



**Updated Statistical Method Certification [40 CFR §257.93(f)(6)]
Curley Hollow Solid Waste Management Facility
Virginia City Hybrid Energy Center
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 a 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 Virginia Electric and Power Company’s Curley Hollow Solid Waste Management Facility at the Virginia City Hybrid Energy Center in Wise County, Virginia.

Statistical Methods

The selected statistical methods for evaluating the groundwater monitoring data for the 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 are presented in the table below.

Statistical Methods Selected for Curley Hollow Solid Waste Management Facility	
Parameter/Constituent	Statistical Method
Antimony	Non-Parametric Tolerance Limit
Arsenic	Non-Parametric Tolerance Limit
Barium	Non-Parametric Tolerance Limit
Beryllium	Non-Parametric Tolerance Limit
Boron	Non-Parametric Tolerance Limit
Cadmium	Non-Parametric Tolerance Limit
Calcium	Non-Parametric Tolerance Limit
Chloride	Non-Parametric Tolerance Limit

Statistical Methods Selected for Curley Hollow Solid Waste Management Facility	
Chromium	Non-Parametric Tolerance Limit
Cobalt	Non-Parametric Tolerance Limit
Fluoride	Non-Parametric Tolerance Limit
Lead	Non-Parametric Tolerance Limit
Lithium	Parametric Prediction Limit
Mercury	Non-Parametric Tolerance Limit
Molybdenum	Non-Parametric Tolerance Limit
pH	Non-Parametric Tolerance Limit
Radium	Parametric Prediction Limit
Selenium	Non-Parametric Tolerance Limit
Sulfate	Non-Parametric Tolerance Limit
Thallium	Non-Parametric Tolerance Limit
Total Dissolved Solids	Non-Parametric Tolerance Limit

DQR – Double Quantification Rule

As presented, the statistical test methods used for the initial evaluation of groundwater monitoring data at the Curley Hollow Solid Waste Management Facility are based on a combination of non-parametric tolerance limit and parametric prediction 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 used to calculate the background concentration for each parameter/constituent. The background dataset for each constituent/parameter was first tested for the presence of outliers. Extreme values identified during outlier testing were removed from the dataset. The background datasets for each constituent/parameter were then tested for normality. The selected statistical method for each constituent/parameter is based on the results of normality testing. For constituent/parameter datasets that exhibited a normal or log-normal distribution, a parametric statistical procedure has been selected. For constituent/parameter datasets that exhibited a non-normal distribution, a non-parametric statistical procedure has been selected.

Further details regarding the statistical methods used to evaluate the groundwater monitoring data are presented in the Unified Guidance and the CCR Rule Groundwater Monitoring Plan prepared for the Curley Hollow Solid Waste Management Facility.

CERTIFICATION

I hereby certify that the selected statistical methods are appropriate for evaluating the groundwater monitoring data for the CCR management area in accordance with the requirements of 40 CFR §257.93.

As used herein, the word “certify” shall mean an expression of the Engineer’s professional opinion to the best of his or her information, knowledge, and belief, and does not constitute a warranty or guarantee by the Engineer.

GOLDER ASSOCIATES INC.



Ron DiFrancesco, P.E.
Principal and Practice Leader

https://golderassociates.sharepoint.com/sites/104139/reports/2019-09-xx_cobalt_&_lithium_asd/2019-10-03_updated_vc_ccr_gw_stats_cert.docx