AECOM
4840 Cox Road
Glen Allen, VA 23060
aecom.com

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Dominion Energy
5000 Dominion Boulevard
Glen Allen, Virginia 23060

Statistical Method Certification
40 CFR 257.93(f)(6)
Dominion Energy
Virginia City Hybrid Energy Center, Curley Hollow Solid Waste Management Facility
Wise County, Virginia

EPA's "Disposal of Coal Combustion Residuals from Electric Utilities" Final Rule, 40 CFR §257.93(f)(6), requires the owner or operator of an existing Coal Combustion Residuals (CCR) unit to obtain a certification from a qualified professional engineer stating that the selected statistical method is appropriate for evaluating the groundwater monitoring data for the CCR management area. The certification must include a narrative description of the statistical method selected to evaluate the groundwater monitoring data.

The following provides a description of the statistical methods selected to evaluate the groundwater monitoring data at Dominion Energy's Virginia City Hybrid Energy Center, Curley Hollow Solid Waste Management Facility.

Statistical Methods

The selected statistical methods for evaluating the groundwater monitoring data for the Virginia City Hybrid Energy Center, Curley Hollow Solid Waste Management Facility were developed in accordance with 40 CFR §257.93(f) using methodologies presented in Statistical Analysis of Groundwater Data at RCRA Facilities, Unified Guidance, March 2009, EPA 530/R-09-007 (Unified Guidance). The statistical methods selected for each constituent at the Jawbone Coal Unit and the Kennedy Member Sandstone & Shale aquifer are presented separately in the tables below.

Statistical Methods Selected For Virginia City Hybrid Energy Center, Curley Hollow Solid Waste Management Facility Jawbone Coal Unit	
Parameter/Constituent	**Statistical Method**
Antimony	Non-parametric Tolerance Interval
Arsenic	Non-parametric Tolerance Interval
Barium	Non-parametric Tolerance Interval
Beryllium	Non-parametric Tolerance Interval

Statistical Methods Selected For Virginia City Hybrid Energy Center, Curley Hollow Solid Waste Management Facility Jawbone Coal Unit	
Parameter/Constituent	**Statistical Method**
Boron	Non-parametric Tolerance Interval
Cadmium	Non-parametric Tolerance Interval
Calcium	Non-parametric Tolerance Interval
Chloride	Non-parametric Tolerance Interval
Chromium	Non-parametric Tolerance Interval
Cobalt	Non-parametric Tolerance Interval
Combined Radium (Ra-226/Ra-228)	Parametric Upper Prediction Interval
Fluoride	Non-parametric Tolerance Interval
Lead	Non-parametric Tolerance Interval
Lithium	Non-parametric Tolerance Interval
Mercury	Non-parametric Tolerance Interval
Molybdenum	Non-parametric Tolerance Interval
pH	Parametric Tolerance Interval - 2 sided
Selenium	Non-parametric Tolerance Interval
Sulfate	Non-parametric Tolerance Interval
Thallium	Non-parametric Tolerance Interval
Total Dissolved Solids	Non-parametric Tolerance Interval

Statistical Methods Selected For Virginia City Hybrid Energy Center, Curley Hollow Solid Waste Management Facility Kennedy Member Sandstone & Shale	
Parameter/Constituent	**Statistical Method**
Antimony	Non-parametric Tolerance Interval
Arsenic	Non-parametric Tolerance Interval
Barium	Non-parametric Tolerance Interval
Beryllium	Non-parametric Tolerance Interval
Boron	Non-parametric Tolerance Interval
Cadmium	Non-parametric Tolerance Interval
Calcium	Non-parametric Tolerance Interval
Chloride	Parametric Upper Prediction Interval
Chromium	Non-parametric Tolerance Interval
Cobalt	Non-parametric Tolerance Interval
Combined Radium (Ra-226/Ra-228)	Parametric Upper Prediction Interval
Fluoride	Parametric Upper Prediction Interval
Lead	Non-parametric Tolerance Interval
Lithium	Non-parametric Tolerance Interval
Mercury	Non-parametric Tolerance Interval
Molybdenum	Non-parametric Tolerance Interval
pH	Parametric Upper Prediction Limit – 2 sided

Statistical Methods Selected For Virginia City Hybrid Energy Center, Curley Hollow Solid Waste Management Facility Kennedy Member Sandstone & Shale	
Parameter/Constituent	**Statistical Method**
Selenium	Non-parametric Tolerance Interval
Sulfate	Parametric Upper Prediction Interval
Thallium	Non-parametric Tolerance Interval
Total Dissolved Solids	Non-parametric Tolerance Interval

As presented, the statistical test methods used for the initial evaluation of groundwater monitoring data at Virginia City Hybrid Energy Center, Curley Hollow Solid Waste Management Facility are based on the prediction interval and tolerance limit methods. Interwell statistical methods are proposed – meaning that data from downgradient wells will be compared to upgradient background groundwater quality. Using this approach, background data from the network of upgradient wells is pooled to calculate a one-sided upper Prediction Limit (PL) or a one-sided upper Tolerance Limit (TL) for each parameter/constituent, except pH, which is pooled to calculate a two-sided PL or two-sided TL. A two-sided approach will provide both an upper and a lower PL or TL. The pooled background data set for each constituent was first tested for the presence of outliers. Extreme values identified during outlier testing were removed from the dataset. The datasets for each constituent were then tested for normality. The selected statistical method for each constituent is based on the results of normality testing. For constituent datasets that exhibited a normal or log-normal distribution, parametric statistical procedures have been selected. For constituent datasets that exhibited a non-normal distribution, non-parametric statistical procedures have been selected.

Further details regarding the statistical methods used to evaluate the groundwater monitoring data are presented in the Unified Guidance.

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Certification Statement 40 CFR § 257.93(f)(6) – Statistical Method for the Evaluation of Groundwater Monitoring Data for the CCR Management Area

CCR Unit: Dominion Energy; Virginia City Hybrid Energy Center; Curley Hollow Solid Waste Management Facility

I, Donald O. Seward, Jr., being a Registered Professional Engineer in good standing in the State of Virginia, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification is prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the statistical method selected for the groundwater monitoring system is appropriate for evaluating groundwater monitoring data pursuant to the requirements of 40 CFR §257.93.

AECOM Technical Services, Inc.

Donald O. Seward, Jr., PE
Associate Vice President