STATISTICAL ANALYSIS PLAN CERTIFICATION

NEW FGD POND
WILLIAMS STATION
GOOSE CREEK, SOUTH CAROLINA

Prepared For:

DOMINION ENERGY SOUTH CAROLINA, INC.
COLUMBIA, SOUTH CAROLINA

Prepared By:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PITTSBURGH, PENNSYLVANIA

CEC Project 306-309

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1.0 INTRODUCTION

1.1 OBJECTIVE

This certification has been prepared for South Carolina Generating Company (SCGENCO) and Dominion Energy South Carolina, Inc. (DESC) to demonstrate that the A.M. Williams Station (Williams Station) Coal Combustion Residuals (CCR) Unit described as the New FGD Pond meets the requirements of the United States Environmental Protection Agency (USEPA) CCR Rule which has been published in the Federal Register (FR) on April 17, 2015 as part of the Code of Federal Regulations (CFR) Title 40, Part 257 (§257). Specifically, this report demonstrates that the statistical analysis plan for the New FGD Pond meets the requirements in §257.93.

1.2 BACKGROUND

The Williams Station is a coal-fired power generation station located at 2242 Bushy Park Road in Goose Creek, South Carolina that is owned by SCGENCO and operated by DESC. The 650 MW coal-fired electric generating station is generally positioned within a small strip of lowlands between meanders of the Back River (west) and the Cooper River (east). The station property is bounded by Bushy Park Road to the west and tidal wetlands and/or lowlands border the remainder of the property. The Williams Station wastewater management impoundment complex, is comprised of six interconnected separate ponds labeled Ponds A through E and the Coal Pile Runoff Pond, is located north of main station structures.

Williams Station infrastructure includes a flue gas desulfurization (FGD) air quality control system that produces an FGD wastewater blowdown waste stream that is managed in an on-site FGD Pond that was constructed in 2009 in accordance with South Carolina Department of Health and Environmental Control (SCDHEC) regulations and permits. This CCR Unit is also regulated as a CCR Surface Impoundment per Title 40 CFR, Part 257, Subpart D published in April 2015 (CCR Rule) by the USEPA and subsequent revisions.

The FGD Pond is located within the boundaries of the wastewater management impoundment complex at the Williams Station facility and was originally constructed within the footprint of former Pond C in 2009 and in accordance with SCDHEC Bureau of Water Permit Number 19263-IW. The original construction was certified to meet the design documents and Construction Quality Assurance (CQA) Plan by Garrett & Moore (CQA Report, Williams Station FGD Scrubber Blowdown Wastewater Pond, dated September 14, 2009). The New FGD Pond occupies essentially the same footprint as the former FGD Pond and is comprised of two approximate 700,000 gallon forebays (identified as Forebay 1 and Forebay 2) and approximately two acres in total. Because the New FGD Pond occupies the same footprint and elevation profile, the original groundwater monitoring system remains in use for CCR Rule groundwater monitoring compliance.

2.0 CRITERIA FOR STATISTICAL METHOD SELECTION §257.93

The applicable sections of §257.93 are presented below in bold, italic font. The responses follow each section of the rule and are provided in normal font.

2.1 METHOD SELECTION §257.93(F) THROUGH §257.93(G)

(f) The owner or operator of the CCR unit must select one of the statistical methods specified in paragraphs (f)(1) through (5) of this section to be used in evaluating groundwater monitoring data for each specified constituent. The statistical test chosen shall be conducted separately for each constituent in each monitoring well.

(1) A parametric analysis of variance followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.

(2) An analysis of variance based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.

(3) A tolerance or prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.

(4) A control chart approach that gives control limits for each constituent.

(5) Another statistical test method that meets the performance standards of paragraph (g) of this section.

(g) Any statistical method chosen under paragraph (f) of this section shall comply with the following performance standards, as appropriate, based on the statistical test method used:

(1) The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of constituents. Normal distributions of data values shall use parametric methods. Non-normal distributions shall use non-parametric methods. If the distribution of the constituents is shown by the owner or operator of the CCR unit to be inappropriate for a normal theory test, then the data must be transformed or a distribution-free (non-parametric) theory test must be used. If the distributions for the constituents differ, more than one statistical method may be needed.

(2) If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a groundwater protection standard, the test shall be done at a Type I error level no less than 0.01 for each testing period. If a multiple comparison procedure is used, the Type I experiment wise error rate for each testing period shall be no less than 0.05; however, the Type I error of no less than 0.01 for individual well comparisons must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts.

(3) If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated parameter values shall be such that this approach is at least as effective as any other approach in this section for evaluating groundwater data. The parameter values shall be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

(4) If a tolerance interval or a predictional interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain, shall be such that this approach is at least as effective as any other approach in this section for evaluating groundwater data. These parameters shall be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

(5) The statistical method must account for data below the limit of detection with one or more statistical procedures that shall at least as effective as any other approach in this section for evaluating groundwater data. Any practical quantitation limit that is used in the statistical method shall be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.

(6) If necessary, the statistical method must include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

The Statistical Analysis Plan (SAP) available in the operating record and developed for the Williams Station FGD Pond was prepared in accordance with the CCR Rule (§257.93, OBG, 2017). The SAP was developed with the goal of minimizing false positive results while maximizing groundwater protection for the site. This plan was prepared for the original FGD Pond, however CEC has reviewed the new CCR Unit footprint, associated monitoring network, and field conditions to confirm that these conditions have not changed and the SAP is appropriate for use at

the New FGD Pond. Furthermore, the statistical approaches in the plan remain consistent with EPA's Unified Guidance and EPRI's 2015 monitoring guidance for Detection Monitoring, Assessment Monitoring, and Corrective Action Monitoring. Therefore, the approaches stated in the original certification remain valid and the New FGD Pond still complies with CCR Rule §257.93.

The SAP details the analysis approach for inter-well comparison of downgradient compliance wells to upgradient background wells using box-whisker plots for initial graphical identification of outliers and data grouping as well as use of the Shapiro-Wilk method to determine normality along with the Shapiro-Francia as the data set grows.

The SAP for Detection Monitoring includes verification of resampling, passing 1 of 2 and 2 of 2 method; processing of non-detects based on percentages with consideration to normality using ½ multiplier and Kaplan-Meier when data is parametric; and parametric/non-parametric statistical comparison tests for determination of whether or not a result is an SSI using prediction intervals and/or the Shewhart-CUSUM tests.

The SAP for Assessment Monitoring includes how Groundwater Protection Standards (GWPS) will be determined, determination of background for constituents without maximum contaminant level (MCL) or to test if background is higher than the MCL, processing of non-detects based on percentages with consideration to normality, how SSLs will be evaluated when all background results are non-detect, criteria for selection of compliance data, criteria for selection of appropriate confidence intervals (e.g., parametric, non-parametric, trend-based), and criteria for determining whether or not an SSL has occurred.

The SAP for Corrective Action Monitoring includes how GWPS will be determined, determination of background for constituents without MCLs or to test if background is higher than the MCL, how compliance will be evaluated when all background results are non-detect, criteria for selection of compliance data, criteria for selection of appropriate confidence intervals (e.g., parametric, non-parametric, trend-based), and criteria for determining whether or not the facility is in compliance.

The SAP establishes criteria for periodically updating the background data set, when it should be updated and evaluation of the data to ensure that new data does not reflect CCR impacts.

2.2 OBTAIN CERTIFICATION (§257.93(F)(6))

> ***(6) The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority 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.***

A written certification from a qualified professional engineer is provided in Section 3.0.

2.3 RECORD KEEPING REQUIREMENTS §257.93(J)

> ***(j) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(h), the notification requirements specified in §257.106(h), and the Internet requirements specified in §257.107(h).***

A record of the certification must be placed in the facility's operating record [§257.105(h)] and the publicly accessible internet site [§257.107(h)] and the state must be notified [§257.106(h)] that the information is available.

3.0 STATISTICAL ANALYSIS PLAN CERTIFICATION

By means of this certification, I certify that I have reviewed this Statistical Analysis Plan, New FGD Pond, Williams Station meets the requirements of Section 40 CFR 257.93(f)(6) and the selected statistical method described herein is appropriate for evaluating the groundwater monitoring data for the CCR management area. Furthermore, the levels of confidence and percentages of population using a tolerance or prediction interval approach or using a control chart approach are at least as effective as any other approach to evaluate groundwater monitoring data.

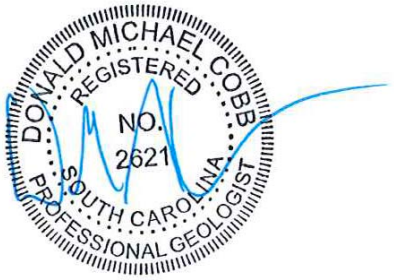
Scott L. Brown, P.E.
Printed Name of Professional Engineer

Signature

25687	South Carolina	5-7-21
Registration No.	Registration State	Date

By means of this certification, I certify that I have reviewed this Statistical Analysis Plan, New FGD Pond, Williams Station meets the requirements of Section 40 CFR 257.93(f)(6) and the selected statistical method described herein is appropriate for evaluating the groundwater monitoring data for the CCR management area. Furthermore, the levels of confidence and percentages of population using a tolerance or prediction interval approach or using a control chart approach are at least as effective as any other approach to evaluate groundwater monitoring data.

Donald M. Cobb, P.G.
Printed Name of Professional Geologist



Signature

2621	South Carolina	5-7-21
Registration No.	Registration State	Date

4.0 REFERENCES

OBG, 2017. Statistical Analysis Plan – SCE&G Williams Station FGD Pond, Prepared by Natural Resource Technology, an OBG Company, Submitted October 17, 2017.