



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

MAY 20 2004

OFFICE OF
AIR AND RADIATION

Mr. Warren Candy
Vice President - Generation Operations
Designated Representative
Minnesota Power
30 West Superior Street
Duluth, MN 55802-2093

Re: Petition to Use a Site-specific Moisture Default Value for Units 1, 2, and 3 at the Taconite Harbor Energy Center (Facility ID (ORISPL) 10075)

Dear Mr. Candy:

The United States Environmental Protection Agency (EPA) has reviewed the petition submitted under §75.66(a) by Minnesota Power (MP) on March 24, 2003, in which MP requested permission to use a site-specific default moisture value for the purpose of making moisture corrections to the emissions data from Units 1, 2 and 3 at Taconite Harbor Energy Center. EPA approves the petition, with conditions, as discussed below.

Background

Minnesota Power owns and operates three 80 MWe tangentially-fired boilers, i.e., Units 1, 2, and 3, at the Taconite Harbor Energy Center in Minnesota. All three units combust sub-bituminous coal. The units are subject to Acid Rain Program. Therefore, MP is required to continuously monitor and report sulfur dioxide (SO₂) and carbon dioxide (CO₂) mass emissions, nitrogen oxides (NO_x) emission rate, and heat input rate for these units.

To measure the NO_x emission rate (in lb/mmBtu), MP uses a NO_x-diluent monitoring system consisting of a wet-basis NO_x concentration monitor and a wet-basis oxygen (O₂) monitor. When both NO_x and O₂ are measured on a wet basis, section 3.1 of Appendix F to Part 75 requires the use of the equations in Method 19 in Appendix A of 40 CFR Part 60 to determine the NO_x emission rate. MP calculates NO_x emission rate using Equation 19-3 from EPA Method 19. This equation requires a stack gas moisture correction.

For the purposes of determining CO₂ mass emissions, MP uses the data from its wet-basis oxygen monitor to calculate hourly CO₂ concentrations, utilizing Equation F-14b from section

4.4 of Appendix F to Part 75. Equation F-14b also requires a stack gas moisture correction.

Part 75 provides two options for determining the stack gas moisture content when moisture corrections are required. The owner or operator may either report the appropriate fuel-specific default moisture value provided in §75.11(b) or §75.12(b), or, if this option is not viable, a continuous moisture monitoring system must be installed, certified, maintained and operated. Section 75.12(b) specifies that when Equation 19-3 is used to determine NO_x emission rate, the appropriate moisture default value for sub-bituminous coal is 12.0% H_2O . However, §75.13(c) states that when Equation F-14b is used to calculate CO_2 concentration, the appropriate default moisture value for sub-bituminous coal is the value from §75.11(b), i.e., 8.0% H_2O .

Thus, two different default moisture values are prescribed by Part 75 for the combination of equations used by MP. Having different moisture constants for different parameters creates a number of complex data acquisition and handling system (DAHS) programming problems and reporting issues. In view of this, in the March 24, 2003 petition, MP requested permission to use a single moisture default value for all of the emission and heat input calculations for Taconite Harbor Units 1, 2 and 3.

In support of the March 24, 2003 petition, MP analyzed stack gas moisture data from a series of emission tests of Units 1, 2, and 3 in 2002. EPA Method 4 was used to make the moisture measurements. According to MP, the results of these 48 test runs show an average stack gas moisture content of 10.3% H_2O , with the 10th percentile, 90th percentile, and maximum values of the data set being 9.4%, 11.3%, and 11.9% H_2O , respectively. Based on these results, MP requested permission to use the average moisture value from the data set, i.e., 10.3% H_2O , as the single, site-specific default moisture value for calculating all of the hourly CO_2 mass emissions, NO_x emission rates, and heat inputs for Units 1, 2, and 3.

EPA's Determination

EPA conditionally approves MP's petition to use a single fuel-specific default moisture value for Units 1, 2, and 3 at Taconite Harbor Energy Center, in lieu of installing continuous moisture monitoring systems. The conditions of approval are as follows:

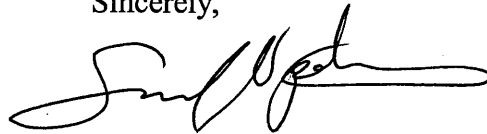
- (1) MP shall use a site-specific moisture default value of 11.3% H_2O , rather than the value of 10.3% H_2O requested in the March 24, 2003 petition. MP shall begin using this default value to determine hourly emissions starting January 1, 2004. The approved fuel-specific default moisture value is the 90th percentile value from the moisture data provided by MP in support of the petition. This is consistent with the manner in which EPA determined the fuel-specific default moisture values for coal and wood combustion in §75.12(b). The 90th percentile value was selected because MP uses Equation 19-3 to calculate the hourly NO_x mass emission rate. In that equation, as the percent moisture increases, the NO_x mass emission rate increases. Therefore, using a conservatively high moisture value in

Equation 19-3 greatly reduces the possibility of underestimating NO_x emissions;
and

- (2) MP shall re-evaluate the appropriateness of the site-specific moisture default value each year, during the annual relative accuracy test audits (RATAs). Provided that the average percent moisture measured during the RATAs of Units 1, 2, and 3 either is less than or equal to the approved default moisture value or does not exceed the approved value by more than 1.0% H₂O, the approved value shall continue to be used. However, if the average percent moisture measured during the RATAs exceeds the approved default value by more than 1.0% H₂O, the average value from the RATAs shall become the new approved value, and shall be used, beginning no later than one week after the results of the moisture tests have been received.

EPA's determination relies on the accuracy and completeness of the information provided by MP in the March 24, 2003 petition and is appealable under Part 78. If you have any questions regarding this determination, please contact Louis Nichols at (202) 343-9008.

Sincerely,



Samuel Napolitano, Director
Clean Air Markets Division

cc: Cecilia Mijares, USEPA Region 5
Jim Kolar, MPCA
Louis Nichols, CAMD