



Pyrite Pond Liner Construction Certification

**Mount Storm Power Station
Mount Storm, West Virginia**

November 7, 2016

*Prepared For
Virginia Electric and Power Company*

A handwritten signature in blue ink, appearing to read "R. Nilsson", written over a horizontal line.

R. Kent Nilsson, P.E.
Senior Engineer

A handwritten signature in blue ink, appearing to read "Nakia W. Addison", written over a horizontal line.

Nakia W. Addison
Project Manager

*TRC Environmental Corporation | Virginia Electric and Power Company
Pyrite Pond Liner Construction Certification
Mt. Storm Power Station, Mount Storm, West Virginia
Final*

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Section 1

Regulatory Requirement

Pursuant to the CCR Rule (CCR Rule, Federal Register §257.50 through §257.107), the Mount Storm Power Station has retrofitted the Pyrite Pond that includes an alternative composite liner system. The design criteria outlined in the CCR rule (40 CFR 257.72) stipulate that any new or retrofitted CCR surface impoundment be constructed with a composite liner system consisting of a 60-mil high density polyethylene (HDPE) geomembrane overlying, and in direct contact with, at least a two-foot layer of compacted soil. The compacted soil layer shall demonstrate a hydraulic conductivity of no more than 1×10^{-7} cm/s. The CCR Rule allows for an alternative composite liner system provided it performs no less effectively than the stipulated liner system.

Section 2

Alternative Composite Liner

Due to an absence of sufficient suitable clay soils in the Mt Storm area for use in the lower portion of the composite liner system, the two-foot thick compacted clay layer (CCL) was replaced with a geosynthetic clay liner (GCL). A GCL consists of granular sodium bentonite sandwiched between woven or non-woven geotextiles or geomembrane. A GCL is commonly used as a replacement for compacted soil in landfills and surface impoundments. Its effectiveness has been confirmed in numerous field trials including an evaluation sponsored by the United States Environmental Protection Agency (USEPA), where it was found that a geomembrane/GCL composite liner outperformed a traditional geomembrane/compacted clay liner in controlling leakage from a double-lined landfill (Othman et al., 1998)¹.

TRC performed liner equivalency calculations to verify that the GCL was an acceptable replacement for the CCL in the specific conditions for the Mt Storm impoundments. The calculations showed that a GCL in this application must have a maximum hydraulic conductivity of 1.1×10^{-9} cm/s. Commercially-available GCL products typically demonstrate hydraulic conductivities ranging between 1×10^{-8} to 1×10^{-10} cm/s, depending upon its construction. A GCL product that meets the required hydraulic conductivity requirement for this project was specified and installed. The use of this GCL in combination with the installed 60-mil high density polyethylene geomembrane meets the alternative liner requirements of 40 CFR 257.70(c).

¹ M.A. Othman, R. Bonaparte, B.A. Gross, and D. Warren, "Evaluation of Liquids Management Data for Double-lined Landfills", Draft Document prepared for the US Environmental Protection Agency, National Risk Management Laboratory, Cincinnati, Ohio, 1998

Section 3 Certification

I, the undersigned WV Professional Engineer, hereby certify that I am familiar with the technical requirements of 40 CFR 257.72. I also certify that it is my professional opinion that, to the best of my knowledge, information, and belief, that the alternative composite liner was constructed in conformance with the construction documents and is in accordance with current good and accepted engineering practice(s) and standard(s) appropriate to the nature of the project and the technical requirements of 40 CFR 257.72.

For the purpose of this document, "certify" and "certification" shall be interpreted and construed to be a "statement of professional opinion". The certification is understood and intended to be an expression of my professional opinion as a WV Registered Professional Engineer, based upon knowledge, information, and belief. The statement(s) of professional opinion are not and shall not be interpreted or construed to be a guarantee or a warranty of the installation activities.

R. Kent Nilsson

Printed Name of Professional Engineer



Signature of Professional Engineer

21543

State of West Virginia License Number

November 7, 2016

Date

