

August 23, 2005

Jim Alexander
Air Compliance Manager
U.S. Steel, Gary Works
One North Broadway
Gary, IN 46402-3199

Re: Petition for an Alternative Method of Determining the F-factor and GCV for Blast Furnace Gas, for the Power Boilers at U.S. Steel's Gary Steel Works (Facility ID (ORISPL) 50733)

Dear Mr. Alexander:

EPA has reviewed your May 19, 2003 petition under §75.66 in which United States Steel Corporation (USS) requested to use an alternative method of determining the F-factor and gross calorific value (GCV) for blast furnace gas at its Gary, Indiana facility. EPA approves the petition, with conditions, as discussed below.

Background

USS owns and operates eight gas- and oil-fired boilers at its Gary Steel Works (Gary) in Gary, Indiana, i.e., Units 720B1, 720B2, and 720B3 at the No. 4 Boiler House, and Units 701B1, 701B2, 701B3, 701B5, and 701B6 at the Turbo-Blower Boiler House. The boilers combust blast furnace gas (BFG) as their primary fuel, which they co-fire with natural gas, coke oven gas, and fuel oil, in varying proportions. All of the units are subject to the NO_x Budget Trading Program under the Indiana Department of Environmental Management's (IDEM's) Regulation 326 IAC 10-4. This regulation requires USS to continuously monitor and report the ozone season¹ nitrogen oxides (NO_x) mass emissions and heat input from these units in accordance with 40 CFR Part 75 and to hold NO_x allowances equal to the ozone season NO_x mass emissions, beginning with the 2004 ozone season.

To satisfy the NO_x monitoring requirements of the NO_x Budget Program, USS has installed and certified a NO_x-diluent continuous emission monitoring system (CEMS) on each of the eight boiler stacks, consisting of a NO_x pollutant concentration monitor and an oxygen (O₂) monitor. For each hour of unit operation, these monitoring systems measure and record the NO_x

¹ The ozone season extends from May 1 through September 30.

concentrations (in ppm) and the O₂ concentrations (in percent O₂), from which the NO_x emission rates (in lb/mmBtu) are determined. The NO_x emission rates are then multiplied by the measured heat input rates to determine the hourly NO_x mass emissions.

USS uses Equation 19-1 from Method 19 in Appendix A of 40 CFR Part 60 (which is equivalent to Equation F-5 in Appendix F of Part 75) to calculate the hourly NO_x emission rates for the Gary boilers. This equation contains an “F-factor”, which, for a particular fuel, is the volume of flue gas (in dry, standard cubic feet) produced for every million Btu of heat input. Conventional fuels such as coal, fuel oil, and natural gas have well-established F-factors (see Table 1 in Appendix F of Part 75). However, for a fuel such as blast furnace gas, the appropriate F-factor must be determined on a case-by-case basis.

There are four blast furnaces at Gary (i.e., Blast Furnaces # 4, 6, 8, and 13). For each operating hour of each furnace, USS uses mass spectroscopy to determine the percent composition of the BFG from the furnace and calculates an F-factor for the BFG using Equation F-7a in Appendix F of Part 75. USS also uses the hourly mass spectroscopy data to calculate the GCV of the blast furnace gas and for process control purposes. Sections 3.3.6.1 and 3.3.6.2 in Appendix F of Part 75 list the acceptable analytical methods for determining the percent composition and GCV of gaseous fuels. Mass spectroscopy is not among the methods listed.

In view of this, in the May 19, 2003 petition, USS requested to use mass spectroscopy in lieu of the methods listed in Appendix F of Part 75, to calculate the F-factors and the GCV of its blast furnace gas. For the F-factors, USS proposed to use default values derived from historical data and to update these values quarterly if any significant changes are observed. USS further proposed to use the mass spectroscopy data from Blast Furnace (BF) # 13 in the calculations for the three units at the No. 4 Boiler House since these units receive virtually all of their BFG from BF # 13, which essentially supplies BFG only to these units. For the five units at the Turbo-blower Boiler House, USS proposed to use an average of the mass spectroscopy data from the three remaining blast furnaces (i.e., Blast Furnaces # 4, 6, and 8) since those units receive virtually all their BFG from those blast furnaces, which essentially supply BFG only to those units.

EPA's Determination

EPA approves USS' request to use mass spectroscopy as the method of determining the F-factors and GCV of the blast furnace gas combusted in Units 720B1, 720B2, 720B3, 701B1, 701B2, 701B3, 701B5, and 701B6 at the Gary Steel Works. The Agency also approves USS' proposal to base the F-factors and GCV values for Units 720B1, 720B2, and 720B3 on the mass spectroscopy data from Blast Furnace # 13 and to average the mass spectroscopy data from Blast Furnaces # 4, 6, and 8 to determine the F-factors and GCV values for Units 701B1, 701B2, 701B3, 701B5, and 701B6.

The basis for this approval is as follows. First, EPA believes that mass spectroscopy is comparable to the other analytical methods listed in section 3.3.6 of Part 75, Appendix F for

determining the percent composition and GCV of gaseous fuels. Second, the fact that USS uses the mass spectroscopy data for process control provides reasonable assurance that the data are suitable for Part 75 emissions reporting, since it is in the best interest of USS to ensure that the data are accurate and reliable. Third, since USS determines the percent composition and GCV of the blast furnace gas hourly, this satisfies the sampling frequency requirements of section 2.3.4.3.3 of Part 75, Appendix D. Section 2.3.4.3.3 requires the GCV to be determined at least daily for gaseous fuels that do not qualify as natural gas, and that have not been demonstrated under section 2.3.6 of Appendix D to have a low GCV variability².

The conditions of this approval are as follows:

- (1) For Units 720B1, 720B2, and 720B3:
 - (a) USS shall use Equation F-8 in Appendix F of Part 75 to calculate and report a prorated F-factor for each unit operating hour, representing the specific combination of fuels combusted during the hour. In Equation F-8, USS shall use a default F-factor for blast furnace gas, determined according to condition (1)(b) below.
 - (b) A default F-factor shall be calculated at the end of each calendar quarter by averaging all available (non-zero) hourly F-factors obtained during the quarter for the BFG from Blast Furnace # 13. To ensure that NO_x mass emissions are not underreported, whenever the default F-factor determined at the end of the quarter exceeds the default value currently in use, the new F-factor shall be used prospectively from the date on which it is determined. Otherwise, the current default value shall continue to be used; and
 - (c) For each unit operating hour, USS shall determine and report the GCV of the blast furnace gas from Blast Furnace # 13. For any unit operating hour in which valid mass spectroscopy data for Blast Furnace # 13 are unavailable, USS shall report the average of the GCV values before and after the missing data period.
 - (d) If USS operates the units in any hour when Blast Furnace #13 is not operating and the BFG is supplied by Blast Furnaces #4, 6, and 8, then USS shall use the F-factor and the GCV obtained from the data for Blast Furnaces #4, 6, and 8 for that hour.
- (2) For Units 701B1, 701B2, 701B3, 701B5, and 701B6:
 - (a) Same as condition (1)(a), above.
 - (b) Same as condition (1)(b), above, except that the hourly data from Blast Furnaces #4, 6, and 8 shall be used, rather than from Blast Furnace #13.
 - (c) Same as condition (1)(c), above, except that hourly data from Blast Furnaces #4, 6, and 8 shall be used, rather than data from Blast Furnace

² To date, USS has not provided the required data and statistical analysis to demonstrate that its BFG has a low GCV variability and qualifies for less-frequent sampling.

- #13.
- (d) If USS operates the units when Blast Furnaces #4, 6, and 8 are not operating and the BFG is supplied by Blast Furnace #13, then USS shall use the F-factor and GCV obtained from the data for Blast Furnace #13.

EPA's determination relies on the accuracy and completeness of the information provided by USS in the May 19, 2003 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: Cecelia Mijares, EPA Region V
Jarrod Fisher, IDEM
Louis Nichols, CAMD