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October 4, 2018

Project C131883.01

Mr. Dennis Slade
Supervisor – Environmental Regulations
Dominion Energy
5000 Dominion Drive
Glen Allen Virginia

CCR Rule §257.64 Unstable Areas
Curley Hollow Solid Waste Management Facility
Virginia City Hybrid Energy Center

Dear Mr. Slade:

At the request of Dominion Energy (Dominion), GAI Consultants (GAI) has reviewed Curley Hollow Solid Waste Management Facility's (CHSWMF) compliance with CCR Rule Section §257.64 Unstable Areas. This report reviews the requirements of CCR Rule Section §257.64 which requires that an existing CCR landfill must not be located in an unstable area unless the owner or operator demonstrates that recognized and generally accepted good engineering practices have been incorporated into the design. Unstable area factors to be considered, at a minimum, are on-site and local soil conditions, geologic or geomorphologic features, and human made features or events. These three factors are reviewed and discussed below:

1. On-site or local soil conditions: As part of the Virginia Department of Environmental Quality (VDEQ) Solid Waste Facility Permit, Permit Number 608 Part B Application, the landfill site soils were evaluated for bearing capacity, elastic settlement and strain, and consolidation settlement. The results of these analyses can be found in Module V Design Report Attachment 2 of the Part B Permit Application. The bearing capacity indicated a minimum safety factor of 4.3. The settlement and strain analyses determined that total settlement is estimated to range from 0.0 inches to 23.0 inches and localized differential settlement is anticipated to be less than 3 percent with a total strain on the surface-installed liner components of 9.6 percent. The consolidation settlement estimated a maximum of 59.1 inches and an estimated induced tensile strain on liner components of 3.0 percent. Strains of this magnitude can be tolerated by the various components of the designed landfill liner system. Based on the analyses results, the integrity of the structural components of the CCR landfill will not be disrupted by the on-site or local soils.
2. On-site or local geologic or geomorphologic features: As part of the VDEQ Solid Waste Facility Permit, Permit Number 608 Part A Application, the landfill geology was evaluated and a subsurface investigation conducted. The hydrogeologic and geotechnical review of the landfill site is included as part of the groundwater monitoring and sampling and analysis plan which is in the VDEQ Solid Waste Facility Permit, Permit Number 608 Part B Application. Per the groundwater monitoring plan, the boreholes were logged throughout their entire length and the soils were classified in accordance with the unified soil classification system (USCS). No voids resulting from the dissolution of limestone (karst) were observed during the subsurface investigation. Since no indications of karst or other unstable geomorphologic features were encountered, it is assumed that these features are not present and the integrity of the structural components of the CCR landfill will not be disrupted by on-site or local geologic or geomorphologic features.

3. On-site or local human-made features or events: The landfill site has underground mine workings under several areas. A report, "Potential Mine Subsidence and Proposed Mitigation Measures, Curley Hollow Solid Waste Management Facility, Virginia City Hybrid Energy Center, Wise County Virginia" was prepared to discuss and address the mine workings under the site. The report can be found in Module V, Appendix A of the Part B permit application. According to the report, in order of increasing depth, the Kennedy, Raven, and Jawbone coal seams, were identified to have mine workings under the site which may affect the stability of the landfill unless mitigated. An engineered mitigation plan was prepared which included mine grouting and installation of geogrid based on the depth of mine workings below the liner system.

   Prior to construction of the landfill cells, the ten areas identified as, K1, K2, K3, K4, K5, K6, K7, J1, J2, and R1, received mine grouting and an area identified of geogrid was installed. Verification that these measures were installed per accepted good engineering practices is provided by mine grouting reports. The following mine grouting reports cover the identified mine grouting areas:

   - "CQA Report for Grout Stabilization of Abandoned Underground Mine Workings Virginia City Hybrid Energy Center Curley Hollow Solid Waste Management Facility Stage 1A Construction Kennedy Coal Seam, Areas K1, K2, K3, K4, and K5" dated June 4, 2010;
   - "Virginia City Hybrid Energy Center Curley Hollow Solid Waste Management Facility Kennedy Coal Seam, Area K6 and K7, Construction Quality Assurance Report Grout Stabilization of Abandoned Underground Mine Workings Solid Waste Permit Number 608" dated January 8, 2014;
   - "Virginia City Hybrid Energy Center Curley Hollow Solid Waste Management Facility Raven Coal Seam, Area R1, Construction Quality Assurance Report Grout Stabilization of Abandoned Underground Mine Workings Solid Waste Permit Number 608" dated January 27, 2015;
   - "CQA Report for Grout Stabilization of Abandoned Underground Mine Workings Virginia City Hybrid Energy Center Stage 1A Construction Curley Hollow Solid Waste Management Facility Jawbone Coal Seam, Area J1" dated May 17, 2010; and
   - "Virginia City Hybrid Energy Center Curley Hollow Solid Waste Management Facility Jawbone Coal Seam, Area J2, Construction Quality Assurance Report Grout Stabilization of Abandoned Underground Mine Workings Solid Waste Permit Number 608" dated January 8, 2014.

Based on the mitigation of these areas according to the mine grouting reports and the subsidence analysis, the integrity of the structural components of the CCR Unit will not be disrupted by on-site or local human-made features or events.

GAI has reviewed the above mentioned documents in relation to the requirements of CCR Rule Section §257.64 Unstable Areas. The documents show that CHSWMF, as designed and constructed, meets the requirements of the CCR Rule for Unstable Areas.

Sincerely,

GAI Consultants, Inc.

James Shields, P.E.
Assistant Engineering Manager

James M. Joyce, P.E.
Senior Engineering Manager

JFS/JMJ/taj

Attachment: Unstable Areas Certification

October 4, 2018

Unstable Areas Certification (40 CFR §257.64(c))
Virginia City Hybrid Energy Center – Curley Hollow Solid Waste Management Facility
Solid Waste Facility Permit #608
Wise County, Virginia

EPA's "Disposal of Coal Combustion Residuals form Electric Utilities" Final Rule, 40 CFR §257.64, requires the owner and operator of an existing Coal Combustion Residuals (CCR) unit to obtain a certification from a qualified professional engineer stating that the CCR unit demonstrates meeting the requirements of 40 CFR §257.64(a).

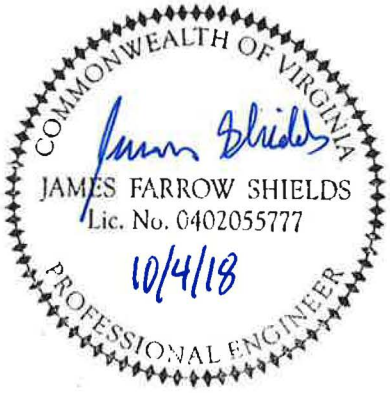
CERTIFICATION

Based on review of the documentation described in 40 CFR 257.64, the mine grouting CQA reports, and permit documentation, it is my professional opinion as a Professional Engineer registered for practice in the Commonwealth of Virginia, that the Curley Hollow Solid Waste Management Facility existing and under construction Stages 1A, 1B, 2A, 2B, and 3B meet the requirements of 40 CFR Section 257.64 (unstable areas).

40 CFR Section 257.64 is from the United States Environmental Protection Agency's, "CCR Rule" published in the Federal Register on April 17, 2015 with an effective date of October 19, 2015.

This Professional Engineer's Certification is limited to the information available to GAI at the time this report was prepared. The use of the words "certification" and/or "certify" in this document shall be interpreted and construed as a Statement of Professional Opinion and is not and shall not be interpreted or construed as a guarantee, warranty, or legal opinion.

GAI Consultants, Inc.



James F. Shields, P.E.
Assistant Engineering Manager

Date 10/4/18

VA PE License Number: 40255777