



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

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*ARD-030010#3*

AUG 27 2003

OFFICE OF  
AIR AND RADIATION

Mr. Steven A. Schultz  
Executive Director  
Blount Generating Station  
Madison Gas and Electric Company  
P.O. Box 1231  
Madison, WI 53701-1231

Re: Petition to Correct 2002 CEMS Data for Unit 8 at Madison Gas and Electric Company's Blount Generating Station (Facility ID (ORISPL) 003992)

Dear Mr. Schultz:

The United States Environmental Protection Agency (EPA) has reviewed the petition submitted under §75.66(a) by Madison Gas and Electric Company (MGE) on December 18, 2002, in which MGE requested permission to resubmit the second and third quarter, 2002 electronic emissions data reports (EDRs) for Unit 8 at the Blount Generating Station, in order to correct the data for a low bias that was discovered by MGE. EPA approves the petition, with conditions, as discussed below.

Background

Unit 8 at MGE's Blount Generating Station in Madison, Wisconsin is a coal-burning 54 megawatt dry-bottom, wall-fired boiler. Unit 8 is subject to the Acid Rain Program and MGE is required to monitor and report sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and carbon dioxide (CO<sub>2</sub>) emissions and heat input data for the unit in accordance with 40 CFR Part 75. To meet the SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub> monitoring requirements of Part 75, MGE uses in-stack dilution extractive continuous emissions monitoring systems (CEMS).

On August 19, 2002, MGE noticed a significant increase in the stack gas concentrations measured by the CEMS immediately after installing a like-kind replacement sampling probe on Unit 8. MGE interpreted the sharp increase in the gas concentrations as an indication that, for an indeterminate amount of time prior to the probe replacement, the emissions data recorded by the CEMS may have been biased low. MGE described this observation in the third quarter, 2002

EDR report for Unit 8 and then hired RMB Consulting and Research, Inc., 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<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub> emissions data collected in the time period from April 29 through August 19, 2002 was, 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 analyzers. Although it is not certain what caused the low CEMS measurements, it appears that either a probe leak or probe plugging is the most probable cause. 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 MGE performed and passed all required daily and quarterly QA checks of the monitoring systems during the time period in question.

According to RMB, the Unit 8 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 the low bias in the CEMS data. RMB proposed to apply a bias correction factor of 1.242 to the SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub> data recorded in the period from April 29 through August 19, 2002. To derive this correction factor, RMB first identified two distinct periods of time, one before the probe replacement, and one after the replacement, during which Unit 8 was operated in a similar manner. To confirm that unit operation in the two time periods was truly similar, the unit heat input during each time period was estimated from fuel usage data. The estimates agreed within 0.64%. RMB then examined the unit heat input measured by the CEMS during the same two time periods, and found that the heat input in the period following the installation of the new probe was 24.2% higher than the heat input in the time period prior to the probe replacement. Hence, RMB recommended a 24.2% upward adjustment of the CEMS data, using a correction factor of 1.242.

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<sub>2</sub> data recorded from April 29 through August 19, 2002 to all of the CO<sub>2</sub> data reported by MGE after the probe replacement (i.e., from August 20, 2002 through March 31, 2003). 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<sub>2</sub> data were selected for the analysis, because in the equation used to calculate heat input from CEMS measurements, heat input is directly proportional to the CO<sub>2</sub> concentration. Thus, differences in CO<sub>2</sub> concentration could be used to derive an appropriate bias correction factor.

EPA divided the pre- and post-replacement CO<sub>2</sub> data into three categories, i.e., data recorded at the low, mid, and high load levels. This was done to account for any variation in CO<sub>2</sub> concentration with unit operating load. At each load level the median values of the pre- and post-replacement CO<sub>2</sub> concentrations were determined. A bias correction factor was calculated at

each load level by dividing the post-replacement median CO<sub>2</sub> value by the pre-replacement median CO<sub>2</sub> value. The highest correction factor calculated at any of the three operating levels was 1.27. This factor is similar to, but slightly higher than (and therefore more conservative and preferable to), the correction factor proposed by RMB.

EPA evaluated the appropriateness of the calculated 1.27 bias correction factor by applying it to each of the pre-replacement median concentrations of CO<sub>2</sub>, NO<sub>x</sub>, and SO<sub>2</sub> and then comparing each adjusted median value to the corresponding post-replacement median concentration. In each case, the adjusted median pre-replacement concentration was within one-half standard deviation of the median post-replacement concentration. For NO<sub>x</sub> and CO<sub>2</sub> the corrected pre-replacement median concentrations were within 1 ppm and 0.1% CO<sub>2</sub>, respectively, of the post-replacement values. For SO<sub>2</sub>, the corrected pre-replacement and post-replacement median values were not as close, probably because the concentration of SO<sub>2</sub> varies with the sulfur content of the fuel. However, EPA performed graphical analyses of the adjusted pre-replacement hourly data versus the post-replacement hourly data, and these clearly show that for all three parameters (SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub>), the corrected pre-replacement data are similar in both magnitude and variability to the quality-assured data collected following the probe replacement. EPA therefore believes that a bias correction factor of 1.27 is appropriate for all three parameters.

#### EPA's Determination

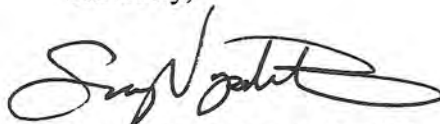
Although the gas monitoring systems installed on Blount Unit 8 passed all of the required daily and quarterly QA tests in the period from April 29 through August 19, 2002, data analyses performed by RMB and EPA have shown that the actual emission measurements made during that time interval were invalid (i.e., biased low). In its December 18, 2002 petition, MGE noted that only a relative accuracy test audit (RATA) and bias test would have detected the low bias, and RATA testing is typically performed just once a year.

Ordinarily, for any unit operating hour(s) in which valid, quality-assured data are not obtained with a certified monitor, the missing data provisions in §§75.30 through 75.33 would require appropriate substitute data values to be reported. However, the data analyses described above have demonstrated that there was a consistent, uni-directional bias in the data recorded by Unit 8's certified gas monitoring systems in the period extending from April 29 through August 19, 2002. EPA therefore approves MGE's petition to make an upward adjustment of the SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub> emissions data for this time period, in lieu of using the standard Part 75 missing data routines. The approved bias correction factor is 1.27.

Correcting the data will require a resubmission of the second, third and fourth quarter, 2002 EDRs for Unit 8. EPA estimates that the SO<sub>2</sub> mass emissions for 2002 will increase by approximately 239 tons for Unit 8 as a result of the data adjustment. MGE should coordinate resubmission of the data with Mr. Craig Hillock, who may be reached at (202) 564-9105 or by e-mail at hillock.craig@epa.gov.

EPA's determination relies on the accuracy and completeness of MGE's December 18, 2002 petition and the associated electronic data reports and is appealable under Part 78. If you have any questions regarding this correspondence, please contact Matthew Boze at (202) 564-1975.

Sincerely,

A handwritten signature in black ink, appearing to read "Sam Napolitano", written in a cursive style.

Sam Napolitano, Acting Director  
Clean Air Markets Division

cc: Constantine Blathras, USEPA Region 5  
Andy Seeder, WI DNR  
Susan Rosenberg, MGE  
Louis Nichols, USEPA CAMD  
Craig Hillock, USEPA CAMD