



2020 Statistical Method Certification (40 CFR §257.93(f)(6))
Yorktown Power Station – Industrial Landfill
Solid Waste Permit #457
Yorktown, 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 Virginia Electric and Power Company’s Yorktown Power Station Industrial Landfill, Solid Waste Permit No. 457.

Statistical Methods

The selected statistical methods for evaluating the groundwater monitoring data for the Yorktown Power Station Industrial Landfill 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 Yorktown Power Station Industrial Landfill | |
|--|---|
| Parameter/Constituent | Statistical Method (2020 Update) |
| Boron | Parametric Upper Prediction Limit |
| Calcium | Non-Parametric Tolerance Limit |
| Chloride | Non-Parametric Tolerance Limit |
| pH | Non-Parametric Lower/Non-Parametric Upper Tolerance Limit |
| Sulfate | Non-Parametric Tolerance Limit |
| Total Dissolved Solids | Non-Parametric Tolerance Limit |
| Fluoride | Parametric Upper Prediction Limit |
| Antimony | Non-Parametric Tolerance Limit |
| Arsenic | Non-Parametric Tolerance Limit |
| Barium | Non-Parametric Tolerance Limit |
| Beryllium | Non-Parametric Tolerance Limit |

| Statistical Methods Selected for Yorktown Power Station Industrial Landfill | |
|--|----------------------------------|
| Parameter/Constituent | Statistical Method (2020 Update) |
| Cadmium | Non-Parametric Tolerance Limit |
| Chromium | Non-Parametric Tolerance Limit |
| Cobalt | Non-Parametric Tolerance Limit |
| Lead | Non-Parametric Tolerance Limit |
| Lithium | Non-Parametric Tolerance Limit |
| Mercury | Non-Parametric Tolerance Limit |
| Molybdenum | Non-Parametric Tolerance Limit |
| Radium | Parametric Upper Tolerance Limit |
| Selenium | Non-Parametric Tolerance Limit |
| Thallium | Non-Parametric Tolerance Limit |

As presented, the statistical test methods used for the 2020 update evaluation of groundwater monitoring data at the Yorktown Power Station Industrial Landfill 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 an upper Prediction Limit (PL) or an upper Tolerance Limit (TL) for each parameter/constituent. 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 background 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.

CERTIFICATION

I hereby certify that the selected statistical methods are appropriate for the 2020 update evaluation of groundwater monitoring data for the CCR management area at the Yorktown Power Station Industrial Landfill, Solid Waste Permit No. 457, 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.



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