July 24, 2008

Daniel F. Cole
Designated Representative
Ameren Services
One Ameren Plaza
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P.O. Box 66149
St. Louis, MO 63166-6149

Re: Petition to use Alternative Substitute Data Methodology for Unit 2 at the Rush Island Facility (Facility ID (ORISPL) 6155)

Dear Mr. Cole:

The United States Environmental Protection Agency (EPA) has reviewed the April 7, 2008 petition under 40 CFR 75.66, in which Ameren Services (Ameren) requested to use alternative missing data substitution for Unit 2 at the Rush Island, Missouri facility (Rush Island). EPA approves the petition in part, with conditions, as discussed below.

Background

Ameren owns and operates a coal-fired boiler, Unit 2, at its Rush Island facility. Unit 2 is subject to both the Acid Rain and NO_x Budget Trading Programs. Therefore, Ameren is required to continuously monitor and report sulfur dioxide (SO_2), nitrogen oxides (NO_x), and carbon dioxide (CO_2) emissions and heat input for Unit 2, in accordance with 40 CFR Part 75. To meet these monitoring requirements, Ameren has installed and certified dilution-extractive continuous emission monitoring systems (CEMS) for SO_2, NO_x, and CO_2, and a stack gas flow rate monitor.

On February 22, 2008, one of Ameren's corporate boiler performance engineers noticed that the CO_2 readings at Rush Island Unit 2 were lower than expected and that this problem apparently originated in the fourth quarter of 2007. According to Ameren, the plant personnel did not suspect a problem because the CEMS continued to pass all required daily calibration error tests and quarterly linearity checks. The low CO_2 readings were attributed to the fact that Unit 2 was operating at lower load levels than Unit 1 (its "sister" unit) during the time period in question. However, this assumption was incorrect because the SO_2 readings, which are not load-dependent, were also considerably lower at Unit 2 than Unit 1.

Numerous maintenance activities were performed on Unit 2's gas monitoring systems between October 2007 and February 2008. The probe controller tubing was

replaced on October 17, 2007; the dilution probe and orifice were replaced on November 20, 2007; an O-ring was replaced on December 6, 2007; and the critical orifice and a ferrule were replaced on February 27, 2008. After each of these actions, the CO_2 readings increased for a short time, only to return to the suspect lower levels. Finally, on March 8, 2008, a crack was discovered in the calibration gas tubing leading to the dilution probe. When the tubing was replaced, all of the gas concentration readings returned to their normal, expected levels and have remained there since then.

Ameren concluded that the crack in the calibration line tubing caused ambient air to leak into the probe, thereby diluting the gas samples, resulting in lower than expected gas concentrations. This type of leak is not detectable during daily calibrations and linearity checks, during which gases flow through the calibration line under positive pressure. Any excess calibration gas flows outward through the crack in the calibration line, and the gas concentration is not diluted. Ambient air is drawn into the calibration line only during normal sampling of the stack gas, which is performed under negative pressure.

According to Ameren, the probe leak started on October 8, 2007 and ended on March 9, 2008. All data recorded by the gas monitoring systems during this time period are considered invalid; therefore, substitute data must be reported for each unit operating hour, using the standard missing data procedures in §75.33 (for SO_2 and NO_x) and §75.35 (for CO_2). Due to the length of the missing data period (five months), the percent monitor data availability (PMA) for each parameter (SO_2, NO_x, and CO_2) dropped significantly and fell below 80.0 percent in December 2007. When the PMA is less than 80.0 percent, Part 75 requires maximum potential values of SO_2, and CO_2 concentration and NO_x emission rate to be reported. Believing that the use of maximum potential values grossly overstates Unit 2's emissions during the probe leak incident, Ameren submitted a petition to EPA on April 7, 2008, requesting to use alternative missing data substitution for the time period in question.

Ameren proposed to apply conservative adjustment factors to the data recorded by Unit 2's gas monitors between October 8, 2007 and March 9, 2008. Based on an analysis of emissions data from Unit 1 (the "sister" unit) during this time interval, Ameren concluded that the SO_2, and CO_2 data recorded by the Unit 2 CEMS during the probe leak period were 16 and 14 percent lower than expected, respectively. Therefore, Ameren proposed to adjust the SO_2 data upward by a factor of 1.19 (1.16 plus 0.03) and to adjust the CO_2 data upward by a factor of 1.14. The proposed SO_2 adjustment factor includes the additional 0.03 adjustment to ensure that emissions are not underreported. For NO_x, Ameren proposed to adjust the lb/mmBtu emission rates upward by a factor of only 1.03 because the low biases in the measured NO_x and CO_2 concentrations cancel out when the NO_x emission rate is calculated.

In the April 7, 2008 petition, Ameren states that improvements are being made to its monitoring systems and facilities to prevent this type of problem from recurring. Elevators are being installed to facilitate access to the monitoring platform, which is expected to improve monitor operation and maintenance. Also, Ameren plans to provide

additional training, for individuals involved in operating and maintaining the CEMS, aimed at providing a better understanding of the data generated by the monitoring systems.

EPA's Determination

EPA conditionally approves Ameren's petition to use an alternative substitute data methodology to adjust Rush Island Unit 2's reported emissions data in the time period extending from October 8, 2007, hour 07 through March 9, 2008, hour 06. However, the approved data adjustment factor differs from the correction factors proposed by Ameren. The basis for this approval and the conditions of approval are presented below.

As previously noted, Ameren based its proposed SO_2, NO_x, and CO_2 data adjustment factors on a comparison of data recorded during the probe leak period by the gas monitors installed on Units 1 and 2. However, this methodology can provide only a rough estimate of the effects of the probe leak on Unit 2's emissions data. Although Units 1 and 2 are similar units and have the same design, it cannot be safely assumed that the emissions from the two units are the same at a given load level. For instance, although both units draw from the same coal pile, coal (even from the same mine) is not homogeneous in sulfur content, which can cause variation in SO_2 emissions. EPA therefore disapproves the data correction factors proposed by Ameren, and, for reasons stated below, approves instead a single adjustment factor of 1.135, to be applied uniformly to the hourly SO_2, NO_x, and CO_2 emissions data.

EPA derived the approved data adjustment factor by applying its recently-developed "Control Chart Methodology"[1] to data recorded by Unit 2's CO_2 monitor. First, an average "baseline" CO_2 concentration of 11.0% CO_2 was derived from quality-assured data recorded at Unit 2 in the time period extending from January 24, 2007 (the date of the 2007 annual RATAs) to October 8, 2007 (the beginning date of the probe leak). Only CO_2 data in "load bin" #9, which is the unit's most frequently-used load range, were used in the calculations. Next, the Agency compared the CO_2 data in load bin #9 during the probe leak period against the baseline CO_2 concentration. Essentially all of these data fell below the lower control limit (LCL), i.e., they were more than 3 standard deviations below the baseline CO_2 concentration, confirming that Unit 2's emissions were underreported when the probe leak was present.

The approved data correction factor of 1.135 was determined by dividing the baseline CO_2 concentration by the average CO_2 concentration during the probe leak period and adjusting the result for uncertainty, using the standard deviations of the two data sets as a measure of the uncertainty. This correction factor is appropriate for all three gases, SO_2, NO_x, and CO_2, because air in-leakage at the probe of a dilution-

[1] An explanation of the Control Chart Methodology is posted on the Clean Air Markets Division web site, at http://www.epa.gov/airmarkets/workshops/index.html

extractive CEMS lowers the concentrations of all components of a stack gas sample by an equal amount[2].

Application of the approved adjustment factor will substantially increase Unit 2's reported SO_2, NO_x, and CO_2 mass emissions and unit heat input, but will not impact the NO_x lb/mmBtu emission rates because the effects of the leak on the NO_x and CO_2 concentrations cancel out in the NO_x emission rate equation. The increase in the reported SO_2 emissions affects compliance with the requirement to hold allowances covering SO_2 emissions for 2007 under the Acid Rain Program. The increase in NO_x mass emissions does not affect compliance with the allowance holding requirement under the NO_x Budget Trading Program, however, because the probe leak occurred outside the ozone season. The increase in CO_2 mass emissions will have no significant effect since CO_2 has no emission limit at the present time. Table 1 below compares the unadjusted SO_2 emissions during the probe leak period, as originally reported, to the SO_2 emissions that would be reported using: (a) standard Part 75 missing data substitution; and (b) the approved data adjustment factor of 1.135.

Table 1: Impact of Standard and Alternative Missing Data on Reported SO_2 Emissions During Probe Leak (Rush Island---Unit 2)

SO_2 Calculation Method	Reported SO_2 Emissions During Probe Leak Period (tons)
Unadjusted data, as originally reported	5,415
Adjusted data (estimate of likely actual emissions)	5,845
Standard Part 75 missing data substitution	11,147
Adjusted data (using 1.135 correction factor)	**6,115**

The second line in Table 1 shows that EPA's estimate of Unit 2's likely actual SO_2 emissions during the probe leak period is 5,845 tons[3]. From this it is clear, on the one hand, that using standard Part 75 missing data substitution would grossly overstate the SO_2 emissions, i.e., overstate them by almost 100%. On the other hand, applying the approved 1.135 data adjustment factor gives a much more reasonable, yet conservatively high estimate of the emissions, and would require Ameren to surrender an additional 700 SO_2 allowances. This is consistent with the purposes of the Part 75 standard missing data

[2] The assumption of equal dilution of the three gases is based on the fact that the concentrations of SO_2, NO_x, and CO_2 in the dilution air are insignificant. The dilution air is conditioned to ensure that it is of high purity and free of all gaseous species that may interfere with the measurements.

[3] This estimate was obtained by applying a data correction factor of 1.083 to each hour of the originally-reported SO_2 emissions data. This correction factor, which approximates the amount by which air in-leakage lowered the gas concentrations, was determined by dividing the average baseline CO_2 concentration by the average CO_2 concentration during the probe leak period. The approved (more conservative) data correction factor of 1.135 takes into consideration the uncertainty of those two average CO_2 concentrations.

substitution procedures, which are to ensure that emissions are not underreported and to provide strong incentive for owners and operators to ensure that monitoring systems are properly operated and maintained.

The conditions of this approval are as follows:

(1) Ameren shall resubmit the fourth quarter 2007 and first quarter 2008 electronic data reports (EDRs) for Rush Island Unit 2.

(2) For the time period extending from October 8, 2007, hour 07 to March 9, 2008, hour 06, Ameren shall report alternative substitute data values for SO_2 concentration, NO_x concentration, and CO_2 concentration, as follows:

(a) Each value of SO_2 concentration originally reported as quality-assured in column 35 of EDR record type (RT) 200 shall be adjusted upward by the approved data correction factor of 1.135. The adjusted concentrations shall be reported in column 35 of RT 200 and column 29 shall be left blank;

(b) Each NO_x concentration value originally reported as quality-assured in column 24 of RT 201 shall be multiplied by 1.135;

(c) Each CO_2 concentration value originally reported as quality-assured in column 24 of RT 202 and in column 24 of RT 210 shall be multiplied by 1.135;

(d) Any SO_2, NO_x, and CO_2 concentrations in RTs 200, 201 and 202 that were originally reported as substitute data values shall remain unchanged; and

(e) Ameren shall report a Method of Determination Code (MODC) of "55" in the appropriate columns of RTs 200, 201, 202, and 210, for each hourly SO_2, NO_x, and CO_2 concentration to which the approved data correction factor is applied.

(3) Ameren shall include EDR record type 910 in each of the two resubmitted EDRs for Rush Island Unit 2. Each RT 910 shall indicate the period(s) of time for which the emissions data have been adjusted in accordance with this approval.

(4) Ameren shall coordinate resubmission of the EDRs with Mr. Craig Hillock, who may be reached at (202) 343-9105, or by e-mail at hillock.craig@epa.gov

(5) Ameren shall address the SO_2 allowance accounting issues for Rush Island Unit 2 with Mr. Kenon Smith, who may be reached at (202) 343-9164, or by e-mail at smith.kenon@epa.gov

EPA's determination relies on the accuracy and completeness of the information provided by Ameren in the April 7, 2008 petition and supplementary data provided on April 8, 2008 and is appealable under Part 78. If you have any questions or concerns about this determination, please contact Robert Vollaro at (202) 343-9116, or by e-mail at vollaro.robert@epa.gov. Thank you for your continued cooperation.

Sincerely,

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/s/
Sam Napolitano, Director
Clean Air Markets Division

cc: Jon Knodel, EPA Region VII
Peter Yronwode, Missouri DNR
Robert Vollaro, CAMD
Craig Hillock, CAMD
Kenon Smith, CAMD