



2024 Annual Landfill Inspection

Antelope Valley Station Coal Combustion Residual Landfill



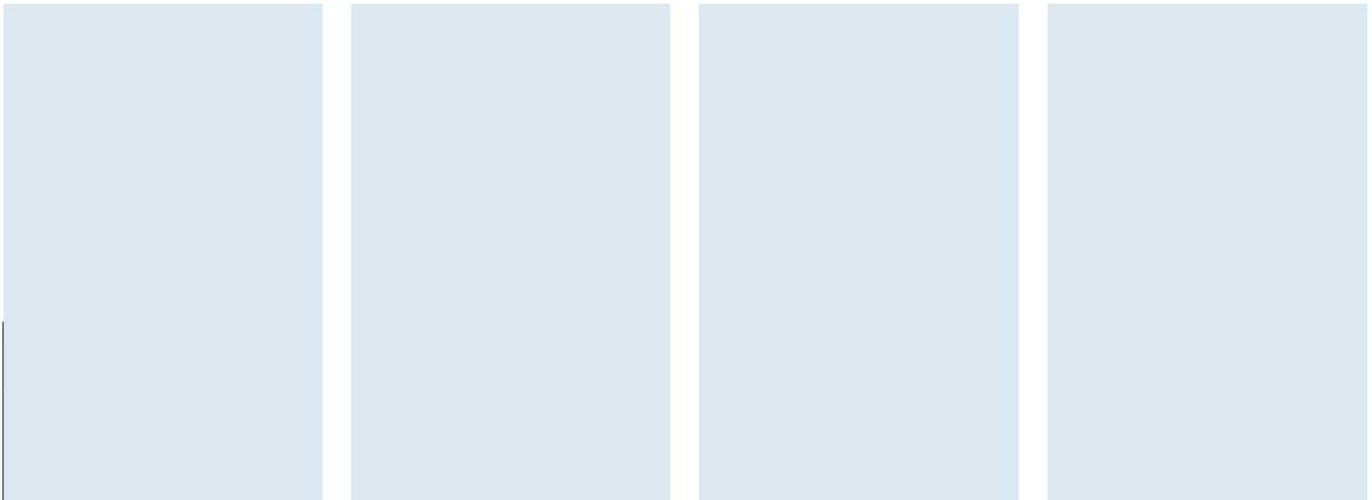
Prepared for
Basin Electric Power Cooperative

Prepared by
Barr Engineering Co.

January 2025

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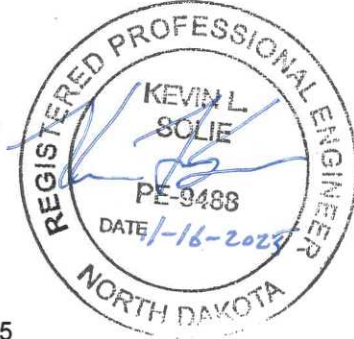




Certification

I hereby certify that I have examined the facility and, being familiar with the provisions of NDAC Title 33.1, Article 20, Chapter 08 and 40 CFR 257 Subpart D, attest that this Annual Landfill Inspection report has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and the requirements of NDAC 33.1-20-08-05-05 and 40 CFR § 257.84.

Kevin L. Solie
Barr Engineering Co.
ND Registration PE #: 9488



January 16, 2025
Date

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January 2025



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1 Introduction

In accordance with 40 CFR § 257.84(b)(2) and North Dakota Administrative Code (NDAC) 33.1-20-08-05-04, 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 (Basin Electric) Antelope Valley Station (AVS) landfill is consistent with recognized and generally accepted good engineering standards.

AVS operates two lignite-fired boilers, resulting in the production of coal combustion residuals (CCRs). CCRs are defined in 40 CFR § 257.53 (Definitions) 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.”

On average, approximately 1,868 tons of mixed FGD materials, fly ash, and bottom ash are produced at AVS each day. The proportions of FGD, fly ash, and bottom ash are approximately 5%, 70%, and 25% respectively. The moisture-conditioned CCRs are transported by haul truck approximately 2.3 miles to the AVS CCR landfill, where the CCRs are dumped, spread and compacted.

This report documents the annual landfill inspection performed by Kevin L. Solie, ND P.E. No. 9488 on November 18, 2024, as required by the NDAC and the federal CCR Rule. Other annual inspection duties, including a review of the available information regarding the status and condition of the CCR unit and storage capacity evaluations, were performed prior and following the on-site inspection. Mr. Solie is familiar with the facility and has made numerous visits over the past decade to the landfill.

2 Review of Existing Information

2.1 Facility File Review

The area occupied by the AVS CCR landfill was originally permitted as part of the Coteau Properties Freedom Mine. The mining permit was revised in 1989 to allow an approximately 160-acre parcel be set aside for use as a landfill. The site was permitted by the North Dakota Department of Health, now North Dakota Department of Environmental Quality (NDDEQ), for solid waste disposal in 1995 under Permit SP-160. The first phase of liner construction was completed in 1996, with ash placement beginning the same year. The second phase of liner construction was completed in 2000, while the third phase of liner construction was completed and placed into service in 2008. The final phase of liner construction took place in 2015. In total, the four phases of earthen liner construction encompass approximately 102.66 acres. A lateral expansion of the AVS CCR landfill was permitted by the NDDEQ in early 2022. Construction of the first phase of the expansion, including a composite liner and leachate collection system, was completed in 2023. The landfill active area in 2024 was approximately 94 acres (52 Acres (prior open area) + 42.3 acres (opened 2023 as Cell 5 expansion)).

The landfill underwent partial sequential closure in 2003, 2011, 2014, and 2016; approximately 57.54 acres of the landfill have undergone partial sequential closure through the four previous landfill closure/capping projects (Basin Electric, 2024a).

The leachate collection system was jetted and inspected by a third-party vendor on October 15, 2024 and found to be in very good condition, with no defects noted. Routine maintenance was also performed on leachate collection system pumps and transducers.

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

2.2 Results of Weekly Inspections

During 2024, qualified individuals (generally the AVS 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 vegetative cover; and (6) slope erosion. A review of the periodic inspection reports for the AVS CCR landfill indicated no signs of actual or potential structural weakness or other adverse conditions as described above.

2.3 Results of Previous Annual Inspections

The annual inspection performed in December 2023 (AECOM, 2024) was reviewed as part of this annual inspection. The annual inspection documented the following visual observations and associated remedial activities:

- No deficiencies or releases were noted.
- No corrective measures were required.
- No recommendations other than normal regular maintenance items were noted.

The review of existing information confirmed that the design, construction, operation and maintenance of the landfill is consistent with recognized and generally accepted good engineering standards.

3 Onsite Inspection and Operational Review

An on-site inspection was performed by Kevin L. Solie, ND PE No. 9488 on November 18, 2024 to visually identify signs of distress or malfunction of the landfill. The inspection consisted of a vehicular and on-foot inspection of the perimeter embankments, the active landfill face, final covered areas, leachate collection system appurtenances and the evaporation pond. All areas were readily accessible. No snow cover was present, thus allowing the unhindered observation of the ground surface. Visual inspection items and results are summarized in the following table:

Table 1 Summary of Visual Inspection

Item	Visual Inspection Description	Visibly Observed (Yes/No)	Notes
1	Proper placement of waste	Yes	Waste is contained within landfill limits.
2	Adequate slope stability and erosion control	Yes	No significant areas of erosion identified. Basin Electric will monitor and repair if necessary, in 2025.
3	Run-on and Run-off controls properly functioning	Yes	Surface water controls appeared adequate and were functioning.
4	Surface water percolation minimized	Yes	No surface water ponding or excessive leachate generation observed.
5	Liner systems properly operated and maintained	Yes	Liner and cover system appeared to be in good condition at time of inspection.
6	Leachate collection systems properly operated and maintained	Yes	The leachate collection system was jetted and inspected by a third-party vendor on October 15, 2024 and found to be in very good condition, with no defects noted. Routine maintenance was also performed on leachate collection system pumps and transducers.
7	Water quality monitoring systems maintained and operating	Yes	Existing monitoring wells were accessible and appeared to be in good condition.
8	Dust adequately controlled	Yes	No dust issues observed at the time of inspection.
9	Landfill geometry consistent with facility plan	Yes	Plan was reviewed prior to visit and no geometry changes observed.
10	Animal burrows absent or of no significance	Yes	No burrows of significance identified.
11	Adequate vegetation density and vegetation maintenance	Yes	Vegetation appeared well established and well maintained. Basin Electric will monitor and remove/repair, if necessary, in 2025.
12	Debris controlled or absent	Yes	No windblown wastes noted.

4 Volume of CCR Contained

The annual Basin Electric waste volume survey for the AVS CCR landfill was conducted in late-2024. Based on the results of the survey, approximately 500,000 cubic yards of CCRs and other permitted wastes were placed into the landfill since the previous survey in October 2023. The total volume of CCRs present in the AVS landfill as of November 2024 is approximately 15,152,000 cubic yards; approximately 7,183,000 cubic yards of permitted and constructed airspace remain (Basin Electric, 2024b).

5 Summary and Conclusions

The annual inspection revealed no appearance of actual or potential structural weakness of the CCR unit. No 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. The design, construction, operation and maintenance of the facility are consistent with recognized and generally accepted good engineering standards and industry practices. No corrective measures are recommended for the AVS CCR landfill.

6 References

AECOM, 2024. Basin Electric Power Cooperative Antelope Valley Station Coal Combustion Residual Landfill Annual Inspection Report – 2023, January 16, 2024.

Basin Electric, 2024a. Drawing Number 0CY-9064, Revision 40 - Special Waste Landfill Permit SP-160 Existing conditions/Limits of Landfill, December 2024.

Basin Electric, 2024b. Drawing Number 0CY-9087, Revision 13 - Special Waste Landfill Permit SP-160 Volume History, December 2024.

Attachment A

Photolog



Subject: North-northwest corner of active area, view to southeast

Location: Antelope Valley Station CCR landfill, Beulah, ND

Date: November 18, 2025

Comments: Bottom liner of expansion area has been protected by layer of CCRs; fill progression appears consistent with plan.



Subject: North-northeast active area, view to southwest

Location: Antelope Valley Station CCR landfill, Beulah, ND

Date: November 18, 2025

Comments: East perimeter berm vegetation still growing in



Subject: Southeast corner of leachate pond, view to northwest

Location: Antelope Valley Station CCR landfill, Beulah, ND

Date: November 18, 2025

Comments: Pond has adequate freeboard.



Subject: Southeast corner of closed area, view to north along east perimeter

Location: Antelope Valley Station CCR landfill, Beulah, ND

Date: November 18, 2025

Comments: Excellent vegetation on closed areas, no evidence of erosion.