HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

MEMORANDUM

30 September 2022
File No. 131363-003

Evergy Kansas Central, Inc. (Evergy, formerly known as Westar Energy, Owner) operates the existing coal combustion residuals (CCR) landfill referred to as the Flue Gas Desulfurization (FGD) Landfill at the Jeffrey Energy Center (JEC) located in Pottawatomie County, KS. Phases 1A and 1B of the FGD Landfill were active prior to the effective date of the CCR Rule. Evergy has contracted and completed the design and construction of a lateral expansion named Phase 1C to the FGD Landfill. This construction criteria certification addresses the requirements of §257.70 *Design criteria for new CCR landfills and any lateral expansion of a CCR landfill* of the US Environmental Protection Agency's (EPA's) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR Part 257 (CCR Rule) effective 19 October 2015.

§257.70(f): Upon completion of construction of the CCR landfill or any lateral expansion of a CCR landfill, the owner or operator must obtain a certification from a qualified professional engineer that the composite liner (or, if applicable, alternative composite liner) and the leachate collection and removal system has been constructed in accordance with the requirements of this section.

Phase 1C has been constructed with a composite liner system designed to meet the requirements of sections (c) and (d) as discussed below.

§257.70(c): If the owner or operator elects to install an alternative composite liner, all of the following requirements must be met:

1) *An alternative composite liner must consist of two components; the upper component consisting of, at a minimum, a 30-mil GM, and a lower component, that is not a geomembrane, with 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. GM components consisting of high density polyethylene (HDPE) must be at least 60-mil thick. If the lower component of the alternative liner is compacted soil, the GM must be installed in direct and uniform contact with the compacted soil.*

2) *The owner or operator must obtain certification from a qualified professional engineer that the liquid flow rate through the lower component of the alternative composite liner is no greater than the liquid flow rate through two feet of compacted soil with a hydraulic conductivity of 1 x 10^{-7} cm/sec. The hydraulic conductivity for the two feet of compacted soil used in the comparison shall be no greater than 1 x 10^{-7} cm/sec. The hydraulic conductivity of any alternative to the two feet of compacted soil must be determined using recognized and*

generally accepted methods. The liquid flow rate comparison must be made using Equation 1 of this section, which is derived from Darcy's Law for gravity flow through porous media.

$$\frac{Q}{A} = q = k\left(\frac{h}{t} + 1\right)$$

Where,
Q = flow rate (cubic centimeters/second);
A = surface area of the liner (squared centimeters);
q = flow rate per unit area (cubic centimeters/second/squared centimeters);
k = hydraulic conductivity of the liner (centimeters/second);
h = hydraulic head above the liner (centimeters); and
t = thickness of the liner (centimeters).

I certify that the design liquid flow rate through the lower component of the alternative liner for Phase 1C of the FGD Landfill is no greater than the liquid flow rate through two feet of compacted soil with a hydraulic conductivity of 1 x 10^{-7} cm/sec.

Signed: _____
Certifying Engineer

Steven F. Putrich
Digitally signed by Steven F. Putrich
Date: 2022.09.30 11:08:09 -04'00'

Print Name:	Steven F. Putrich
Kansas License No.:	PE24363
Title:	Project Principal
Company:	Haley & Aldrich, Inc.

Professional Engineer's Seal:

3) *The alternative composite liner must meet the requirements specified in paragraphs (b)(1) through (4) of this section.*

§257.70(b): A composite liner must consist of two components; the upper component consisting of, at a minimum, a 30-mil geomembrane liner (GM), and the lower component consisting of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1 x 10^{-7} centimeters per second (cm/sec). GM components consisting of high density polyethylene (HDPE) must be at least 60-mil thick. The GM or

upper liner component must be installed in direct and uniform contact with the compacted soil liner component. The composite liner must be:

1) *Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the CCR or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;*
2) *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;*
3) *Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and*
4) *Installed to cover all surrounding earth likely to be in contact with the CCR or leachate.*

Phase 1C was constructed with an alternative composite liner consisting of a 60-mil HDPE geomembrane upper component and a geosynthetic clay liner lower component with a liquid flow rate no greater than that of two feet of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/sec per Equation 1 of this section and certified above. The upper component was installed in direct and uniform contact with the lower component. The materials were assessed for chemical, strength and interface friction properties and were deemed suitable for use in this project to meet the requirements of this section. The composite liner was placed on suitable subgrade and cover surrounding areas for this phase of the landfill on which CCR will be placed and leachate will be managed.

§257.70(d): The leachate collection and removal system must be designed, constructed, operated, and maintained to collect and remove leachate from the landfill during the active life and post-closure care period. The leachate collection and removal system must be:

1) *Designed and operated to maintain less than a 30-centimeter depth of leachate over the composite liner or alternative composite liner;*
2) *Constructed of materials that are chemically resistant to the CCR and any non-CCR waste managed in the CCR unit and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying waste, waste cover materials, and equipment used at the CCR unit; and*
3) *Designed and operated to minimize clogging during the active life and post-closure care period.*

Phase 1C utilizes a geocomposite drainage layer, perforated HDPE pipes, and granular drainage material above the geomembrane to facilitate drainage to the Leachate Pond and minimize head on the bottom liner less than 30-cm. The materials selected are chemically resistant to the

CCR and leachate, and meet suitable strength characteristics. Clean-outs were installed for long-term maintenance. Therefore, for purposes of the complying with this requirement of the CCR Rule, Phase 1C was constructed with an acceptable leachate collection and removal system.

§257.70(e): Prior to construction of the CCR landfill or any lateral expansion of a CCR landfill, the owner or operator must obtain a certification from a qualified professional engineer that the design of the composite liner (or, if applicable, alternative composite liner) and the leachate collection and removal system meets the requirements of this section.

I certify that the Phase 1C lateral expansion of the FGD Landfill alterative composite liner and leachate collection and removal system has been constructed to meet the requirements of §257.70.

Signed:_____
Certifying Engineer

Print Name:	Steven F. Putrich
Kansas License No.:	PE24363
Title:	Project Principal
Company:	Haley & Aldrich, Inc.

Professional Engineer's Seal:

Steven F. Putrich

Digitally signed by Steven F. Putrich
Date: 2022.09.30 11:08:33 -04'00'