



Coal Combustion Residuals Landfill Location Restrictions Demonstrations

Laramie River Station Landfill



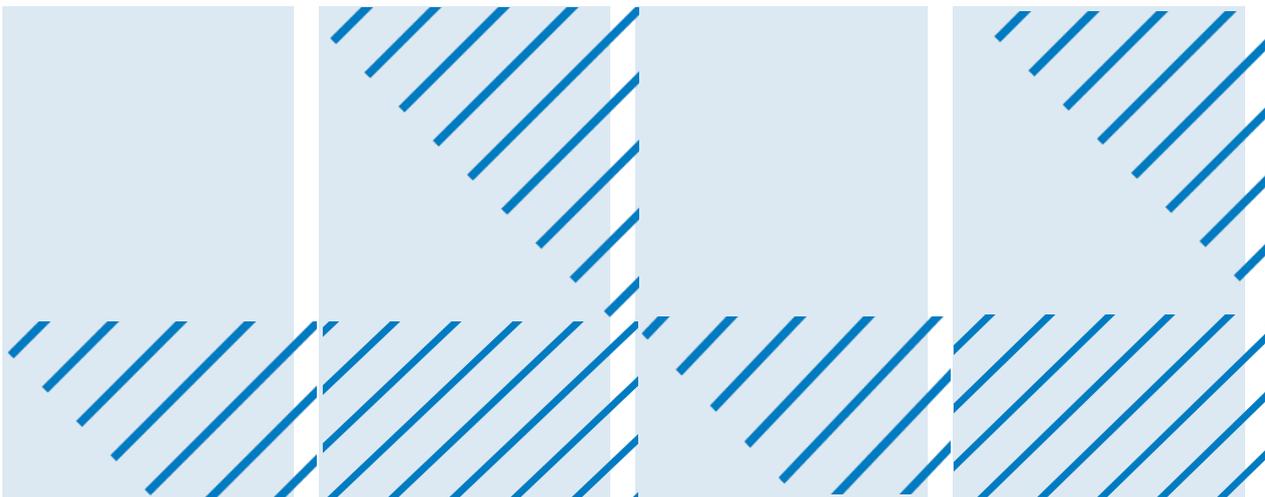
Prepared for
Basin Electric Power Cooperative

Prepared by
Barr Engineering Co.

January 2026

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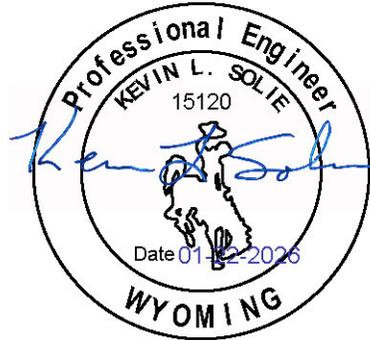
Certification

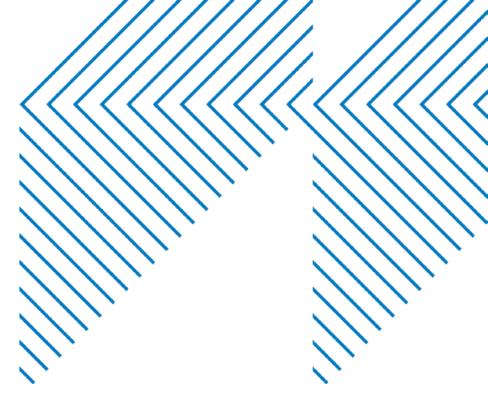
I hereby certify that I have, or my agent has examined the facility and, being familiar with the provisions of 40 CFR 257 Subpart D, attest that the following location restriction demonstrations for this Coal Combustion Residuals landfill and lateral expansion are in accordance with good engineering practice, including consideration of applicable industry standards. I certify that the following demonstrations meet the requirements of 40 CFR § 257.60, § 257.61, § 257.62, § 257.63, and § 257.64 for this facility and that procedures for recordkeeping and reporting have been established.



Kevin L. Solie
Wyoming PE #: 15120

January 22, 2026
Date





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January 2026



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1 Introduction

Laramie River Station (LRS) is a coal-fired power plant consisting of three units that generate about 1,700 megawatts (MW) combined. The power plant, owned by the Missouri Basin Power Project (MBPP) and operated by Basin Electric Power Cooperative (Basin Electric), is located approximately five miles northeast of Wheatland in Platte County, Wyoming. Coal ash from LRS is disposed at the Area 1 Solid Waste Landfill, regulated as a coal combustion residual (CCR) landfill under Permit No. 20.066 issued by the Wyoming Department of Environmental Quality (WDEQ). CCR management is subject to Federal Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments per 40 CFR 257 Subpart D.

LRS's existing landfill consists of nine cells, Cells 1-9, that were originally permitted in 1978 for the disposal of coal ash and other industrial wastes generated at the station. Construction of the facility has been phased with the development of the nine cells during the preceding 40-plus years. Cells 1-9 comprise an area of approximately 164 acres.

The landfill expansion (lateral and vertical) has a waste disposal capacity of approximately 8,130,000 cubic yards (cy), yielding a total of 10,130,000 cy available for future waste disposal. The Cell 10 lateral expansion will cover an area of approximately 20 acres, increasing the disposal footprint to approximately 184 acres. The anticipated volumetric fill rate is approximately 300,000 cy per year, yielding an operational life of approximately 33 years for the entire landfill.

The CCR location restrictions demonstrations in this report have been developed to satisfy the requirements of 40 CFR § 257.60 through 40 CFR § 257.64, as they apply to the lateral expansion of the CCR landfill. Cells 1-9 are considered an existing CCR landfill; accordingly, § 257.64 (Unstable Areas) applies to the facility. The unstable areas engineer certification included in Appendix A was prepared for the existing landfill and subsequently posted to Basin Electric's CCR compliance data website in 2018. This report supersedes the previous (2018) certification.

2 § 257.60 Placement Above Uppermost Aquifer

As stated in 40 CFR § 257.60:

New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table).

2.1 Demonstration

Groundwater at LRS is monitored on a regular basis with a CCR groundwater monitoring system. Figure 1 shows the groundwater monitoring system for the uppermost aquifer below the CCR unit. It consists of the following nine wells:

- Upgradient wells:
 - MW-32B
 - MW-39B

- Down- and side-gradient wells:
 - MW-14BR
 - MW-20B
 - MW-33B
 - MW-34B
 - MW-35B
 - MW-36B
 - MW-37B

Table 2-1 presents a summary of groundwater levels at each of the monitoring wells recorded during 2023 groundwater monitoring events (AECOM, 2024). The uppermost aquifer exhibits relatively high permeability and water levels recover quickly after purging and sampling and thus accurately represent the elevation of the water table in the vicinity of the landfill. All water levels have been below an elevation of 4,511 feet, with wells near the Cell 10 expansion area (MW-35, MW-36, and MW-37) ranging in elevation from approximately 4,470 to 4,485 feet. The lowest base grade of the composite-lined sump for Cell 10 is at an approximate elevation of 4,522 feet, or more than 37 feet above the water table for nearby wells and at least 11 feet above the highest water level in Table 2-1. Therefore, the Cell 10 lateral expansion area will be constructed with a base that is greater than 5 feet above the upper limit of the uppermost aquifer.

Based on the groundwater monitoring data, the Cell 10 lateral expansion meets the requirements of § 257.60.

Table 2-1 Groundwater Level Results

Well	Top of Casing (TOC) Elevation	Date	Depth to Water (ft below TOC)	Groundwater Elevation
MW-14BR	4,537.90	6/8/2023	56.41	4,481.49
		10/25/2023	55.40	4,482.50
MW-20B	4,535.47	6/9/2023	58.35	4,477.12
		10/25/2023	58.25	4,477.22
MW-32B	4,567.11	6/8/2023	56.56	4,510.55
		10/25/2023	57.15	4,509.96
MW-33B	4,566.61	6/8/2023	66.75	4,499.86
		10/25/2023	67.24	4,499.37
MW-34B	4,554.72	6/8/2023	64.30	4,490.42
		10/25/2023	64.60	4,490.12
MW-35B	4,548.67	6/8/2023	64.25	4,484.42
		10/25/2023	64.67	4,484.00
MW-36B	4,532.44	6/8/2023	59.10	4,473.34
		10/25/2023	59.39	4,473.05
MW-37B	4,530.37	6/8/2023	60.54	4,469.83
		10/25/2023	60.80	4,469.57
MW-39B	4,581.45	6/8/2023	76.91	4,504.54
		10/25/2023	77.02	4,504.43

3 § 257.61 Wetlands

As stated in 40 CFR § 257.61:

New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in wetlands, as defined in § 232.2 of this chapter, unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that the CCR unit meets the requirements of paragraphs (a)(1) through (5) of this section.

3.1 Demonstration

40 CFR § 257.61 stipulates that a lateral expansion of a CCR landfill must not be located in wetlands. Barr completed a desktop wetland review of the proposed expansion area. LRS is located within the Laramie River watershed on the fourth and fifth river terraces. There are no wetlands identified by the US Fish and Wildlife Service (USFWS) in the CCR landfill lateral expansion area. Soil borings in the vicinity of the CCR landfill have not shown hydric soils, thus indicating an absence of surface water and wetlands. Finally, a review of historic aerial photography shows no wetlands in the CCR landfill expansion area.

Based on a review of the USFWS National Wetland database and historic aerial photography, the Cell 10 lateral expansion is in compliance with the provisions of 40 CFR § 257.61.

4 § 257.62 Fault Areas

As stated in 40 CFR § 257.62:

New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that an alternative setback distance of less than 60 meters (200 feet) will prevent damage to the structural integrity of the CCR unit.

4.1 Demonstration

40 CFR § 257.62 stipulates that the lateral expansion of a CCR landfill must not be located with 200 feet of the outermost damage zone of a fault that has had displacement in Holocene time (last 11,700 years to present). The area around LRS was analyzed using the US Geological Survey Database of Quaternary Faults and Folds (Database). The Database contains information on faults and associated folds that demonstrate geological evidence of surface deformation in the Quaternary Period (last 2.5 million years to present). According to the Database, no faults are present in the vicinity of LRS or within 200 feet of the proposed footprint for Cell 10.

Based on a desktop review of the US Geological Survey Database of Quaternary Faults and Folds, the Cell 10 lateral expansion is in compliance with the provisions of 40 CFR § 257.62.

5 § 257.63 Seismic Impact Zones

As stated in 40 CFR § 257.63:

New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in seismic impact zones unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.

5.1 Demonstration

40 CFR § 257.63 stipulates that a lateral expansion of a CCR landfill must not be located in a seismic impact zone unless that owner or operator demonstrates that all structural components including liners, leachate collection and removal systems, and surface water control systems are designed to resist the maximum horizontal acceleration in lithified earth material for the site. Per 40 CFR § 257.63, a seismic impact zone is defined as “an area having a 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth’s gravitational pull (g), will exceed 0.10 g in 50 years.” A desktop review of USGS National Seismic Hazards Map shows that the CCR landfill lateral expansion is located in an area of approximately 0.0045 g peak ground acceleration (at a 425-year return period). Further, the USGS PSHA Deaggregation program was used to estimate a peak ground acceleration of 0.0084 g (in 50 years), yielding a slightly higher value. In either case, the lateral expansion is in compliance with the provisions of 40 CFR § 257.63.

Based on a desktop review of available seismic data, the Cell 10 lateral expansion area meets the requirements of § 257.63.

6 § 257.64 Unstable Areas

As stated in 40 CFR § 257.64:

An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted.

The owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable:

- (1) On-site or local soil conditions that may result in significant differential settling;*
- (2) On-site or local geologic or geomorphologic features; and*
- (3) On-site or local human-made features or events (both surface and subsurface).*

6.1 Demonstration

40 CFR § 257.64 stipulates that both existing CCR landfills or the lateral expansion of a CCR landfill must not be located in an unstable area. An unstable areas demonstration was previously prepared for the existing landfill (Cells 1-9) in 2018 and is included in Appendix A. The existing facility has been in operation for more than 40 years, and there have been no indications of instability or differential settlement. There are no human-made features in the subsurface that could negatively affect foundation conditions. Soil borings and testing indicates that there are no geologic, geomorphologic, or local soil conditions that would result in differential settling. Calculations included in the detailed design Engineering Report (Barr, 2025) indicate a maximum potential settlement of 6 to 8 inches below the highest portion of the landfill.

Based on a review of geotechnical data and observations at the site, both the existing CCR landfill and the Cell 10 lateral expansion area are not located in an unstable area and meet the requirements of § 257.64.

7 References

AECOM, 2018. Engineer's Certification of Unstable Areas Demonstration, Existing CCR Landfill, EPA Final CCR Rule, Laramie River Station, Wheatland, Wyoming, October 12, 2018.

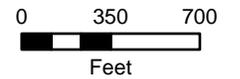
AECOM, 2024. 2023 Annual Groundwater Monitoring and Corrective Action Report, Laramie River Station, Wheatland, Wyoming, January 31, 2024.



Figures



-  Monitoring Well
-  Existing Landfill



Imagery: FSA, 2022

**LRS CCR
Monitoring Well Locations**
Basin Electric Power Cooperative
Laramie River Station Landfill
Platte County, Wyoming

FIGURE 1



Appendix A
AECOM Unstable Area Certification

October 12, 2018

AECOM Project No.
60587593

Basin Electric Power Cooperative
294 County Road 15
Beulah, North Dakota 58523

Engineer's Certification of Unstable Areas Demonstration, Existing CCR Landfill, EPA Final CCR Rule, Laramie River Station, Wheatland, Wyoming

1. Purpose

The purpose of this document is to certify that the Unstable Areas Demonstration for the BEPC Laramie River Station existing CCR Landfill is in compliance with the Unstable Areas demonstration specified in the Final CCR Rule at 40 CFR § 257.64. Pursuant to § 257.64(d)(1), the owner or operator of an existing CCR landfill must complete the unstable areas location demonstration no later than October 17, 2018.

2. Background

According to 40 CFR § 257.64(a) of the EPA Final CCR Rule, any existing or new CCR landfills, and new and existing CCR surface impoundments, and all lateral expansions of CCR units must not be located in unstable areas unless the owner or operator demonstrates that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist movement associated with the unstable area.

3. Summary of Findings

Based on review of historical documents, geological data, and geotechnical exploration reports, AECOM has concluded that BEPC Laramie River Station existing landfill is not considered to be in an unstable area, and has determined that the existing Landfill of the BEPC Laramie River Station meets the requirements of the EPA Final CCR Rule 40 CFR § 257.64.

4. Certification

I, Jeremy Thomas, being a Registered Professional Engineer in good standing in the State of Wyoming, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification has been prepared in accordance with the accepted practice of engineering and that the information contained herein is accurate as of the date of my signature below. I certify that the Unstable Area Demonstration for CCR, dated October 12, 2018, for the above-referenced CCR Unit meets the unstable areas location requirements of 40 CFR § 257.64(a), as recognized and generally accepted good engineering practices have been incorporated into the design of the CCR Unit to ensure that the integrity of the structural components of the Unit will not be disrupted.

Jeremy M. Thomas
Printed Name

October 12, 2018
Date

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