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Design of Alternative Composite Liner

Basin Electric Power Cooperative
Laramie River Station

Bottom Ash Pond 3

AECOM Project No.: 60664804
April 26, 2022

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Laramie River Station Design of Alternative Composite Liner, Bottom Ash Pond 3

Revision No.	Revision Date	Section Revised	Summary of Revision(s)
0	4/26/2022		Original Document

Revisions are accomplished in accordance with Section 3.

1. Background

The purpose of this document is to verify that the design for the alternative composite liner for the Laramie River Station Bottom Ash Pond (BAP) 3 is consistent with recognized and generally accepted good engineering practices and in accordance with the Coal Combustion Residuals Rule (CCR Rule). The following sections provide background information on the facility and related regulatory requirements.

1.1 Facility Information

Name of Facility	Laramie River Station (LRS)
Name of CCR Units	Bottom Ash Pond (BAP 3)
Name of Operator	Basin Electric Power Cooperative
Facility Mailing Address	347 Grayrocks Road, Wheatland, WY 82201
Location	Approximately five (5) miles northeast of Wheatland, WY
Facility Description	Laramie River Station (LRS) is owned by Missouri Basin Power Project (MBPP) and operated by Basin Electric Power Cooperative (Basin Electric). LRS consists of three (3) 570 megawatt (MW) units. Unit 1 went online in 1980, Unit 2 went online in 1981 and Unit 3 went online in 1982.

1.2 Regulatory Requirements

This document has been developed for the LRS BAP 3 in accordance with 40 CFR 257.72. The CCR Rule requires preparation of a certification that the design of the alternative composite liner complies with the requirements of 40 CFR 257.70(c). The requirements of this portion of the rule are as follows:

A. The alternative composite liner must consist of two components. (257.70(c)(1))

B. The upper components must consist if a 30 mil geomembrane, the geomembrane must be a minimum of 60 mil if high density polyethylene (HDPE) is utilized. (257.70(c)(1))

C. The lower component, that is not a geomembrane, must have a liquid flow rate no greater than the liquid flow rate of two feet of compacted soil with a hydraulic conductivity of no more than 1 x 10-7 cm/sec. (257.70(c)(1))

D. The alternative composite liner must be constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the CCR, climactic conditions, the stress of installation and the stress of daily operations. (257.70(b)(1))

E. The alternative composite liner must be constructed of materials that provide appropriate shear resistance of the upper and lower component interface to prevent sliding of the upper component including on slopes. (257.70(b)(2))

F. The alternative composite liner must be placed upon a foundation or base capable of providing support to the liner. (257.70(b)(3))

G. The alternative composite liner must be installed to cover all surrounding earth likely to be in contact with the CCR. (257.70(b)(4))

2. Alternative Composite Liner System

The alternative composite liner system proposed for the project consists of 60 and 80 mil HDPE geomembrane underlain by a chemically stabilized geo-composite clay liner (GCL) system. The liner system is proposed to consist of 60 mil HDPE on the base of the impoundment with 80 mi HDPE installed on the side slopes of the unit. The GCL consists of a Cetco Resistex 100DN9. The material manufacturer completed chemical compatibility testing between the GCL and samples of the free water from the ponds on site which represent the conditions the GCL may be exposed to in service. The testing consisted of hydraulic conductivity testing performed in accordance with ASTM D6766 utilizing the Cetco Resistex 100DN9 and samples of the actual pond water from the facility. The testing determined that the proposed GCL had the appropriate properties to manage the chemistry which it would be exposed to. The results of the testing were also utilized to determine that the flow rate through the GCL would be less than the flow two feet of compacted clay with a hydraulic conductivity no greater than 1 x 10-7 cm/sec.

The alternative composite liner system is designed to resist the potential shear forces which will be applied to it. The HDPE membrane will be installed in an exposed condition and there will be limited shear forces present. The alternative composite liner system will be installed on a prepared soil subgrade. This soil subgrade is prepared to be stable enough to support the liner system during construction as well as in the final installed and in-service condition. The liner system and associated anchor trench have been designed to extend to the crest of the perimeter berms surrounding the CCR unit and completely cover the earth that may come in contact with the CCR.

3. Engineering Certification

Certification Statement 40 CFR § 257.72(c) – Design of the Alternative Composite Liner for the Retrofit of Bottom Ash Pond 3

CCR Unit: Basin Electric Power Cooperative; Laramie River Station, Bottom Ash Pond 3

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. I certify, for the above-referenced CCR Units, that the design of the alternative composite liner as included in the design dated January 21, 2022 complies with the requirements of 40 CFR § 257.72.

Jeremy Thomas

Printed Name

April 26, 2022

Date