March 1, 2007

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

Re: Petition to Resolve Data Quality Issues for Unit 3 at the Northside Generating Station (Facility ID (ORISPL) 667)

Dear Mr. Holbrooks:

The United States Environmental Protection Agency (EPA) has reviewed the November 22, 2006 petition under §75.66 in which the Jacksonville Electric Authority (JEA) requested relief from using standard missing data substitution for Unit 3 at the Northside Generating Station, in order to resolve two issues concerning the quality of Unit 3's 2006 emissions data. 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 that 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 November 22, 2006 petition, JEA states that through an internal audit of the reported 2006 emissions data for Northside Unit 3, two issues were identified that could adversely affect the quality of the data: (1) a tri-blend calibration gas with an expired certificate of analysis was used from May 12, 2006 to June 28, 2006 to perform daily calibrations of the SO_2, NO_X, and CO_2 monitors; and (2) the out-of-stack CEMS probe malfunctioned on four separate occasions.

On June 28, 2006, JEA noticed that a calibration gas cylinder with an expired certificate of analysis was being used for the daily calibration error tests of Unit 3's gas monitors. The gas cylinder, which had an expiration date of May 12, 2006, was immediately replaced with one that had a current certificate of analysis. The expired gas

was then sent back to the vendor to be recertified. Next, JEA thoroughly reviewed the daily calibration protocols in Unit 3's quality assurance (QA) plan. The procedures were found to be adequate. The expired calibration incident was traced to an individual who had failed to follow the established protocols.

The results of the vendor's recertification of the expired calibration gas demonstrated that the concentrations of SO_2, NO_x, and CO_2 inside the cylinder were essentially the same as the values indicated on the initial certificate of analysis. In view of this, JEA believes that no CEMS measurement errors resulted from the use of the expired calibration gas. Therefore, in the November 22, 2006 petition, JEA requested that EPA accept the SO_2, NO_x, and CO_2 data that were recorded in the time period extending from the May 12, 2006 expiration date of the cylinder to June 28, 2006, when the cylinder was removed from service.

Regarding the four identified periods in which the CEMS dilution probe malfunctioned, JEA hired RMB Consulting and Research, Inc. (RMB), to investigate the cause and duration of the malfunctions and to assess their effect on the quality of the CEMS data. RMB first established a baseline for evaluating CEMS performance by plotting the unit heat rate (Btu/kW-hr) versus unit load (MW) for a representative period of valid CEMS data. Hourly heat rates were then calculated from the 2006 CEMS data, separated into nine different load ranges, and compared against the baseline. The results of this evaluation brought to light specific time periods where it appears that probe malfunctions adversely impacted the CEMS measurements, as evidenced by heat rate values that were significantly lower (10 to 20%) than the baseline values. The heat rate is directly proportional to the CO_2 concentration. Therefore, when the CO_2 concentration is lower than expected (as was the case during the periods of probe malfunction), the heat rate will also be lower than expected.

Table 1, below, shows the results of the heat rate versus load evaluation performed by RMB, which identified two probe malfunction periods. The probe problems apparently began on February 5, 2006. The first episode ended on February 16, 2006, when the unit went off-line. Probe maintenance was performed before Unit 3 came back on line on April 1, 2006, and the heat rates were consistent with expected values until April 24, 2006, when the second episode began. The second episode ended when probe maintenance was performed on June 7, 2006. After identifying these two incidents of probe malfunction, JEA hired CEMS Solutions to review the CEMS technicians' probe maintenance procedures. CEMS Solutions did not find any problems or shortcomings with those maintenance procedures.

Following the probe maintenance on June 7, 2006, JEA and RMB were not fully convinced that the problem had been resolved. However, the CEMS appeared to be operating well, and there were no clear maintenance actions to be taken. Nevertheless, to prevent probe malfunctions from going unnoticed in the future, JEA implemented new data evaluation procedures which included, among other things, ongoing heat rate evaluations. These new procedures proved to be effective. The last two periods of probe malfunction, on August 6-7 and August 11-12, 2006 were detected and resolved much more quickly.

Table 1. Comparison of Heat Rate vs. Load for Initial Data Evaluations

	D	E	F	G	H	I	J	K	L	M	N
2098			<75 MW	75<>125	125<>175	175<>225	225<>275	275<>325	325<>375	375<>425	>425
2099			Btu/kWh	Btu/kWh	Btu/kWh	Btu/kWh	Btu/kWh	Btu/kWh	Btu/kWh	Btu/kWh	Btu/kWh
2100	Accurate	Average	15807	13428	12287	11465	11251	10846	10700	10568	10298
2101	CEMS Data	Std Dev	1084.2	820.4	627.8	459.4	408.8	424.8	289.6	266.8	253.8
2102											
2103	1/7 - 2/5	Average	15351	13315	12355	11111	10951	10222	11059		
2104	CEMS Data	Std Dev	1506.9	1153.0	805.5	434.5	597.3	322.4	113.5		
2105											
2106	2/5 - 2/16	Average	14309	11957	10856	9712	9119	9070	8354	7958	7410
2107	CEMS Data	Std Dev	1261.2	900.4	895.9	756.0	506.3	563.3	386.5	575.8	541.4
2108											
2109	4/1 - 4/24	Average	16817	14270	12957	11945	11203	10509			
2110	CEMS Data	Std Dev	1500.0	552.9	757.0	311.6	442.3	138.8			
2111											
2112	4/24 - 6/7	Average	14010	11830	10704	9721	9252	8918	7910	7565	7039
2113	CEMS Data	Std Dev	1257.8	920.6	832.9	640.0	745.4	782.9	746.1	877.7	967.4
2114											

Concerned about the frequency of the CEMS probe malfunctions, JEA hired RMB, Raesemann, Inc., and EPM, Inc. to thoroughly inspect the CEM systems in an attempt to determine the cause. The following problems were identified. First, when the new DAHS was installed in 2005, the probe blowback sequence had not been properly configured. As a result, the probe filter began to plug, preventing adequate sample gas from reaching the out-of-stack dilution orifice. The problem was more pronounced at higher loads, due to high particulate concentration at these load levels. Second, the dilution air, bypass and sample flow rates had been set too high.

To correct these problems, the blowback sequence was reconfigured, the dilution air and sample flow rates were adjusted, and continuous measurement of the dilution orifice pressure was initiated. JEA also implemented two preventive maintenance procedures: (1) the probe maintenance procedures were modified to reduce the risk of leaks (e.g., by replacing the flange/filter gaskets each time maintenance is performed on the probe); and (2) blowback and purge components were upgraded to improve their effectiveness and minimize future problems.

There have been no recurrences of CEMS probe malfunction since these corrective actions and preventive maintenance procedures were implemented. JEA and RMB believe that the probe issue has been resolved and that procedures are in place to quickly identify and resolve these or similar problems in the future.

The SO_2, NO_x, and CO_2 emissions data recorded during the four identified periods of probe malfunction in 2006 were biased low and need to be adjusted. Under Part 75, the data should be declared invalid and replaced with substitute data based on the standard Part 75 missing data procedures. However, Part 75 also allows submission of a petition under §75.66 requesting use of an alternative approach to use of the standard missing data routines. Believing that the Part 75 missing data substitution procedures would grossly overstate Unit 3's emissions during the time periods in question, JEA petitioned EPA for approval of an alternative substitute data methodology.

In the November 22, 2006 petition, JEA proposed to use non-linear regressions based on measured heat rates plus a 95% confidence interval to provide reasonable, yet conservatively high substitute data values. According to JEA, the measurement error associated with probe malfunction varied with time and load. Therefore, applying a single, constant correction factor to all periods of probe malfunction would not be appropriate. In view of this, JEA proposed to use a separate heat rate versus load equation, based on a period of valid CEMS data, to derive the appropriate correction factor for each load range.

To generate the heat rate equation for each load range, the quality assured CEMS data were first subjected to the Standardized Residual Test in order to exclude data outliers. According to JEA, exclusion of anomalous data is necessary because, during unit startups and load swings, the heat rate data may not be synchronized with the unit load. As the unit load shifts, the response times of the CO_2 analyzer, flow monitor, and load signals coming to the DAHS are all slightly different, and the calculated heat rate values may be less accurate during these periods.

After the final heat rate equations were determined, a 95% confidence interval was calculated and added to each equation. These equations (including the 95% confidence intervals) were then used to determine an average correction factor for each of EPA's three load ranges, for each period where the data validity was in doubt.

All of the SO_2, NO_x, and CO_2 emissions data recorded during the periods of probe malfunction were corrected using these load-based correction factors. The impact on the reported SO_2 emissions is shown below in Table 2. Table 2 shows that the estimate of Unit 3's 2006 SO_2 emissions obtained using JEA's proposed alternative substitute data methodology is substantially (> 1,400 tons) lower than the emissions estimate obtained by applying the standard Part 75 missing data procedures. According to JEA, the emissions estimate from the proposed alternative data substitution methodology is both environmentally conservative and more representative of the actual emissions from the unit during the incidents of probe malfunction.

Table 2. Data Substitution Impacts

SO_2 Emissions	**Tons**	**Increase from Reported**
Reported	1,476	N/A
Substituted[1]	3,214	+ 1,738
Petition[2]	1,728	+ 252

[1] Using standard Part 75 missing data routines
[2] Using the alternative substitute data procedure proposed by JEA

EPA's Determination

EPA approves JEA's petition to keep the SO_2, NO_x, and CO_2 emissions data recorded by Northside Unit 3's CEMS during the period extending from May 12 to June 28, 2006, when the expired calibration gas was used. The Agency compared the results of the original May 12, 2004 certification of the calibration gas mixture in question to the recertification performed June 29, 2006. Table 3 shows the results of this comparison.

Table 3. Certificate of Analysis of the Calibration Gas Mixture

Gaseous Component	Original Certification Concentration	Recertification Concentration
Nitric Oxide	425 ppm +/- 5ppm	425.4 ppm +/- 4.2 ppm
Sulfur Dioxide	853 ppm +/- 9 ppm	855.3 ppm +/- 8.5 ppm
Carbon Dioxide	17.0% +/- 0.2%	17.07% +/- 0.17%
Total NO_X	425 ppm	425.4 ppm

It is evident from Table 3 that there was essentially no change in any of the gas concentrations between the original certification and the recertification. EPA therefore accepts as valid all of the CEMS data that were quality-assured using this calibration gas cylinder. No adjustment to any of the emissions data recorded by Unit 3's gas monitors in the period from May 12 to June 28, 2006 is required.

EPA conditionally approves JEA's petition to use an alternative substitute data methodology to adjust Northside Unit 3's reported SO_2, NO_x, and CO_2 emissions data during the four identified incidents of CEMS probe malfunction. The basis for this approval and the conditions of approval are presented below.

To evaluate JEA's proposed substitute data methodology, EPA performed a similar analysis of the CEMS data recorded before, during, and after each incident of probe malfunction. Specifically, for each incident, EPA separated the hourly data into three categories (i.e., pre-malfunction period, malfunction period, and post-repair period), and further separated the data in each category into three load ranges (low, mid, and high).

As a result of its data analysis, the Agency has concluded that JEA's proposed substitute data methodology yields results comparable to the results of EPA's analysis and is technically sound. The Agency is allowing JEA to use this alternative methodology in lieu of applying the standard missing data procedures in §75.33, because using substitute data based on the standard missing data procedures would result in reported emissions for the probe leak period that are likely to overstate the actual emissions far more than is appropriate in this case. As shown in Table 2, above, the reported SO_2 emissions using standard substitute data (3,214 tons) would be about 2.2 times the currently reported amount of emissions (1,476 tons) for the period. The approved data correction methodology requires 1,728 tons of SO_2 to be reported, which is approximately 1.2 times the reported emissions. This emissions estimate is still conservatively high, but is believed to be much closer to Northside Unit 3's actual emissions. Further, the probe leak at Unit 3 could not be detected through performance of the quality assurance (QA) tests required for that period. In fact, the gas monitoring

systems installed on Northside Unit 3 consistently passed their required QA tests during the time period in question.

Under these circumstances, EPA concludes that substitute data based on the alternative data correction methodology is sufficiently conservative to ensure that emissions are not understated and to provide a strong incentive for compliance with Part 75 requirements.

The conditions of this approval are as follows:

(1) JEA shall resubmit the first, second, third, and fourth quarter, 2006 electronic data reports (EDRs) for Northside Unit 3;

(2) For each of the following time periods, JEA shall apply the approved alternative data substitution methodology described in the November 22, 2006 petition. The appropriate correction factor shall be applied to each hour of data recorded by Unit 3's SO_2, NO_x, and CO_2 CEMS during these time periods:

(a) February 5, 2006, hour 00 through February 16, 2006, hour 23
(b) April 24, 2006, hour 00 through June 7, 2006, hour 23
(c) August 6, 2006, hour 00 through August 7, 2006, hour 23
(d) August 11, 2006, hour 00 through August 12, 2006, hour 23

(3) JEA shall report a Method of Determination Code (MODC) of "01" for each hour of adjusted SO_2, NO_x, and CO_2 emissions data;

(4) JEA shall include EDR record type (RT) 910 in the first, second and third quarter, 2006 EDRs for Northside Unit 3. Each RT 910 shall indicate the period(s) of time for which the SO_2, NO_x, and CO_2 emissions data have been adjusted in accordance with this approval. Further, the RT 910 in the second quarter, 2006 EDR shall indicate the hours in which the expired protocol gas was used to calibrate Unit 3's gas monitors and shall indicate that EPA approved JEA's November 22, 2006 petition to accept these data without adjustment; and

(5) JEA shall coordinate resubmission of the EDRs 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 November 22, 2006 petition and is appealable under Part 78.

If you have any questions or concerns about this determination, please contact Manuel J. Oliva, at (202) 343-9009. Thank you for your continued cooperation.

Sincerely,

/s/
Sam Napolitano, Director
Clean Air Markets Division

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