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INTRADEPARTMENTAL MEMORANDUM

FILE: McKenzie County Landfill (0336)

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Division of Waste Management CRH

THROUGH: Diana A. Trussell, Manager DAT
Solid Waste Program
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SUBJECT: Permit Application Review

DATE: March 24, 2025

Introduction

The North Dakota Department of Environmental Quality (Department) received a permit application for a modification for McKenzie County's solid waste facility.

McKenzie County currently owns and operates a municipal solid waste landfill (MSW), regulated under Permit 0336, on approximately 120 acres located in the NW1/4 of the NE1/4 and the NE1/4 of the NE1/4, and the N1/2 of the S1/2 of the NE1/4 of Section 36, Township 150 North, Range 100 West in McKenzie County, ND. McKenzie County is proposing to modify their permit to reconfigure some of the existing municipal solid waste (MSW) landfill areas and add approximately 7.74 acres of land for inert waste landfilling. The proposed inert waste landfill area will be located southwest of the current landfill office. The facility was first permitted in 1992.

Design

The entire 120-acre facility is fenced; in addition, portable containment fences are also located within the active MSW landfill area. The facility entrance includes a lockable gate where permanent/facility entrance signs are posted. Scales and a scale house/office are located just south of the facility entrance. There are three buildings at the facility used for equipment and material storage, one is located just south of the scale house and two are located at the northeastern area of the facility. A County Sheriff Gun Range is currently located at the southeast corner of the facility, and a County Road Bridge, Storage and Impound Lot is currently located at the northeast corner of the facility.

The bedrock formation in the area is the Sentinel Butte Formation, consisting of layers of sand, silt, clay, and lignite. Glacial drift of the Cole Harbor Formation overlies the Sentinel Butte Formation in the county; however, in many areas, bedrock is exposed due chiefly to erosion.

The modification to reconfigure the MSW landfill area will bring the new permitted total MSW airspace to 4,589,195 cubic yards. The ultimate capacity of the MSW Landfill is anticipated to be reached in 2068.

MSW Landfill Phases 1 – 11

To date, the permitted MSW landfill area has been developed with 6 MSW phases originating in the northern, and southwestern area of the facility accommodating a waste footprint of approximately 22.7 acres and a total capacity of 1,320,550 cubic yards (yd^3) of air space for MSW disposal.

The proposed MSW Phases 7 through 11 in the southern area of the facility may accommodate a waste footprint of approximately 30 acres and provide 3,272,000 yd^3 of disposal capacity. The total MSW disposal capacity for the facility is 4,333,610 yd^3.

Phases 1 and 2 have received final cover, and portions of Phases 3, 4, and 5 have received final cover. Phase 6 is currently receiving waste for disposal. Phases 7 through 11 have not been constructed to date.

Phases 1 through 4 are underlain by 2 feet of clay material compacted to achieve a hydraulic conductivity of less than or equal to 1×10^{-7} centimeters (cm/sec). Because the facility historically accepted less than twenty tons per day of MSW, the region typically receives less than twenty inches of precipitation annually, and the proportion of clay in the Sentinel Butte Formation in the area is conducive to low groundwater velocities that retard leachate migration, typical leachate drainage material and collection piping were not installed within MSW landfill Phases 1 through 4.

Due to increased MSW disposal activity including the facility accepting greater than twenty tons per day of MSW, MSW Phases 5 and 6 were constructed with a composite base liner consisting of 2 feet of compacted clay overlain by a 60 mil HDPE liner, and one foot of sand drainage material, and an associated leachate piping collection system. MSW landfill leachate is collected within landfill sumps and transferred to the existing surface impoundments for evaporation.

Surface Impoundments

Two permitted existing 0.5-acre compositely lined (consisting of 2 feet of compacted clay overlain by a 60 mil HDPE) surface impoundments used for storing and evaporating MSW landfill leachate are located at the northwestern area of the facility and provide approximately 700,000 gallons of storage operating capacity for each.

Inert Waste Landfill

An existing permitted inert landfill (Phases 1 and Phase 2) when completed will cover an area of approximately 6.0 acres and is located at the northern area of the facility. The original estimated capacity of the inert landfill was approximately 125,000 yd^3. Phases 1 and Phase 2 are currently accepting waste. The area has an estimated remaining capacity of 28,000 yd^3.

The previously permitted inert landfill area (Phases 3 through 7) will not be developed for inert waste disposal, but instead may be reserved for additional MSW disposal area.

The facility is proposing a new inert waste landfill area to be located southwest of the scale office (Phases 3 through 5). The footprint for the proposed inert waste landfill area covers an area of 7.74 acres which may bring the total inert waste landfill acreage to 9.32 acres and provide approximately 506,100 yd^3 (inclusive of final cover) of disposal capacity. The projected life expectancy of the inert waste landfill (Phases 1 through 5) is estimated to be reached in 2076.

Groundwater Monitoring

The groundwater monitoring network currently consists of eight groundwater monitoring wells (MW) that are sampled semi-annually:

- MW-2 (downgradient of current landfill)
- MW-3 (upgradient of current landfill)
- MW-5 (sidegradient of current landfill)
- MW-110D (downgradient of current landfill)
- MW-110S (downgradient of current landfill)
- MW-104 (downgradient of surface impoundment 2)
- MW-111 (downgradient of current landfill)
- MW-112 (upgradient of current landfill and surface impoundments).

MW-108, MW-109, and MW-113 are being monitored for water levels only.

Recommendations contained in the 2020 Annual Groundwater Report proposed discontinuing sampling MW-1, MW-101S, and MW-107. These MWs are located either upgradient or sidegradient to the current landfill. On April 12, 2021, the Department approved of changes to the environmental monitoring plan proposed by McKenzie County. Water levels will continue to be monitored in these MWs.

MW-14S/D, and MW-15S/D are proposed downgradient MWs for future landfill expansion monitoring.

According to the 2023 Annual Groundwater Monitoring Report, groundwater flow in the coal unit is generally to the south at a hydraulic gradient of 0.009 to 0.017 leading to the natural site drainages along the southern property boundary. It should be noted that this unit is not saturated everywhere across the site and the groundwater may be perched on top of the deep clay layer. Groundwater flow in the lower clay unit is to the southeast at a hydraulic gradient of 0.002 to 0.003. Overall, the groundwater monitoring data are not indicative of any significant releases from the landfill. Additional information can be found in **section c) of NDAC Subsection 33.1-20-03.1-02(6) of this memo.**

Operation

The facility may accept, on average, less than 500 tons per day of MSW. The facility operates two surface impoundments for storing and evaporating landfill leachate. The McKenzie County Landfill also has a separate area or unit which may be used to dispose of no more than 40 tons per day of inert waste. The facility stores scrap metal such as major appliances for future

recycling, and some areas of the facility will be used for storing stormwater, borrowing, and stockpiling cover soils, a public drop-off area, and a used oil collection tank.

Closure

Currently, approximately 6.3 acres of the MSW landfill Phases 1-5 have been certified closed with at least three feet of final cover. Future final cover is proposed to consist of 1.5 feet of soil barrier layer, one foot of rooting soil layer, and six inches of suitable plant growth material (SPGM). Final cover slopes in the design drawings are 25% or less. The largest anticipated area ever requiring final cover at any time during the active life of the MSW site was described in the Landfill Closure Plan section as 19.5 acres.

Currently, none of the inert landfill has been closed. The inert landfill is inactive and has received interim soil cover. Final cover for the inert landfill will consist of twelve inches of compacted clay, six inches of soil rooting layer, and six inches of SPGM, and final cover slopes will be 25% or less.

Compliance History

Very few noncompliance issues have been noted at the facility over the years. Some of the deficiencies noted include:

- Lack of MSW landfill daily cover
- Excessive windblown litter
- Storing landfill leachate in the MSW landfill area including excessive head-on liner and unauthorized liquids disposal

The above items of noncompliance have been appropriately addressed by the facility, and no formal notices of violations have been issued to the facility.

Solid Waste Management Rules (NDAC Article 33.1-20)

NDAC Section 33.1-20-02.1-05. Record of notice.

An affidavit signed by Ronald A. Anderson, County Board of Commissioners Chair, addressing the Record of Notice requirement for the facility was filed with McKenzie County on November 21, 2014.

NDAC Section 33.1-20-02.1-06. Property rights.

According to the McKenzie County Director of Tax Equalization web site (Parcel Number: 03-00-14940 and 03-00-14950), McKenzie County is the Deed Holder for the facility property described in the permit application.

NDAC Section 33.1-20-03.1-01. Preapplication procedures.

On April 27, 2012, Wenck Associates, Inc. submitted a preapplication to the Department on behalf of McKenzie County. The preapplication was routed to the North Dakota State Water Commission, the North Dakota Geologic Survey and the North Dakota Department of Health – Division of Water Quality (now the North Dakota Department of Environmental Quality – Division

of Water Quality) for review. The preapplication was approved by the Department in a letter dated June 12, 2012.

On August 30, 2018, Burns & McDonnell submitted a preapplication for a MSW landfill expansion to the Department on behalf of McKenzie County. The proposed expansion area is to the south and east of the existing permitted MSW landfill area. The proposed area to the south was not previously approved by the Department in 2013 and 2014 due to the steep slopes and the potential for erosional issues. The preapplication stated that the undulating topography along the southern end of the property will be removed by excavation, as part of the landfill's soil borrow operations, as shown in Drawing 2 and the cross sections on Drawings 4 and 5. Soil borrow will occur in this area whether the landfill expands or not. The removal of the undulating topography, the stability issue of the steep and erodible soils will no longer exist, and the base of the proposed expansion area will be on stable soils. The preapplication was routed to the North Dakota State Water Commission, the North Dakota Geologic Survey and the North Dakota Department of Health – Division of Water Quality (now the North Dakota Department of Environmental Quality – Division of Water Quality) for review. The preapplication for the MSW landfill expansion was approved by the Department in a letter dated May 3, 2019.

NDAC Section 33.1-20-03.1-02. Permit application procedures.

NDAC Subsections 33.1-20-03.1-02(1) – (3)

A completed Application For A Solid Waste Management Facility Permit (SFN 19269) (4-2010) form was included with the application. The application form was signed by a McKenzie County Commissioner, Director of McKenzie County Solid Waste, and a Professional Engineer. One hard copy of the application and an electronic version was provided to the Department. An application processing fee was submitted to the Department.

NDAC Subsection 33.1-20-03.1-02(4)

Proof of publication for the public notice requirement was submitted to the Department on November 6, 2024.

NDAC Subsection 33.1-20-03.1-02(5)

Notification to the North Dakota Public Service Commission is not required as the facility is not proposing to dispose of coal processing wastes in a mining permit area.

NDAC Subsection 33.1-20-03.1-02(6)

Applications for a solid waste management unit or facility permit must include the following information where applicable:

a. A completed application form, subsection 1;

A completed Application For A Solid Waste Management Facility Permit (SFN 19269) (4-2010) form was included with the permit application.

b. A description of the anticipated physical and chemical characteristics, estimated amounts, and sources of solid waste to be accepted, including the demonstration required by North Dakota Century Code section 23.1-08-14;

The application states that the facility will be used primarily for the disposal of MSW generated from within McKenzie County. The facility will also accept construction and demolition debris (generally inert waste), waste tires, yard waste, and industrial waste. The estimated population of McKenzie County in 2018 was 16,632. Reviews of the 2021, 2022, and 2023 annual reports for the facility shows that the facility has accepted on average for the last three years approximately 16,213 tons of MSW per year or approximately 45 tons per day on average. An Industrial Solid Waste Management Plan was submitted with the 2013 application and is part of this application.

The facility stores scrap metal such as major appliances for recycling, scrap tires that are either disposed of at the facility or shredded and mixed with soil and used for daily cover, wood consisting primarily of trees and branches for disposal, or possible beneficial reuse (shredded and mixed with soil for daily cover). The facility constructed a public drop off area west of the existing scale house and is used for storing tires, scrap metal, appliances, wood debris, temporary storage of electronic waste, and as a staging area for the annual household hazardous waste and electronic waste collection event. Some areas of the facility are used for borrowing cover soils.

c. The site characterization of section 33.1-20-13-01 and a demonstration that the site fulfills the location standards of section 33.1-20-04.1-01;

During June 2013, twenty-six soil borings were advanced across the general proposed landfill areas. Five of the soil borings were advanced to a depth of 76 feet below ground level and seven of the soil borings were completed as groundwater monitoring wells.

The on-site geology generally consists of clayey to silty soils with some sand and traces of gravel overlying a very fine-grained sand, which in turn overlies a deeper clay layer. Based on the hydrogeologic investigation report, most of the site is believed to be the upper weathered unit of the Sentinel Butte Formation.

Fine-grained sand deposits were encountered in almost all the soil borings conducted across the site. Consolidated sand units (sandstone) were also encountered in some of the soil borings. Sand units appear to be continuous across the proposed landfill area.

A deeper clay layer appears to be continuous across and located under the proposed landfill areas. This deeper clay layer is overlain with coal layer that ranges in thickness from 10 feet or less. The coal layer is fairly uniform across the site. Areas where the landfill and surface impoundment liners may intersect coal layers should be over-excavated and additional clay liner material should be added. This has been addressed through a standard permit condition.

Three laboratory permeability tests were conducted on undisturbed soil samples collected from thin-wall tube samples. The soil samples ranged from a low 5.8 x 10^{-9} cm/sec at 24 to 29 feet below ground surface to a high of 3.2 x 10^{-8} cm/sec at 17 to 19 feet below ground surface.

Permeability tests were also conducted on three remolded samples collected from various locations across the site for the purpose of identifying potential clay liner material. Permeability results indicated excellent clay liner material to be present beneath the proposed expansion areas.

Slug tests were performed on five different monitoring wells. Hydraulic conductivity values ranged from a low of 3.3 x 10^{-4} cm/sec to a high of 2.0 x 10^{-2} cm/sec.

The application demonstrates that the proposed expansion meets the location standards.

d. Soil survey and segregation of suitable plant growth material;

A "High Intensity Soil Survey Report" for the McKenzie County Solid Waste Landfill Expansion and completed by Prairie Soil Consulting, LLC was submitted to the Department on October 10, 2013.

According to the soil survey, the area generally consisted of a complex undulating to hilly upland with most of the alluvial soils affected by sodium. The report states the most extensive alluvial soils were phases of the sodium affected Daglum, Rhoades and Belfield soils. There were also limited acres of Arnegard soils found in swales. Steeper areas were dominated with Sen, Chama, and Cabba soils, which were derived from siltstone. There were also extensive areas of sodium affected Janesburg soils on uplands. A small amount of acreage of saline, hydric soils were identified. A spoil stockpile from the existing landfill covered a small area in the eastern portion of the project. A total of 162,441 yd^3 of SPGM were identified within the study area. There is more than enough SPGM present at the site for reclamation purposes. As far as the segregation of SPGM, the application states that the Department's Guidelines 24 and 26 will be strictly adhered to. The application also states that topsoil and subsoil areas shall be staked, and excavation operators shall be trained by a Registered Professional Soil Scientist to ensure proper segregate of SPGM and subsoil prior to excavation activities. SPGM will be stockpiled on site for future use. The SPGM, subbase soil, and clay stockpiles are shown on Drawing C101 – A of the October 2019 application.

e. Demonstrations of capability to fulfill the general facility standards of section 33.1-20-04.1-02;

1. Operator Training.

The October 2019 application states that a certified operator will be present to observe proper operation and monitoring of the landfill at all

times it is open to receive waste. Landfill operators are trained in equipment safety and waste handling and are Department certified operators with safety training. Additional safety training is coordinated by McKenzie County and is ongoing.

2. **The solid waste management facility shall comply with the water protection provisions of Chapter 33.1-20-13.**

   An "Environmental Monitoring Plan Plan" prepared for the McKenzie County Landfill was included with the application. The McKenzie County Landfill has been accepting municipal solid waste since approximately November 1992. According to the "Groundwater Monitoring Plan" provided by Wenck in the 2013 application, the site water quality has remained of good quality and very comparable to recent sampling events, with no apparent trending. According to Wenck, the landfill is not significantly impacting groundwater below the site for either inorganic substances (geochemicals or metals) or VOCs. The natural and engineered protections for the landfill are working well, and no significant off-site migration of contaminants in the groundwater is occurring.

   Additional information can be found in the **Design section** of this memo.

3. **Discharge to waters of the state.**

   Leachate collected at the base of the phases and any contact water is directed to leachate sumps at the low end of the phases. Leachate will then be transferred via a side slope riser and force main piping to two compositely- lined surface impoundments. An emergency backup plan for managing leachate, according to the plan, is to transport leachate from the on-site surface impoundments to Watford City's wastewater treatment plant for disposal, a Class 1 Disposal Well facility, or the Arnegard Waste Water Lagoons. Stormwater that has not contacted waste but has contacted intermediate and/or final cover will be managed using best management practices including sedimentation ponds. A Stormwater Pollution Prevention Plan (SWPP), dated May 2017, has been submitted to the Department for the facility.

   Surface water sampling for the landfill is being proposed under the annual reporting requirements of the North Dakota Pollutant Discharge Elimination System (NDPDES) General Storm Water Permit for industrial activity. McKenzie County proposes to use the storm water ponds, as a potential storm water sampling location (i.e., SW-1). The proposed surface water sampling points (SW-1 through SW-5) will be analyzed for the parameters (pH, total Suspended Solids, COD, Lead, and Oil and Grease visual sheen inspection) outlined in Table 6-5 of the application.

   The facility currently operates two compositely lined surface impoundments for the storage and evaporation of stormwater that has contacted MSW.

4. **Ambient air quality standard or odor rules.**

   According to the application, the proposed operational mass of the waste will not exceed the 2.5 million megagram threshold set forth by the federal rule for landfill gas control, New Source Performance Standards.

   All waste will be covered as soon as possible to eliminate the creation of odors.

5. **Dust control procedures.**

   Landfill leachate will be used as a dust suppressant within lined landfill areas. Also, dust will be controlled by watering the access roads, if necessary, and by prompt revegetation of filled cells to establish vegetative growth. The application addresses dust and litter suppression adequately.

6. **Open burning.**

   Open burning at the facility is prohibited.

7. **Signage.**

   The signage requirements are addressed and the facility's sign at the entrance meets the requirements.

8. **Owner or operator inspections.**

   The waste acceptance plan, preliminary screening, random inspections, waste unloading screening, and waste handling procedures used to control and reject the disposal of unauthorized wastes are described in the 2019 application. The landfill scale includes radiation detectors on the in-bound scale to screen for loads containing radioactive waste.

9. **Windblown materials.**

   Litter control procedures discussed in the 2019 application are appropriate.

a. **Facility engineering specifications adequate to demonstrate the capability to fulfill performance, design, and construction criteria provided by this article and enumerated in this subdivision;**

   1) **Transfer stations and drop box facilities, section 33.1-20-04.1-06.**

      The requirements of this section are not applicable as the facility is not proposing a transfer station or a drop box facility.

2) **Waste piles, section 33.1-20-04.1-07.**

The facility maintains a tire waste pile at the landfill. The tire pile is allowed to be located in the public drop-off area or within the MSW landfill. The landfill includes perimeter fencing which controls access to the pile. Also, each of the locations allows for a 50-foot fire lane around the pile, access by fire control equipment, and provides run-on and runoff control systems to control surface water for a 25-year, 24-hour storm event. The tire pile is limited to a basal area of 10,000 square feet (ft^2) in size underlain by appropriate material of sufficient thickness, strength, and low permeability to withstand stresses from equipment and to minimize liquid infiltration. The height of the pile is limited to 20 feet. The cost to remove and dispose of the waste tire pile is $55,000 according to the 2019 application. This cost is included in the closure cost estimates for the facility and is adjusted annually for inflation.

3) **Resource recovery, section 33.1-20-04.1-08.**

The requirements of this section are not applicable as the facility is not proposing any resource recovery activities.

4) **Land treatment, section 33.1-20-04.1-09 and chapter 33.1-20-09.**

The requirements of this section are not applicable as the facility is not proposing a land treatment facility.

5) **Non-CCR surface impoundments, section 33.1-20-04.1-09 and chapter 33.1-20-08.1.**

Two permitted existing 0.5-acre compositely lined (consisting of 2 feet of compacted clay overlain by a 60 mil HDPE) surface impoundments used for storing and evaporating MSW landfill leachate are located at the northwestern area of the facility and provide approximately 700,000 gallons of storage operating capacity for each. According to the 2019 application, the total cost for closure of the two leachate surface impoundments $97,237 and is adjusted annually for inflation. The current plan for treatment/disposal is evaporation of leachate and utilizing leachate as dust suppression within the lined MSW cells and hauling to approved wastewater treatment plants or a Class I disposal well as an emergency back-up.

6) **Any disposal, section 33.1-20-04.1-09.**

The requirements of this section are discussed in greater detail in **section 7) Inert waste landfill** and **section 8) Municipal waste** landfill of this review memo.

7) **Inert waste landfill, chapter 33.1-20-05.1.**

The facility operates an inert landfill that covers an area of approximately 1.58 acres and is located at the northeast area of the facility. The original estimated capacity of the inert landfill was approximately 125,000 yd^3. Phase 1 and Phase 2 are currently accepting waste. The previously permitted inert landfill area (Phases 3 – 7) will not be developed for inert waste disposal but instead may be reserved for additional MSW disposal area.

On July 8, 2021, the Department received additional information from McKenzie County to include an inert waste wedge fill area (Inert Phase III) vertical expansion above closed, partially closed, or active MSW landfill phases. This proposal was permitted, however, now the facility is requesting it to be removed.

The application is proposing three new Inert waste landfill phases 3, 4, and 5 to be located west of the MSW landfill Phases 6, and 7. The proposed Phases 3, 4, and 5 will cover an area of 7.74 acres which brings the total inert landfill areas to 9.32 acres and adds 381,100 cubic yards of inert landfill air space.

An "Industrial Solid Waste Management Plan McKenzie County Landfill (Permit #SW – 336) Prepared for: McKenzie County Solid Waste Department September 2012" referenced in the application addresses waste acceptance procedures at the facility.

Inert waste landfill Phases I, 2, 3, 4, and 5 cover an area of 9.32 acres; consequently, sequential inert landfill closure may not be required. The inert waste landfill will have a final cover consisting of 2 feet of soil consisting of twelve inches of soil barrier layer, six inches of soil rooting layer, and six inches of SPGM. The final cover slopes will be 25% or less.

8) **Municipal waste landfill, chapter 33.1-20-06.1.**

Access to the facility is controlled by fencing and lockable gates.

To date, the permitted MSW landfill area has been developed with 6 MSW phases originating in the northern, and southwestern area of the facility accommodating a waste footprint of approximately 22.7- acres and a total capacity of 1,320,550 yd^3 of air space for MSW disposal. The proposed MSW Phases 7 through 11 in the southern area of the facility may accommodate a waste footprint of approximately 30-acres and provide 3,272,000 yd^3 of disposal capacity bringing the total MSW disposal capacity for the facility to 4,333,610 yd^3. Phases 1 and 2 have received final cover, and portions of Phases 3, 4, and 5 have received final cover. MSW Phase 6 is currently receiving waste for disposal. The remaining life span of the facility with the proposed expansion is approximately 38 years.

MSW landfill Phases 1 through 4 are underlain by 2 feet of clay material compacted to achieve a hydraulic conductivity of less than or equal to 1 X 10^{-7} cm/sec. Because the facility historically accepted less than twenty tons per day of MSW, the region typically receives less than twenty inches of precipitation annually, and the proportion of clay in the Sentinel Butte Formation in the area is conducive to low groundwater velocities that retard leachate migration, typical leachate drainage material and collection piping were not installed within MSW landfill Phases 1 through 4. Due to increased MSW disposal activity including the facility accepting greater than twenty tons per day of MSW, MSW Phases 5 and 6 were constructed with a composite base liner consisting of 2 feet of compacted clay overlain by a 60 mil HDPE liner, and one foot of sand drainage material, and an associated leachate piping collection system. MSW landfill leachate is collected within landfill sumps and transferred to the existing surface impoundments for evaporation. The proposed MSW landfill Phases 7 through 11 will be constructed with a composite base liner consisting of 2 feet of compacted clay overlain by a 60 mil HDPE liner, and one foot of sand drainage material, and an associated leachate piping collection system. MSW landfill leachate will be collected within landfill sumps and transferred to the existing surface impoundments for evaporation.

The leachate collection system for Phases 7 through 11 will have a collection efficiency of 99.98% or better and be capable of maintaining a hydraulic head of 12 inches or less above the liner.

Currently, approximately 6.3 acres of the MSW landfill Phases 1 through 5 have been certified closed with at least three feet of final cover. Future final cover is proposed to consist of 1.5 feet of soil barrier layer, one foot of rooting soil layer, and six inches of SPGM. Final cover slopes in the design drawings are 25% or less. The largest anticipated area ever requiring final cover at any time during the active life of the MSW site was described in the Landfill Closure Plan section of the application is 19.5 acres. According to the application, the HELP Model calculations, provided in Appendix N of the application, show the cover system design provides an efficiency of nearly 99.99 percent.

Methane monitoring procedures are addressed.

A certified operator will be present at all times the facility is open to receive waste.

Waste handling, compaction, daily cover, intermediate cover, and final cover are addressed in the application.

An "Industrial Solid Waste Management Plan McKenzie County Landfill (Permit #SW – 336) Prepared for: McKenzie County Solid

Waste Department September 2012" referenced in the application addresses waste acceptance procedures, including unacceptable waste and waste rejection procedures at the facility. The following wastes are not accepted for disposal in the MSW landfill facility, with the listed special exceptions:

- Ash from MSW incinerators (i.e., Municipal Waste Combustor Ash)
- Chemical containers (except containers normally in household waste, and larger containers that are empty, and have been triple-rinsed or power-rinsed and punctured)
- Fluorescent and HIS lamps ballasts containing polychlorinated biphenyls (PCBs)
- Hazardous waste (other than normal "household" quantities from MSW pickups)
    - Ignitables (e.g., solvents, fuels, paints, etc.)
    - Corrosives (e.g., acids and alkalis)
    - Reactives (e.g., hypochlorite - swimming pool chemicals, cyanides)
    - Toxicity characteristic wastes
    - Other listed hazardous wastes
- Infectious waste
- Large quantities of soluble wastes (fly ash, salt, etc.)
- Liquids (other than normal "household" quantities from MSW pickups)
- Live coal tar (including applicators, containers, and tubes)
- Manure
- Medical waste
- Paint residues, paint filters and paint dust
- PCB wastes/oils
- Pesticides
- Pesticide containers (except that MSW landfills may accept containers normally in household waste; and larger containers that are empty and have been triple-rinsed or power-rinsed and punctured)
- Petroleum products, containers, or filters (including oil, grease, or fuel)
- Radioactive waste
- Septic tank pumpings
- Sludge
- Special wastes (which are nonhazardous solid wastes generated by energy conversion facilities; crude oil and natural gas exploration and production; mineral and ore mining, beneficiation, and extraction; and surface coal mine operations.)
- Spent activated carbon filters
- Uncured sealants (including undried applicators, containers, and tubes)

- Unused chemicals
- Vehicles

According to the application, asbestos waste is currently not accepted at this facility. However, should the facility decide to, approval must be obtained from the Department.

9) Industrial waste landfill, chapters 33.1-20-07.1 or 33.1-20-10.

The requirements of this section are not applicable as the facility is not proposing an industrial waste landfill.

10) TENORM waste landfill, chapters 33.1-20-07.1 or 33.1-20-10 and 33.1-20-11

The requirements of this section are not applicable as the facility is not proposing a TENORM waste landfill.

11) Special waste landfill, chapter 33.1-20-07.1;

The requirements of this section are not applicable as the facility is not proposing a special waste landfill.

12) CCR unit, chapter 33.1-20-08;

The requirements of this section are not applicable as the facility is not proposing a CCR unit.

13) Municipal solid waste ash landfills, chapter 33.1-20-10;

The requirements of this section are not applicable as the facility is not proposing a municipal solid waste ash landfill.

14) Regulated infectious waste unit, chapter 33.1-20-12;

The requirements of this section are not applicable as the facility is not proposing a regulated infectious waste unit.

b. The plan of operation of section 33.1-20-04.1-03;

A Landfill Plan of Operation was included within the application, and it addresses the following:

- Waste acceptance and rejection procedures,
- Waste handling procedures,
- Facility inspection procedures,
- Contingency actions for fires,
- Interior traffic control,
- Leachate removal system operation and maintenance procedures,
- Sequential partial closure,

- Industrial waste or special waste management procedures, and
- Accident prevention and safety procedures.

c. Demonstration of the treatment technology of section 33.1-20-01.1-12;

The requirements of this section are not applicable as the facility is not proposing to treat waste.

d. The place where the operating record is or will be kept, section 33.1-20-04.1-04;

The operating record is kept at the facility.

e. Demonstration of capability to fulfill the groundwater monitoring, sections 33.1-20-08-06 or 33.1-20-13-02;

A "Groundwater Monitoring Plan" prepared for the McKenzie County Landfill was included with the application as part of the "Environmental Monitoring Plan" received by the Department on June 24, 2014. The McKenzie County Landfill has been accepting municipal solid waste since approximately November 1992. According to the "Groundwater Monitoring Plan" provided by Wenck in the 2013 application, the site water quality has remained of good quality and very comparable to recent sampling events, with no apparent trending. According to Wenck, the landfill is not significantly impacting groundwater below the site for either inorganic substances (geochemicals or metals) or VOCs. The natural and engineered protections for the landfill are working well, and no significant off-site migration of contaminants in the groundwater is occurring.

An updated "Environmental Monitoring Plan" was submitted with the application. The groundwater monitoring network currently consists of eight groundwater monitoring wells (MW) that are sampled semi-annually:

- MW-2 (downgradient of current landfill)
- MW-3 (upgradient of current landfill)
- MW-5 (sidegradient of current landfill)
- MW-110D (downgradient of current landfill)
- MW-110S (downgradient of current landfill)
- MW-104 (downgradient of surface impoundment 2)
- MW-111 (downgradient of current landfill)
- MW-112 (upgradient of current landfill and surface impoundments).

MW-108, MW-109, and MW-113 are being monitored for water levels only.

Recommendations contained in the 2020 Annual Groundwater Report proposed discontinuing sampling MW-1, MW-101S, and MW-107. These MWs are located either upgradient or sidegradient to the current landfill. On

April 12, 2021, the Department approved of changes to the environmental monitoring plan proposed by McKenzie County. Water levels will continue to be monitored in these MWs.

MW-14S/D, and MW-15S/D are proposed downgradient MWs for future landfill expansion monitoring.

According to the 2020 Annual Groundwater Monitoring Report, groundwater flow in the coal unit is generally to the south at a hydraulic gradient of 0.007 to 0.017 leading to the natural site drainages along the southern property boundary. It should be noted that this unit is not saturated everywhere across the site and the groundwater may be perched on top of the deep clay layer. Groundwater flow in the lower clay unit is to the southeast at a hydraulic gradient of 0.002 to 0.003. Overall, the groundwater monitoring data are not indicative of any significant releases from the landfill.

f. Construction quality assurance and quality control;

A "Construction Quality Assurance Plan" (CQAP) was included with the application and addresses the requirements of this section.

g. Demonstrations of capability to fulfill the closure standards, section 33.1-20.1-04.1-05 and otherwise provided by this article;

Landfill closure plans for both the MSW landfill and inert landfill were included in the application. Once waste in the MSW landfill reaches the final waste elevations, the waste will be covered with a three-foot cover system. The 3-foot final cover system (excluding intermediate cover soils) is made up of the following components: a minimum of 18 inches of compacted clay barrier layer with a maximum permeability of 1×10^{-7} cm/sec when compacted to a minimum of 95% Standard Proctor Dry Density; a minimum of 12 inches of native soil material to provide a rooting layer; and 6 inches of SPGM capable of sustaining vegetation; mulched and seeded with shallow-rooted, drought-tolerant grasses.

The final closure slopes for the MSW landfill will not be greater than approximately 25%. Justification to show steeper slopes greater than 15% are stable and will not result in long-term surface soil loss in excess of two tons per acre per year were provided in the 2019 application.

For the MSW landfill, the largest anticipated closure area will be approximately 19.5 acres. Costs estimates for closure of 19.5 acres of MSW landfill, in October 2019 dollars, was estimated at $879,802.00. The cost estimates are adjusted annually for inflation.

Financial assurance calculations for closing the two surface impoundments were estimated at $97,237.00, and the cost to remove and dispose of the waste tire pile is estimated at $55,000.00. The cost estimates are adjusted annually for inflation.

The inert landfill will be final covered with 2 feet of soil consisting of twelve inches of soil barrier layer, six inches of soil rooting layer, and six inches of SPGM. The inert landfill will have a maximum of 25% final cover slopes, and the largest open area will be approximately 9.32 acres.

According to the application, the final cover topsoil layer will be mulched as necessary to minimize the soil loss potential (usually at a rate of two tons/acre) and will be seeded with mixture of shallow-rooted, drought resistant grasses well suited to the area and this purpose, as recommended by the local Natural Resources Conservation Service (NRCS).

The facility has financial assurance for closure in accordance with NDAC Chapter 33.1-20-14.

h. Demonstrations of capability to fulfill the postclosure standards, section 33.1-20-04.1-09 and otherwise provided by this article; and

Post closure plans for the facility were included in the 2019 application. The integrity and effectiveness of the final cover must be maintained, the leachate management system must be maintained and operated, the groundwater monitoring system must be maintained and operated, and the gas control and monitoring systems must be maintained during the 30-year post-closure period.

The annual post-closure care cost, in 2019 dollars, is estimated to be $89,869.00. The closure costs plus the post-closure care costs (30 years), in 2019 dollars, are estimated at $3,728,121.00. The cost estimates are adjusted annually for inflation.

According to the application, McKenzie County plans to retain control of the site as green space.

The facility has financial assurance for post-closure care in accordance with NDAC Chapter 33.1-20-14.

i. A disclosure statement as required by North Dakota Century Code section 23.1-08-17.

A disclosure statement that meets the requirements of this section was submitted to the Department.

Conclusion

Based on the submitted application and items discussed above, McKenzie County has shown that the proposed major permit modification meets the requirements of the North Dakota Solid Waste Management Rules. It is proposed that the Department grant the McKenzie County Landfill a permit with the conditions listed in Permit 0336. The proposed permit length is through November 17, 2031, as this is for a major permit modification and not a renewal.

CRH:DAT:BJT
Attachment