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

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OFFICE OF
AIR AND RADIATION

Mark C. Barnes
Manager Air Compliance
Environmental Affairs
U.S. Steel
600 Grant Street, RM 2068
Pittsburgh, PA 15219-2749

Re: Revised Petition to Use Alternative Fuel Flow Measuring Devices and Standards for Units 5 and 8 at the U.S. Steel Fairfield Works (Facility ID (ORISPL) 880046)

Dear Mr. Barnes:

The United States Environmental Protection Agency (EPA) has reviewed your August 13, 2003 letter, in which U.S. Steel proposed revisions to the conditions of approval of a May 5, 2003 petition response from EPA. That petition response conditionally allowed the use of alternative fuel flow monitoring devices and standards for Units 5 and 8 (EPA ID numbers 206 and 208) at the Fairfield, Alabama facility.

In the August 13, 2003 letter, U.S. Steel proposed to determine a monthly average F-factor and to use its certified continuous emission monitors to determine the heat input for Unit 8, in lieu of using the previously-approved alternative fuel flow monitor. Also, U.S. Steel requested permission to use a different quality assurance procedure to assess the accuracy of the approved alternative fuel flow monitor installed on Unit 5.

EPA approves U.S. Steel's proposed revisions to the May 5, 2003 petition response, with conditions, as discussed below.

Background

At its Fairfield, Alabama facility, U.S. Steel owns and operates four boilers, Units 5, 8, 9, and 10, which are subject to the NO_X Budget Trading Program under the Alabama Department of Environmental Management's (ADEM's) Code R.335-3-8 regulation. Code R.335-3-8 requires U.S. Steel to continuously monitor and report nitrogen oxides (NO_X) mass emissions and heat input for Units 5, 8, 9, and 10, beginning on May 1, 2003, in accordance with Subpart H of 40 CFR Part 75.

For Units 5, 8, 9, and 10, U.S. Steel has elected to use Equation F-24 in Appendix F of Part 75 to determine the hourly NO_X mass emissions. In Equation F-24 , the NO_X mass emissions (lbs) are the product of the hourly NO_X emission rate (lbs/mmBtu), the hourly heat input rate (mmBtu/hr), and the unit operating time (hr). The NO_X emission rates are determined using certified NO_X-diluent continuous emissions monitoring systems (CEMS). To calculate the hourly heat input rate for each unit, U.S. Steel had originally planned to use the methodologies in Appendix D of Part 75. Appendix D requires hourly measurement of fuel flow rate(s), using an in-line fuel flowmeter. Units 5, 8, 9, and 10 combust a combination of natural gas and blast furnace gas (BFG) from steel production operations. These gases are not mixed prior to entering the boilers. Therefore, separate flowmeters are required for each fuel.

Both the natural gas feed pipes and the BFG feed pipes to Units 9 and 10 have orifice-type fuel flowmeters that conform to the specifications of American Gas Association (AGA) Report No. 3. Therefore, these flowmeters meet the certification requirements of Part 75, Appendix D, section 2.1.5.1. However, Units 5 and 8 have Part 75-compliant flowmeters only on the natural gas feed pipes. The BFG feed piping to Units 5 and 8 lacks adequate runs of straight section to accommodate an orifice, venturi or nozzle-type flowmeter that meets the requirements of AGA Report No. 3. Moreover, that AGA report applies only to natural gas applications in pipelines with an inside diameter of less than 20 inches. The BFG feed pipe diameters for Units 5 and 8 are greater than 72 inches. In view of this, U.S. Steel submitted a petition to EPA on March 7, 2003, requesting permission to use alternative fuel flow monitors, consisting of pitot tube arrays, in the BFG feed pipes to Units 5 and 8.

On May 5, 2003, EPA approved the aforementioned petition, on the condition that each year, at the time of the annual relative accuracy test audits (RATAs) of the continuous emission monitors, a test would be conducted to verify the accuracy of the pitot tube arrays. Specifically, unit heat input rates would be calculated using fuel flow rates measured by the pitot tube arrays, in conjunction with the gross calorific value (GCV) of the fuel. The relative accuracy of these heat input rates would then be determined by comparing them to heat input rates calculated using Equation F-17 in Part 75, Appendix F. In Equation F-17, the stack gas volumetric flow rate, moisture content and percent oxygen values would be obtained from CEMS readings or annual stack tests for Unit 8 and Unit 5, respectively. The F-factor would be determined by fuel sampling and analysis. To pass the test, the relative accuracy of the heat input rates measured by each pitot tube array would have to be 10% or less at all load levels tested. A bias test would also be required, and, if the heat input rates measured by the pitot tube array were found to be biased low, a bias adjustment factor would have to be applied to the subsequent heat input rates measured by the array.

After receiving EPA's petition response, U.S. Steel conducted the required tests of Units 5 and 8. However, the 10% relative accuracy criterion for the heat input rates measured by the pitot tube arrays was not met at all load levels tested. Believing this short-term evaluation of the flow monitors' accuracy to be unrepresentative because of high variability of BFG pressure and flow rate, U.S. Steel submitted the August 13, 2003 letter to EPA, proposing the following

revisions to the conditions of the May 5, 2003 petition response:

- For Unit 8, U.S. Steel proposed to discontinue using the pitot tube array to determine the unit heat input rate, and to use certified oxygen, stack flow rate and moisture monitors for this purpose. Equation F-17 would be used to calculate the hourly heat input rates. An F-factor for the blast furnace gas would be determined monthly and used in the calculations. To justify using a monthly average F-factor, U.S. Steel provided the results of a demonstration, showing that the F-factor for BFG has a low variability. Using the methodology described in Part 75, Appendix D, section 2.3.5, U.S. Steel analyzed 720 hours of GCV data recorded by an on-line mass spectrograph. The analysis shows that the GCV of blast furnace gas has a low variability and that the F-factor, which is a function of the GCV, has a similarly low variability. This suggests that the use of a monthly average F-factor is reasonable. U.S. Steel proposed to use hourly average data from an on-line mass spectrograph to calculate each monthly average F-factor.

  To demonstrate the accuracy of the F-factors obtained with the mass spectrograph, U.S. Steel performed fuel sampling during the heat input RATAs of Units 5 and 8. The F-factors from lab analyses of the 7 fuel samples taken during the RATA testing were compared against the F-factors calculated by the mass spectrograph during the emission test period. The relative accuracy of the mass spectrograph F-factors was 5.06%.

- For Unit 5, U.S. Steel proposed to conduct annual stack testing to obtain calculated unit heat input rates, for purposes of comparison against the heat input rates determined by the pitot tube array. Based on the results of this comparison, bias adjustments to the flow rates measured by the pitot tube array would be made as necessary. This proposed methodology is essentially the same as the one outlined in the May 5, 2003 petition approval from EPA, except that U.S. Steel is requesting a waiver of the 10% relative accuracy (RA) requirement for the heat input rates measured by the pitot tube array. U.S. Steel believes that this relative accuracy requirement is difficult for this alternative fuel flow monitoring system to meet in a short-term test such as a RATA, and that a waiver of the 10% RA requirement is justified for Unit 5 because of its classification as a peaking unit (i.e., the unit is seldom operated).

EPA's Determination

For Unit 8 (EPA ID No. 208), EPA conditionally approves U.S. Steel's proposed change in the heat input rate calculation methodology. The proposed approach is a standard Part 75 methodology, using Equation F-17 in Appendix F. This equation requires the use of an F-Factor, which can be derived by the methods in section 3.3.6 of Appendix F. The Agency also conditionally approves U.S. Steel's request to use an on-line mass spectrograph to determine

monthly average F-factors for BFG, based on the demonstrated accuracy of the mass spectrograph and the demonstrated low variability in the F-factor for BFG. The conditions of these approvals, which supersede the conditions of approval in the May 5, 2003 petition response, are as follows:

1. Prior to using the new heat input rate calculation methodology, the required CEMS to measure stack gas flow rate, percent oxygen and percent moisture must be represented in the electronic monitoring plan for Unit 8. Appropriate span and range information for the CEMS shall be added. The fuel flowmeter system and associated information must be deleted from the monitoring plan, and CEM codes and an appropriate heat input formula shall replace the corresponding Appendix D codes and formulas.

2. All of the required CEMS must be certified in accordance with §75.20(a). Further, the monitoring systems must meet the applicable on-going quality-assurance requirements of §§75.74(c)(2) and (c)(3).

3. U.S. Steel shall operate the on-line mass spectrograph continuously according to the manufacturer's recommendations. The quality assurance procedures for the spectrograph shall be included in the QA plan for Unit 8, as required under Part 75, Appendix B, section 1.

4. The F-factor value used in a particular calendar month to determine the heat input rates for Unit 8 shall be the arithmetic average of all quality-assured F-factors obtained with the mass spectrograph during the preceding month.

For Unit 5 (EPA ID No. 206), the conditions of approval in the May 5, 2003 petition response remain in effect, except that, in light of the limited utilization of the unit, EPA conditionally approves a waiver of the 10% relative accuracy requirement for heat input rates measured with the pitot tube array. The conditions of this waiver are as follows:

1. U.S. Steel shall document that Unit 5 qualifies as a peaking unit under §72.2 or §75.74 (c)(11), as applicable. To document this from year-to-year, U.S. Steel shall report the annual or ozone season capacity factors (as applicable) for Unit 5 in the quarterly electronic data reports (EDRs), using EDR record type 507.

2. If, during the annual comparison of the heat input rates obtained by emission testing, as described in the May 5, 2003 petition response, versus the heat input rates measured by the pitot tube array, any heat input rate from the pitot tube array is found to be biased low, a bias correction factor shall be calculated so that the average heat input rate measured by the pitot tube array matches the value obtained from the stack testing. The highest of these correction factors shall be applied to the subsequent hourly heat input rates measured by the pitot tube array until the next annual comparison testing is performed.

3. In the event that Unit 5 should lose its status as a peaking unit, a relative accuracy standard for the pitot tube array will be reinstated. The appropriate RA specification will be determined by EPA in consultation with U.S. Steel and ADEM.

EPA's determination in this letter relies on the accuracy and completeness of the information provided by U.S. Steel, in the August 13, 2003 petition revision, and is appealable under Part 78. If you have any questions or concerns about this determination, please contact Manuel J. Oliva, at (202) 564-0162.

Sincerely,

Samuel Napolitano, Acting Director
Clean Air Markets Division

cc: Wilson Haynes, EPA Region III
David Schilson, Jefferson County Department of Health
Manuel J. Oliva, EPA CAMD