

STATISTICAL METHOD CERTIFICATION
(40 CFR §257.93(f)(6))
Gavin Power Plant
Cheshire, Ohio

The United States Environmental Protection Agency's (USEPA's) "Disposal of Coal Combustion Residuals from Electric Utilities" Final Rule (40 Code of Federal Regulations [CFR] Part 257 §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 method selected to evaluate the groundwater quality data at the Gavin Power Plant including the Bottom Ash Complex, Fly Ash Reservoir, and Residual Waste Landfill CCR units. The prediction limit (PL) approach that will be used for the Gavin Power Plant was developed in accordance with 40 CFR §257.93(f) using methodology presented in Statistical Analysis of Groundwater Data at Resource Conservation and Recovery Act (RCRA) Facilities, Unified Guidance, March 2009, USEPA 530/R-09-007 (Unified Guidance).

STATISTICAL METHODS

The PL calculations are a multi-step procedure that includes:

- Establishment of the background dataset;
- Development of upper prediction limits (UPLs); and
- A framework for decision making in detection and assessment monitoring.

Establishment of the Background Dataset

Gavin is situated in a hydrogeologically complex area with multiple aquifers and hydrostratigraphic units resulting in high spatial variability in groundwater concentrations. When characterizing background concentrations, appropriately capturing this heterogeneity is critical to avoiding unnecessary false positives in the downgradient wells since UPLs assume that the underlying data is from a single, continuous population (i.e., assumes spatial stationarity). Data from both upgradient and downgradient wells will be considered to determine their suitability

for use as background datasets. A mixture of interwell and intrawell statistical limits will be applied at the site on a constituent-by-constituent basis based on:

- The degree of significant spatial heterogeneity in upgradient well datasets¹;
- The availability of pre-waste-placement data in downgradient wells;
- The geology and hydrology at the site; and
- Whether existing downgradient concentrations are within the ranges expected for unimpacted upgradient concentrations.

An initial data screening of all proposed background data will be performed. The screening includes visualizing the data in time series plots, testing for trends, examining the data for seasonality and evaluating outliers using statistical and visual techniques. Verified outliers will be excluded from the background dataset.

Development of Upper Prediction Limits

Depending on the background dataset used, it may be appropriate to calculate a different UPL for each downgradient well or to calculate a single UPL to be applied to all downgradient wells. UPLs will be constructed with 95% confidence (an individual test $\alpha \leq 0.05$), a 1-of-2 retesting scheme, and an annual site wide false positive rate of 0.1. Before PLs are calculated, the data assumptions of the calculation will carefully be checked using graphical and statistical methods in accordance with 40 CFR §257.93(g). If significant trends are found in the background dataset, UPLs will be calculated on the trend line and the most recent UPL will be used as the background threshold value. In cases where the minimum data requirements are not met², alternative methods may be considered on a case-by-case basis including the double quantification rule (Unified Guidance).

¹ Background data from the network of upgradient wells may be pooled to calculate a UPL for each constituent if there is no significant spatial heterogeneity in concentrations.

² Minimum data requirements include at least 8 values and a minimum detection rate of 50 percent.

Decision Making

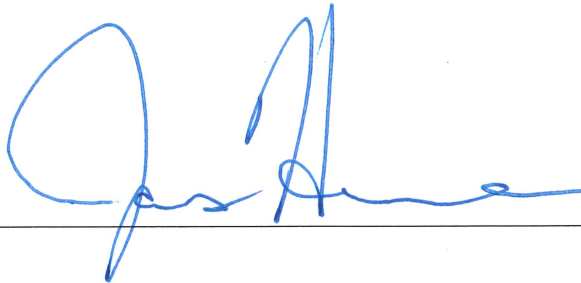
Data from the downgradient monitoring wells will be evaluated by comparing individual results to the appropriate UPL after each monitoring event. An "initial exceedance" occurs when any downgradient well data exceed its associated PL. If data from a downgradient well exceeds the UPL, a 1-of-2 resampling strategy will be used to verify the result. In 1-of-2 resampling, one independent resample will be collected and evaluated within 90 days to determine whether the initial exceedance is verified. A statistically significant increase (SSI) is determined only if the resample verifies the initial exceedance (i.e., the resample also exceeds the PL).

For assessment monitoring and corrective action, a confidence interval approach will be used to compare downgradient wells to the ground water protection standards or alternate concentration limits, as specified in 40 CFR §257.95(h).

Further details regarding the UPL approach are presented in the Unified Guidance and the Statistical Analysis Plan.

CERTIFICATION

I hereby certify that the selected statistical method is appropriate for evaluating the groundwater monitoring data for the Bottom Ash Complex, Fly Ash Reservoir, and Residual Waste Landfill of the Gavin Power Plant in accordance with the requirements of 40 CFR §257.93.



James Hemme, P.E.

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