



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

JUN -3 2004

OFFICE OF
AIR AND RADIATION

Mr. Boyd A. Giles
Authorized Account Representative
MeadWestvaco Coated Board, Inc.
P.O. Box 940
Phenix City, Alabama 36868-0940

Dear Mr. Giles:

Re: Request for Approval of an Alternative Substitute Data Value for Unit X022 and a Default GCV Value for Unit Z008 at MeadWestvaco's Mahrt Paper Mill (Facility ID (ORISPL) 54802)

This is in response to your March 10, 2004 petition under §75.66 in which MeadWestvaco Coated Board, Inc. (MeadWestvaco) requested approval of a more representative substitute data value for nitrogen oxides (NO_x) emission rate under certain operating conditions of Unit X022 at the Mahrt Paper Mill. MeadWestvaco also requested permission to use a default gross calorific value (GCV) when fuel oil is combusted in Unit Z008 at the Mahr Mill. EPA approves the petition for the reasons discussed below.

BACKGROUND

MeadWestvaco owns and operates a 25 MW combined-cycle combustion turbine (Unit X022) at the Mahrt Paper Mill in Cottonton, Alabama. The turbine was installed in 1998 and is designed to cogenerate steam and electricity for the mill. Natural gas is the primary fuel and No. 2 fuel oil with less than 0.05% sulfur by weight is the secondary fuel. The turbine is equipped with duct burners rated at 170 mmBtu/hr to provide supplemental energy to a heat recovery steam generator. Dry low-NO_x technology is used to control NO_x emissions during gas firing and water injection provides NO_x control during oil firing.

MeadWestvaco also owns and operates a 428 mmBtu/hr pressurized furnace industrial (PFI) boiler (Unit Z008) at the Mahrt Mill. Unit Z008 is used to produce steam for the mill. The primary fuel for the unit is pipeline natural gas and the secondary fuel is No.2 fuel oil. The unit has no emission controls for NO_x.

Units X022 and Z008 are subject to the NO_x Budget Trading Program under Alabama Department of Environmental Management (ADEM) Code R. 335-3-8, which requires MeadWestvaco to continuously monitor and report NO_x mass emissions and heat input for these

units in accordance with Subpart H of 40 CFR Part 75, beginning on May 1, 2003. Code R. 335-3-8 further requires MeadWestvaco to hold NO_x allowances equal to the ozone season¹ NO_x mass emissions from Units X022 and Z008, beginning on May 31, 2004².

In two separate petitions to EPA, on June 17, 2002 and April 30, 2003, MeadWestvaco requested permission to use predictive emission monitoring systems (PEMS) for Units X022 and Z008, instead of continuous emission monitoring systems (CEMS), to quantify NO_x emission rate. On January 28, 2003 and March 1, 2004, respectively, EPA conditionally approved the use of PEMS for Units X022 and Z008.

One of the terms of the January 28, 2003 petition approval for Unit X022 is that during periods when both the combustion turbine (CT) and duct burners are operating and combusting natural gas, MeadWestvaco may not report NO_x emission data from the PEMS, but must instead report the maximum potential NO_x emission rate (MER), calculated according to Part 75, Appendix A, section 2.1.2.1(b), using a maximum potential NO_x concentration (MPC) value of 150 ppm from Table 2-2 of Appendix A. Using this MPC value in conjunction with the "diluent cap" value of 19.0% O₂, MeadWestvaco determined the MER to be 1.716 lb/mmBtu.

Request for an Alternative Substitute Data Value

In the March 10, 2004 petition, MeadWestvaco states that reporting the MER during periods of duct burner operation in the 2003 ozone season resulted in Unit X022's NO_x mass emissions being over-reported by 90%. In view of this, MeadWestvaco requested approval of a more representative substitute data value for these operational periods. In particular, MeadWestvaco requested permission to use a NO_x emission rate of 0.116 lb/mmBtu. This emission rate is based on NO_x and O₂ data obtained with EPA reference methods during the PEMS test program in 2002. A total of 429 hours of reference method data were collected, with the turbine and duct burners in operation, firing natural gas. MeadWestvaco provided the test data as an attachment to the March 10, 2004 petition.

For all 429 hours in the reference method data set, the CT operated at high load, in the lean-premixed (i.e., low-NO_x) mode, while the operation of the duct burners varied considerably, from 6.8% to 93.2% of the maximum heat input capacity. The maximum measured NO_x concentration was 28.3 ppm, which occurred with the duct burners operating at 91.8% of the maximum rated heat input capacity. The maximum measured O₂ value was 15.6% O₂, which occurred with the duct burners operating at 7.5% of the maximum rated heat input capacity. MeadWestvaco substituted these maximum NO_x and O₂ values into Equation F-5 in Appendix F of Part 75, to obtain a conservatively high NO_x emission rate of 0.116 lb/mmBtu.

¹ The ozone season ends on September 30 and, for 2005 and thereafter, starts on May 1.

² A court decision has mandated that the 2004 ozone season will begin on May 31 rather than May 1 in certain states (including Alabama).

According to MeadWestvaco, it is reasonable to report this significantly lower substitute data value instead of the MER when the turbine and duct burners are operating and combusting natural gas, because the turbine will always be in the low-NO_x mode under these operating conditions. Flame safety considerations only allow the duct burners to be fired after the turbine is operating in the lean-premixed mode, at a high load level (at least 70% of maximum load), with the heat recovery steam generator (HRSG) generating steam at a significant rate. The only times that the turbine can be safely operated outside of the low-NO_x mode (i.e., in the diffusion mode) are during periods of startup, shutdown, or lean/lean firing conditions. Forcing the turbine to operate in diffusion mode at other times could cause serious damage to the unit. MeadWestvaco therefore believes that it is appropriate to report the MER only when the turbine is outside the low-NO_x mode, and to report 0.116 lb/mmBtu during periods of natural gas combustion where the CT and duct burners are operating.

Request to Use a Default GCV Value

MeadWestvaco regularly performs fuel sampling and analysis to determine the gross calorific value (GCV) of the diesel oil combusted by Unit Z008, the PFI boiler. The diesel fuel is held in a common bulk storage tank that supplies numerous sources at the paper mill. Oil is transferred periodically from the storage tank to a day tank, which feeds the PFI boiler and two other sources. Oil is combusted infrequently in Unit Z008 during the ozone season, typically only to ensure that the boiler's piping system and burners are functioning properly. Depending on the duration of the oil firing periods, GCV sampling may be required multiple times in a day since several oil deliveries to the common bulk storage tank may occur each day.

In the March 10, 2004 petition, MeadWestvaco requested permission to use a constant default GCV value of 20,000 Btu/lb for the diesel fuel, instead of using an assumed GCV value and updating it after each delivery as directed under section 2.2.4.3(c) in Appendix D of Part 75. This default GCV value is the one prescribed for missing data substitution in Table D-6 of Part 75, Appendix D. Based on past GCV analyses (summarized in the table below), MeadWestvaco believes that using this default will result in a very slight (< 1%) overestimation of NO_x mass emissions.

Sampling Date	Gross Calorific Value (Btu/lb)
3/13/2003	19583
4/30/2003	19467
6/16/2003	19399
7/01/2003	19203
8/12/2003	19412
12/01/2003	19221
1/07/2004	19309

MeadWestvaco further proposed to sample from the holding tank once each month of the ozone

season to determine a GCV value, whether or not diesel fuel is burned in Unit Z008 during that month. And if any monthly GCV exceeded the 20,000 Btu/lb default value, MeadWestvaco would use that GCV as the new default value.

EPA's DETERMINATION

Request for an Alternative Substitute Data Value

EPA concurs with MeadWestvaco's assessment that, for Unit X022, reporting the MER during periods of natural gas combustion where the turbine and duct burners are operating is inappropriate and will result in a gross overstatement of the unit's NO_x mass emissions. The 429 hours of reference method data that were collected in 2002 under these operating conditions have satisfactorily demonstrated this. The Agency is also persuaded by the safety issues associated with the operation of Unit X022, which ensure that the turbine will be operating at a high load and in the low-NO_x mode when the duct burners are used. Therefore, for Unit X022, EPA approves the alternative substitute data value of 0.116 lb/mmBtu proposed by MeadWestvaco. MeadWestvaco shall report this NO_x emission rate for each unit operating hour in which natural gas is combusted and the turbine and duct burners are in operation. This requirement amends the provision in the January 28, 2003 petition approval for Unit X022, which had required the MER to be reported during these operating conditions.

Since the emission rate of 0.116 lb/mmBtu was determined using the highest measured NO_x and O₂ concentrations from the reference method data set and since these maximum values were not recorded in the same hour, EPA believes that the emission rate is sufficiently conservative to ensure that NO_x mass emissions will not be underestimated. For instance, at the hour of the highest NO_x concentration (28.3 ppm), the O₂ concentration was 12.8% O₂. The NO_x emission rate calculated from these values is 0.076 lb/mmBtu, which is lower than the approved default value (0.116 lb/mmBtu). Similarly, at the hour of the highest O₂ concentration (15.6%), the NO_x concentration was 17.1 ppm. The NO_x emission rate for that hour was 0.070 lb/mmBtu, which is also lower than the approved default value. The rest of the reference method data are consistent with these findings, i.e., when the NO_x concentration is high, the O₂ values are relatively low, and when the O₂ concentration is high, the NO_x concentrations are comparatively low.

EPA also agrees with MeadWestvaco that for periods of startup, shutdown, or lean/lean firing conditions (when the CT is outside of the low-NO_x mode, in burner mode "0" or "1"), the NO_x MER of 1.716 lb/mmBtu (determined by MeadWestvaco using the diluent cap value of 19.0% O₂) should be used.

Request to Use a Default GCV Value

In the March 10, 2004 petition, MeadWestvaco proposed to take monthly diesel fuel samples during the ozone season from the holding tank that feeds Unit Z008, and if the GCV obtained from any monthly sample exceeded the proposed default value of 20,000 Btu/lb, that higher GCV value

would become the new default value for determining heat input and NO_x mass emissions. This general approach is consistent with (though not identical to) the methodology described in section 2.2.4.3(c) in Appendix D of Part 75. Section 2.2.4.3(c) allows the owner or operator to use an assumed value for GCV, which gets updated if it is ever exceeded by an actual sampled GCV value. The assumed value may either be the highest GCV from the previous calendar year's samples or the maximum value indicated in a contract with the fuel supplier.

Thus, the only difference between the methodology in Appendix D, section 2.2.4.3(c) and MeadWestvaco's proposed approach is the numerical value of the assumed GCV. The default value of 20,000 Btu/lb proposed by MeadWestvaco, as noted above, is the substitute data value from Table D-6 of Appendix D. This GCV value is conservatively high when compared to the results of 7 samples of the diesel fuel that were submitted by MeadWestvaco in support of the March 10, 2004 petition. The GCV values for these 7 samples ranged from 19,203 to 19,583 Btu/lb, averaging 19,371 Btu/lb. Therefore, if MeadWestvaco were allowed to begin with an assumed GCV value of 20,000 Btu/lb, it is highly unlikely that Unit Z008's heat input and NO_x mass emissions would be underestimated. In view of these considerations, EPA approves MeadWestvaco's request to use a default GCV value of 20,000 Btu/lb for diesel fuel combustion in Unit Z008.

The Agency also approves MeadWestvaco's proposal to perform monthly sampling of the diesel fuel during the ozone season. Although this sampling frequency may be less than the frequency prescribed in the various oil sampling options in sections 2.2.3 and 2.2.4 of Part 75, Appendix D, the designated representative may, as provided in section 2.2 of Appendix D, petition for a reduced sampling frequency if the fuel combusted has a consistent and relatively non-variable GCV.

EPA used the statistical criteria in section 2.3.5 of Appendix D to assess the GCV variability of the diesel fuel combusted at the Mahrt Mill³. Section 2.3.5 states that monthly GCV sampling may be used if the mean value of the GCV multiplied by 1.075 is greater than the sum of the mean value and one standard deviation. When this statistical method is applied to the results of the 7 fuel samples provided by MeadWestvaco (which cover a 10 month period), the following results are obtained:

Analysis of Diesel GCV Data from Mahrt Paper Mill	
Mean	19371
Standard deviation	136
Mean x 1.075	20823
Mean + 1 std dev	19507
n	7

³ Although section 2.3.5 of Appendix D applies to gaseous fuels, the statistical method used to assess GCV variability may be applied to fuel oil as well.

As can be seen from the table above, the GCV of the diesel fuel meets the section 2.3.5 metric, demonstrating that it has a low variability. Therefore, monthly GCV sampling is justifiable.

In summary, MeadWestvaco must perform monthly diesel GCV sampling during each ozone season, starting in the 2004 ozone season and continuing indefinitely thereafter. If the results of any monthly sample exceed the 20,000 Btu/lb default GCV value, MeadWestvaco shall use that higher GCV value as the new default value to determine heat input and NO_x mass emissions. Whenever the GCV value is updated, MeadWestvaco shall report the new GCV in record type 302 of the electronic data report (EDR) for the quarter in which the change in GCV occurs.

EPA's determination relies on the accuracy and completeness of the information provided in MeadWestvaco's March 10, 2004 petition and is appealable under Part 78. If you have any questions or concerns about determination, please contact John Schakenbach of my staff at 202-343-9158 or at (schakenbach.john@epa.gov).

Sincerely,



Sam Napolitano, Director
Clean Air Markets Division

cc: Lynn Haynes, EPA Region 4
David McNeal, EPA Region 4
Anthony Yarbrough, ALDEM
John Schakenbach, CAMD
Manuel Oliva, CAMD