Dakota has large reserves of lignite (low BTU) coal. Lignite is a soft, low-sulfur, high-moisture (38%) coal that produces about 6,500 BTU/pound and 8% ash. The quality doesn't generally warrant long-distance transport. There are former underground workings, but current mining is surface mining. Overburden is generally around 60-110 feet down to a coal seam 10-17 feet thick. The coal seam is often an aquifer, but natural water quality is very poor (high total dissolved solids). The concern about the impact on ground water from mining is on water quantity, not quality, particularly for agricultural use. Ground water is widely used, particularly in farm settings. Usable aquifers are about 40 feet deep. Precipitation averages 14 inches annually. North Dakota has almost exclusively large, mine-mouth power stations that export energy to Minnesota. The power stations historically had “wet” ash handling practices, but the trend is now toward “dry” handling.

The CCW minefill regulatory approach in North Dakota differs from that in many other States. All CCW facilities are permitted and regulated by the Health Department, not the State program approved under the Surface Mining Reclamation and Control Act (SMCRA). Where an area of a former coal mine is to become a CCW facility (not allowed on active mine sites), ownership of that portion of the mine is transferred to the power company. The area is removed from the State SMCRA permit and is permitted by the Health Department under its solid waste regulations. The solid waste permit is for a term of 10 years and is renewable. Both the Health Dept (i.e., NDDH) and the State SMCRA agency (i.e., PSC) are pleased with this regulatory approach and work together in the permitting process. PSC has no need to be burdened with CCW placement issues, and the NDDH sees CCW disposal as their proper purview. The North Dakota regulations that apply to CCW mine placement sites are akin to the federal 40 CFR Part 258 regulations. For example, the North Dakota regulations provide for 30-year post-closure care, corrective action, and deed recordation. The applicable water quality standards are negotiated as per Part 258 based on maximum contaminant levels (MCLs) and/or background levels. Perhaps due to the comprehensive regulations on the disposal of CCW, there is little public concern over its disposal on former mine sites.

In addition to disposal of CCW in inactive coal mines (disposal is not occurring in sand and gravel pits or other non-coal mines), a significant amount of CCW utilization occurs. North Dakota has no acid mine drainage (AMD) concerns, so CCW is not used for AMD mitigation. CCW is used extensively, however, as grout, road base, cement additive, road abrasive, backfill, and as grit for sandblasting ships, for example. North Dakota DOT allows up to 20 percent ash in concrete and encourages the use of ash. The Great River Energy's Cold Creek Power Station sells so much of its CCW for beneficial uses that it has established a marketing terminal in Denver.

North Dakota has been very successful in using ash with cement to grout underground mine voids to remediate or prevent subsidence and incidences of sink holes. Lou Ogaard provided detailed descriptions of case studies. In the case of prevention, voids are not merely filled with a blob of grout; rather, grout is mixed and pumped to form underground pillars to support the roof. The use of ash in such a capacity was examined to ensure that it would not have an adverse impact on water quality. Testing is performed on each application to ensure water quality standards are met. Visit the PSC website at: [www.psc.state.ND.us](http://www.psc.state.ND.us) and search for "AML" to see papers published on use of fly ash in reclamation.

Guy Padgett from OSM spoke about some items from the mining perspective. He noted that dust is a key nuisance issue in the Powder River Basin and is a public concern. Years ago, a judge discredited OSM's air quality standards; however, OSM regulations do include a requirement for a dust suppression plan for roads. He also detailed OSM's information sharing initiatives that

include training in, for example, computer applications, soils, geology, GPS, permitting, inspections, evidence and enforcement, and reclamation.<sup>1</sup>

## SUMMARY OF SITE VISITS

The site visits were conducted on July 10, 2002. In attendance for the visits were:

- Truett DeGeare, U.S. EPA
- Mike Clipper, U.S. EPA
- Kimery Vories, OSM
- Guy Padgett, OSM
- Steve Tillotson, NDDH
- Kevin Solie, NDDH
- Jim Deutsch, PSC
- Dave Bickel, PSC
- Christine Garrow, SAIC

The tour included three coal-fired power stations with CCW disposal sites, a coal gasification plant with a disposal site for gasification wastes and other plant waste, and an active mine site where CCW is being beneficially used for haul road construction. Although all of the CCW disposal sites visited are located on formerly surface-mined land, North Dakota law interprets the activity as landfilling, not minefilling, therefore the terms “landfill” and “landfilling” are used in the summary below.

### **Basin Electric Power Company Antelope Valley Station**

The first site visited was Basin Electric Power Company's Antelope Valley Station.<sup>2</sup> The Antelope Valley Station has two 450 megawatt units that burn coal supplied through an 8-mile long conveyor belt from the co-located Freedom Mine, an active coal mine operated by the Coteau Properties Company (a subsidiary of the North American Coal Company), and generates approximately 1,500 tons/day of fly ash (from a baghouse and dry scrubber system) and 2,000 tons/day of bottom ash. Because the sulfur content of the CCW inhibits its marketability, the fly ash and bottom ash typically are mixed together (the mix varies at any one time) and disposed of in a nearby landfill on mined-out land that was once part of the Freedom Mine. Ash is conditioned with water before being hauled to disposal. There also is an older, closed CCW landfill at the same location. The NDDH solid waste permit for the landfill is held by the

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<sup>1</sup>The three initiatives include: Technical Information Processing System (TIPS), the Denver Office of Technology Transfer, and the National Technical Training Program (NTTP).

<sup>2</sup>Contact: Chris Miller, Basin Electric Power Company, phone: 701-873-4545, email: cmiller@becp.com.

Antelope Valley Station, not the mining company. The bottom ash is also used as backfill and instead of sand as a road abrasive.

Chris Miller compared the Coal Creek and Antelope Valley Stations in describing how the type of emission control system can dictate the marketability of ash. Coal Creek uses an electrostatic precipitator (ESP) followed by a wet scrubber to produce an ash stream separate from the scrubber sludge, resulting in a clean, highly marketable ash. Antelope Valley employs a baghouse and lime-injected scrubber which entrains sulfur and lime in the ash. This ash is less marketable because sulfates can damage reinforcing steel used in concrete.

The 150-acre landfill has a life expectancy of 28 years and is divided into four cells, with cell one currently active. There is a 2-foot compacted clay liner (permeability of less than  $10^{-7}$  cm/sec) and side-wall liners, as well as 100 feet of tight natural clays below the liner. The only water on the site is storm water runoff, there is no water/no leachate from the dry fill itself. The storm water is managed in two “zones:” 1) storm water in the CCW area stays onsite and is recycled for dust control on the landfill (the coarser bottom ash is also used as a cover for dust control), and 2) storm water outside of the CCW area is directed to a ditch and then pumped to an NPDES-permitted pond with a 60 mil HDPE liner (the runoff contains elevated levels of pH).

There are 13 ground-water monitoring wells that surround the perimeter of the older, closed landfill and the active landfill, although many of the monitoring wells are dry much of the time, requiring patience in obtaining a sample. Antelope staff stated that the samples are spoil water and they have not seen any impacts to upgradient or downgradient ground water from the landfill. Core samples of the old landfill have demonstrated a lack of ground-water interaction with the CCW. The first cell is at grade (12-15 percent slope) with only the road areas of the cell left to fill and bottom ash being used on top for dust control. The cell will be closed in the Fall with a total cap of 7 feet of bottom ash and soil material.

### **Freedom Mine**

The second site visited was the Freedom Mine, an active surface coal mine operated by the Coteau Properties Company (a subsidiary of the North American Coal Company).<sup>3</sup> The Freedom Mine is just minutes from the Antelope Valley Station and is the largest lignite mine in the country with 8,000 acres reclaimed, 25,000 acres permitted, and 700-1,000 acres mined each year. The mine has a 110-foot layer of overburden and a 17-foot coal seam. Since 1998, the mine has relied on fly ash as a stabilizer in constructing onsite haul roads and dragline repair pads used for heavy equipment such as 290 ton (3 rail cars) coal trucks and the massive dragline – one of the largest in the world. Road construction occurs in the summer months only. The fly

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<sup>3</sup>Contacts: Joe Friedlander, Coteau Properties Company, phone: 701-873-7213, email: joe.friedlander@coteau.com and Donn Stephen, Coteau Properties Company, phone: 701-873-2281 email: donn.steffen@coteau.com

ash is disked into soil at a mixture of 20 percent ash and 80 percent soil (no water is added, soil has enough moisture) and is compacted to form a 2-foot thick road bed which is then covered with a 6-inch layer of gravel. The ash is not exposed on the side slope of the road, only overburden is used for the sides. The ash sets up to an almost cement-like consistency and provides 2.5 times the compressive strength of compacted soil and 2.5 times the penetration resistance. The cost to obtain the equal amount of strength and resistance from another material was estimated at a million dollars per mile. An additional bonus to the use of ash is, since less gravel is needed, the local gravel shortage is less of a concern or expense. Approximately 60,000 tons of fly ash, obtained from the Antelope Valley Station, was used in 2001 to construct roads on the mine site.<sup>4</sup>

In regular samples of the runoff from the ash roads, the Coteau mining company has found an insignificant increase in selenium and arsenic, and is now starting to look at mercury. When the area is reclaimed, the mining permit requires the road to be buried under 10 feet of soil but Coteau plans to request a depth of 5 feet instead. In areas where the road has been constructed on leased property, it will be removed.

### **Dakota Gasification Company Great Plains Synfuel Plant**

The next site was the Dakota Gasification Company's Great Plains Synfuel Plant, which is located next to the Antelope Valley Station and also obtains its coal supply from the Freedom Mine.<sup>5</sup> Because it is the only coal gasification plant in the country, the characteristics of its ash are unique with a more coarse texture and higher amounts of pH, dissolved solids, arsenic, and selenium than Antelope's, for example. Another product of the gasification process is ammonium sulfate from the scrubber which is used to make fertilizer for commercial sale.

The Dakota Gasification Company (DGC) has plans to ultimately build a total of 10 cells for fly and bottom ash disposal in a mined-out area located close to the plant. All cells are sloped to the center line for maximum drainage. Cell 1 is full and capped, cell 2 is almost ready to be capped, and cells 3 and 4 are currently active. Ash and other site wastes are co-mingled in the cells and are usually covered on an as-needed basis to reduce fly-away and storm water infiltration. Approximately 1,100 tons of ash is disposed in the landfill each day. Again, the NDDH solid waste permit for the ash landfill is held by the DGC, not the mining company.

The cells have a 5-foot compacted clay liner with a sub-liner of 20-25 feet of highly impermeable natural clays. Water-quenched gasifier ash is de-watered and then trucked to the landfill at 15

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<sup>4</sup>During the non-construction winter months from November through May, the ash to be used on the haul roads and dragline is not left exposed but rather is covered with gravel and spoil.

<sup>5</sup>Contacts: Dave Peightal, Dakota Gasification Company, phone: 701-873-6613, email: dpeightal@bepec.com and Rick Nelson, phone: 71-873-6613, email: rnelson@bepec.com.



percent moisture (and about 67 degrees or so). Separately, fine ash is first piped into a dewatering basin where it is later hauled to the landfill at 40 percent moisture. A leachate collection system is in place in the landfill.<sup>6</sup> The highly mineralized leachate, with high content of sodium sulfate and very high pH, is pumped and removed everyday through manholes and recycled back to the plant for ash handling activities. Any water that has contacted waste or leachate is managed as leachate. The leachate collection sump has a synthetic liner (HDPE). Storm water runoff that has not contacted waste material is collected and pumped to a NPDES-permitted pond. To assess water quality, there are eight ground-water monitoring wells, two in each corner of the 10-cell disposal site. The ground water is sampled semi-annually with continuous findings of no impacts from the ash landfill. When ready for closure, the cells are capped with 3 feet of compacted clay, a layer of overburden, and a final layer of topsoil.

### **Basin Electric Power Company Leland Olds (Stanton) Station**

The next stop on the field tour was Basin Electric Power Company's Leland Olds Station in Stanton, North Dakota.<sup>7</sup> As with the Antelope Valley Station and the DGC plant, Stanton obtains its coal from the Freedom Mine. Due to a greater distance from the mine, the coal is supplied via rail with three train runs per day. Stanton is a 630 megawatt plant that burns 10,000-12,000 tons/day of coal producing 8-9 percent CCW (50 percent fly ash and 50 percent bottom ash). The consistency of fly and bottom ashes are similar to those from Antelope Valley Stations. The sulfur content of the Stanton ash, however, is lower (dry ESP, no scrubber). As a result, the facility is able to market much of its bottom ash, termed "Black Beauty," as use for sandblasting ships in Texas and as road abrasive. For sandblasting, the bottom ash is preferred over sand because there is no silicosis problem associated with ash.

In 1994, at the encouragement of State regulators, Stanton converted from a wet to a dry handling system for fly ash at a capital cost of \$7.4 million. As a result, Stanton went from a slurry system, in which the facility combined water, fly ash, and bottom ash and disposed the mixture into nearby ash ponds (located in the Missouri River's alluvial plain), to handling the two types of ash separately. The bottom ash, which is classified as inert waste (pH is 11.0), is slurried into an unlined settling pond next to the plant, and marketed. The fly ash (with a small amount of water added for dust control) is collected into a silo for dry disposal at a former mine located four miles from the plant in the uplands. For further information on costs of converting from wet to dry handling, contact Plant Manager Curt Melland, email: [curtm@bepc.com](mailto:curtm@bepc.com), phone (701-745-3371).

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<sup>6</sup>An older nearby landfill used previously by DGC was constructed without leachate drainage and still retains water. DGC is currently working on methods to remove the leachate, including horizontal drilling.

<sup>7</sup>Contact: Jim Berg, Basin Electric Power Company, phone: 701-223-0441, email: [jberg@bepc.com](mailto:jberg@bepc.com).

The fly ash landfill consists of five cells in total, with one closed and one currently active. Disposal has occurred since 1995 at this site, which consists of pre-SMCRA, unreclaimed mineland owned by Basin Electric. The plan is to reclaim the cells as they are filled, to avoid openface as much as possible. The liner is 2 feet of compacted clay (permeability of less than  $10^{-8}$  or  $10^{-9}$  cm/sec) and is located on top of 40-50 feet of natural clays above the coal seam/water table. As soon as the liner is in place it is covered with 3 feet of fly ash to protect it from the freeze and thaw of the winter months and precipitation. All storm water runoff and leachate is managed onsite. Contact water is directed to a clay-lined pond that is then sprayed back onto the landfill to control dust. Despite it being a high wind area, no dust was observed. Runoff outside of the landfill area is directed to an NPDES-permitted pond. There are 10 ground-water monitoring wells; three are upgradient, seven are downgradient, and two are dry. The site's ground water is not usable, with a total dissolved solids concentration (TDS) of 4,000 mg/L. In comparison, leachate from the landfill has a TDS of 2,000 mg/L.

The cells are ready for closure when they have reached the maximum height of 60 feet. Upon closure, 2 feet of compacted clay and 2 feet of growth material is used for the cap. The closed cell was covered with a salt-tolerant weed/seed mix using spoil material (along with additives/fertilizers) instead of topsoil. Though vegetated, the surface was not fully covered.

### **Minnkota Power Cooperative Milton R.Young Station**

The final destination was the Minnkota Power Cooperative's Milton R.Young Station on Nelson Lake in Center, North Dakota.<sup>8</sup> Young has two units, one 440 megawatts and the other 225 megawatts. The units are equipped with ESPs and wet scrubbers to remove sulfur from the off-gas. The scrubbers use fly ash as a scrubbing agent, resulting in a wet fly ash/scrubber sludge slurry that is piped to an on-site surface impoundment. Bottom ash from the combustion units is minefilled separately.

There is currently one active impoundment. Two more are planned, for a total life expectancy of 30 years. Each impoundment (or "pond") will be located in a mined-out area (mined specifically for creation of the ponds under a separate mining permit), with the base of the ponds falling within the Hagel bed (an aquifer). The active pond, in use since 1997, is lined on the base with 4 feet of compacted clay and a granular drainage layer with a leachate collection system. Underlying the compacted clay is about 60 feet of natural, low permeability clays. The pond is lined on the sides with 10 feet of compacted clay in the deeper parts and 4 feet of compacted clay in the upper parts of the pond. A permeable synthetic mat is also being used on the banks for stability. Storm water drainage controls/structures are also in place around the ridge of the pond.

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<sup>8</sup>Contact: Kevin Thomas, Permitting & Compliance Engineer, Minnkota Power Cooperative, Inc., phone: 701-794-7278, email: kthomas@minnkota.com and Craig Bleth, Minnkota Power Cooperative, Inc., Phone: 701-794-8711, email: cbleth@minnkota.com.

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Excess slurry water flows into a recycling system for return to the ash handling system, leaving wet ash settled in the impoundment.

The facility had previously used on-site, initially unlined surface impoundments to manage CCW. These ponds were clay lined in the early 1980's to control seepage. The older impoundments were periodically dredged and the settled CCW was disposed in a landfill. In contrast, the plan for the new ponds is to de-water them once they are full, leave the ash in place, and cap them like a landfill. This is a unique process for ash disposal in North Dakota. The facility's engineers used infiltration models to prove to the NDDH that it was a safe and workable method of ash disposal.

The plan is to cap the ponds using dry fly ash to help set up a hard, cement-like surface. Each pond is approximately 17 acres in size and will have a total depth of 65 feet when closed. Monitoring wells have been installed to sample ground water from the Hagel bed and the deeper aquifer, located approximately 60 feet below the Hagel bed. It is hard to discern any impacts of the ponds to the Hagel bed since it naturally has TDS of 1,000 mg/L. The water in the pond is high in sodium sulfate.

## CCW MINEFILL MANAGEMENT PRACTICES DISCUSSION GUIDE<sup>9</sup>

### Outline

- I. **General**  
*Regulating agencies, program structure*
- II. **Planning/Permitting**  
*Permit requirements, type/source of CCW, number of permits, quantity of waste, acid/base balances, reclamation plans, operational plans, closure/post-closure plans, future uses*
- III. **Waste Characterization**  
*Timing (before/during placement), testing methods, parameters, performance standards/waste characterization limits*
- IV. **Site Characterization**  
*Types of data, hydrology, criteria for acceptability, liners*
- V. **Risk Assessment**  
*Formal assessment/modeling, methods/criteria*
- VI. **Ground Water Monitoring**  
*Monitoring system design, timing (during placement/post-closure), frequency, location, parameters, performance standards/enforceable limits*
- VII. **Surface Water Monitoring**  
*Monitoring system design, timing (during placement/post-closure), frequency, location, parameters, performance standards/enforceable limits*
- VIII. **Placement Practices**  
*Appropriate practices for: underground mines, surface mines, active mines, closed mines, proximity to water table, grouting, soil conditioning, mine sealing, subsidence control, spoil encapsulation*
- IX. **Operational Requirements/Design Requirements**  
*Dust controls, erosion/flooding controls, runoff controls, leachate collection, re-vegetation, access controls, post-closure maintenance*
- X. **Corrective Action**  
*Circumstances/triggers for action, action measures, existing damage cases*
- XI. **Financial Assurance**  
*Mechanisms, liability, bond release*
- XII. **Reporting**  
*Inspection frequency (pre-, during, and post-placement), monitoring data review, compliance evaluation*
- XIII. **Public Participation**  
*Availability of data (pre-, during, and post-placement), compliance participation*

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<sup>9</sup> This document was prepared by the U.S. Environmental Protection Agency (EPA). It is being used to guide discussions with State and Tribal mining regulatory authorities on coal combustion waste (CCW) minefill management practices. This list of discussion items is part of an information collection effort. It is not a proposed model for CCW minefill regulation.

# CCW MINEFILL MANAGEMENT PRACTICES QUESTIONNAIRE

July 9, 2002 – North Dakota

<b>Interviewee Names:</b>	Steve Tillotson, Assistant Director, Division of Waste Management
<b>Interviewee Agency:</b>	North Dakota Department of Health
<b>Interview Date:</b>	July 9, 2002

## Notes:

**ND Dept of Health rules are available online at their website:** [www.health.state.nd.us](http://www.health.state.nd.us)

**Rules and some guidelines and publications are at:**

<http://www.health.state.nd.us/ndhd/environ/wm/pubs.htm#swpubs>

**For more information contact Steve Tillotson at:** [stillots@state.nd.us](mailto:stillots@state.nd.us) or (701) 328-5163

## I General

1. Is there a distinction between disposal and beneficial use? **Yes, beneficial use, generally relatively small amounts, must follow guidelines and be approved by the Department.**
  - 1.1 How is the distinction made (e.g., waste quantity, placement type)? **Case by case with formal approval required. See guideline 11 “Ash Utilization for Soil Stabilization Filler Materials, and other Engineering Uses.”**
2. Under what program(s) does the state regulate mine placement (e.g., state SMCRA implementing regulations, state solid waste program)? **State solid waste rules Article 33-20 NDAC**
3. Are there differing requirements/policies applicable to different types of CCW (e.g., fly ash vs. FGD wastes)? **Bottom ash qualifies as inert waste and can be disposed with lesser standards – no ground-water monitoring, financial assurance, corrective action, less design, etc.**
4. Are there differing requirements/policies applicable for different types of placement? **Other than limited beneficial use, only placement in permitted landfills is approved.**
5. Are there differing requirements/policies applicable for different kinds of mines (e.g., coal vs. non-coal mines such as quarries)? **No**

## II Planning/Permitting

1. Are mine facilities required to obtain permits for CCW placement? **Yes**
2. Who issues the appropriate permits? **North Dakota Department of Health**

3. Do the permits contain project-specific conditions or requirements? **Yes**
4. Are there environmental justice considerations in the permitting process? **Not a formal part of the State's process, but it has not been an issue. Most disposal sites have been in rural areas with sparse population on property owned by the power company.**
5. Is the operator required to identify:
  - 5.1 The type of CCW to be minefilled? **Yes**
  - 5.2 The source of the CCW? **Yes**
  - 5.3 The quantity of CCW to be minefilled? **Yes**
6. How many permits have been authorized in the State for CCW mine placement? **Placement in active mines does not occur. About 3.6 to 4 million tons per year on a dry basis is disposed in permitted landfills, some of which are in former mine areas.**
7. What is the total quantity of CCW minefilled in the State per year? **No "minefilling" occurs.**
8. Are operators required to address acid/base balances prior to placement? **No, we do not have acid mine drainage.**
  - 8.1 What procedures are used to conduct acid/base balances? **Not applicable**
    - 8.1.1 What are the shortcomings of these procedures, if any? **Not applicable**
    - 8.1.2 What is the long-term reliability of these procedures? **Not applicable**
9. Is a reclamation plan required? **Yes.**
  - 9.1 Is the plan required to specifically address the use of CCW? **Yes.**
  - 9.2 What must the plan include? **Final cover design, slope, vegetation, post closure care.**
  - 9.3 What are the standards for reclamation (i.e., how is the end-point of reclamation defined)? **Site stabilized, 30 year post closure care (minimum).**
10. Is an operational plan required? **Yes**
  - 10.1 Is the plan required to specifically address the use of CCW? **Yes**
  - 10.2 What must the plan include? **See Section 33-20-04.1-03 NDAC as follows:**  
  
**33-20-04.1-03. Plan of operation. All solid waste management facilities, except those permitted by rule, shall meet the requirements of this section.**
    1. **The owner or operator of a solid waste management unit or facility shall prepare and implement a plan of operation approved by the department as part of the permit. The plan must describe the facility's operation to operating personnel and the facility must be operated in accordance with the plan. The plan of**

operation must be available for inspection at the request of the department.

Each plan of operation must include, where applicable:

- a. A description of waste acceptance procedures, including categories of solid waste to be accepted and waste rejection procedures as required by subsection 2 of section 33-20-05.1-02 or subsection 8 of section 33-20-06.1-02 or subsection 2 of section 33-20-07.1-01 or subsection 4 of section 33-20-10-03;
- b. A description of waste handling procedures;
- c. A description of facility inspection activities required by subsection 2, including frequency;
- d. A description of contingency actions for the following:
  - (1) Fire or explosion;
  - (2) Leaks;
  - (3) Ground-water contamination;
  - (4) Other releases (for example, dust, debris, failure of run-on diversion or runoff containment systems); and
  - (5) Any other issues pertinent to the facility.
- e. Leachate removal system operation and maintenance procedures;
- f. Safety procedures;
- g. For landfills, implementation of sequential partial closure;
- h. A description of industrial waste or special waste management procedures, which include:
  - (1) A procedure for notifying solid waste generators and haulers of the facility operating requirements and restrictions;
  - (2) A procedure for evaluating waste characteristics, liquid content, the specific analyses that may be required for specific wastes, and the criteria used to determine when analyses are necessary, the frequency of testing, and the analytical methods to be used;
  - (3) A procedure for inspecting and for identifying any special management requirements, and the rationale for accepting or rejecting a waste based on its volume and characteristics;
  - (4) Procedures for managing the following solid waste, as appropriate:
    - (a) Bulk chemical containers which contain free product or residue;
    - (b) Asbestos;
    - (c) Waste containing polychlorinated biphenyls at a concentration less than fifty parts per million;
    - (d) Radioactive waste;
    - (e) Rendering and slaughterhouse waste;
    - (f) Wastes that could spontaneously combust or that could ignite other waste because of high temperatures;
    - (g) Foundry waste;
    - (h) Ash from incinerators, resource recovery facilities, and power plants;

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- (i) Paint residues, paint filters, and paint dust;
- (j) Sludges, including ink sludges, lime sludge, wood sludge, and paper sludge;
- (k) Fiberglass, urethane, polyurethane, and epoxy resin waste;
- (l) Spent activated carbon filters;
- (m) Oil and gas exploration and production waste;
- (n) Wastes containing free liquids;
- (o) Contaminated soil waste from cleanup of spilled products or wastes; and
- (p) Any other solid waste that the owner or operator plans to handle.

(5) The owner or operator must describe any solid waste that will not be accepted at the facility; and

- i. The owner or operator must amend the plan whenever operating procedures, contingency actions, waste management procedures, or wastes have changed. The owner or operator shall submit the amended plan to the department for approval or disapproval.

- 2. The owner or operator shall inspect the facility to ensure compliance with this article, a permit, and approved plans. The owner or operator shall keep an inspection log including information such as the date of inspection, the name of the inspector, a notation of observations made, and the date and nature of any repairs or corrective action taken.

**33-20-04.1-04. Recordkeeping and reporting.** The owner or operator of a solid waste management facility, except those permitted by rule, shall comply with these recordkeeping and reporting requirements:

- 1. A solid waste management facility may not accept solid waste until the department has received and approved a report which includes narrative, drawings, and test results to certify that the facility has been constructed in accordance with the approved plans and specifications and as required by the permit.
- 2. An owner or operator shall keep an operating record consisting of a copy of each application, plan, report, notice, drawing, inspection log, test result or other document required by this article, including those enumerated in the subdivisions of this subsection, or a permit. The operating record must include any deviations from this article, the permit, and facility plans where department approval is required. The owner or operator shall provide a copy of any document in the operating record upon receiving a request from the department. The operating record must be kept at the facility, or at a location near the facility within North Dakota and approved by the department.
  - a. The permit preapplication, section 33-20-03.1-01.



- b. The permit application, section 33-20-03.1-02.
  - c. An amended permit application, section 33-20-03.1-03.
  - d. The site characterization, section 33-20-13-01.
  - e. Any site demonstrations, section 33-20-04.1-01.
  - f. Documentation of training, section 33-20-04.1-02.
  - g. The plan of operation, section 33-20-04.1-03.
  - h. Facility inspection logs, section 33-20-04.1-03.
  - i. Records of notice, section 33-20-02.1-04.
  - j. As-built drawings and certifications, sections 33-20-04.1-04 and 33-20-04.1-05.
  - k. The ground-water monitoring plan, all monitoring data, and statistical interpretations, section 33-20-13-02.
  - l. Records of the weight or volume of waste, section 33-20-04.1-09.
  - m. The closure plan, sections 33-20-04.1-05 and 33-20-14-02.
  - n. The postclosure plan, sections 33-20-04.1-09 and 33-20-14-02.
  - o. The financial assurance instruments for closure and postclosure, chapter 33-20-14.
  - p. Records of gas monitoring and remediation, section 33-20-06.1-02.
  - q. The annual report, section 33-20-04.1-04.
  - r. Notices of intent to close and completion of postclosure, sections 33-20-04.1-05 and 33-20-04.1-09 respectively.
  - s. The permit and any modifications, sections 33-20-02.1-03 and 33-20-02.1-06.
3. An owner or operator shall prepare and submit a copy of an annual report to the department by March first of each year. The annual report must cover facility activities during the previous calendar year and must include the following information:
- a. Name and address of the facility;
  - b. Calendar period covered by the report;
  - c. Annual quantity for each category of solid waste in tons or volume;
  - d. Identification of occurrences and conditions that prevented compliance with the permit and this article; and
  - e. Other items identified in the facility plans and permit.
11. Is a closure plan and/or post-closure plan required? **Yes**
- 11.1 Is the plan required to specifically address the use of CCW? **Yes**
  - 11.2 What must the plan include? **See Section 33-20-04.1-05 as follows:**

**33-20-04.1-05. General closure standards. The requirements of this section apply to all solid waste management facilities, unless otherwise specified.**

- 1. Each owner or operator shall close their facility in a manner that achieves the following:

- a. **Minimizes the need for further maintenance; and**
  - b. **Controls, minimizes, or eliminates any escape of solid waste constituents, leachate, fugitive emissions, contaminated runoff, or waste decomposition products.**
2. **Sequential partial closure must be implemented to minimize the working face of a landfill.**
3. **Closure must be implemented within thirty days after receipt of the final volume of waste and must be completed within one hundred eighty days following the beginning of closure activities, unless otherwise specified and approved under subsection 5. Prior to beginning closure, the owner or operator must notify the department in writing of the intent to close.**
4. **The owner or operator of a landfill for which closure is completed in part or whole shall enter into the operating record and submit to the department:**
- a. **As-built drawings showing the topography, pertinent design features, extent of waste, and other appropriate information; and**
  - b. **Certification by the owner or operator and a professional engineer that closure has been completed in accordance with the approved closure plan and this article.**
5. **Each owner or operator shall prepare and implement a written closure plan approved by the department as part of the permitting process. The closure plan must:**
- a. **Estimate the largest area ever requiring final cover at any time during the active life of the site;**
  - b. **Estimate the maximum inventory of solid waste onsite over the active life of the facility;**
  - c. **For landfills, describe the final cover and the methods to install the cover;**
  - d. **Project time intervals at which sequential partial closure or closure is to be implemented;**
  - e. **Describe the resources and equipment necessary for closure; and**
  - f. **Identify closure costs estimates and provide financial assurance mechanisms as required by chapter 33-20-14.**
12. Are there procedures and criteria for determining what future uses are acceptable following closure? **Yes.**
- 12.1 How is the public involved in this determination? **Part of public comment period. Also is described on the deed to the property.**
- 12.2 If use is restricted, what protects against inappropriate uses? **Notice on the deed and state rules prohibiting unacceptable uses.**

### **III Waste Characterization**

1. Is characterization of the CCW conducted prior to placement? **Yes.**
  - 1.1 What analytes are measured? **General Chemistry and Metals**
  - 1.2 What is the testing method used? **TCLP, SPLP, ASTM-D-3987 or similar.**
  - 1.3 Are there numerical waste acceptance/rejection criteria? **No.**
    - 1.3.1 If so, what are they? **Not applicable.**
    - 1.3.2 If not, how are waste characteristics considered in pre-placement and planning? **As part of the permit review on the facility design, operation, monitoring and closure.**
  
2. Is ongoing waste characterization required during placement? **Limited for permitted landfills. For beneficial use, we would like to see some replication but have not formalized this.**
  - 2.1 How do the analytes, testing methods, or waste acceptance/rejection criteria differ from those used prior to placement? **Not much variance of great significance.**
  - 2.2 What is the required frequency of characterization? **For disposal, not required unless the generator or the Department has knowledge that the waste has changed. For beneficial use, some Department may ask for repeat analysis on a case by case basis.**
  - 2.3 How often is the waste characterization data reviewed by the appropriate regulatory agency? **Varies.**
  
3. What is the basis for any numerical acceptance/rejection criteria? **For disposal, we have only encountered problems if excess liquids or extreme dust are problems. For Beneficial use, we use the drinking water standards and review the proposed use.**

#### **IV Site Characterization**

1. Is characterization of the site required prior to placement? **Yes**
  - 1.1 What factors are examined in characterizing a site? **See Sections 23-29-07.6; 33-20-4.1-01; and 33-20-13-01 as follows:**

**23-29-07.6. NDCC Preconstruction site review. The department, in cooperation with the state engineer and the state geologist, shall develop criteria for siting a solid waste disposal facility based upon potential impact on environmental resources. Any application for a landfill permit received after the department develops siting criteria as required by this section must be reviewed for site suitability by the department after consultation with the state engineer and state geologist before any site development. Site development does not include the assessment or monitoring associated with the review as required by the department in consultation with the state engineer and state geologist.**

**33-20-04.1-01. General location standards.**

1. **No solid waste management facility may be located in areas which result in impacts to human health or environmental resources or in an area which is unsuitable because of reasons of topography, geology, hydrology, or soils.**
2. **Sites for new, or for lateral expansions of, land treatment units, surface impoundments closed with solid waste in place, municipal waste landfills, industrial waste landfills, and special waste landfills must minimize, control or prevent the movement of waste or waste constituents with geologic conditions and engineered improvements. Sites should be underlain by materials with low permeability to provide a barrier to contaminant migration.**
  - a. **The following geographic areas or conditions must be excluded in the consideration of a site:**
    - (1) **Where the waste is disposed within an aquifer;**
    - (2) **Within a public water supply designated wellhead protection area;**
    - (3) **Within a one hundred-year floodplain;**
    - (4) **Where geologic or manmade features, including underground mines, may result in differential settlement and failure of a structure or other improvement on the facility;**
    - (5) **On the edge of or within channels, ravines, or steep topography whose slope is unstable due to erosion or mass movement;**
    - (6) **Within woody draws; or**
    - (7) **In areas designated as critical habitats for endangered or threatened species of plant, fish, or wildlife.**
  - b. **The following geographic areas or conditions may not be approved by the department as a site unless the applicant demonstrates there are no reasonable alternatives:**
    - (1) **Over or immediately adjacent to principal glacial drift aquifers identified by the state engineer;**
    - (2) **Closer than one thousand feet [304.8 meters] to a down gradient drinking water supply well;**
    - (3) **Closer than two hundred feet [60.96 meters] horizontally from the ordinary high water elevation of any surface water or wetland;**
    - (4) **Within final cuts of surface mines; or**
    - (5) **Closer than one thousand feet [304.8 meters] to any state or national park.**
  - c. **The department may establish alternative criteria based on specific site conditions.**
3. **No municipal waste landfill or lateral expansion may be located within ten thousand feet [3048 meters] of any airport runway currently used by turbojet aircraft or five thousand feet [1524 meters] of any runway currently used by only piston-type aircraft. Owner or operators proposing a new site or lateral expansions for a municipal waste landfill within a five-mile [8.05-kilometer]**

**radius of an airport must notify the affected airport and the federal aviation administration.**

4. **A minimum horizontal separation of twenty-five feet [7.62 meters] must be maintained between new or lateral expansions of solid waste management units and any aboveground or underground pipeline or transmission line. The owner shall designate the location of all such lines and easements.**

**33-20-13-01. Site characterization. The department shall require adequate site characterization to ensure that the waters of the state are not or will not be adversely impacted by the solid waste management facility. At a minimum, the site characterization must address the following:**

1. **Location and water quality of lakes, rivers, streams, springs, or wetlands within one mile [1.61 kilometers] of the site boundary based on available data;**
  2. **Domestic and livestock wells within one mile [1.61 kilometers] of the site boundary. Information collected should include the location, water quality, depth to water, well depth, screened intervals, yields, and the aquifers tapped;**
  3. **Site location in relation to the one hundred-year floodplain;**
  4. **Depth to and thicknesses of the uppermost aquifers;**
  5. **Hydrologic properties of the uppermost aquifers beneath the proposed facility including existing water quality, flow directions, flow rates, porosity, coefficient of storage, hydraulic conductivity, and potentiometric surface or water table; and**
  6. **An evaluation of the potential for impacts to surface and ground-water quality from the proposed facility.**
- 1.2 What are the criteria for accepting/rejecting a site? **See Above.**
2. Is consideration of the site hydrology (e.g., a probable hydrologic consequences determination under SMCRA) required? **Yes, permit applications are routed to the NDPSC for their review and input.**
    - 2.1 Does this consideration specifically address the use of CCW? **Yes.**
    - 2.2 What are the hydrologic criteria for site acceptance/rejection? **See item IV-1 above.**
    - 2.3 Does consideration of site hydrology specifically address both ground water and surface water? **Yes.**
    - 2.4 What time period does PHC determination or other consideration of site hydrology address? **Not addressed by NDDH.**

3. Is background ground-water monitoring data required prior to placement? **Yes.**  
3.1 What analytes are measured? **See Sections 33-20-13-02 and 33-20-13-03 as follows:**

**33-20-13-02. Ground-water quality monitoring.**

- 1. An owner or operator of a resource recovery unit, a land treatment unit, a surface impoundment, or a landfill, except an inert waste landfill, must incorporate a ground-water monitoring system into the design of the facility. If the owner or operator demonstrates to the department that there is no potential for migration of solid waste constituents to the uppermost aquifer during the life of the solid waste management unit and the postclosure period, the department may suspend this requirement. The demonstration must be based upon factors such as the site characterization, the solid waste characteristics and constituents, the potential capacity of the unit or facility, and the physical, chemical, and biological processes affecting contaminant fate and transport.**
- 2. Ground-water monitoring systems must be designed to effectively detect the migration of contamination. At a minimum, a water quality monitoring system shall:**
  - a. Include one ground-water monitoring well located upgradient of the solid waste management unit, and at least two wells located downgradient of the unit. The monitoring wells should be installed at appropriate locations and depths to yield ground water from the uppermost aquifer and all hydraulically connected aquifers below the solid waste management units on the facility;**
  - b. Represent the elevation of ground water in each well immediately prior to purging so that the owner or operator may determine the rate and direction of ground-water flow each time ground water is sampled;**
  - c. Represent the quality of ground water that has not been affected by spills or leakage from solid waste management units;**
  - d. Represent the quality of ground water to ensure detection of contamination passing the compliance boundary;**
  - e. Ground-water samples at municipal waste landfills must not be filtered prior to analysis; and**
  - f. The frequency and number of samples collected must be consistent with statistical procedures for evaluating ground-water data. A minimum of four independent samples from each well must be collected for analysis during the first sampling event for establishing background data at upgradient (subdivision c) and downgradient (subdivision d) wells, unless four or more sampling events occur prior to acceptance of solid waste by the facility. The monitoring frequency must be semiannual during the active life of the facility and during the postclosure period. The department may specify an alternate frequency for sampling based upon**

such factors as site hydrogeological characteristics, solid waste characteristics, evidence of a spill or leakage, or resource value of the aquifer.

3. **Additional wells may be required in complicated hydrogeological settings or to define the extent of contamination detected.**
4. **A written ground-water monitoring plan must be developed for approval by the department and implemented as part of the permitting process. The plan must include:**
  - a. **Number and location of wells;**
  - b. **Procedures for decontamination of drilling and sampling equipment;**
  - c. **Procedures for sample collection;**
  - d. **Sample analytical procedures;**
  - e. **Chain of custody control;**
  - f. **Parameters for analysis;**
  - g. **Quality assurance or quality control procedures;**
  - h. **A monitoring schedule;**
  - i. **Data statistical methods and analysis procedures; and**
  - j. **Reporting of a statistically significant increase over a background value or of an exceedance of a maximum concentration limit or a water quality standard.**
5. **Ground-water monitoring data obtained under this section must be analyzed within a reasonable period of time after completing sampling and laboratory analysis to determine whether or not a statistically significant increase over background values or an exceedance of a maximum concentration limit or water quality standard has occurred for each parameter required in the monitoring plan or permit. Statistical methods must, as appropriate:**
  - a. **Be appropriate for the distribution of the data and, if inappropriate for a normal theory test, be transformed or a distribution-free theory test must be used.**
  - b. **Control or correct for seasonal and spatial variability in the data.**
  - c. **Account for data below the limit of detection that can be reliably achieved by routine laboratory techniques, using the limit as the lowest concentration level for a chemical parameter which is below detection.**
  - d. **Be protective of human health and environmental resources.**

**33-20-13-03. Water quality standards.**

1. **All solid waste management systems, operations, units, and facilities must be designed, constructed, operated, maintained, closed, and maintained after closure so as to be in compliance with North Dakota Century Code chapter 61-28, and water quality standards defined in articles 33-16 and 33-17.**

**Compliance with these standards is enforceable at the compliance boundary of the facility.**

- 2. Whenever ground-water monitoring is required, the department must specify in the facility permit the specific elements of ground-water monitoring, including indicator parameters which are constituents in or derived from solid waste, the maximum concentration limits in ground water for each parameter not otherwise defined by subsection 1, and the compliance boundary, considering:**
  - a. The physical and chemical characteristics of the waste, including the potential for migration in surface water, in the unsaturated zone beneath the facility, and in ground water;**
  - b. The hydrogeological characteristics of the site and the surrounding land;**
  - c. The existing quality and quantity of ground water, other possible sources of contamination, and the direction of ground-water flow;**
  - d. The detectability of the indicator parameters or constituents in surface water or in ground water; or**
  - e. The proximity of the facility to surface waters; and**
  - f. Appropriate parameters from the list in table 1.**
  
- 3. The compliance boundary shall be located on land owned by the owner of the facility and no more than five hundred feet [152.4 meters] from a landfill or landfill disposal cell.**

[North Dakota does not have numerical standards for ground-water quality; rather, a non-degradation policy is spelled out in State water law, Section 61-28. Section 33-20-13, above, references 61-28 NDCC, including the prohibitions of 61-28-06 below]

Section 61-28-06 NDCC states:

**61-28-06. Prohibitions.**

- 1. It shall be unlawful for any person:**
  - a. To cause pollution of any waters of the state or to place or cause to be placed any wastes in a location where they are likely to cause pollution of any waters of the state; and**
  - b. To discharge any wastes into any waters of the state which reduce the quality of such waters below the water quality standards established therefor by the department.**
  
- 2. It is unlawful for any person to carry on any of the following activities unless the person holds a valid permit for the disposal of all wastes which are, or may be, discharged thereby into the waters of the state:**
  - a. The construction, installation, modification, or operation of any disposal system or part thereof or any extension or addition thereto without plans and specifications previously approved by the department.**



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- b. Cause a material increase in volume or strength of any wastes in excess of the permissive discharges specified under existing approved plans.**
  - c. The construction, installation, or operation of any industrial, commercial, or other establishment or any extension or modification or addition thereof, the operation of which would cause an increase in the discharge of wastes into the waters of the state or would otherwise alter the physical, chemical, or biological properties of any waters of the state in any manner not already lawfully authorized.**
  - d. The construction or use of any new outlet for the discharge of any wastes into the waters of the state.**
- 3. Notwithstanding any other provisions of this chapter, and except as in compliance with the provisions of this chapter, and any rules and regulations promulgated hereunder, the discharge of any wastes by any person shall be unlawful.**

Where Sec. 61-28-02 defines “Pollution” as the manmade or man-induced alteration of the physical, chemical, biological, or radiological integrity of any waters of the State.

[See <http://ranch.state.nd.us/LR/01/cencode/CCT61.pdf> (Page 217); for further information, contact Scott Radig [www.sradig@state.nd.us](mailto:www.sradig@state.nd.us)]

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**TABLE 1**  
**List of Parameters for Assessing Ground-Water Quality**

- a. Parameters measured in the field:**  
(1) Appearance (including color, foaming, and odor)  
(2) pH<sup>10</sup>  
(3) Specific conductance<sup>11</sup>  
(4) Temperature  
(5) Water elevation<sup>12</sup>
- b. General geochemical parameters:**
- |                      |                                   |
|----------------------|-----------------------------------|
| (1) Ammonia nitrogen | (11) Chloride                     |
| (2) Total hardness   | (12) Fluoride                     |
| (3) Iron             | (13) Nitrate + Nitrite, as N      |
| (4) Calcium          | (14) Total phosphorus             |
| (5) Magnesium        | (15) Sulfate                      |
| (6) Manganese        | (16) Sodium                       |
| (7) Potassium        | (17) Total dissolved solids (TDS) |
| (8) Total alkalinity | (18) Total suspended solids (TSS) |
| (9) Bicarbonate      | (19) Cation/anion balance         |
| (10) Carbonate       |                                   |
- c. Heavy metals:**
- | Group A:     | Group B:       |
|--------------|----------------|
| (1) Arsenic  | (9) Antimony   |
| (2) Barium   | (10) Beryllium |
| (3) Cadmium  | (11) Cobalt    |
| (4) Chromium | (12) Copper    |
| (5) Lead     | (13) Nickel    |
| (6) Mercury  | (14) Thallium  |
| (7) Selenium | (15) Vanadium  |
| (8) Silver   | (16) Zinc      |
- d. Total organic carbon (TOC)  
Chemical oxygen demand (COD)**
- e. Naturally occurring radionuclides:**  
(1) Radon  
(2) Radium  
(3) Uranium

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<sup>10</sup>Two measurements: in field, and immediately upon sample's arrival in laboratory.

<sup>11</sup>As measured in field.

<sup>12</sup>As measured to the nearest 0.01 foot in field before pumping or bailing.

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- 3.2 How are the sampling locations selected? **Site hydrogeology and proximity to facility - see above.**
- 3.3 How much data is required before placement? **Intensive study of site hydrogeology - see guidance document "Guideline 3 - Hydrogeologic Investigations, Ground-water Monitoring Networks and Ground-water Sampling for Solid Waste Management Facilities."**
4. Is background surface water monitoring data required prior to placement? **Yes.**
  - 4.1 What analytes are measured? **See above.**
  - 4.2 How are the sampling locations selected? **See above.**
  - 4.3 How much data is required before placement? **See above.**
5. Is the use of liners considered in site characterization? **Yes.**
  - 5.1 If a site is determined to be unacceptable for CCW placement, can it be made acceptable through the use of liners? **Yes, On a case by case basis. Liners are widely used.**
6. Are there any restrictions on the type of sites that can accept CCW? **Yes, see location and siting issues discussed above.**

#### **V Risk Assessment**

1. Is a formal risk assessment performed? **No, it is factored into the rules and permit process.**
  - 1.1 Is it based on site-specific, regional or other (please specify) data? **Not applicable.**
  - 1.2 Describe the steps taken in this assessment. **Not applicable.**
  - 1.3 Who conducts the assessment? **Not applicable.**
2. Are specific air, surface water, and ground water models, equations, etc., used to assess risk or impacts? **Sometimes.**
  - 2.1 What models are used? **HELP model; RUSLE (Soil Loss); Slope stability; Liner design parameters, such as strength and pullout capacity; Stormwater calculations for design for drainage structures. Dumpstat used to evaluate ground-water impacts.**
  - 2.2 What is the State's experience with these models (e.g., ease of use, value of results)?
3. How are the risk assessment results expressed? {e.g., monetization of potential damages, calculated incremental health risks (illness, deaths), negative risk (i.e., benefits outweigh negative impacts), rationalization (e.g., aquifer is not potable anyway), comparative (current/future use of the resource)}. **Not applicable.**
4. How are the results interpreted to determine the level and acceptability of impacts to receptors? **Not applicable.**

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4.1 Who is responsible for interpreting the results? **Not applicable.**

5. If no risk assessment is completed, is there a presumption that placement is acceptable if certain criteria are met? (e.g., leachate characteristics, distance to ground water, liner placement, historical experience of the regulatory authority). **Yes.**

5.1 Please list the pass/fail criteria below. **Leachate characteristics, distance to potable ground water, liner construction, operation and management, experience of agency and review team.**

## **VI Ground-Water Monitoring**

1. Is a ground-water sampling and analysis plan required? **Yes.**

2. Is ground-water monitoring required during placement? **Yes.**

2.1 What analytes are measured? **See Section IV, Question 3 above.**

2.2 How are the number of wells, well locations, and screening zones selected? **Determine gradient, Monitoring wells must be as close to the disposal site as possible, no less than 500 feet of the disposal site.**

2.3 What is the frequency of monitoring? **At minimum, semi-annual.**

3. Is post-closure ground-water monitoring required? **Yes.**

3.1 If so, how does it differ from ground-water monitoring conducted during placement (analytes monitored, frequency, etc.)? **Generally the same, although the Department may modify the number of wells and the frequency if justified.**

4. Can ground-water monitoring be discontinued? **After post-closure period.**

4.1 What are the criteria for discontinuing ground-water monitoring? **Based on assessment of ground-water monitoring results, site stability, leachate generation, probable receptors, etc.**

5. How is ground-water monitoring designed to specifically detect/distinguish the effects of CCW placement? **Based on knowledge of waste and background ground-water quality.**

6. How are large expanses dealt with? **Not applicable - disposal sites are generally discrete areas that can be monitored.**

7. How is existing ground-water contamination dealt with as part of the monitoring program? **Assessment monitoring as required under 33-20-13-05 NDAC:**

**33-20-13-05. Assessment monitoring, remedial measures, and corrective action.**

1. **Within ninety days of finding that a parameter has been detected at a statistically significant level exceeding the ground-water standards established**

under sections 33-20-13-02 and 33-20-13-03, the owner or operator shall initiate an assessment of remedial measures. The assessment must:

- a. Be completed within a reasonable time period, unless otherwise specified by permit or the department;
  - b. Include an evaluation of the nature and extent of the release of the constituents including pathways to human and environmental receptors;
  - c. For municipal landfills, include ground-water sampling and analysis for all parameters listed in appendix 1 of this chapter. The department may delete any of the appendix I parameters if it can be shown that the removed constituents are not reasonably expected to be in or derived from the waste within the leaking facility;
  - d. Include an analysis of the effectiveness of potential remedial measures in meeting all requirements of subsection 2 and include the following:
    - (1) The performance, reliability, ease of implementation, and potential impacts of each potential remedial measure;
    - (2) The time required to begin and complete each potential remedial measure;
    - (3) The costs of implementation of each potential remedial measure; and
    - (4) The permit requirements or other environmental or public health requirements that may substantially affect implementation of each potential remedial measure; and
  - e. When requested by the department, the owner or operator must discuss results of the assessment of remedial measures, prior to selection of a corrective action remedy, in a public meeting with interested and affected persons.
2. Based on the results of the assessment of remedial measures conducted under subsection 1, the owner or operator must select a corrective action remedy within thirty days which, at minimum, meets the following standards:
    - a. Is protective of human health and environmental resources;
    - b. Attains the ground-water protection standards under sections 33-20-13-02 and 33-20-13-03;
    - c. Controls the sources of release so as to reduce or eliminate, to the maximum extent practicable, further releases of constituents that may pose a threat to human health or environmental resources; and
    - d. Complies with this article and other applicable environmental statutes and rules.
  3. When selecting a corrective action remedy under subsection 2, the owner or operator shall consider these factors:
    - a. The short-term and long-term effectiveness of the potential remedial measure considering:

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- (1) **Magnitude of reducing exposure to constituents;**
    - (2) **Likelihood of further releases;**
    - (3) **Practical capability of technologies; and**
    - (4) **Time until the standards are achieved.**
  - b. **The ease or difficulty of implementing the potential remedial measure considering:**
    - (1) **Availability of equipment and specialists;**
    - (2) **Long-term management needs such as monitoring, operation, and maintenance; and**
    - (3) **Need to coordinate with and obtain necessary approvals or permits from other agencies.**
  - c. **The need for interim measures to control the sources of the release and to protect human health and environmental resources.**
  - d. **The schedules for initiating, conducting, and completing the potential remedial measure.**
  - e. **Practical capability of the owner or operator.**
4. **The owner or operator shall provide the department with a document fully describing the remedial measures assessment under subsection 1 and the selected corrective action remedy under subsections 2 and 3.**
5. **Upon selection of the corrective action remedy under subsection 2 and with the concurrence of the department, the owner or operator shall establish and implement the remedy.**
  - a. **During implementation, the owner or operator shall monitor the effectiveness of the remedy.**
  - b. **Implementation shall be considered complete when all actions and standards required to complete the remedy have been satisfied and approved by the department.**
  - c. **Upon completion of a corrective action remedy, the owner or operator shall place in the operating record a certification that the corrective action remedy has been completed. Within fourteen days of completion of the certification, the owner or operator shall notify the department that the certification has been placed in the operating record.**
8. **What water quality standards/criteria must be met? Background or drinking water quality standards.**
9. **Are alternative monitoring methods allowed? Not normally.**
  - 9.1 **What alternative monitoring methods are allowed? Not applicable.**

## **VII Surface Water Monitoring**

1. Is a surface water sampling and analysis plan required? **Yes. Water that has encountered waste is considered leachate and is managed as such. Stormwater runoff from non-waste areas is covered under a stormwater management plan subject to the NPDES Permit. See below:**

**33-20-04.1-02. General facility standards. An owner or operator of a solid waste management facility shall comply with these general facility standards:**

1. **All personnel involved in solid waste handling and in the facility operation or monitoring must be instructed in specific procedures to ensure compliance with the permit, the facility plans, and this article as necessary to prevent accidents and environmental impacts. Documentation of training, such as names, dates, description of instruction methods, and copies of certificates awarded, must be placed in the facility's operating record.**
  2. **The solid waste management facility shall comply with the water protection provisions of chapter 33-20-13.**
  3. **The solid waste management facility may not cause a discharge of pollutants into waters of the state unless such discharge is in compliance with requirements of the North Dakota pollutant discharge elimination system pursuant to chapter 33-16-01.**
  4. **The solid waste management facility may not cause a violation of the ambient air quality standard or odor rules, article 33-15, at the facility boundary.**
  5. **Suitable control measures must be taken whenever fugitive dust is a nuisance or exceeds the levels specified in article 33-15.**
2. Is surface water monitoring required during placement? **All facilities must be in compliance with the State's NPDES requirements. Discharges would need to meet NPDES effluent limitations or stormwater BMP requirements. More specific surface water monitoring may be required through a permit condition on a case-by-case basis, dependent on site-specific factors, including proximity to surface water bodies and/or past history.**
    - 2.1 **What analytes are measured? For NPDES releases, parameters typically are limited to Total Suspended Solids, total iron, pH. If more specific surface water monitoring is required through the permit process, the analytes would be similar to or the same as the ground-water monitoring parameters.**
    - 2.2 **How are sampling locations selected? Site-specific, based on surface water conditions, flow, upgradient and downgradient analysis, etc.**

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- 2.3 What is the frequency of monitoring? **If specific monitoring is required through the solid waste permit, the frequency typically would be the same as for the ground-water monitoring except for the winter; surface water sampling is not required during the winter. NPDES sampling typically is required at the time of release.**
3. Is post-closure surface water monitoring required? **Only if site impacts are evident. Normally, landfills covered, closed, and stabilized would only need to meet the storm water requirements.**
  - 3.1 How does it differ from surface water monitoring conducted during placement (analytes monitored, frequency, etc.)? **Analytes and frequency may be reduced.**
4. Can surface water monitoring be discontinued? **Yes, during post-closure care if the land is stabilized.**
  - 4.1 What are the criteria for discontinuing surface water monitoring? **Effective reclamation and stability**
5. How is surface water monitoring designed to specifically detect/distinguish the effects of CCW placement? **If formal monitoring is required, background surface water quality should be provided.**
6. How is background surface water quality assessed? **Through knowledge of the receiving water body. When more detailed monitoring is required, a sampling point upgradient of the facility is preferred.**
7. What water quality standards/criteria must be met? **North Dakota Ambient water quality standards.**

#### **VIII Placement Practices**

1. What types of CCW placement are allowed (i.e., into active mines, closed mines, surface mines, underground mines, etc)? **Permitted landfills only - Not active mines.**
2. Is placement into the water table allowed? **No.**
  - 2.1 If so, under what conditions? **Not applicable.**
  - 2.2 If not, how close to the water table is placement allowed? **No specific requirement. Depends on the nature and quality of ground water and potential receptors. Siting restrictions apply.**
  - 2.3 If a liner is required beneath the CCW, what are the design/performance standards for the liner? **No migration of waste or waste constituents during active life and post-closure period (30 years minimum). Flexible liner standards, but generally 4 feet of compacted clay with hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec.**
3. Is placement into mine pools allowed? **No.**



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- 3.1 What placement techniques are used? **Not applicable.**
- 3.2 Are there additional/special monitoring requirements after placement into a mine pool? **Not applicable.**
4. Are there specific design/operational requirements for the following types of projects and, if so, what are they?
  - 4.1 Placement into underground mines? **Beneficial use as a grouting admixture approved by NDDH to ND Public Service Commission - AML program. Limited use in reclamation of abandoned mine lands.**
  - 4.2 Placement into surface mines? **Only permitted landfills or approved beneficial use for haul roads, soil stabilization, etc.**
  - 4.3 Grouting? **See 4.1 above.**
  - 4.4 Acid mine drainage remediation? **Not applicable.**
  - 4.5 Soil conditioning? **No.**
  - 4.6 Mine sealing? **See 4.1 above.**
  - 4.7 Subsidence control? **See 4.1 above.**
  - 4.8 Spoil encapsulation? **Not applicable.**

#### **IX Operational Requirements/Design Requirements**

1. How is the potential for flooding/washout addressed? **Permit and design review.**
2. Are runoff controls used/required? **Yes.**
3. Are leachate collection systems used or required? **Case by case.**
  - 3.1 Under what conditions? **Depends on the nature of the waste and the site.**
  - 3.2 What are the design criteria? **Flexible, case by case for coal combustion waste. Some facilities use bottom ash or course ash as drainage medium.**
4. Is waste conditioning required? **Not specific in rules.**
  - 4.1 What waste conditioning methods are allowed? **Pug mill for dust control. Dewatering/solidification for liquid control.**
  - 4.2 What design criteria exist for waste conditioning? **Not applicable.**
5. What fugitive dust controls are used or required: **See below:**

**33-20-04.1-02. General facility standards. An owner or operator of a solid waste management facility shall comply with these general facility standards:**

- 4. The solid waste management facility may not cause a violation of the ambient air quality standard or odor rules, article 33-15, at the facility boundary.**
- 5. Suitable control measures must be taken whenever fugitive dust is a nuisance or exceeds the levels specified in article 33-15.**

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- 5.1 During transport and discharge from transport vehicles? **No visible fugitive dust allowed. Pug mill (moisten), add water. Spillage must be cleaned up immediately.**
  - 5.2 During/following placement? **No visible fugitive dust emissions - dust control - spray with water and/or apply intermediate cover.**
6. Is a cover or cap required over the CCW? **Yes.**
- 6.1 What are the design/performance criteria? **See below:**

**33-20-06.1-03. Closure criteria. In addition to sections 33-20-04.1-05 and 33-20-04.1-09, at closure, an owner or operator shall cover an existing unit with a layer of compacted soil material having a thickness of eighteen inches [45.7 centimeters] or more and a hydraulic conductivity of  $1 \times 10^{-7}$  centimeters per second or less. The compacted layer must be free from cracks and extrusions of solid waste. 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. At least six inches [15.2 centimeters] of suitable plant growth material must be placed over the covered landfill and the facility planted with adapted grasses. The total depth of final cover must be three feet [91.4 centimeters] or more, as required to achieve subsection 3 of section 33-20-06.1-02.**

- 6.2 What kind of cover materials are required? **Clay-rich soil - See above.**
- 6.3 What minimum/maximum slopes are allowed for final cover? **3 to 15 percent, with up to 25 percent allowed if erosion controls can justify steeper slopes and they are stable.**
- 6.4 What compaction criteria/standards apply to the cover/cap? **See Guideline 5 "Quality Assurance for Construction of Landfill and Surface Impoundment Liners, Caps, ..."**
- 6.5 What are the maintenance standards for covers/caps? **See below:**

**33-20-04.1-05. General closure standards. The requirements of this section apply to all solid waste management facilities, unless otherwise specified.**

1. Each owner or operator shall close their facility in a manner that achieves the following:
  - a. **Minimizes the need for further maintenance; and**
  - b. **Controls, minimizes, or eliminates any escape of solid waste constituents, leachate, fugitive emissions, contaminated runoff, or waste decomposition products.**
2. **Sequential partial closure must be implemented to minimize the working face of a landfill.**

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3. **Closure must be implemented within thirty days after receipt of the final volume of waste and must be completed within one hundred eighty days following the beginning of closure activities, unless otherwise specified and approved under subsection 5. Prior to beginning closure, the owner or operator must notify the department in writing of the intent to close.**
4. **The owner or operator of a landfill for which closure is completed in part or whole shall enter into the operating record and submit to the department:**
  - a. **As-built drawings showing the topography, pertinent design features, extent of waste, and other appropriate information; and**
  - b. **Certification by the owner or operator and a professional engineer that closure has been completed in accordance with the approved closure plan and this article.**
5. **Each owner or operator shall prepare and implement a written closure plan approved by the department as part of the permitting process. The closure plan must:**
  - a. **Estimate the largest area ever requiring final cover at any time during the active life of the site;**
  - b. **Estimate the maximum inventory of solid waste onsite over the active life of the facility;**
  - c. **For landfills, describe the final cover and the methods to install the cover;**
  - d. **Project time intervals at which sequential partial closure or closure is to be implemented;**
  - e. **Describe the resources and equipment necessary for closure; and**
  - f. **Identify closure costs estimates and provide financial assurance mechanisms as required by chapter 33-20-14.**

**History: Effective December 1, 1992; amended effective October 1, 1994.**

**General Authority: NDCC 23-29-04**

**Law Implemented: NDCC 23-29-04, 23-29-07**

4. **Closure standards, excluding land treatment units.**
  - a. **Closed solid waste management units may not be used for cultivated crops, heavy grazing, buildings, or any other use which might disturb the protective vegetative and soil cover.**
  - b. **All solid waste management units must be closed with a final cover designed to:**
    - (1) **Have a permeability less than or equal to the permeability of any bottom liner or natural subsoils present;**
    - (2) **Minimize precipitation run-on from adjacent areas;**
    - (3) **Minimize erosion and optimize drainage of precipitation falling on the landfill. The grade of slopes may not be less than three percent, nor**

more than fifteen percent, unless the permit applicant or permittee provides justification to show steeper slopes are stable and will not result in surface soil loss in excess of one-tenth of one percent per year for the first year and one-hundredth of one percent per year thereafter. In no instance may slopes exceed twenty-five percent; and

- (4) Provide a surface drainage system which does not adversely affect drainage from adjacent lands.
  - c. The final cover must include six inches [15.2 centimeters] or more of suitable plant growth material which must be seeded with shallow rooted grass or native vegetation.
  - d. The department may allow, on a case-by-case basis, the use of closed inert waste landfill sites for certain beneficial uses that would not pose a threat to human health or the environment.
5. Postclosure standards for solid waste management facilities regulated by this section.
- a. The owner or operator of a landfill or a surface impoundment closed with solid waste in place shall meet the following during the postclosure period:
    - (1) Maintain the integrity and effectiveness of the final cover, including making repairs to the cover to correct effects of settlement, subsidence, and other events, and preventing run-on and runoff from eroding or otherwise damaging the final cover;
    - (2) Maintain and operate the leachate collection system, if applicable;
    - (3) Monitor the ground water and maintain the ground-water monitoring system, if applicable; and
    - (4) Operate and maintain the gas control system, if applicable.
  - b. The owner or operator of a municipal waste landfill, an industrial waste landfill, a special waste landfill, a surface impoundment closed with solid waste remaining in place, or a land treatment facility shall prepare and implement a written postclosure plan approved by the department as a part of the permitting process. The postclosure plan must address facility maintenance and monitoring activities for a postclosure period of thirty years.
    - (1) Postclosure includes appropriate: ground-water monitoring; surface water monitoring; gas monitoring; and maintenance of the facility, facility structures, and ground-water monitoring systems.
    - (2) The postclosure plan must: provide the name, address, and telephone number of the person or office to contact during the postclosure period; and project time intervals at which postclosure activities are to be implemented, identify postclosure cost estimates, and provide financial assurance mechanisms as required by chapter 33-20-14.
    - (3) The department may require an owner or operator to amend the postclosure plan, including an extension of the postclosure period, and

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**implement the changes. If the permittee demonstrates that the facility is stabilized, the department may authorize the owner or operator to discontinue postclosure activities.**

**c. Following completion of the postclosure period, the owner or operator shall notify the department verifying that postclosure management has been completed in accordance with the postclosure plan.**

7. Is re-establishment of surface streams required? **Covered under PSC Rules. State Solid waste rules do not allow disposal in surface water features. PSC has not approved mining of any intermittent or perennial streams. Mining has only affected ephemeral drainageways which are restored after mining.**
- 7.1 What determines when it is appropriate and how it should be done? *[Question not applicable.]*
- 7.2 What are the design criteria? *[Question not applicable.]*
8. Is contouring of waste so water drains away from the fill required? **Yes.**
- 8.1 When is it appropriate to contour wastes? **Routine operation- daily or weekly.**
- 8.2 What are the minimum slope and compaction criteria? **See below:**

**33-20-04.1-09. General disposal standards.**

1. **In addition to sections 33-20-04.1-02, 33-20-04.1-03, 33-20-04.1-04, and 33-20-04.1-05, the standards of this section apply to all landfills, surface impoundments closed with solid waste in place, and land treatment units, unless otherwise indicated.**
2. **Construction and operation standards for solid waste management facilities regulated by this section:**
  - a. **Every solid waste landfill or facility shall have and maintain, or have access to, equipment adequate for the excavation, compaction, covering, surface water management, and monitoring procedures required by approved plans and this article.**
  - b. **Roads must be constructed and maintained to provide access to the facility. Access roads must be cleaned and decontaminated as necessary.**
  - c. **There must be available an adequate supply of suitable cover material, which, if necessary, must be stockpiled and protected for winter operation.**
  - d. **The final cover of all disposal facilities must be designed and constructed in a manner that ensures the quality and integrity of the hydraulic barrier and the protective vegetative cover.**
  - e. **The working face or open area of a landfill must be limited in size to as small an area as practicable. Sequential partial closure must be implemented as necessary to keep the disposal area as small as practicable and to close filled areas in a timely manner.**

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9. Is re-vegetation required? **Yes.**
- 9.1 What are the design criteria? **See Section IX, Question 6, above.**
- 9.2 What kinds of plants are used? **Adapted grasses approved in application and permit- see guideline “General Native Grass Seeding Guideline”**
- 9.3 What kinds of topsoil/compost are required? **Minimum of 6 inches plus 12 inches suitable to use as a plant root zone.**
10. Is the operator required to restrict public access to the waste and facility? **Yes.**
- 10.1 What design/performance standards or criteria apply? **See below:**

**33-20-04.1-02. General facility standards. An owner or operator of a solid waste management facility shall comply with these general facility standards:**

7. **A permanent sign must be posted at the entrance of a facility, or at the entrance of a solid waste management unit used by a facility for wastes generated onsite, which indicates the following:**
- a. The name of the facility;**
  - b. The permit number;**
  - c. The name and telephone number of the owner and the operator if different than the owner;**
  - d. The days and hours the facility is open for access;**
  - e. The wastes not accepted for disposal; and**
  - f. Any restrictions for trespassing, burning, hauling, or nonconforming dumping.**
8. **The owner or operator of a facility shall periodically inspect solid waste managed at the facility, on a schedule proposed by the owner or operator and approved by the department, to control and reject unauthorized solid wastes as specified by this article, a permit, or a plan of operation.**
11. What are the post-closure maintenance requirements (e.g., maintaining cover integrity and effectiveness, slopes, vegetation, etc.)? **See below:**
4. **Closure standards, excluding land treatment units.**
- a. Closed solid waste management units may not be used for cultivated crops, heavy grazing, buildings, or any other use which might disturb the protective vegetative and soil cover.**
  - b. All solid waste management units must be closed with a final cover designed to:**
    - (1) Have a permeability less than or equal to the permeability of any bottom liner or natural subsoils present;**
    - (2) Minimize precipitation run-on from adjacent areas;**

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- (3) **Minimize erosion and optimize drainage of precipitation falling on the landfill. The grade of slopes may not be less than three percent, nor more than fifteen percent, unless the permit applicant or permittee provides justification to show steeper slopes are stable and will not result in surface soil loss in excess of one-tenth of one percent per year for the first year and one-hundredth of one percent per year thereafter. In no instance may slopes exceed twenty-five percent; and**
        - (4) **Provide a surface drainage system which does not adversely affect drainage from adjacent lands.**
      - c. **The final cover must include six inches [15.2 centimeters] or more of suitable plant growth material which must be seeded with shallow rooted grass or native vegetation.**
      - d. **The department may allow, on a case-by-case basis, the use of closed inert waste landfill sites for certain beneficial uses that would not pose a threat to human health or the environment.**
5. **Postclosure standards for solid waste management facilities regulated by this section.**
  - a. **The owner or operator of a landfill or a surface impoundment closed with solid waste in place shall meet the following during the postclosure period:**
    - (1) **Maintain the integrity and effectiveness of the final cover, including making repairs to the cover to correct effects of settlement, subsidence, and other events, and preventing run-on and runoff from eroding or otherwise damaging the final cover;**
    - (2) **Maintain and operate the leachate collection system, if applicable;**
    - (3) **Monitor the ground water and maintain the ground-water monitoring system, if applicable; and**
    - (4) **Operate and maintain the gas control system, if applicable.**
  - b. **The owner or operator of a municipal waste landfill, an industrial waste landfill, a special waste landfill, a surface impoundment closed with solid waste remaining in place, or a land treatment facility shall prepare and implement a written postclosure plan approved by the department as a part of the permitting process. The postclosure plan must address facility maintenance and monitoring activities for a postclosure period of thirty years.**
    - (1) **Postclosure includes appropriate: ground-water monitoring; surface water monitoring; gas monitoring; and maintenance of the facility, facility structures, and ground-water monitoring systems.**
    - (2) **The postclosure plan must: provide the name, address, and telephone number of the person or office to contact during the postclosure period; and project time intervals at which postclosure activities are to be implemented, identify postclosure cost estimates, and provide financial assurance mechanisms as required by chapter 33-20-14.**

(3) The department may require an owner or operator to amend the postclosure plan, including an extension of the postclosure period, and implement the changes. If the permittee demonstrates that the facility is stabilized, the department may authorize the owner or operator to discontinue postclosure activities.

c. Following completion of the postclosure period, the owner or operator shall notify the department verifying that postclosure management has been completed in accordance with the postclosure plan.

12. How long is the owner/operator responsible for post-closure maintenance? **30 years minimum.**

13. What other operational requirements exist? **See Section IX, Question 11, above. Also, notice on deed to property.**

**X Corrective Action**

1. Under what circumstances are corrective actions required/what is the trigger for a corrective action? **Statistically significant level triggers and assessment. See below:**

**33-20-13-05. Assessment monitoring, remedial measures, and corrective action.**

1. **Within ninety days of finding that a parameter has been detected at a statistically significant level exceeding the ground-water standards established under sections 33-20-13-02 and 33-20-13-03, the owner or operator shall initiate an assessment of remedial measures. The assessment must:**
  - a. **Be completed within a reasonable time period, unless otherwise specified by permit or the department;**
  - b. **Include an evaluation of the nature and extent of the release of the constituents including pathways to human and environmental receptors;**
  - c. **For municipal landfills, include ground-water sampling and analysis for all parameters listed in appendix 1 of this chapter. The department may delete any of the appendix I parameters if it can be shown that the removed constituents are not reasonably expected to be in or derived from the waste within the leaking facility;**
  - d. **Include an analysis of the effectiveness of potential remedial measures in meeting all requirements of subsection 2 and include the following:**
    - (1) **The performance, reliability, ease of implementation, and potential impacts of each potential remedial measure;**
    - (2) **The time required to begin and complete each potential remedial measure;**
    - (3) **The costs of implementation of each potential remedial measure;**  
**and**





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4. **The owner or operator shall provide the department with a document fully describing the remedial measures assessment under subsection 1 and the selected corrective action remedy under subsections 2 and 3.**
  
5. **Upon selection of the corrective action remedy under subsection 2 and with the concurrence of the department, the owner or operator shall establish and implement the remedy.**
  - a. **During implementation, the owner or operator shall monitor the effectiveness of the remedy.**
  - b. **Implementation shall be considered complete when all actions and standards required to complete the remedy have been satisfied and approved by the department.**
  - c. **Upon completion of a corrective action remedy, the owner or operator shall place in the operating record a certification that the corrective action remedy has been completed. Within fourteen days of completion of the certification, the owner or operator shall notify the department that the certification has been placed in the operating record.**
  
2. **What types of corrective action measures are appropriate? Additional monitoring, cleanup, etc. May not need cleanup if justified.**
  
3. **Does the state have any damage cases? Yes, from earlier activities.**
  
- XI Financial Assurance**
  1. **Is financial assurance required? Yes.**
    - 1.1 **What types of financial assurance mechanisms are allowed? See below.**

**CHAPTER 33-20-14  
FINANCIAL ASSURANCE REQUIREMENTS**

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**33-20-14-07 Specific Requirements of Mechanisms for  
Financial Assurance . . . . . 14-5**

**33-20-14-01. Financial assurance for solid waste disposal facilities.**

- 1. The requirements of this chapter apply to all new and expanded solid waste disposal facilities and to existing solid waste disposal facilities that have not been closed by April 9, 1994. These requirements do not apply to inert waste landfills.**
- 2. New or expanded facilities must demonstrate financial assurance prior to acceptance of solid waste and existing facilities by the date given in subsection 1.**
- 3. Owners of facilities may set up one mechanism to demonstrate financial assurance for both closure and postclosure care of each facility. The amount of funds available through the mechanisms must be no less than the sum of funds that would be available if a separate mechanism had been established and maintained for financial assurance of closure and of postclosure care.**
- 4. Mechanisms used to demonstrate financial assurance under this chapter must ensure that the amount of funds assured is adequate to cover the costs of closure and postclosure care and that the funds will be available in a timely fashion whenever needed, until released from the financial assurance requirement by the department.**
- 5. Mechanisms must be legally valid and binding under North Dakota law.**

**33-20-14-02. Cost estimates for closure and postclosure.**

- 1. Each owner or operator shall prepare separate written closure and postclosure estimates of the costs of hiring a third party to complete identified activities of the facility closure and postclosure plans.**
  - a. The initial cost estimates must be in current dollars, and cost estimates must be adjusted annually for inflation.**
  - b. The cost estimate for closure must equal the cost of closing the largest area requiring a final cover during the active life of the facility.**
  - c. The owner or operator must increase the cost estimates if changes in the closure plan or postclosure plan increase the maximum costs of closure or postclosure care, respectively. The owner or operator may reduce a cost estimate for closure if it exceeds the maximum costs of closure during the remaining life of the facility or a cost estimate for postclosure care if it**

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exceeds the maximum costs of postclosure during the remaining postclosure period.

- d. The cost estimate for postclosure must account for the total costs of postclosure care over the entire postclosure period, including the most expensive costs of postclosure during the postclosure period.
2. Each owner or operator shall prepare a new closure or postclosure cost estimate whenever any of the following occurs:
    - a. Changes in operating plans or facility design affect the closure or postclosure plans;
    - b. There is a change in the expected year of closure; and
    - c. The department directs the owner or operator to revise the closure or postclosure plan.

**33-20-14-03. Financial assurance mechanism for closure and postclosure.**

1. Each owner or operator of an applicable solid waste disposal facility shall establish one or more financial assurance mechanisms which together total an amount equal to the closure cost estimate or postclosure cost estimate prepared in accordance with section 33-20-14-02.
2. Each financial assurance mechanism must be approved by the department. The following financial assurance mechanisms are acceptable, provided respective requirements of section 33-20-14-07 are met:
  - a. Reserve account;
  - b. Trust fund;
  - c. Surety bond;
  - d. Irrevocable letter of credit;
  - e. Financial test;
  - f. Insurance policy; and
  - g. Corporate guarantee in accordance with the form and content of subdivision a of subsection 8 of section 33-24-05-81.
3. A trust fund, surety bond, letter of credit, corporate guarantee, financial test, or insurance policy may be terminated or canceled only if alternate financial assurance is substituted or if the owner or operator is released from the requirement by the department.

**33-20-14-04. Implementation of financial assurance for closure and postclosure.**

1. The closure plan and postclosure plan required by this article must specify the financial assurance mechanisms required by this chapter and, if a reserve

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account, trust fund, surety bond, or insurance policy, the methods and schedules for funding the mechanisms.

2. **Publicly owned solid waste disposal facilities shall comply with the following:**
  - a. **Closure and postclosure financial assurance funds must be generated for each facility as indicated in the closure and postclosure plans;**
  - b. **Each facility owner or operator must establish a procedure with the trustee of the financial assurance mechanism for notification of nonpayment of funds to be sent to the department; and**
  - c. **Each owner or operator shall file with the department no later than August thirty-first of each succeeding year an annual report of the financial assurance mechanism established for closure and postclosure activities.**
3. **Privately owned solid waste disposal facilities shall comply with the following:**
  - a. **Each owner or operator shall file with the department no later than August thirty-first of each succeeding year an annual audit of the financial assurance mechanisms established for closure and postclosure activities; and**
  - b. **Annual audits must be conducted by a certified public accountant licensed in the state and must be filed with the department no later than August thirty-first of each year for the previous calendar year, including each year of the postclosure period.**

**33-20-14-05. Financial assurance for corrective action.**

1. **The department may require an owner or operator to undertake remedial measures, including corrective action, under the provisions of subsection 10 of North Dakota Century Code section 23-29-04 and chapter 61-28 when a release occurs.**
2. **An owner or operator required to undertake corrective action must have a detailed estimate, in current dollars, of the cost of hiring a third party to perform the corrective action.**
  - a. **The cost estimate must account for the total costs of corrective action for the entire corrective action period.**
  - b. **The owner or operator must annually adjust the cost estimate for inflation until corrective action is completed.**
  - c. **The owner or operator shall increase the cost estimate if changes in corrective action or conditions increase the total costs. The owner or operator may reduce the cost estimate if the total costs exceed the maximum remaining costs of corrective action.**

3. **An owner or operator required to undertake corrective action shall establish financial assurance in accordance with section 33-20-14-07 no later than one hundred twenty days after the corrective action remedy has been selected. The owner or operator shall provide continuous coverage for corrective action until demonstrating compliance with article 33-16.**
2. What is the period of liability? **Operation, Closure, Post Closure period - 30 years minimum.**
3. What is the amount of financial assurance required? **Based on written cost estimates for closure, post-closure care and monitoring. Must be adjusted annually for inflation. Financial assurance for corrective action can be required.**
4. What are the conditions for bond release? **See below:**

**33-20-14-07. Specific requirements of mechanisms for financial assurance.**

2. **Surety bond. A surety bond guaranteeing payment or performance must satisfy to the requirements of this subsection.**
  - a. **The penal sum of the bond must be in an amount equal to or greater than the current closure or postclosure cost estimate, whichever is applicable.**
  - b. **Under the terms of the bond, the surety must become liable on the bond obligation when the owner or operator fails to perform as guaranteed by the bond.**
  - c. **The owner or operator must establish a standby trust fund that meets the requirement of subsection 1, except for payment provisions in subdivisions b, c, and d.**
  - d. **Payments made under the terms of the bond must be deposited by the surety into the standby trust fund. Payments from the trust fund must be approved by the trustee.**
  - e. **Under the terms of the bond, the surety may cancel the bond by sending notice of cancellation by certified mail to the owner or operator and to the department one hundred twenty days or more in advance of the cancellation. If the surety cancels the bond, the owner or operator must obtain alternate financial assurance.**
5. Is there a separate State liability fund? **Not active.**
  - 5.1 What is the source of money for this fund? **Not applicable.**

## **XII Reporting**

1. How frequently is monitoring data on wastes, ground and surface water reported to the government? **Annual basis at minimum. Some facilities to semi-annual, quarterly or monthly reporting on a case-by-case basis as required in their permit.**

2. Is the data maintained at the facility? **Yes.**
3. How often are sites inspected? **Two to 4 times per year.**
4. How often is compliance with permit requirements, performance standards, enforceable limits, etc., evaluated? **Two to 4 times per year minimum. More often if needed.**
  - 4.1 Who is responsible for this evaluation? **N.D.. Department of Health**
5. What are the post-closure reporting requirements? **Annual.**
6. How frequently does the regulatory authority inspect the closed facility, and what are the criteria for terminating inspection? **Every 2 years estimated.**

### **XIII Public Participation**

1. Prior to permit issuance, does the public have an opportunity to review and comment on monitoring (surface and ground water) and/or modeling data and Probable Hydrologic Consequences determination? **Yes - NDDH files.**
  - 1.1 What other opportunities for public involvement are there in the permitting process? **Two publications by applicant, one publication by Department. 30 day public comment period. Opportunity for a Hearing if sufficient interest.**
2. Is monitoring data available to the public? **Yes.**
3. What opportunity does the public have to participate in overseeing compliance at the site? **Virtually all records are open, including reports, inspections, ground-water data, etc. Department copies inspection reports to local Health Districts and/or political subdivisions. Department records are open for review during normal office hours.**
4. How does the public have access to post-closure reports? **At department offices and/or copies to local health/political subdivisions.**
5. Are citizen actions allowed? **Yes.**
  - 5.1 What types of actions are allowed (e.g., petitions, suits)? **Both.**
  - 5.2 Who adjudicates citizen actions (e.g., permitting agency, administrative law judge, State court, federal court)? **Permitting Agency with potential administrative law judge or State Court.**