November 28, 2017 **via Email: mwillis@smeci.net**

Ms. Mari Willis
Environmental Supervisor
San Miguel Electric Cooperative, Inc.
P.O. Box 280
Jourdanton, TX 78026

Re: Groundwater Statistical Method for CCR Detection Monitoring
San Miguel Electric Cooperative, Inc.
Atascosa County, Texas
Project No. 017698

Dear Ms. Willis:

Zephyr Environmental Corporation (Zephyr) was contracted to evaluate groundwater analytical data collected from the background groundwater monitoring wells for the three Coal Combustion Residual (CCR) waste management units (Ash Pile, Ash Ponds, and Equalization Pond) located at the San Miguel Electric Cooperative, Inc. (San Miguel) power generation facility in Atascosa County, Texas. The purpose of this evaluation was to establish statistical methodologies in accordance with 40 CFR 257.90 to establish background limits for 40 CFR 257 Appendix III and IV analytes at each CCR waste management unit. The background limits will be used when evaluating detection monitoring groundwater analytical data to determine whether a statistical increase over background concentrations has occurred for any analyte.

San Miguel established upgradient and downgradient monitoring well systems for each of their three CCR waste management units (Ash Pile, Ash Ponds, and Equalization Pond). The detection monitoring well systems were installed and certified on October 17, 2017 by Environmental Resources Management (ERM). A breakout of background and point of compliance monitoring wells for each CCR waste management unit is presented below:

1) Ash Pile Groundwater Monitor Well Network:

Well ID	Well Function
SP-34	Background Monitoring
SP-1	Point of Compliance Monitoring
SP-2	Point of Compliance Monitoring
SP-3	Point of Compliance Monitoring
SP-32	Point of Compliance Monitoring

2) Ash Ponds Groundwater Monitor Well Network:

Well ID	Well Function
PZ-2	Background Monitoring
PZ-3	Background Monitoring
PZ-5	Point of Compliance Monitoring
PZ-6	Point of Compliance Monitoring
AP-31	Point of Compliance Monitoring
AP-32	Point of Compliance Monitoring
AP-33	Point of Compliance Monitoring
AP-34	Point of Compliance Monitoring
AP-35	Point of Compliance Monitoring
AP-36	Point of Compliance Monitoring
MW-3	Point of Compliance Monitoring

3) Equalization Pond Monitor Well Network:

Well ID	Well Function
EP-31	Background Monitoring
EP-32	Point of Compliance Monitoring
EP-33	Point of Compliance Monitoring
EP-34	Point of Compliance Monitoring
EP-35	Point of Compliance Monitoring
EP-36	Point of Compliance Monitoring
EP-37	Point of Compliance Monitoring
EP-38	Point of Compliance Monitoring
MW-4	Point of Compliance Monitoring

4) Groundwater Observation Wells:

Well ID	Well Function
MW-1	Groundwater Elevation Assessment
MW-2	Groundwater Elevation Assessment
PZ-4	Groundwater Elevation Assessment
PZ-7	Groundwater Elevation Assessment

Pursuant to the requirements of 40 CFR 257.90, San Miguel collected eight separate groundwater samples from background and downgradient monitoring wells at each CCR waste management unit during 2016 and 2017. Groundwater samples were analyzed for the 40 CFR 257 Appendix III and IV analytes. Groundwater analytical data were obtained by both ERM and AECOM Technical Services, Inc. (AECOM) during this time period. The data utilized in the evaluation consisted of a laboratory-supplied Microsoft Excel file containing all of the data collected during 2017. In addition, groundwater analytical data tables from the AECOM October 30, 2017 "*Groundwater Sampling Report – Event 8 – August 2017*" were converted by Zephyr

from an Adobe Acrobat format to a Microsoft Excel format for analytical data produced from groundwater sampling events performed in 2016 and 2017. These data represent eight individual sampling events from May 2016 through August 2017.

Zephyr utilized the most current edition of the EPA software program, ProUCL 5.1 to determine the appropriate statistical methods to be used to establish background concentrations for each analyte at each CCR waste management unit. ProUCL uses parametric and nonparametric methods to address data variability when calculating an upper confidence limit (UCL) of the mean, an upper tolerance limit (UTL), and the upper prediction limit (UPL).

The ProUCL software calculated parametric and non-parametric upper tolerance limits (UTL) for the CCR Appendix III and IV analytes. Non-parametric UTL and lower tolerance limits (LTL) were calculated for background pH. A parametric UTL was calculated for those background CCR analyte data sets with less than 50% non-detected concentrations. For data sets with greater than 50% non-detected concentrations, or without a distinct distribution, a non-parametric UTL was calculated using the highest detected concentration in the background data set. For background well data sets having 100% of the background data for a CCR analyte reported as less than the detection limit, then the Double Quantification Rule was applied, meaning that the highest reporting limit (RL) will be used as the UTL for the background data set.

The analytical results for each CCR analyte for each downgradient well will be compared directly to each unit's corresponding calculated background UTL with the exception of pH which will be compared to non-parametric UTL and LTL. In the event that any of the CCR analytes, other than pH, at any downgradient well exceeds the background UTL, a single sample hypothesis testing will be used to compare downgradient analytical results to the background UTL. This comparison will utilize a single sample parametric or non-parametric hypothesis test to determine whether a statistical exceedance exists. If any downgradient pH value falls outside the background UTL or LTL, a two sample, non-parametric hypothesis test will be used to determine whether a statistical exceedance exists.

In summary, based upon the analytical data results for the background groundwater samples, a single statistical method cannot be used for establishing a UTL for all of the analytes Instead, four methods were selected because the statistical methodology needed to account for parametric and non-parametric data, as well as data without any detected concentrations. The chosen statistical methods meet the requirements of 40 CFR 257.93(f)(3) and (g)(4).

40 CFR 257.93(f)(6) requires that the owner or operator of the CCR waste management unit must 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 waste management units. The certification must include a narrative description of the statistical method selected to evaluate the groundwater monitoring data. The required certification statement is attached to this correspondence.

Please contact me at (512) 879-6622 or bmoore@zephyrenv.com or Paul Moore at (512) 879-6642 or pmoore@zephyrenv.com if you have any questions or concerns regarding the information presented above.

Sincerely,
ZEPHYR ENVIRONMENTAL CORPORATION

Betty H. Moore. P.G.
TXPG-5292.
Senior Consultant

Attachment (1) – Certification Statement

cc: Mr. Ali Abazari, Jackson Walker
Ms. Lisa R. Kost, Jackson Walker

CERTIFICATION OF GROUNDWATER STATISTICAL METHODOLOGY

CERTIFICATION OF GROUNDWATER STATISTICAL METHODOLOGY
FOR
SAN MIGUEL ELECTRIC COOPERATIVE, INC.
Atascosa County, Texas

Zephyr Environmental Corporation (Zephyr) was retained by San Miguel Electric Cooperative (SMEC) to evaluate the groundwater analytical data collected from the background groundwater monitoring wells for the three Coal Combustion Residual (CCR) waste management units located at the San Miguel Electric Cooperative, Inc. (SMEC) power generation facility in Atascosa County, Texas to determine the appropriate statistical method for evaluating groundwater monitoring data as required by 40 CFR 257.93. Presented below are the project purpose, a narrative description of the selected statistical methods, certification limitations, and the Engineer's Certification.

BACKGROUND

SMEC established upgradient and downgradient monitoring well systems for each of their three CCR waste management units (Ash Pile, Ash Ponds, and Equalization Pond). The detection monitoring well systems were installed and certified on October 17, 2017 by Environmental Resources Management (ERM).

Pursuant to the requirements of 40 CFR 257.90, SMEC collected eight separate groundwater samples from background monitoring wells during 2016 and 2017 for each of the three CCR waste management units. Groundwater analytical data were obtained by both ERM and AECOM Technical Services, Inc. (AECOM). Groundwater samples were analyzed for the 40 CFR 257 Appendix III and IV analytes.

Pursuant to 40 CFR 257.90(b)(ii), owners and operators of existing CCR landfills, and existing CCR surface impoundments, must develop a groundwater sampling and analysis program that includes selection of the statistical procedures to be used for evaluating groundwater monitoring data as required by 40 CFR.§ 257.93.

40 CFR 257.93(f) requires the owner or operator of the CCR unit to select one of the methods specified in 40 CFR 257.93(f)(1)-(5) to be used in evaluating groundwater monitoring data for each specified chemical constituent and the performance standards for the selected statistical method must conform to the requirements specified in §257.93(g).

Pursuant to 40 CFR 257.93(f)(6), the owner or operator of the CCR unit must 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 selected statistical method.

NARRATIVE DESCRIPTION OF SELECTED STATISTICAL METHOD

Zephyr utilized the most current edition of the EPA software program, ProUCL 5.1 to determine the appropriate statistical methods to be used to establish background concentrations for each

analyte at each CCR waste management unit. ProUCL uses parametric and nonparametric methods to address data variability when calculating an upper confidence limit (UCL) of the mean, an upper tolerance limit (UTL), and the upper prediction limit (UPL).

The ProUCL software calculated parametric and non-parametric upper tolerance limits (UTL) for the CCR Appendix III and IV analytes. Non-parametric UTL and lower tolerance limits (LTL) were calculated for background pH. A parametric UTL was calculated for those background CCR analyte data sets with less than 50% non-detected concentrations. For data sets with greater than 50% non-detected concentrations, or without a distinct distribution, a non-parametric UTL was calculated using the highest detected concentration in the background data set. For background well data sets having 100% of the background data for a CCR analyte reported as less than the detection limit, then the Double Quantification Rule was applied, meaning that the highest RL will be used as the UTL for the background data set.

The analytical results for each CCR analyte at each downgradient well will be compared directly to each unit's corresponding calculated background UTL for each analyte with the exception of pH which will be compared to non-parametric UTL and LTL. In the event that any of the CCR analytes, other than pH, at any downgradient well exceeds the background UTL, a single sample hypothesis testing will be used to compare downgradient analytical results to the background UTL. This comparison will utilize a single sample parametric or non-parametric hypothesis test to determine whether a statistical exceedance exists. If any downgradient pH value falls outside the background UTL or LTL, a two sample, non-parametric hypothesis test will be used to determine whether a statistical exceedance exists. In summary, based upon the analytical data results for the background groundwater samples, a single statistical method cannot be used for establishing a UTL for all of the analytes Instead, the statistical methodology needed to account for parametric and non-parametric data, as well as data without any detected concentrations. However, the chosen four statistical methods meet the requirements of 40 CFR 257.93(f)(3) and (g)(4).

CERTIFICATION LIMITATIONS

The signature by the certifying engineer on this document represents that to the best of the engineer's knowledge, information, and professional judgment, the aforementioned information is accurate as of the signature date. The certifying engineer's opinions and decisions are made on the basis of the certifying engineer's relevant experience, qualifications, and professional judgment and are not to be construed as warranties or guaranties. In addition, opinions relating to environmental, geologic, and geotechnical conditions (or other estimates) are based on available data, and actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

CERTIFICATION OF GROUNDWATER STATISTICAL METHODOLOGY
FOR
SAN MIGUEL ELECTRIC COOPERATIVE, INC.
Atascosa County, Texas

Continued

CERTIFICATION

I, **David H. Sorrells,** have evaluated existing geochemical data provided by SMEC from prior groundwater monitoring events, and determined that sufficient information is available to make the requisite certification. Being a Registered Professional Engineer with the State of Texas, do hereby certify to the best of my knowledge, information, and belief, that, pursuant to 40 CFR 257.93(f)(6) and as of November 15, 2017, the selected statistical methods are appropriate for evaluating the groundwater monitoring data for SMEC's three CCR waste management units (Ash Pile, Ash Ponds, and Equalization Pond). The statistical method selection process has been conducted in accordance with recognized and generally accepted good engineering and scientific practices.

(Seal)

David H. Sorrells

Printed Name of Licensed Professional Engineer

David H. Sorrells, P.E.

Signature of Licensed Professional Engineer

Date 11/28/2017

License No. 42153 State Texas