February 23, 2005

Mr. Kevin Holbrooks
Director, Environmental Compliance & Incident Response
Jacksonville Electric Authority
102 Kernan Boulevard North
Jacksonville, FL 32225-5300

Re: Petition for the use of an alternative data substitution method for Unit 3 at the Northside Generating Station (Facility ID (ORISPL) 000667)

Dear Mr. Holbrooks:

The United States Environmental Protection Agency (EPA) has reviewed the December 3, 2004 petition submitted under §75.66 by the Jacksonville Electric Authority (JEA), in which JEA requested permission to use an alternative missing data substitution methodology for Unit 3 at the Northside Generating Station, in order to correct the first and second quarter, 2004 emissions data for a low bias that was discovered by JEA. EPA approves the petition, with conditions, as discussed below.

Background

Unit 3 at JEA's Northside Generating Station in Jacksonville, Florida is a 5,260 mmBtu/hr dry-bottom, wall-fired boiler, which burns a combination of residual oil and pipeline natural gas. Unit 3 is subject to the Acid Rain Program, and JEA is required to monitor and report sulfur dioxide (SO_2), nitrogen oxides (NO_X), and carbon dioxide (CO_2) emissions and heat input data for the unit in accordance with 40 CFR Part 75. To meet the SO_2, NO_X, and CO_2 monitoring requirements of Part 75, JEA uses in-stack dilution extractive continuous emissions monitoring systems (CEMS).

In the December 3, 2004 petition, JEA states that a problem was found with the first and second quarter, 2004 emissions data that had been reported for Northside Unit 3. For a period of about 30 days in March and April, 2004, the SO_2 , NO_X, and CO_2 concentrations were all observed to be significantly lower than normal. When this was discovered, JEA hired RMB Consulting and Research, Inc. (RMB), to investigate the cause and duration of the apparent low bias and to recommend possible ways to correct the emissions data. RMB determined that the SO_2, NO_X, and CO_2 emissions data collected in the time period from March 25 through April 23, 2004 were, in fact, biased low and therefore emissions were under-reported during this time interval. Since the low bias was observed for all gaseous parameters, the in-stack dilution probe

was the most likely source of the bias, rather than the individual gas analyzers. Although it is not certain what caused the low CEMS measurements, it appears that a probe leak is the most probable cause, since the low bias in the data disappeared on April 23, 2004 after maintenance was performed on the probe. RMB noted that the daily calibration error and quarterly linearity quality assurance (QA) checks of dilution-extractive CEMS do not readily detect these types of problems, as evidenced by the fact that JEA performed and passed all required daily calibration and quarterly linearity checks of the monitoring systems during the time period in question.

According to RMB, the Unit 3 CEMS data can be directly correlated with other operating parameters, such as unit heat rate, making it possible to use a simple multiplier to correct a low bias in CEMS data. To derive such a multiplier for Northside Unit 3, RMB compared the unit heat rate calculated from the CEMS data (Btu/kW-hr) to the unit load (MW) for periods before and after the occurrence of the low bias. This comparison showed that the calculated unit heat rate was unreasonably low from March 25, 2004 until maintenance was performed on the dilution probe on April 23, 2004.

To determine the exact starting point of the low bias, RMB first calculated the average ratios of SO_2 mass emissions, CO_2 mass emissions, and heat input to unit load for every 10-hour period in which the unit operated during the month of March 2004. Based on a comparison of these 10-hour average ratios, the 10-hour period in which the low bias started was identified. Then, the mass emissions- and heat input-to-load ratios were calculated for the individual hours in this time period, and it was found that the 13th hour of March 25, 2004 was the starting point of the low bias.

RMB then compared the "normal" mass emissions- and heat input-to-load ratios from before and after the low bias incident to the corresponding ratios during the period of low bias. From this comparison, a series of correction factors were calculated. Table 1 is a summary of the bias correction factors derived by RMB.

Table 1. Summary of Bias Correction Factors

Parameter	Normal Ratio (per MW)	Ratio During Incident (per MW)	Correction Factor (column 2/column 3)
CO_2 mass	0.74	0.51	1.451
Heat Input	9.89	6.86	1.442
SO_2 mass	11.27	7.96	1.415
NO_X mass	2.91	1.92	1.515

According to RMB, since Unit 3 combusts multiple fuels with varying sulfur and carbon content, the most appropriate correction factor to apply to the data would the correction factor associated with heat input (i.e.,1.442) because unit heat rate is relatively constant irrespective of which fuel is burned in the unit.

By applying a correction factor of 1.442 to the reported SO_2 concentration data for the

time period from March 25, 2004 through April 23, 2004, Unit 3's cumulative SO_2 emissions for the 1st and 2nd calendar quarters of 2004 increase from 4,050 to 4,317 tons. However, if the standard Part 75 missing data procedures are applied over this same time period, the SO_2 mass emissions are more than 400 tons higher (i.e., 4,784 tons). JEA believes that the correction factor derived by RMB reasonably represents the actual SO_2 emissions from Unit 3, whereas the standard missing data procedures give an artificially inflated estimate of emissions. Therefore, in the December 3, 2004 petition, JEA requested permission to use the correction factor of 1.442 to adjust the unit's reported emissions data in the period extending from March 25 through April 23, 2004.

EPA's Determination

EPA conditionally approves JEA's petition to use an alternative missing data substitution methodology to adjust the emissions data for Northside Unit 3 in the time period extending from March 25 to April 23, 2004. The approved bias correction factor is 1.442. The basis for this approval and the conditions of approval are presented in the paragraphs below.

To assess the appropriateness of RMB's proposed correction factor, EPA performed a similar type of analysis of the CEMS data reported before and after the probe replacement. EPA compared the low-biased CO_2 data recorded from March 25 through April 23, 2004 to 720 hours of CO_2 data reported by JEA before the probe malfunction (prior to March 25, 2004) and also to 720 hours of CO_2 data reported by JEA following the probe repair (after April 23, 2004). EPA was able to verify that there was no noticeable difference in the manner of boiler operation before and after the probe replacement. The CO_2 data were selected for the analysis, because in the equation used to calculate heat input from CEM measurements, heat input is directly proportional to the CO_2 concentration. Thus, differences in CO_2 concentration could be used to derive an appropriate bias correction factor.

EPA separated the CO_2 data in each of the three data sets (i.e., pre-malfunction period, malfunction period and post-repair period) according to unit load, i.e., data recorded at the low, mid, and high load levels. This was done to account for any variation in CO_2 concentration with unit operating load. At each load level the median values for CO_2 concentrations were determined. Bias correction factors were then calculated at each load level by dividing the pre-malfunction and post-repair median CO_2 values by the median value obtained during the malfunction period. The highest correction factor calculated at any of the three operating levels was 1.34. This factor is similar to, but slightly lower than (and therefore less conservative than), the correction factor proposed by RMB. EPA also performed a graphical analysis, comparing the SO_2 mass emissions data adjusted with JEA's proposed factor of 1.442 to data recorded before and after the period of low bias. This analysis showed that the adjusted data are similar in both magnitude and variability to the quality-assured data collected prior to the probe malfunction and following the probe repair. EPA therefore believes that the proposed bias correction factor of 1.442 is appropriate. The Agency is allowing this correction factor to be used in lieu of the standard missing data procedures in §75.33, because JEA self-reported the incident of low bias, which would likely have gone undetected, in view of the fact that the gas monitoring systems installed on Northside Unit 3 passed all of the required daily and quarterly QA tests in the time period in question.

Conditions of Approval

The conditions of this approval are as follows:

(1) JEA shall resubmit the first, second and third quarter, 2004 electronic data reports (EDRs) for Northside Unit 3;

(2) For the time period extending from March 25, 2004, hour 13 through April 23, 2004:

(a) JEA shall apply a correction factor of 1.442 to each of the recorded hourly SO_2 concentrations in column 35 of EDR record type 200. Column 29 in RT 200 shall be left blank and a method of determination (MODC) code of "55" (i.e., "Other substitute data, approved through petition by EPA") shall be reported in column 41 of RT 200.

(b) JEA shall apply a correction factor of 1.442 to each of the recorded hourly CO_2 concentrations in column 24 of EDR record type 202. A method of determination (MODC) code of "55" shall be reported in column 30 of RT 202.

(c) JEA shall not report any NO_X or diluent gas data in EDR record types 201 and 210.

(d) For NO_X emission rate (which is not affected by the low bias in the CEM data)[1] JEA shall not adjust the NO_X emission rates reported in column 42 of EDR record type 320. However, column 36 of RT 320 shall be left blank, and a MODC code of "55" shall be reported in column 53 of RT 320.

(3) JEA shall coordinate resubmission of the data with Mr. Kevin Tran, who may be reached at (202) 343-9074 or by e-mail at tran.kevin@epa.gov.

EPA's determination relies on the accuracy and completeness of the information provided by JEA in the December 3, 2004 petition and is appealable under Part 78. If you have

[1] In the equation for NO_x emission rate, the NO_x concentration is in the numerator and the CO_2 concentration is in the denominator. Therefore, if a 1.442 correction factor is applied to each concentration, they cancel out and do not affect the NO_x emission rate.

any questions or concerns about this determination, please contact Manuel J. Oliva, at (202) 343-9009.

Sincerely,

/s/Larry Kertcher (for)
Sam Napolitano, Director
Clean Air Markets Division

cc: Wilson Haynes, EPA Region IV
Errin Pichard, Emissions Monitoring Section, Florida DEP
Manuel J. Oliva, EPA CAMD