AECOM Environment

Submitted to:
Basin Electric Power Cooperative
Leland Olds Station
Stanton, ND

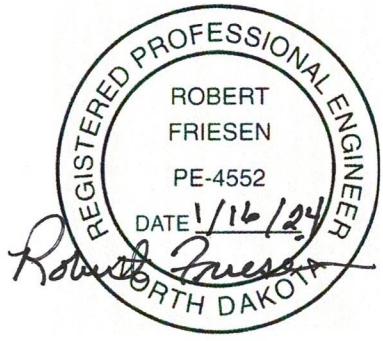
Submitted by:
AECOM
Fort Collins, CO
60634996
January 17, 2024

Basin Electric Power Cooperative
Leland Olds Station

Coal Combustion Residual Landfill Annual Inspection Report –2023

Inspection Completed by:

I certify that this report has been prepared in accordance with 40 Code of Federal Regulations (CFR) 257.84(b)(2) requiring a written Annual Inspection Report prepared by a Qualified Professional Engineer (QPE) as set forth in the Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments for the Basin Electric Power Cooperative (BEPC) Leland Olds Station (LOS) landfill for 2023.



Robert Friesen, PE
Senior Project Manager
North Dakota PE #4552
Expires 12-31-2024

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Acronyms

AECOM	AECOM Technical Services, Inc.
BEPC	Basin Electric Power Cooperative
CCR	coal combustion residual
CFR	Code of Federal Regulations
FGD	flue gas desulfurization
LOS	Leland Olds Station
NDDEQ	North Dakota Department of Environmental Quality
QPE	Qualified Professional Engineer

1.0 Introduction

1.1 Purpose and Definitions

In accordance with 40 Code of Federal Regulations (CFR) 257.84(b)(2), the purpose of this document is to fulfill the requirements for an Annual Inspection Report prepared by a Qualified Professional Engineer (QPE) to ensure the design, construction, operation, and maintenance of the Basin Electric Power Cooperative (BEPC) Leland Olds Station (LOS) landfill is consistent with recognized and generally accepted good engineering standards.

LOS operates two lignite-fired boilers, resulting in the production of coal combustion residuals (CCRs). CCRs are defined in 40 CFR 257.53 as: "CCR means fly ash, bottom ash, boiler slag, and flue gas desulfurization materials generated from burning coal for the purpose of generating electricity by electric utilities and independent power producers."

CCRs generated at LOS (regulated under 40 CFR 257) include bottom ash, flue gas desulfurization (FGD) materials and fly ash.

1.2 CCR Production and Handling

On a daily average, approximately 530 tons of FGD materials, fly ash, and bottom ash are generated at LOS. Not all CCRs generated at LOS are managed in solid waste facilities; significant amounts of bottom ash and fly ash are sold for beneficial reuse. The proportions of FGD, fly ash, and bottom ash are approximately 40%, 30%, and 30% respectively. When not being beneficially reused, the moisture conditioned CCRs are transported by haul track approximately 4.5 miles to the offsite LOS Glenharold Mine landfill, where the CCRs are dumped, spread, and compacted.

1.3 Facility Description

The LOS Glenharold Mine Landfill, designated as 0143 by the North Dakota Department of Health, now known as the North Dakota Department of Environmental Quality (NDDEQ), was first permitted for the disposal of CCRs in 1992. The landfill is located in an area of spoils left by the mining of the Hagel Lignite Bed. **Figure 1** presents the site location of the LOS Landfill. Disposal of CCRs at the site began in late 1992, within an area permitted for CCR disposal encompassing approximately 67.79 acres. A lateral expansion including eight future disposal cells encompassing 80.7 acres was approved by the NDDEQ in 2017. Cell 1, underlain by approximately 14.9 acres of composite landfill liner and a leachate collection system, began receiving CCRs in mid-2018. In 2023, construction of Cell 2A and Cell 2B commenced (part of the future disposal cells approved by NDDEQ) and are anticipated to be placed into service in 2024.

At the beginning of 2023, the active disposal area encompassed approximately 50.48 acres in various stages of filling. Closure of 16.86 acres in the active area began during the fall of 2022. Capping, seeding, and erosion controls were implemented during 2023. LOS anticipates vegetation growth during 2024. At the time of this report, the completion approval from NDDEQ has yet to be obtained. Once the completion is approved, the landfill active area will be reduced to approximately 33.62 acres. Approximately 32.21 acres of the landfill have undergone partial sequential closure through 11 previous landfill closure/capping projects.

2.0 Review of Existing Information

A review of existing facility records confirms the design, construction, operation, and maintenance of the landfill has been generally consistent with recognized and accepted good engineering standards.

2.1 CCR Unit Documents and Operating Records

Below is a list of documents reviewed with respect to the landfill:

- Coal Combustion Residual Landfill Post-Closure Plan (BEPC 2017)
- Location Restrictions for Ash Landfill Expansion (AECOM 2017)
- Engineer's Certification of Unstable Areas Demonstration, Existing CCR Landfill (AECOM 2018)
- Coal Combustion Residual Landfill Annual Inspection Report 2020 (BEPC 2021)
- Coal Combustion Residual Landfill Annual Inspection Report 2021 (BEPC 2022)
- Coal Combustion Residual Landfill Annual Inspection Report 2022 (BEPC 2023a)
- Coal Combustion Residual Landfill Run-on and Run-off Control Plan (BEPC 2023b)

2.2 Weekly Inspection Review

During 2023, qualified individuals (generally the LOS Environmental Coordinator) conducted weekly inspections for any appearance of actual or potential structural weakness and other conditions which were disrupting or had the potential to disrupt the operation or safety of the CCR unit. Appearances of structural weakness may include but are not limited to: (1) signs of piping and other internal erosion; (2) transverse, longitudinal, and desiccation cracking; (3) slides, bulges, boils, sloughs, scarps, sinkholes, or depressions; (4) animal burrows; (5) excessive or lacking vegetation cover; and (6) slope erosion. A review of the periodic inspection reports for the LOS CCR landfill indicated no signs of actual or potential structural weakness or other adverse conditions as described above. The completed weekly inspection checklists are filed in the operating record.

3.0 On-site Annual Inspection of Facility

The annual inspection was conducted on Monday, December 11, 2023, starting at 8:25 a.m. central Standard Time. The weather was breezy and approximately 19 degrees Fahrenheit. Some snow cover was observed during the inspection visit.

Personnel in attendance for the inspection included:

- Robert Friesen, PE (ND 4552), AECOM Technical Services, Inc. (AECOM)

The completed annual inspection form is provided as **Attachment A**. A sample weekly inspection form used by LOS staff is provided as **Attachment B**. A photo log and figure for the December 11, 2023 inspection is included as **Attachment C**.

3.1 Findings

The total volume of CCRs present in the LOS landfill as of December 2023 is estimated to be approximately 14,750,000 cubic yards; approximately 8,354,000 cubic yards of permitted air space remain. The 2023 annual inspection revealed no appearance of actual or potential structural weakness of the CCR unit. No significant signs of distress or malfunction of the CCR unit were observed during the inspection and no changes have occurred that affect the stability or operation of the facility. Previously closed areas appeared to be well-vegetated and were graded in accordance with the NDDEQ solid waste landfill permit. Run-on and run-off were properly controlled, and no fugitive dust was evident. No erosion or signs of slope instability were observed. The design, construction, operation, and maintenance of the facility are consistent with recognized and generally accepted good engineering standards and industry practices.

4.0 Conclusions

As noted in CCR Rule §257.84(b)(5), “If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken.”

4.1 Recommendations Other Than Normal Maintenance

No recommendations other than normal regular maintenance items were noted.

4.2 Deficiencies Discovered

No significant deficiencies or releases were noted as part of this annual inspection or document review.

4.3 Corrective Measures Taken

No corrective measures for significant deficiencies were noted that need to be taken by LOS as part of this annual inspection.

5.0 References

AECOM Technical Services, Inc. (AECOM). 2017. Location Restrictions for Ash Landfill Expansion, Leland Olds Station, Basing Electric Power Cooperative, Stanton, Mercer County, North Dakota. November 20.

AECOM. 2018. Engineer's Certification of Unstable Areas Demonstration, Existing CCR Landfill, EPA Final CCR Rule, Leland Olds Station, Stanton, North Dakota. October 5.

Basin Electric Power Cooperative (BEPC). 2017. Coal Combustion Residual Landfill Post-Closure Plan, Basin Electric Power Cooperative, Leland Olds Station, Revision 1. December.

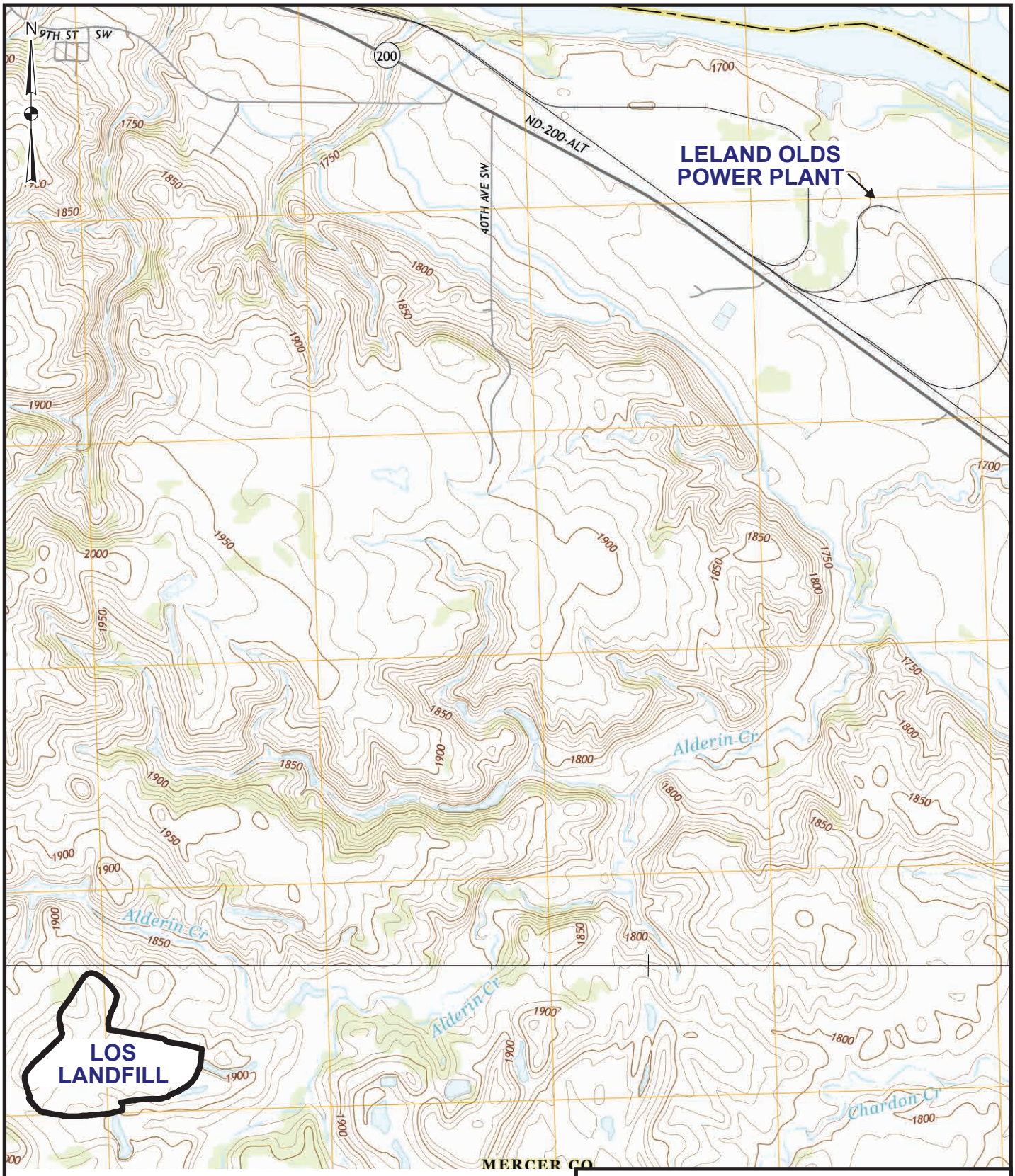
BEPC. 2021. Coal Combustion Residual Landfill Annual Inspection Report 2020, Basin Electric Power Cooperative Leland Olds Station. January.

BEPC. 2022. Coal Combustion Residual Landfill Annual Inspection Report 2021, Basin Electric Power Cooperative Leland Olds Station. January.

BEPC. 2023a. Coal Combustion Residual Landfill Annual Inspection Report 2022, Basin Electric Power Cooperative Leland Olds Station. January.

BEPC. 2023b. Coal Combustion Residual Landfill Run-On and Run-off Control Plan, Basin Electric Power Cooperative Leland Olds Station. January.

Figures



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APPROXIMATE SCALE IN FEET

ND

Quadrangle Location

BASE MAP SOURCE: USGS 7½ minute topographic quadrangle maps: Hannover NE, North Dakota 2014; Stanton SE, North Dakota 2014.

BASIN ELECTRIC POWER COOPERATIVE

FIGURE 1
SITE VICINITY MAP
LOS LANDFILL

JOB NO. 60634996

Attachment A
2023 Federal CCR Annual Inspection Form

Federal CCR Annual Inspection Form

Station: LOS CCR Unit: Landfill

Date: 12/11/2023 Inspector(s): Bob Friesen

Weather Conditions: ~19°F and breezy, partly cloudy Ground Conditions: light snow cover

Purpose of Inspection: Per the CCR Rule published by the USEPA and entered into the federal register on April 17, 2015, existing and new CCR landfills are required to be inspected annually by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR facility is in good condition and conforms to standard engineering practices for this type of facility.

Please refer to the attached figure to mark location of any identified conditions.

CCR UNIT FEATURE	Yes	No	NA	Location ID # or map identifier
CCR Placement				
1) Is waste being handled or placed differently than standard station practices?		X		
Bench Conditions				
2) Any signs of surface cracking?		X		
3) Any signs of depressions or sunken areas?		X		
Slope Conditions				
4) Any signs of surface cracking?		X		
5) Any signs of surface movement? If yes, please categorize		X		
5a) Sloughing (sliding of materials in sheets)		X		
5b) Sliding		X		
5c) Sinking		X		
6) Any signs of erosion rills greater than 3 inches?		X		
7) Any signs of erosion gullies greater than 6 inches?		X		
8) Any signs of holes or animal burrows?		X		
Haul Road Conditions				
9) Any obstructions?		X		
10) Any noticeable damage? If yes, please categorize		X		
10a) Rutting		X		
10b) Sinking		X		
10c) Pot holes		X		
Erosion Controls				
11) Any areas of active construction lacking erosion controls (silt fence)?		X		
12) Any signs that existing erosion controls are not properly functioning?		X		
13) Any evidence of insufficient vegetative cover?		X		
Liner System Conditions (prior to CCR placement or during active liner construction)				
14) Any damage to liner protective cover?			X	New liner not accessible
15) Any damage to liner system observed?			X	

Federal CCR Annual Inspection Form - CCR Landfills

Rev. 0

Station: LOS CCR Unit: Landfill Date: 12/11/2023

CCR UNIT FEATURE	Yes	No	NA	Location ID # or map identifier
Leachate Collection/Detection System				
16) Any signs of obstruction to leachate collection/detection pipe outlets?		X		
17) Any signs of obstruction to leachate flow(s) to storage lagoon(s)?		X		
Surface Water Controls (Diversion Channels/Collection Channels/Sedimentation Ponds)				
18) Any signs of uncontrolled run-on to the landfill?		X		
19) Any signs of uncontrolled run-off from the landfill?		X		
20) Any signs of obstruction in surface water conveyance channels?		X		
21) Any cracking or separation in surface water conveyance channels?		X		
22) Any signs of heaving or sinking of surface water conveyance channels?		X		
23) Any signs of obstruction in culverts, drop boxes, or sumps?		X		
24) Any signs of sedimentation pond malfunction (excessive sediment buildup)?		X		
25) Any signs of excessive sedimentation pond water loss (leaking)?		X		
26) Any signs of obstruction to sedimentation pond outlet structure (in pond)?		X		
27) Any signs of obstruction to sedimentation pond effluent discharge?		X		
Fugitive Dust Controls				
28) Any evidence that fugitive dust controls are not being used?		X		
Other				
29) Any nontypical operations occurring at facility? If yes, please describe.		X		
30) Have weekly inspections been conducted by a qualified person?	X			
31) Did the weekly inspections indicate any appearances of structural weakness?		X		
32) Did the weekly inspections indicate any other conditions which are disrupting or have the potential to disrupt the operation and safety of the CCR unit?		X		
33) Have the weekly inspections been recorded in the facility's operating record?	X			
34) Have there been any changes in geometry of the structure since the previous annual inspection?		X		
35) What is the approximate volume of CCR contained in the unit?				average 1,400 tons per day

Additional Comments: N/A

Individual Completing Form: Bob Friesen (Print) Robert Friesen (Signature)

Attachment B
Sample LOS Weekly Inspection Form

Basin Electric Power Cooperative – Leland Olds Station
SP-143 CCR Landfill
Periodic Inspection Checklist

Inspector: [signature] **Date:** 8/29/23

Landfill Standards: At intervals not exceeding seven days, inspect for any appearances of actual or potential structural weakness and other conditions which are disrupting or have the potential to disrupt the operation or safety of the CCR unit.

Yes	No	N/A	
	✓		1. Are there signs of piping and other internal erosion?
	✓		2. Are transverse, longitudinal, and/or severe desiccation cracks present?
	✓		3. Are slides, bulges, boils, sloughs, scarps, sinkholes, or depressions present?
	✓		4. Are there animal burrows?
	✓		5. Is any slope erosion present?

Actions taken to correct deficiencies (any question answered "Yes") or other comments:

CCR Fugitive Dust Standards: At intervals not exceeding seven days, inspect for CCR fugitive dust originating from CCR units, roads, and other CCR material management and material handling activities.

Yes	No	N/A	
	✓		1. Is there any CCR dust observed at landfill(s)?
	✓		2. Is there any CCR dust observed during ash loading and/or unloading activities?
	✓		3. Is there any CCR dust observed during ash transport and/or other handling??

Actions taken to correct deficiencies (any question answered "Yes") or other comments:

NDDoH Solid Waste Rule Compliance: Complete no less than weekly.

Yes	No	N/A	
✓			1. No unauthorized waste (appliances, household garbage, etc.) is present?
✓			2. Waste is periodically spread and compacted?
✓			3. Are previously closed areas in satisfactory condition? (Adequate vegetation, free from erosion, etc.)
✓			4. Are soil stockpiles and/or soil borrow areas in satisfactory condition?
✓			5. Is the leachate collection and removal system functioning properly? (No standing water in cell)

Actions taken to correct deficiencies (any question answered "No") or other comments:

Signature of Qualified Person: [signature] Title: Env. Coordinator

Attachment C
Photo Log of 2023 Annual Inspection

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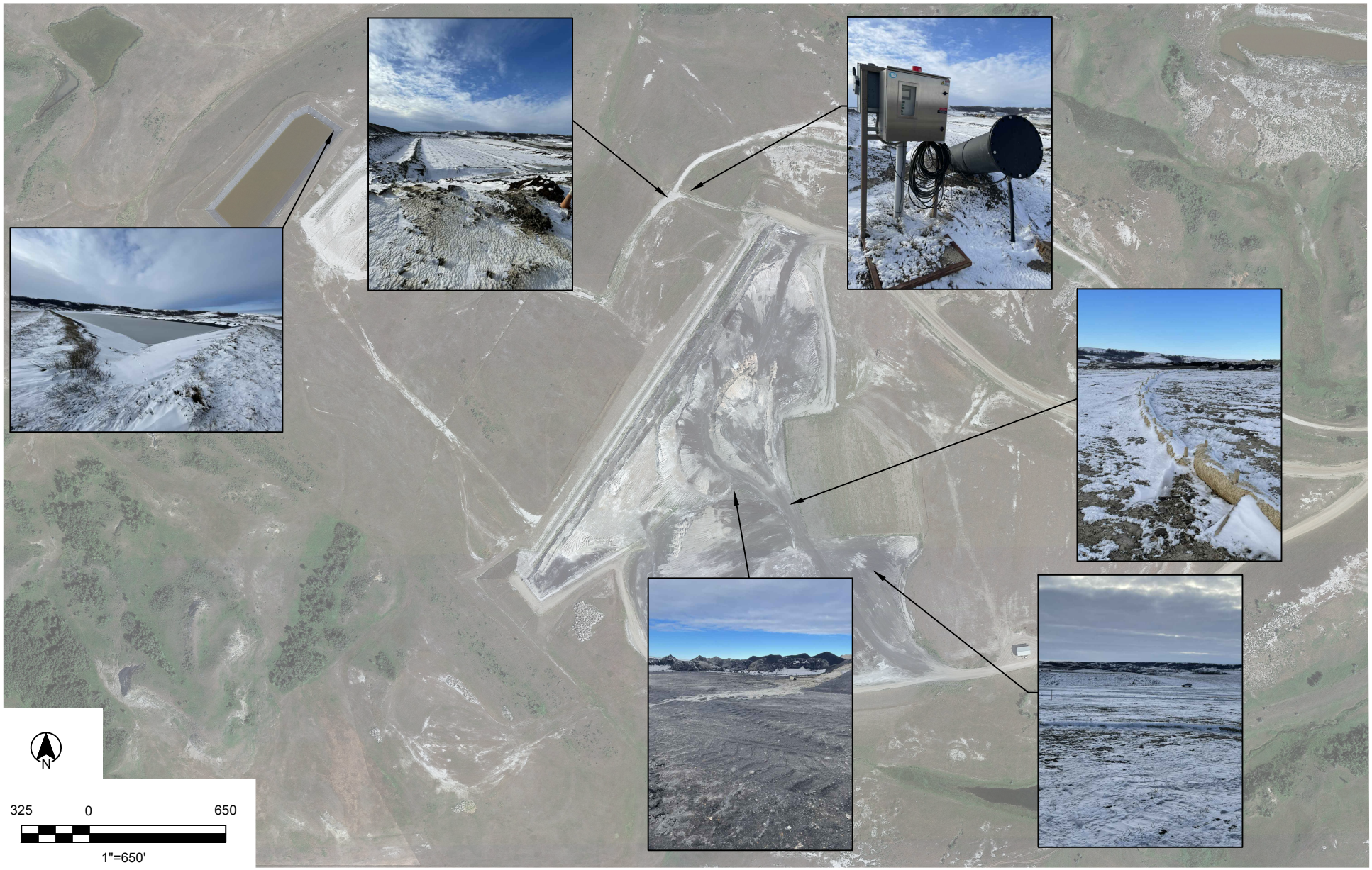

Basin Electric Power Cooperative
Leland Olds Station
Stanton, North Dakota
Project No.: 60632474 Date: 01/10/2024

Leland Olds Station
Photo Map
December 11, 2023

AECOM

Attachment C

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Basin Electric Power Cooperative	LOS CCR Landfill, Stanton, ND	60634996

Photo No.	Date:
1	12/11/23

Direction Photo Taken:

South

Description:

Location: See Figure

New landfill cell under construction at the time of inspection

Client Name:	Site Location:	Project No.
Basin Electric Power Cooperative	LOS CCR Landfill, Stanton, ND	60634996

Photo No.	Date:
2	12/11/23

Direction Photo Taken:

Southwest

Description:

Location: See Figure

Landfill leachate collection system

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Basin Electric Power Cooperative	LOS CCR Landfill, Stanton, ND	60634996

Photo No.	Date:
3	12/11/23

Direction Photo Taken:

Southwest

Description:

Location: See Figure

Landfill leachate collection pond

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Basin Electric Power Cooperative	LOS CCR Landfill, Stanton, ND	60634996

Photo No.	Date:
4	12/11/23

Direction Photo Taken:

North

Description:

Location: See Figure

Active working face of landfill

Client Name:	Site Location:	Project No.
Basin Electric Power Cooperative	LOS CCR Landfill, Stanton, ND	60634996

Photo No.	Date:
5	12/6/23

Direction Photo Taken:

West

Description:

Location: See Figure

Erosion waddles on newly capped disposal cell

PHOTOGRAPHIC LOG

Client Name: Basin Electric Power Cooperative	**Site Location:** LOS CCR Landfill, Stanton, ND	**Project No.** 60634996

Photo No. 6	**Date:** 12/11/23

Direction Photo Taken:

South

Description:

Location: See Figure

Example of capped disposal cell with waddles and cripped straw for erosion protection