



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

APR 30 2002

OFFICE OF  
AIR AND RADIATION

Ms. Corey A. Brandt  
Alternate Authorized Account Representative  
P.H. Glatfelter Company  
228 South Main Street  
Spring Grove, PA 17362

Re: Petition for Approval of a Multi-Fuel F-Factor for P.H. Glatfelter Unit 036

Dear Ms. Brandt:

This is in response to your letter, dated March 6, 2002, in which the P.H. Glatfelter Company ("Glatfelter") requested approval of a multi-fuel F-factor value for Unit 036 at the Spring Grove, Pennsylvania facility. EPA approves the petition, subject to the conditions discussed below.

Background

Glatfelter owns and operates several coal-fired power boilers at the Spring Grove, PA paper mill. Power Boiler 036 (also known as Unit No.5) is an affected unit in the NO<sub>x</sub> Budget Trading Program, under 25 Pa. Code Chapter 145. Therefore, Glatfelter is required to monitor and report NO<sub>x</sub> mass emissions and heat input from this unit, in accordance with Subpart H of 40 CFR Part 75.

Unit 036 is a fluidized bed boiler, capable of burning coal, wood waste and process sludge. Because of its multi-fuel capability, a custom F-factor must be determined for the unit, in order to quantify the unit's NO<sub>x</sub> emission rate and heat input. Appendix F of Part 75 provides an equation for deriving such multi-fuel F-factors (i.e., Equation F-8). Equation F-8 requires that the F-factor for a unit which combusts combinations of fossil fuel and non-fossil fuels (such as wood waste) be pro-rated according to the fraction of the total heat input derived from each type of fuel. However, section 3.3.6.3 of Appendix F states that when fuels such as wood, bark, residue or refuse are combusted in a unit, the multi-fuel F-factor value is subject to the approval of the Administrator.

To satisfy the requirements of section 3.3.6.3 of Appendix F, Glatfelter submitted a petition to the Pennsylvania Department of Environmental Protection and to EPA on March 6, 2002, requesting approval of a carbon-based F-factor (F<sub>c</sub>) value of 1856 scf/mmBtu for Unit 036. Glatfelter used a combination of fuel sampling results and process operating data to derive

the  $F_c$  value and proposed to use this F-factor at all times for emissions reporting. The  $F_c$  value was determined as follows. Forty coal samples, collected in 1998, 1999, 2000 and 2001, were analyzed for percent carbon and gross calorific value (GCV), and the average  $F_c$  derived from these samples was 1766 scf/mmBtu. Thirty-nine wood waste samples from the same time period were similarly analyzed, and the average  $F_c$  was 1876 scf/mmBtu. Thirty-nine process sludge samples were also analyzed, and the average  $F_c$  for these samples was 2161 scf/mmBtu. Note that Glatfelter injects limestone into Unit 036 to control  $SO_2$  emissions. Limestone has no heating value, but it produces  $CO_2$  by a thermal decomposition process called calcination. Therefore, the additional  $CO_2$  generated by calcination was treated as though it had been produced by coal combustion, and the  $F_c$  value of 1766 scf/mmBtu for coal was adjusted upward to 1845 scf/mmBtu. The average limestone-to-coal feed ratio of 0.273 for the period 1998-2001 was used to make this adjustment to  $F_c$ . Glatfelter assumes that 100 percent of the limestone injected into the unit decomposes to form calcium oxide (CaO) and  $CO_2$ . This assumption is based on the high temperature (> 1500 degrees Fahrenheit) of the fluidized bed and the relatively long residence time of the limestone within the bed.

Having derived  $F_c$  values for the individual fuels, Equation F-8 in Appendix F of Part 75 was then used to calculate a pro-rated  $F_c$  value of 1856 scf/mmBtu, as follows. The average annual heat input to Unit 036 for the period 1998-2001 was first determined from fuel usage data and average GCV values were derived from fuel sampling. Then, the fraction of the average annual heat input provided by each individual fuel was calculated. These fractions were, respectively, 0.72 for coal combustion, 0.26 for wood waste, and 0.02 for sludge combustion. Substituting these fractions and the  $F_c$  values for the individual fuels into Equation F-8, gives the pro-rated  $F_c$  value of 1856 scf/mmBtu.

In Table 1 of the March 6, 2002 letter, Glatfelter demonstrated that use of the proposed  $F_c$  value of 1856 scf/mmBtu over the full range of fuel mixtures normally combusted in Unit 036 will result not produce an error greater than about 0.7% for any operating scenario.

#### EPA's Determination

After reviewing Glatfelter's proposed compliance strategy for Unit 036, as presented in the March 6, 2002 letter and in the supplementary data and information provided, EPA approves the proposed  $F_c$  value of 1856 scf/mmBtu for Unit 036 for  $NO_x$  mass emissions and heat input reporting under the  $NO_x$  Budget Trading Program.

The Agency finds this  $F_c$  value to be justifiable, based on an evaluation of the fuel sampling data from which it was derived. On March 8, 2002, Glatfelter provided EPA with the results of the individual fuel samples used to derive the proposed  $F_c$  value. The data scatter for the individual  $F_c$  values derived from the 39 coal samples was found to be small. The individual  $F_c$  values for the coal samples ranged from 1746 to 1781 scf/mmBtu, with 79 percent of the values falling between 1755 and 1775 scf/mmBtu. The average absolute deviation of the individual  $F_c$  values from the mean value was just 6.3 scf/mmBtu, and the sums of the positive and negative deviations about the mean were nearly the same (i.e., + 122 and -123, respectively). For the 39 wood waste and sludge samples, the data scatter was somewhat higher than for the

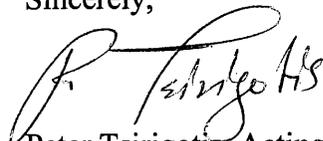
coal samples. This is as expected, since wood waste and sludge are less homogeneous fuels than coal. Nevertheless, for the wood waste, nearly 60 percent of the individual  $F_c$  values were between 1850 and 1900 scf/mmBtu, and 90 percent of the values were between 1800 and 1950 scf/mmBtu. The absolute average deviation from the mean was 33.8 scf/mmBtu, and once again, the sums of the positive and negative deviations about the mean were rather evenly-balanced (i.e., + 703 and - 614, respectively). For the sludge samples, 72 percent of the individual  $F_c$  values were between 2010 and 2130 scf/mmBtu. The absolute average deviation from the mean was 48.8 scf/mmBtu, and the sums of the positive and negative deviations about the mean were + 918 and - 987, respectively). Therefore, Glatfelter's decision to use the mean values of 1766 scf/mmBtu, 1876 scf/mmBtu, and 2069 scf/mmBtu (for coal, wood waste and sludge, respectively) in the F-factor calculations appears to be technically sound. In view of the fact that wood and sludge constitute a much smaller portion of the total unit heat input than coal, EPA concludes that the higher variabilities in the wood and sludge  $F_c$  values does not preclude the use of a single  $F_c$  value to represent the full range of fuel mixtures combusted in Unit 036.

Further, EPA finds that the adjustment of the average coal F-factor from 1766 to 1845 scf/mmBtu is appropriate, and adequately accounts for the additional  $CO_2$  generated by the calcination of the limestone sorbent.

Finally, the Agency finds that the fuel usage data for the four-year period from 1998 through 2001 provides a reasonable basis for estimating the average fraction of the total heat input contributed by each fuel. EPA therefore concludes that the proposed multi-fuel  $F_c$  value of 1856 scf/mmBtu for Unit 036 is suitable for use under all process operating conditions.

EPA's determination in this letter relies on the accuracy and completeness of the information provided by Glatfelter in the March 6, 2002 petition and on March 8, 2002, and is appealable under Part 78. If you have any questions or concerns about this determination, please contact Robert Vollaro, at (202) 564-9116. Thank you for your continued cooperation.

Sincerely,



Peter Tsirigotis, Acting Director  
Clean Air Markets Division

cc: Renee McLaughlin, EPA Region III  
Joseph Nazzaro, Pennsylvania DEP  
Robert Vollaro, CAMD