April 11, 2007

John M. McManus
Vice-President, Environmental Services Division
American Electric Power
1 Riverside Plaza
Columbus, OH 43215-2373

Re: Petition to Use Alternative Sampling Points for Appendix E Testing of Units 2 and 3 at American Electric Power's Knox Lee Plant (Facility ID (ORISPL) 3476)

Dear Mr. McManus:

The United States Environmental Protection Agency (EPA) has reviewed the September 23, 2005 petition submitted by American Electric Power (AEP) under §75.66, in which AEP requested acceptance of nitrogen oxides (NO_x) emission tests performed in July 2005 on Units 2 and 3 at the Knox Lee Plant. The tests were done using fewer sampling points than are normally required by Appendix E of 40 CFR Part 75. EPA approves the petition, for the reasons discussed below.

Background

AEP owns and operates four boilers, Units 2, 3, 4, and 5 at the Knox Lee Plant (Knox Lee) near Longview, Texas. The units' primary fuel is natural gas, and they are subject to the Acid Rain Program. Therefore, AEP is required to continuously monitor and report sulfur dioxide (SO_2), NO_x, and carbon dioxide (CO_2) emissions and heat input for these units in accordance with 40 CFR Part 75.

Knox Lee Units 2 and 3 are peaking units, as defined in 40 CFR 72.2. Therefore, in lieu of using a continuous emission monitoring system (CEMS) to determine the hourly NO_x emission rate from these units, AEP uses the optional NO_x emissions estimation procedures in Appendix E of Part 75. Appendix E applies only to gas-fired and oil-fired peaking units. To use this methodology, a correlation curve of NO_x emission rate versus heat input rate is first derived from emission testing. Then, the hourly unit heat input rates are obtained from measurements of fuel flow rate and gross calorific value (GCV), and hourly NO_x emission rates are determined from the correlation curve.

Section 2.1 of Appendix E requires an initial four-load NO_x emission rate test to be performed for each type of fuel combusted in the unit, except for emergency fuel, for which the testing is optional. For boilers, such as Knox Lee Units 2 and 3, the testing is performed using

EPA Reference Methods 7E and 3A[1]. The emission testing is done at four evenly-spaced load levels, ranging from the minimum to the maximum unit operating load, and three test runs are performed at each load. During each Appendix E test run, the unit heat input rate is determined using the fuel GCV and readings from a fuel flowmeter that meets the requirements of Part 75, Appendix D. Also, certain parameters must be monitored during each test run. For boilers, excess oxygen is monitored, and it must either be set at a normal level or at a conservatively high level. The NO_x emission rate and heat input rate data are averaged at each load level, and a correlation curve of NO_x emission rate (lb/mmBtu) versus heat input rate (mmBtu/hr) is constructed. The correlation curve is then programmed into the data acquisition and handling system (DAHS) and is used to estimate hourly NO_x emission rates.

As previously noted, for the Appendix E NO_x testing of a boiler, EPA Methods 7E (for NO_x concentration) and 3A (for O_2 concentration) must be used. Section 2.1.2.1 of Appendix E requires the number and location of the sampling points to be as specified in section 8.3.1 of EPA Method 3. That is, for stack diameters greater than 24 inches in diameter (such as those at Knox Lee), a minimum of 12 traverse points, located according to EPA Method 1, must be used.

In July 2005, Appendix E NO_x testing was performed on Knox Lee Units 2 and 3. After the testing had been completed, it was discovered that the test company had inadvertently determined the number and location of the sampling points according to the criteria for stationary gas turbines in section 2.1.2.2 of Appendix E, rather than following the procedures for boilers in section 2.1.2.1. As a result, the testing was done at 8 points instead of 12. However, section 2.1.2.1 allows the designated representative to petition the Administrator under §75.66 for permission to use fewer than 12 sampling points for an Appendix E test of a boiler. In view of this, AEP submitted a petition on September 23, 2005, requesting that EPA accept as valid the results of the 8-point Appendix E tests conducted in July 2005 at Knox Lee Units 2 and 3.

As an attachment to the September 23, 2005 petition, AEP provided the results of pre-test traverses that were performed by the testing company just prior to the July 2005 Appendix E tests. Preliminary 16-point traverses of the Unit 2 and 3 stacks were done, in accordance with EPA Method 20 (the test method for stationary gas turbines). The purpose of these preliminary traverses was to identify the 8 points of lowest O_2 concentration in each stack, which were then used as the test points.[2] Although Method 20 only required a pre-test traverse to be done for O_2, in this case, the testers also collected concurrent NO_x concentration data at each of the 16 traverse points. This enabled AEP to calculate the NO_x emission rate (in lb/mmBtu) at each point. According to AEP, the variation in the NO_x emission rates across each stack was so small that the results of the July 2005 tests would not have been significantly different if the testing had been done at 12 points rather than 8.

[1] These test methods are found in Appendices A-2 and A-4 of 40 CFR Part 60.

[2] Note that at the time of these tests (July 2005), a pre-test O_2 traverse was required by Method 20 to identify the 8 sample points. However, in May 2006, Method 20 was revised and the preliminary traverse is no longer required.

EPA's Determination

EPA reviewed the preliminary traverse data provided by AEP. For both Units 2 and 3, the data demonstrate that the NO_x concentration at each of the 16 traverse points was well within 10 percent of the mean value. Similar results were obtained for the O_2 concentration readings. Further, for both units, the calculated NO_x emission rate at each traverse point was within 5 percent of the mean value.

The results of the NO_x and O_2 concentration traverses (all points within 10% of the mean value) meet the acceptance criterion in section 6.5.6.3(a) of Part 75, Appendix A for a stratification test. In other words, in both stacks, no significant stratification (i.e., point-to-point variation) was observed in either the NO_x or the O_2 concentration. For the calculated NO_x emission rates, the point-to-point variation was even less (all points within 5% of the mean), indicating a virtual absence of NO_x emission rate stratification.

In view of the consistency of the NO_x emission rates across each stack, EPA concurs that there would have been no significant difference in the results of the July 2005 Appendix E tests of Knox Lee Units 2 and 3 if the tests had been performed at 12 points rather than 8. Therefore, the Agency accepts those tests as valid, and the correlation curves derived from them may be used for Part 75 reporting purposes. However, all future Appendix E testing done at this facility must meet 40 CFR Part 75 requirements.

EPA's determination relies on the accuracy and completeness of the information provided by AEP in the September 23, 2005 petition, and is appealable under Part 78. If you have any questions regarding this determination, please contact Travis Johnson at (202) 343-9018. Thank you for your continued cooperation.

Sincerely,

/s/
Sam Napolitano, Director
Clean Air Markets Division

cc: Joyce Johnson, Region, EPA Region VI
Mr. John Smith, Texas Commission on Environmental Quality
Travis Johnson, CAMD