



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

FEB 10 2003

OFFICE OF
AIR AND RADIATION

Mark Vignovic
Authorized Account Representative
Weirton Steel Corporation
400 Three Springs Drive
Weirton, WV 26062-4989

Re: Petition to Use Alternative Substitute Data Values and Default F-Factors for
Weirton Steel Corporation (Facility ID (ORISPL) 54344)

Dear Mr. Vignovic:

This is in response to your September 6, 2002 petition under § 75.66 (a), and an amendment to that petition dated November 6, 2002, in which Weirton Steel Corporation (Weirton) requested approval of: (1) alternative substitute data values for fuel gross calorific value (GCV); and (2) default oxygen-based F-factors, to be used when certain fuels are combusted in the boilers at the Weirton Steel Works. EPA approves, with conditions, some of the GCV and F-factor values and denies others, as discussed below.

Background

Weirton owns and operates five boilers at its Weirton, West Virginia facility. The boilers are affected units under the NO_x Budget Trading Program, as specified in the West Virginia Division of Air Quality (WVDAQ) Series 1 regulation. The boilers combust a mixture of fuels, consisting principally of blast furnace gas, which is supplemented at times with natural gas, fuel oil, or mixed gas (which is comprised of approximately 2/3 natural gas, and 1/3 air). To meet the NO_x mass emissions and heat input reporting requirements of these regulations, Weirton plans to quantify unit heat input using certified fuel flowmeters and fuel sampling and analysis, in accordance with Appendix D of Part 75, and to measure NO_x emission rate with NO_x-diluent continuous emission monitoring systems (CEMS). The equation that will be used to calculate NO_x emission rate contains a fuel-specific F-factor term.

In the September 6 and November 6, 2002 letters, Weirton petitioned to use a number of default GCV and oxygen-based F-factor (F_d) values during the combustion of the various gaseous fuels. In particular, Weirton requested permission to use the following F_d and GCV values:

- A default GCV value of 150 Btu/scf for blast furnace gas, to be used only for missing data purposes, when an hourly GCV value is unavailable.
- A default F_d value of 17,209 dscf/mmBtu for blast furnace gas, to be used only for missing data purposes, when an hourly F_d value is unavailable.
- A default GCV value of 782 Btu/scf for mixed gas, to be used for all hours of combustion of that fuel, including missing data hours.
- A default F_d value of 8,674 dscf/mmBtu for mixed gas, to be used during all hours of combustion of that fuel.
- A default GCV value of 1,042.5 Btu/scf for natural gas, to be used only for missing data purposes.

By fuel type, Weirton selected and justified the requested default values as follows:

Blast Furnace Gas

To characterize the GCV of blast furnace gas, Weirton submitted 30 days of hourly data, covering the time period from May 14, 2002 through June 13, 2002. The hourly GCV values ranged from 64.7 to 114.3 Btu/scf, averaging 101.7 Btu/scf.

Weirton also performed a statistical analysis of the GCV data, according to the criterion in section 2.3.5 of Appendix D. The blast furnace gas was found to have a low GCV variability, thereby qualifying it for monthly GCV sampling. Despite this, the September 3, 2002 letter indicates that Weirton intends to continue determining the GCV of the fuel hourly, for the purpose of calculating the hourly heat input to the boilers.

Based on the results of the data analyses, Weirton proposed a missing data value of 150 Btu/scf as an alternative to the substitute GCV value of 2,100 Btu/scf specified in Table D-6 of Appendix D to 40 CFR Part 75 for gaseous fuels other than natural gas. The proposed missing data value would be used for all hours of blast furnace gas combustion in which a valid hourly GCV value is not obtained.

Weirton also proposed an F_d value of 17,209 dscf/mmBtu for blast furnace gas, to be used for missing data purposes. To characterize F_d , Weirton submitted 30 days of hourly data for Blast Furnaces # 1 and 4, covering the time period from May 14, 2002 through June 13, 2002. The hourly F_d values ranged from 14,777 to 20,526 dscf/mmBtu, averaging (arithmetically) 17,826 dscf/mmBtu. The proposed missing data value of 17,209 dscf/mmBtu proposed by Weirton is a flow-weighted average, based on the average relative proportions of the gas flow from the two furnaces over the 30-day period.

Mixed Gas

As previously noted, mixed gas consists of about 2/3 natural gas and 1/3 air. Weirton maintains the percentage of natural gas in the mixed gas between 65 and 75%. The composition of the mixed gas is continuously monitored by sampling the gas and analyzing for its Wobbe Index. The Wobbe Index is the ratio of the GCV of a gaseous fuel to the square root of its specific gravity. By keeping the Wobbe Index between 788 and 935, Weirton ensures that the percentage of natural gas in the mixed gas stays in the 65 to 75% range.

Weirton calculated the "worst-case" (highest) GCV value of 782 Btu/scf for mixed gas, corresponding to a mixture of 75% natural gas and 25% air (at a Wobbe Index of 935). In performing the calculation, Weirton used a GCV of 1,042.5 Btu/scf for natural gas, which is the average GCV from 12 months of daily samples, covering the time period from October, 2001 through September, 2002. Weirton proposed to use this default value of 782 Btu/scf for all hours in which mixed gas is combusted, including missing data hours.

Weirton also proposed a default F_d value of 8,674 dscf/mmBtu for mixed gas, to be used for all hours in which mixed gas is combusted. This value was based on the results of three elemental analyses of the mixed gas, covering the full range of operation (i.e., 65 to 75% natural gas and 25 to 35% air) for this fuel. Equation F-7a in Appendix F of 40 CFR Part 75 was used to calculate the F_d values. The results of all three analyses were virtually identical, averaging 8,674 dscf/mmBtu.

Natural Gas

For the purposes of missing data substitution, Weirton requested to use a default GCV value of 1,042.5 Btu/scf for natural gas, in lieu of the 1100 Btu/scf value specified in Table D-6 of Appendix D to Part 75. As previously noted, 1,042.5 Btu/scf is the average GCV from 12 months of daily natural gas samples, covering the time period from October, 2001 through September, 2002.

EPA's Determination

EPA reviewed the summarized data provided by Weirton as attachments to the September 6 and November 6, 2002 letters. Based on this review, the Agency makes the following determination on each proposed default GCV and F_d value, by fuel type:

Blast Furnace Gas

For blast furnace gas combustion, EPA approves the proposed substitute data value of 150 Btu/scf for GCV. This value is considered acceptably conservative for missing data

purposes, since it is approximately 30 percent higher than the highest hourly GCV value measured in the 30 days of data provided by Weirton.

EPA conditionally approves the use of a default F_d value of 17,209 dscf/mmBtu for missing data purposes. The Agency believes that the proposed value, which represents the average flow-weighted F_d value for a 30-day period, is reasonable for short-term missing data periods. However, as a condition of approval, in the event that a missing data period extends beyond 30 days, Weirton shall use a substitute data value of 19,826 dscf/mmBtu until valid F_d data are once again obtained. Note that 19,826 dscf/mmBtu represents the highest flow-weighted F_d value from the 30 days of data provided by Weirton.

Mixed Gas

EPA denies Weirton's petition to use a single GCV value of 782 Btu/scf for all hours of mixed gas combustion, including missing data hours, for the following reasons.

The proposed value of 782 Btu/scf for mixed gas combustion was rejected because it was derived using the average GCV value (i.e., 1,042.5 Btu/scf) from 12 months of natural gas samples taken in 2001 and 2002. This approach is not consistent with any of the three methods presented in Table D-5 of Appendix D for determining the appropriate natural gas GCV value to use in the heat input calculations. Table D-5 allows the use of either: (1) the highest value from a fuel contract; or (2) the GCV from the most recent monthly sample; or (3) the highest GCV from the previous year's monthly samples. Therefore, when mixed gas is combusted, the natural gas GCV value used by Weirton in the heat input calculations must conform to one of these three options.

The proposed use of a default GCV value of 782 Btu/scf for missing data substitution was similarly rejected, because it is inconsistent with the missing data value for natural gas in Table D-6 of Appendix D. The appropriate substitute GCV value for mixed gas is 825 Btu/scf¹ based on the Table D-6 missing data value of 1,100 Btu/scf for natural gas.

EPA conditionally approves Weirton's proposed default F_d value of 8,674 dscf/mmBtu for mixed gas combustion, given that the results of the three elemental analyses showed the F_d value to be constant over the entire range of mixed gas composition. As a condition of approval, Weirton must perform similar elemental analyses of the mixed gas at least annually. If none of the results of the annual analyses exceeds the approved F_d value of 8,674 dscf/mmBtu, this value shall continue to be used. However, if any F_d value(s) from the annual analyses exceeds 8,674 dscf/mmBtu, Weirton shall use the highest sample result values until a subsequent analysis shows F_d to be once again at or below 8,674 dscf/mmBtu.

Natural Gas

¹ The 825 Btu/scf missing data value was derived by multiplying the proposed value of 782 Btu/scf by the ratio of 1,100/1,042.5.

For natural gas combustion, EPA denies Weirton's petition to use a default GCV value of 1,042.5 Btu/scf for missing data purposes. Consistent with section 2.4.1 of Appendix D, if no valid GCV data are obtained and analyzed for a particular calendar month, Part 75 requires the maximum potential GCV value of 1,100 Btu/scf from Table D-6 in Appendix D to be reported. Therefore, Weirton shall use 1,100 Btu/scf as the GCV of natural gas whenever a required monthly GCV sample is not obtained.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Sam Napolitano", with a stylized flourish at the end.

Sam Napolitano, Acting Director
Clean Air Markets Division

cc: Renee McLaughlin, EPA Region III
Laura Crowder, West Virginia DEP, Division of Air Quality
Robert Vollaro, EPA, CAMD