

November 14, 2017

Tennessee Valley Authority  
1101 Market Street  
Chattanooga, Tennessee 37402

**Groundwater Monitoring Statistical Method  
North Rail Loop (NRL) Landfill  
TVA Gallatin Fossil Plant  
Gallatin, Tennessee**

**1.0 Introduction**

This letter documents AECOM's certification of the statistical methods for use in the Tennessee Valley Authority (TVA) Coal Combustion Residuals (CCR) Rule Groundwater Quality Monitoring Program at the Gallatin Fossil Plant North Rail Loop (NRL) Landfill. The statistical methods as described below are appropriate for evaluating the groundwater monitoring data for the NRL Landfill, as required by the Final CCR Rule at 40 CFR § 257.93(f)-(g).

**2.0 Description of Statistical Methods**

The statistical methods described below apply to detection monitoring at the NRL Landfill at the Gallatin Fossil Plant in Gallatin, Tennessee.

- Background concentrations of Appendix III parameters will be calculated using an Upper Prediction Limit (UPL) statistic. The UPL is one of the statistical methods specifically identified in the CCR Rule at 257.93(f)(3) and 257.93(g)(4).
- The UPLs will be calculated with a 99% confidence, consistent with the US Environmental Protection Agency's (USEPA) Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (EPA 530/R-09-007; March 2009).
- Intrawell statistical evaluations will be used for groundwater monitoring at the NRL Landfill. Background UPLs will be calculated for each parameter in each of the downgradient wells, as provided on Table 1 of the Groundwater Monitoring System Certification dated October 16, 2017, using data from samples collected from these wells prior to waste being placed in the landfill. Specifically, the background dataset will be based on the data collected from these wells between April 2015 and May 2016, which represents a minimum of eight pre-waste sampling events.
- Background UPLs will be calculated using ProUCL, a software tool developed by the USEPA. ProUCL will evaluate the distribution of the data, so that a distribution-appropriate UPL is calculated for each parameter, as required by 257.93(g)(1). ProUCL may identify a distribution as normal, log-normal, gamma, or distribution-free (i.e., non-parametric).

- ProUCL also handles results below the limit of detection, as required by 257.93(g)(5), in several different ways.
- To identify potential statistically significant increases over background, the results from detection monitoring at each well will be compared to the pre-waste background UPL for each parameter at that well (257.93(f)(3) and 257.93(h)).
- Where a statistically significant increase over background is identified, verification re-sampling may be used to confirm the increase.
- The statistical methods described here are appropriate for evaluation of the groundwater monitoring data at the Gallatin Fossil Plant NRL Landfill (257.93(f)(6)).

These methods are subject to change based on data that may be collected in the future and/or for different phases of monitoring (e.g., assessment, etc.). Changes to the statistical methods will need re-certification.

### 3.0 Qualified Professional Engineer Certification

I, Gabriel W. Lang, PE, being a Registered Professional Engineer in good standing in the State of Tennessee, 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; that the information contained herein is accurate as of the date of my signature below; and that the statistical methods described above are appropriate for evaluating the groundwater monitoring data at the Gallatin Fossil Plant NRL Landfill in accordance with 40 CFR § 257.93. Opinions relating to environmental, geologic, and hydrogeologic conditions or other estimates are based on available data; actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

SIGNATURE: \_\_\_\_\_ 

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