June 10, 2002

Mr. Gary D Miracle
Director, Environmental Affairs
AK Steel Corporation
703 Curtis Street
Middletown, Ohio 45043-0001

Re: Petition for alternative monitoring requirements for AK Steel Units P009 through P012

Dear Mr. Miracle,

EPA has reviewed your January 4, 2002 under §§75.66 and 97.7 of EPA's regulations in which AK Steel Corporation's (AK Steel) requests approval to use an alternative monitoring methodology for nitrogen oxides (NOx) mass emissions at Middletown Works, Units P009, P010, P011, and P012.[1] EPA approves the monitoring methodology, with modifications and conditions described below.

Background

AK Steel's waste heat boilers P009, P010, P011, and P012 are non-electric generating units subject to the NO_X Budget Trading Program under Part 97.[2] Each waste heat boiler is supplied heat from the exhaust of a slab furnace that is not subject to this program. The waste heat boilers supplement the heat from the slab furnaces by combusting natural gas, coke oven gas, and No. 6 fuel oil. During normal operation, the NOx mass emissions from each slab furnace and the NOx mass emissions from the associated waste heat boiler exit through the waste heat boiler stack.

Part 75 currently requires AK Steel to monitor NOx mass emissions from the waste heat boilers by installing and certifying a continuous emissions monitoring system (CEMS) at each waste heat boiler stack. AK Steel could elect to subtract the NOx mass emission from the slab furnace exhaust from the combined NOx mass emissions at the waste heat boiler stack. To set up a subtractive stack monitoring methodology, AK Steel could install and certify a CEMS on each waste heat boiler stack to measure the combined NOx mass emissions from the slab furnace and combustion in the waste heat boiler and a second CEMS on the slab furnace exhaust duct to measure the NOx mass emissions from the slab furnace. However, the high temperatures of the exhaust from the slab furnaces (in excess of 2000 degrees Fahrenheit) makes it difficult to

[1] EPA notes that it recently received a letter dated May 10, 2002 urging the Agency to expeditiously grant the January 4, 2002 petition. Today's letter fully addresses the petition.
[2] EPA's determination in this letter also applies if these units become subject the NOx Budget Trading Program under a State Implementation Plan approved by EPA under §51.121.

monitor the NOx mass emissions at the slab furnace exhaust duct with a CEMS.

AK Steel has proposed to monitor the NOx mass emissions contributed by the waste heat boilers using an approach analogous to Appendices D and E of Part 75. However, rather than develop a curve under typical operating conditions, where both the slab furnace and the waste heat boiler would be operating, AK Steel proposes to perform Appendix E testing with only the waste heat boiler in operation. In particular, AK Steel proposes to estimate the waste heat boiler's NOx emission rate (lb/mmBtu) from a NOx correlation curve (heat input rate vs. NOx emission rate) described in section 2.4 of Appendix E. Based on Appendix E, the curve would be determined by a four load performance test, with maximum and minium operating loads selected based on the boiler's operation for last two years. The heat input rate (in mmBtu/hr) into the waste heat boilers would be measured by fuel flow meters under Appendix D. The NOx mass emissions from the waste heat boilers would be determined, separately for natural gas and coke oven gas, by multiplying the NOx emission rate (from the NOx correlation curve) by the heat input rate and multiplying the result by the unit operating time during an hour to get hourly NOx mass emissions (in pounds). AK Steel proposes to meet the requirements of Appendices D and E (e.g., concerning sampling of fuel oil for gross calorific value (GCV) and quality assurance and quality control tests for the fuel flowmeters) except for the following:

1) AK Steel proposes to use a conservative default calculated from Equation F-5 of Appendix F rather than develop a NOx emission rate correlation curve for fuel oil as required by Appendix E. According to AK Steel, the waste heat boilers have rarely combusted fuel oil over the last two years. AK Steel would substitute the maximum potential concentration for NOx from oil combustion of 600 ppm (table 2-2 from Appendix A) and a default excess oxygen level of 14% (section 3.3.4 of Appendix F) into Equation F-5 to obtain a NOx emission rate when combusting fuel oil.

2) Appendix E, section 2.1.2.1 requires an excess oxygen level be selected for each fuel combusted in the boiler that is representative for each load level. In lieu of this approach, AK Steel proposes to monitor combustion air flow through the burners into the waste heat boilers and substitute maximum combustion air flow for the excess oxygen parameter for each load level. According to AK Steel, the excess oxygen level with the boiler operating alone (i.e., when the Appendix E testing will be conducted) is likely to be much lower than with the boiler operating in conjunction with the slab furnace and receiving flue gas from the slab furnace (i.e., during normal operation).

3) Section 2.3.3 of Appendix E requires that the NOx correlation curve be retested whenever the excess oxygen level varies from 2% from the excess oxygen level recorded at the same heat input rate during the previous NOx emission rate test. According to AK Steel, this condition would not be meaningful for AK Steel's typical operation because the excess air is much higher when the slab furnace is operating than when the boiler operates alone. AK Steel proposes to retest the boilers if the combustion air flow to the waste heat boiler exceeds the maximum

combustion air flow measured during the NOx emission rate correlation tests by more than 15% for more than16 consecutive hours. AK Steel states that this is analogous to a baseline of 7% oxygen and an exceedance level of 9% oxygen in Appendix E.

4) AK Steel also proposes to vary from Appendix D, section 2.2.4.3 by sampling GCV of the coke oven gas at the beginning of each ozone season and using a conservative default for GCV in lieu of meeting requirements in Appendix D. AK Steel also proposes to vary from Appendix D by electing not to certify the coriolis meters measuring the oil flowrate into the waste heat boiler. The company proposes to follow the manufacturer's recommendations for quality assurance instead.

5) Finally, AK Steel proposes to vary from the Appendix E, section 2.2 requirement to retest the NOx emission rate curve every 3000 unit operating hours. The company proposes to count only those hours in the unit operates in the ozone season toward the 3000 unit operating hours.

EPA's Determination

Under §75.72(b)(2)(ii), the designated representative may submit a petition to use a method of calculating and reporting the NOx mass emissions from an affected unit (here, the waste heat boiler) as the difference between NOx mass emissions measured in the common stack and the NOx mass emissions measured in the duct of the non-affected unit (here, the slab furnace). However, EPA agrees that it would be difficult to install a CEMS in the duct from the slab furnace to measure NOx mass emissions because of the high temperatures. Further, the slab furnace apparently contributes the vast majority to total NOx mass emissions at the stack. Since any monitors used in the subtractive approach would have some margin of error, it is unclear whether the waste heat boiler's emissions could be reliably deduced using this approach. For example, negative values might result from the subtracting the slab furnace emission values from the stack emission values. Therefore, EPA approves AK Steel's request to use Appendix D and E type monitoring to determine NOx mass emissions from Units P009 through P012, with the following modifications and conditions:

1) For each waste heat boiler, AK Steel demonstrated that fuel oil (predominantly fuel oil reclaimed from AK Steel's facility) is rarely combusted in the ozone season. EPA therefore agrees to allow AK Steel to use Equation F-5 from Appendix F to calculate a maximum NOx emission rate for fuel oil using a maximum potential concentration of 600 ppm and an excess oxygen level of 14%, provided that AK Steel does not combust fuel oil in the boiler for over 720 hours in any one ozone season. If AK Steel combusts fuel in any of the waste heat boilers for over 720 hours in any ozone season, then the company must test and establish an NOx emission rate curve for fuel oil for that boiler.

2) According to AK Steel, each boiler is designed to operate independent of the slab furnace. AK Steels states that combustion air to the boiler is controlled based on the fuel flow to the boiler, the fuel combusted in the boiler does not consume any of the oxygen in the slab furnace exhaust, and excess oxygen downstream of the boiler does not provide meaningful data concerning NOx formation in the boiler. EPA finds that the test data provided by AK Steel show that the excess oxygen level (measured downstream of the boiler) with the boiler operating alone is much lower than when the boiler operates with the slab furnace, as it normally does. Therefore, EPA agrees with AK Steel's proposal to substitute maximum combustion air flow to the boiler for normal excess oxygen during the performance test to establish the NOx emission rate correlation curve._Further, EPA agrees that AK Steel will continue to measure combustion air flow to the waste heat boiler, using a 15% increase in the maximum combustion air flow for 16 consecutive operating hours as an alternative to the testing criterion of section 2.3.2 of Appendix E. This approval is contingent upon demonstrating that the annual emission test was not conducted under starved air conditions.

3) For any hour during which the waste heat boiler combusts any amount of coke oven gas, AK Steel must use the NOx correlation curve (heat input rate vs. NOx emission rate) for coke oven gas. AK Steel may use the NOx correlation curve for natural gas only for hours when the waste heat boiler burns only natural gas.

4) EPA denies AK Steel's request to sample coke oven gas once an ozone season. Although AK Steel has indicated a willingness to use a conservative value for GCV, it has not provided data to indicate the variability of the gross calorific value of coke oven gas. In the absence of data showing that GCV variability is low, use of a single sample may not provide a representative GCV value. AK Steel therefore must follow the sampling procedures for fuel sampling in section 2.3.4 and 2.3.5 of Appendix D.

5) EPA also denies the request by AK Steel to not certify the fuel oil flowmeters. Inasmuch as the reliability of the emissions estimates during the combustion of fuel oil could be significantly impacted by erroneous fuel flow readings, certification of the fuel oil flowmeters is necessary. Nevertheless, in recognition of the infrequency of fuel oil firing, AK Steel may delay certification of the each fuel flowmeter until such time as the waste heat boiler receiving fuel oil measured by that flowmeter combusts fuel oil for 720 operating hours during the ozone season. Prior to certification of the flowmeter, AK Steel must substitute the maximum fuel oil flowrate for any time during which the waste heat boiler combusts fuel oil.

6) EPA agrees to allow AK Steel to retest the NOx emission correlation curve every five calender quarters for coke oven gas and natural gas. The recently promulgated amendments to Part 75 have removed the 3000 hour requirement.

EPA's determination in this letter relies on the accuracy and completeness of AK Steel's submission on January 4, 2002 and is appealable under Part 78. If you have any questions regarding this letter, please contact Louis Nichols at (202) 564-0161.

Sincerely,

/s/
Peter Tsirigotis, Acting Director
Clean Air Markets Division

cc: Cecelia Mijares, Region 5
Todd Brown, OEPA