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

SEP 20 2004

OFFICE OF
AIR AND RADIATION

David W. Osburn
Designated Representative
Richmond Power & Light
P.O. Box 908
Richmond, IN 47375-0908

Re: Petition for Alternative Method of Missing Data Substitution
Following Failure of Quarterly Linearity Test for Units 1 and 2 at
Richmond Power & Light's Whitewater Valley Generating Station
(Facility ID (ORISPL) 1040)

Dear Mr.Osburn:

EPA has reviewed your October 23, 2003 petition under §75.66 in which Richmond
Power & Light (RPL) requested to use an alternative method of missing data substitution
following a failed linearity check, for Units 1 and 2 at the Whitewater Valley Generating Station.
EPA approves the petition in part, and with conditions, as discussed below.

Background

RPL owns and operates two coal-fired boilers, Units 1 and 2, at the Whitewater Valley
facility in Richmond, Indiana. The units discharge to the atmosphere through a common stack
which has an ID number of CS12. Units 1 and 2 are subject to the Acid Rain Program and RPL
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 the units, in accordance with 40 CFR Part 75.
The units are also subject to the NO_x Budget Trading Program and are required to monitor and
report NO_x mass emissions and heat input under the Indiana Department of Environmental
Management regulation, 326 IAC 10-4.

To satisfy the NO_x monitoring requirements of the Acid Rain and NO_x Budget Programs,
RPL has installed and certified a NO_x-diluent continuous emission monitoring system (CEMS) at
common stack CS12, consisting of a NO_x pollutant concentration monitor and a CO_2 monitor.
For each hour of unit operation, this monitoring system measures and records the NO_x
concentration (in ppm) and the CO_2 concentration (in percent CO_2), from which the NO_x
emission rate (in lb/mmBtu) is determined.

RPL is required to calibrate and maintain the NO_x-diluent monitoring system according to

the quality assurance and quality control procedures in Appendix B of Part 75. Section 2.2.1 of Appendix B requires RPL to perform quarterly linearity checks of the NO_x and CO_2 monitors, at three different calibration gas levels (i.e., low, mid, and high). According to section 3.2 of Appendix A to Part 75, the allowable linearity error at each gas level is 5.0 % of the reference gas concentration or "tag value". Alternatively, for the CO_2 monitor, the test results are acceptable if, at each gas level, the absolute difference between the mean monitor response and the reference gas tag value, i.e., $|R - A|$, does not exceed 0.5% CO_2.

On May 22, 2003, a technician employed by Environmental Systems Corporation (ESC) performed the required quarterly linearity checks of the NO_x and CO_2 monitors, as specified in Appendix B of Part 75. Believing the linearity checks to have been passed, RPL submitted the test results to EPA in the second quarter, 2003 electronic data report (EDR) for Whitewater Valley. However, the CO_2 linearity test had actually been failed at the mid-gas level, and this was not discovered until August, 2003.

The mid-level CO_2 test was failed in terms of both the main and alternative linearity specifications. When the main specification is applied to the test data, a linearity error of 7.3% is obtained, which exceeds the allowable 5.0% error. In terms of the alternate specification, an $|R - A|$ value of 0.8% CO_2 is obtained, which exceeds the allowable 0.5% CO_2.

Whenever the linearity check of a Part 75 monitor is failed, the monitor is considered to be out-of-control, and all data from the monitor are considered invalid, until a subsequent linearity check is passed. In this case, the CO_2 test failure results in 2,178 hours of CO_2 data being invalidated, in the period extending from May 22 to August 21, 2003. Since the CO_2 monitor is a component of the NO_x-diluent monitoring system, the NO_x system is also considered to be out-of-control for 2,178 hours. Thus, RPL is required to use the Part 75 missing data algorithms to provide substitute CO_2 concentration and NO_x emission rate data for these hours. Invalidation of 2,178 hours of data results in the percent monitor data availability (PMA) for NO_x emission rate and CO_2 concentration dropping below 80.0% (as of August 3, 2003), which, according to the standard missing data procedures in §75.33, triggers a requirement to report the maximum potential NO_x emission rate (MER). Since the missing data period spanned across two calendar quarters, it is treated as two separate missing data events, i.e. one from May 22 to June 30, 2003 and one from July 1 to August 22, 2003. At the end of the first event, the PMA had not yet dropped below 80.0%, so reporting of the MER was not yet required. However, for the second missing data event, which lasted for 1,237 hours, the MER value of 1.16 lb/mmBtu was reported for each hour.

In the October 23, 2003 petition, RPL requested relief from using the Part 75 standard missing data procedures for the second missing data period following the failed CO_2 linearity check (i.e., for the 1,237 operating hours between July 1 and August 21, 2003). Specifically, RPL requested to continue to use the same missing data algorithm for the second missing data event as was used for the first event. In other words, to avoid reporting the MER for 1,237 hours, RPL wants to use the missing data algorithm corresponding to PMA values between 80.0 and

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90.0%, instead of using the algorithm for PMA values below 80.0%. Further, RPL requested to continue using that same, less conservative algorithm for missing data substitution until the PMA of the monitoring systems returns to a level above 80.0%. RPL expressed concern that reporting the MER value of 1.16 lb/mmBtu (which is about 2 to 3 times higher than the typical NO_x emissions from the unit) for 1,237 hours could result in Units 1 and 2 exceeding their annual NO_x emission limit of 0.45 lb/mmBtu under 40 CFR Part 76.

EPA's Determination

EPA conditionally approves RPL's request to use an alternative missing data substitution methodology for CO_2 and NO_x emission rate for Whitewater Valley, Units 1 and 2, for the 1,237 operating hours extending from July 1, 2003, hour 00 through August 21, 2003, hour 13, following the failed linearity check of the CO_2 monitor. However, the approved methodology is not the one requested by RPL in the October 23, 2003 petition, because EPA believes that in order to maintain consistency in the implementation of the Acid Rain Program and the NO_x Budget Trading Program, it is not appropriate to replace the missing data algorithm prescribed by law for PMA values below 80.0% with the algorithm prescribed for PMA values between 80.0 and 90.0%. Nevertheless, EPA will allow RPL to use the alternative missing data substitution method described below to obtain relief from reporting the maximum potential NO_x emission rate in the 1,237 hour time period in question:

(1)   For each of the 1,237 hours in question, RPL shall use a substitute data value of 12.2% CO_2 in conjunction with the actual, measured hourly NO_x concentration (in ppm) to calculate the hourly NO_x emission rate (in lb/mmBtu). The 12.2% CO_2 substitute data value is the 10th percentile value obtained from a lookback through 720 hours of quality-assured CO_2 data recorded immediately prior to the out-of-control period. Using a conservatively low (10th percentile) CO_2 value ensures that the NO_x emission rates will not be underestimated. RPL calculates NO_x emission rates using Equation F-6 in Appendix F of Part 75. In that equation, as the percent CO_2 decreases, the NO_x emission rate increases. EPA notes that the 720-hour data lookback excluded hours in which only one of the units was in operation, because: (a) both units operated during the entire out-of-control period; and (b) according to RPL, the CO_2 readings are significantly lower when one unit is not operating, due to air in-leakage into the stack.

(2)   For the purposes of the electronic data reports (EDRs) required under §75.64, RPL shall report an hourly NO_x emission rate, calculated according to (1), above, for each of the 1,237 hours of the missing data period extending from July 1, 2003, hour 00 to August 21, 2003, hour 13. The NO_x emission rates shall be reported in EDR record type 320, using a method of determination code (MODC) of "55" (i.e., "Other substitute data approved through petition by EPA"). Manual entry of the NO_x emission rates and MODC codes is permitted.

(3)   RPL shall <u>not</u> report hourly NO_x or diluent gas concentrations in EDR record types 201 and 210 for any of the 1,237 hours of the missing data period. Instead, RPL shall submit a separate electronic file to the Clean Air Markets Division, showing the hourly NO_x concentrations used to calculate the NO_x emission rates during the missing data period. The electronic file shall be sent to Louis Nichols, at : nichols.louis@epa.gov.

(4)   For the CO_2 monitoring system and for heat input determination, RPL shall use the standard missing data procedures in §75.35(d) to provide substitute CO_2 data for both missing data periods, i.e., from May 22, hour 18 to June 30, hour 23 and for July 1, 2003, hour 00 to August 21, hour 13. The substitute data values shall be reported in EDR record type 202.

(5)   RPL shall <u>not</u> reset the percent monitor data availability of either the CO_2 monitoring system or for the NO_x emission rate monitoring system. However, until the PMA of these systems returns to 80.0%, RPL may use a variant of the alternative procedure described in (1), above, to provide substitute NO_x emission rate data, for any hour in which a valid NO_x concentration is obtained[1]. After that, RPL shall resume using the standard missing data procedures in §75.33 for NO_x emission rate.

(6)   Since the adjustments to the 3rd quarter, 2003 data described in (1) and (2), above, affect the cumulative emissions and heat input for the year, RPL must resubmit the EDR reports for both the 3rd and 4th quarters of 2003.
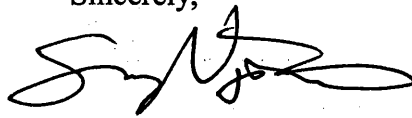
This approval is based on the following considerations. First, a review of the 3rd quarter, 2003 EDR report showed that RPL conducted all of the applicable quality assurance tests set forth in Part 75 and passed all but one of the tests. Second, a review of the quality-assured NO_x emission rates recorded at CS12 in the period preceding the failed linearity check (i.e., from January 1 to May 22, 2003) showed that nearly all of the NO_x emission rates were less than half of the MER value (1.16 lb/mmBtu) that would be used in standard substitute data, and ranged from about 0.300 to 0.500 lb/mmBtu, with none exceeding 0.592 lb/mmBtu. Third, the NO_x concentration monitor passed all of its required daily calibration error tests during the 1,237 hour time period in question. Thus, it is reasonable to calculate substitute NO_x emission rate values for that time period using the actual, measured NO_x concentrations. Fourth, EPA can ensure that NO_x emissions are not under-reported by requiring calculation of alternative substitute NO_x

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[1] That is, until the PMA returns to 80.0%, for any hour in which a valid NO_x concentration value is obtained but the CO_2 monitor is out-of-control, RPL may, in lieu of reporting the MER, calculate the NO_x emission rate using the measured NO_x concentration and a CO_2 value of 12.2% CO_2, reporting a MODC of "55" in RT 320 . However, for missing data hours where the NO_x monitor is out-of-control, RPL shall report the NO_x MER in RT 320, using a MODC of "12".

emission rate values for the 1,237 hour period using a conservatively low substitute CO_2 data value, derived from 720 hours of quality-assured CO_2 data. This alternative CO_2 missing data approach is conceptually and procedurally similar to the standard CO_2 missing data methodology in §75.35, except that the mathematical algorithms are "inverted", i.e., a low (e.g.,10th percentile) substitute data value is used instead of a high (e.g., 90th percentile) value. Application of the standard CO_2 missing data routines is inappropriate in this case, because the substitute data values derived from these algorithms are conservatively high and would underestimate the hourly NO_x emission rates.

EPA's determination relies on the accuracy and completeness of the information provided by Richmond Power & Light in the October 23, 2003 petition and is appealable under Part 78. If you have any questions or concerns about this determination, please contact Louis Nichols, at (202) 343-9008.

Sincerely,

Sam Napolitano, Director
Clean Air Markets Division

cc: Constantine Blathras, EPA Region V
       Jarrod Fisher, IDEM
       Louis Nichols, CAMD