

April 13, 2004

Mr. Warren Candy
Designated Representative
Minnesota Power
1210 NW 3rd Street
Cohasset, Minnesota 55721

Re: Petition for Alternative Method of Missing Data Substitution for Minnesota Power's Boswell Energy Center (Facility ID (ORISPL 1893), Units 1, 2, and 3

Dear Mr. Candy:

EPA has reviewed your March 12, 2004 petition under §75.66 in which Minnesota Power (MP) requested permission to use an alternative method of missing data substitution for Units 1, 2, and 3 at Boswell Energy Center (BEC), during a period where emissions were routed through a bypass stack. EPA approves the petition, with conditions, as discussed below.

Background

Minnesota Power owns and operates three coal-fired boilers, Units 1, 2, and 3, at the Boswell Energy Center in Cohasset, Minnesota. The units are subject to the Acid Rain Program. Therefore, MP is required to continuously monitor and report sulfur dioxide (SO₂), nitrogen oxides (NO_x) and carbon dioxide (CO₂) emissions data and heat input for these units, in accordance with 40 CFR Part 75.

Units 1 and 2 are rated at 74 megawatts each and Unit 3 is rated at 372 megawatts. Under normal operation, emissions from all three units are vented to the atmosphere through a common stack, CS003. Units 1 and 2 have baghouses to control particulate emissions, but have no emission controls for SO₂ or NO_x. The effluent streams from the Unit 1 and 2 baghouses are combined together in a common duct prior to entering CS003. Unit 3 has a wet scrubber to control particulate emissions, which provides an added benefit of reducing SO₂ emissions by about 20 percent.

Unit 3 had a major outage in March and April, 2003. Prior to the outage, it was discovered that the ash buildup in the Unit 3 duct between the wet scrubber and stack was substantial, and to remove it would require approximately four weeks of labor by men working inside the Unit 3 ductwork. However, with Unit 3 off-line and Units 1 and 2 operating, emissions from Units 1 and 2 can infiltrate into the Unit 3 ductwork from common stack CS003, causing a potentially unsafe (low oxygen) condition for the workers. In view of this, MP decided to temporarily close off the common duct leading from Units 1 and 2 to CS003, and re-route the effluent gases from Units 1 and 2 to a bypass stack until the removal of the ash buildup in the Unit 3 ductwork was completed. The bypass stack through which the gases were routed is the original stack through which Units 1 and 2 had discharged in previous years, prior to the

construction of CS003.

On February 20, 2003, MP notified the Minnesota Pollution Control Agency and EPA of the plan to install a plug in the Unit 1 and 2 common duct and route the emissions to the bypass stack during the Unit 3 duct cleaning. The period of the stack bypass extended from March 16 to April 13, 2003. During this time, Units 1 and 2 averaged a combined load of 104 MW and burned 34,126 tons of low-sulfur coal, with sulfur content ranging from 0.27% to 0.42% sulfur by weight.

Diverting the effluent gases away from CS003 is not part of normal operation at BEC, and the bypass stack is not represented in the Part 75 monitoring plans for Units 1 and 2. Sections 75.16(c), 75.16(e), and 75.17(d) address units that have a main stack and bypass stack exhaust configuration. According to those provisions, when the effluent gases are routed through an unmonitored bypass stack, the owner or operator must report emissions data for each hour of the bypass, as follows: (a) the maximum potential SO₂ concentration; (b) the maximum potential NO_x emission rate; and (c) standard missing data values from §§75.33 and 75.35 for stack gas flow rate and CO₂, respectively.

MP calculated the maximum potential SO₂ concentration (MPC) for the temporary bypass based on the sulfur content and gross calorific value (GCV) of the coal burned in Units 1 and 2 during the period. In accordance with Part 75, Appendix A, section 2.1.1.1, MP calculated the ratio of the percent sulfur to the GCV for each of the 18 coal samples and selected the highest %S/GCV ratio. Then, MP substituted this ratio into Equation A-1b of Appendix A to determine the MPC. The result was 345.4 ppm.

However, MP did not use the standard missing data routines for stack gas flow rate, because those procedures overestimate the stack flow rate during the bypass by a factor of four. The reason for this is that just prior to the bypass, Unit 3 was taken off-line, but the Unit 3 fan remained on for several hours to cool the boiler down. During this time period, the measured stack gas flow rates were very high (about 70,000,000 scfh, which is typical of 400-500 MW operation) but the actual combined operating load of Units 1 and 2 was very low (around 100 MW). As a result, when the standard missing data procedures for flow rate are applied to the bypass event (with an average load of 104 MW), the artificially high flow rates recorded at low load during the cool down of Unit 3 turn out to be the substitute data values for the entire bypass period.

In view of this, MP proposed to use an alternative substitute data value of 17,000,000 scfh for stack gas flow rate during the bypass period. This value was derived from an examination of 2 years of flow rate data recorded at CS003 under the following conditions: (a) with Unit 3 off-line; (b) with the Unit 3 fan turned off; and (c) with Units 1 and 2 operating at a combined load of approximately 104 MW (which was the average during the bypass period). For these operating conditions, the measured stack gas flow rates ranged from 14,000,000 to 16,500,000 scfh. Based on these data, MP selected a conservatively high missing data value of 17,000,000 scfh.

Using these substitute data values for SO₂ concentration and flow rate, MP estimates

that about 320 tons of SO₂ were emitted from Units 1 and 2 during the bypass of CS003.

EPA Determination

EPA approves, with conditions, MP's request to use an alternative data substitution methodology for SO₂ and flow rate for BEC Units 1, 2 and 3, in the time period extending from March 16 to April 13, 2003. This approval is granted for the following reasons. First, as noted above, re-routing the effluent gases from Units 1 and 2 to a bypass stack does not represent the normal manner of operation of the BEC units. Therefore, the bypass incident is seen as an unusual event requiring a case-specific missing data substitution procedure. Second, the proposed substitute data values for SO₂ concentration and stack flow rate are reasonable, having been derived, respectively, from actual fuel sampling data collected during the bypass and from actual historical data recorded under operating conditions similar to those that existed during the bypass. EPA concurs with MP that the artificially high flow rates recorded at low load with the Unit 3 fan running and Unit 3 off-line are inappropriate substitute data values for the bypass event. Third, for SO₂, the proposed missing data value is consistent with §75.16(c)(3), which states that for a unit with a main stack and unmonitored bypass stack configuration, the SO₂ MPC used during the bypass may be specific to the type of fuel combusted. Fourth, the proposed substitute data values for SO₂ and flow rate are sufficiently conservative to ensure that the SO₂ mass emissions during the bypass are not underestimated.

The conditions of this approval are as follows. For the purposes of the electronic data reports (EDRs) required under §75.64, for each of the operating hours in the bypass period extending from March 16 to April 13, 2003, MP shall report:

- (1) An hourly SO₂ concentration of 345.4 ppm in EDR record type 200, using a method of determination code (MODC) of "55" (i.e., "Other substitute data approved through petition by EPA");
- (2) A flow rate of 17,000,000 scfh in EDR record type 220, using a MODC of 55;
- (3) The maximum potential emission rate (MER) for NO_x, in EDR record type 320, calculated according to §72.2 (see also §75.17(d)(2)); and
- (4) The appropriate substitute data value for CO₂ in EDR record type 202, using the standard missing data routines of §75.35 (see also §75.16(e)(2)).

All of the above data shall be reported under the common stack ID, i.e., under CS003, except for the NO_x emission rate, which shall be reported under CS0012 (which is the ID of the common duct that leads from Units 1 and 2 to CS003), because the NO_x monitoring system for Units 1 and 2 is located in this common duct. Manual entry of the substitute data values and MODC codes is permitted. Since the adjustment to the first and second quarter, 2003 data affects the cumulative emissions and heat input for the entire year, MP must resubmit the EDR reports for all four quarters of 2003.

EPA's determination relies on the accuracy and completeness of the information provided by Minnesota Power in the March 12, 2004 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,

/s/

Sam Napolitano, Director
Clean Air Markets Division

cc: Constantine Blathras, EPA Region V
Robert Beresford, Minnesota Pollution Control Agency
Louis Nichols, EPA CAMD