



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

FEB - 5 2004

OFFICE OF
AIR AND RADIATION

Daniel Demoise
Authorized Account Representative
Shenango Incorporated
Neville Island
200 Neville Road
Pittsburgh, PA 15225-1690

Re: Petition to Use Low Mass Emissions Methodology in the 2003 Ozone Season for
Units 9 and 10 at Shenango's Neville Island Facility (Facility ID (ORISPL)
54344)

Dear Mr. Demoise:

This is in response to your August 6, 2003 petition in which Shenango Incorporated (Shenango) requested permission to use the low mass emissions (LME) methodology for the 2003 ozone season to report nitrogen oxides (NO_x) mass emissions and heat input for Units 9 and 10 at the Neville Island, Pennsylvania facility. EPA approves the petition, with conditions, as discussed below.

Background

Shenango owns and operates two boilers, Units 9 and 10, at its Neville Island, Pennsylvania facility. The boilers combust primarily coke oven gas (COG), supplemented with natural gas and fuel oil. The units are subject to the NO_x Budget Trading Program under 25 Pa. Code Chapter 145. Chapter 145 requires Shenango to monitor and report NO_x mass emissions and heat input for Units 9 and 10 during each ozone season (i.e., from May 1st through September 30th), in accordance with Subpart H of 40 CFR Part 75.

In the August 6, 2003 petition, Shenango stated that the 2003 ozone season would be the final season in which Units 9 and 10 would operate, and that, barring an emergency situation, Unit 10 was expected to be out of service for the entire 2003 ozone season. According to Shenango, Units 9 and 10 will be permanently retired as soon as two new replacement boilers become fully operational. The replacement boilers, which are rated at a maximum heat input capacity of 100 mmBtu/hr, are too small to be regulated under Chapter 145. An installation permit (# 0025-1003) for the replacement boilers has been issued to Shenango by the Allegheny County Health Department (ACHD).

Under Subpart H of Part 75, there are three principal measurement methodologies for NO_x mass emissions and unit heat input: (1) continuous emission monitoring (CEM); (2)

Appendix E; and (3) low mass emissions (LME). Units 9 and 10 do not have installed continuous emission monitors and the units cannot qualify to use Appendix E, since they do not meet the definition of a peaking unit in §72.2. However, in support of the August 6, 2003, petition Shenango provided the results of historical NO_x emission rate testing and records of unit operating hours and fuel usage for the 2000, 2001 and 2002 ozone seasons, which indicate that the units qualify to use the LME methodology, in accordance with §75.19(a)(2)(ii)(A). Using these data, Shenango estimated that the NO_x mass emissions in the 2000, 2001 and 2002 ozone seasons were, respectively, 42.7, 17.9, and 19.6 tons for Unit 9, and 0.0, 23.9, and 24.6 tons for Unit 10. All of these estimated NO_x tonnages are below the 50 ton limit specified in §75.19(a)(1)(i)(A)(3) for initial LME qualification.

Although Units 9 and 10 appear to meet the initial LME qualification requirements of 75.19(a) based on the estimates of historical fuel usage and emission test results, this does not ensure that the units can meet the on-going qualification requirements of §75.19(b) for the 2003 ozone season, i.e., that the reported NO_x mass emissions will be 50 tons or less. For LME units, the magnitude of the reported NO_x mass emissions depends critically on the methods used to determine the default NO_x emission rate(s) and the unit heat input. For NO_x emission rate, the owner or operator may either report the generic default values from Table LM-2 in §75.19 or may determine fuel-and unit-specific default emission rates by performing NO_x emission testing in accordance with §75.19(c)(1)(iv). For unit heat input, the owner or operator may either report the maximum rated heat input for each operating hour or may use the long-term fuel flow method, as described in §75.19(c)(3).

If the generic default NO_x emission rate from Table LM-2 and/or the maximum rated heat input methodologies were used for Units 9 and 10, it is unlikely that the reported NO_x mass emissions would be below 50 tons in the 2003 ozone season unless the units operated very little. The NO_x mass emissions would be grossly overstated, since the units normally operate well below their rated heat input capacities, and historical NO_x emission test data have shown that the actual NO_x emissions from the units are lower by a factor of ten than the generic default NO_x emission rates in Table LM-2.

Therefore, in the August 6, 2003 petition, Shenango proposed to quantify the NO_x mass emissions from Unit 9 (which was expected to operate in the 2003 ozone season) using the results of fuel-and unit-specific NO_x emission testing in conjunction with the long-term fuel flow methodology. For Unit 10 (which would only operate in an emergency), the NO_x mass emissions (if any) would be estimated using the generic default NO_x emission rate from Table LM-2 and the maximum rated unit heat input.

Note, however, that at the start of the 2003 ozone season (i.e., May 1st), Shenango had not collected all of the necessary emission test data to determine a fuel-and unit-specific default NO_x emission rate for Unit 9. Neither was there a certified fuel flowmeter in place to measure the amount of coke oven gas combusted in Unit 9 in order to quantify the unit heat input. To address these deficiencies, Shenango performed additional NO_x emission rate testing of Unit 9 on May 6 and June 5, 2003 and also performed boiler efficiency testing, using the procedures in ASME Power Test Code 4.1. The NO_x emission testing was performed at two loads. An analysis

of the historical load data from the previous 3 ozone seasons showed that the unit operated for 92% of the time at two load levels and therefore qualified for two-load emission testing (see §75.19(c)(1)(iv)(I)). The boiler efficiency testing was also done at two load levels.

In the August 6, 2003 petition, Shenango requested permission to use a default NO_x emission rate of 0.155 lb/mmBtu, based upon the May 6 and June 5, 2003 testing, taken together with the results of previous emission tests of Unit 9. Shenango also requested permission to quantify the Unit 9 heat input by using an alternative calculation procedure, based on measured steam production rates, feed water rates and boiler efficiency.

As noted above, Unit 10 was not expected to operate in the 2003 ozone season, except in an emergency situation. Such an emergency did occur, however, in August, 2003. Unit 9 developed tube leaks and had to be removed from service. Therefore, Unit 10 was activated to provide the necessary steam load for the process. Unit 10 remained in service until September 22, 2003.

In view of this unexpected development, on December 3, 2003, Shenango amended the August 6, 2003 petition, requesting permission to report emissions from Unit 10 in the same manner as Unit 9, i.e., using a default NO_x emission rate based on emission testing (0.183 lb/mmBtu) and using the same alternative heat input calculation methodology that was proposed for Unit 9.

EPA’s Determination

EPA reviewed the Unit 9 NO_x emission test data submitted by Shenango in support of the August 6, 2003 petition. The results of five emission tests were provided. EPA considers only four of these tests to be suitable for determining an appropriate LME default NO_x emission rate for Unit 9. The August, 1997 data are more than 5 years old and were disregarded. The results of the other four tests are summarized in Table 1, below:

Table 1: Shenango Unit 9—NO_x Test Results

Test Date	Fuel(s) Combusted	Steam Load (klb/hr)	Average NO _x (lb/mmBtu)
9/27/01	COG + NG + Oil	140	0.118
5/6/03	COG + NG	125	0.102
6/5/03	COG	130	0.122
6/5/03	COG	115	0.135

Table 1 shows that the NO_x emission rates for Unit 9 are relatively constant over a fairly wide range of steam loads and for different combinations of fuels. The May 6 and June 5, 2003

tests adequately represent the two load bands that contained 92% of the historical load data from the past 3 ozone seasons. Thus, the test data satisfy the requirements of §75.19(c)(1)(iv)(I).

Based on these test results, Shenango proposed to use a conservatively high default NO_x emission rate of 0.155 lb/mmBtu for Part 75 reporting purposes. This value was obtained by multiplying the highest average NO_x emission rate obtained at any load level from any of the tests (i.e., 0.135 lb/mmBtu at low load) by 1.15. This proposed default emission rate is about 36% higher than the average NO_x emission rates obtained at the load levels where the unit normally operates.

EPA also evaluated the results of the boiler efficiency tests of Unit 9. The low and high load tests showed efficiencies of 76.7 and 76.4%, respectively. In the August 6, 2003 petition, Shenango proposed a methodology for determining unit heat input. First, the unit heat output would be calculated, using the measured steam production rate, the feedwater flow rate, and the enthalpy of the feedwater, steam and blowdown. Then, the heat output would be divided by the boiler efficiency, to give an estimate of the unit heat input. A conservatively low boiler efficiency of 69% would be used in the calculations. Shenango tested this calculation method by comparing it against unit heat input values that were measured during the four emission tests of Unit 9 in Table 1, above. The results of this comparison are shown in Table 2, below:

**Table 2: Measured vs. Calculated Heat Input
(Shenango Unit 9)**

Test Date	Measured Heat Input (mmBtu/hr)	Calculated Heat Input (mmBtu/hr)	% Difference
9/27/01	224	266	+ 18.8
5/6/03	225	238	+ 5.7
6/5/03 (high)	230	232	+ 0.9
6/5/03 (low)	193	210	+ 8.8

Table 2 shows that for an assumed efficiency of 69%, the calculated unit heat input values are all conservatively high with respect to the measured values, by an average of 8.6%.

EPA performed similar data analyses for Unit 10. The results of these are shown in Tables 3 and 4.

Table 3: Shenango Unit 10—NO_x Test Results

Test Date	Fuel(s) Combusted	Steam Load (klb/hr)	Average NO _x (lb/mmBtu)
12/10/99	COG	142	0.156
10/19/01	COG + NG	114	0.151
11/21/03	COG + NG	104	0.070

Shenango has proposed to use a conservatively high NO_x emission rate of 0.183 lb/mmBtu for Unit 10. This value was determined by multiplying the highest emission rate observed in any of the three emission tests by 1.15.

Table 4: Measured vs. Calculated Heat Input (Shenango Unit 10)

Test Date	Measured Heat Input (mmBtu/hr)	Calculated Heat Input (mmBtu/hr)	% Difference
12/10/99	232	255	+ 9.9
10/19/01	295	205	- 27.1
11/21/03	242	187	- 22.7

Table 4 shows that when an efficiency of 69% is assumed, the heat input values calculated using Shenango's proposed methodology do not agree well with the values determined from the test data. For the December, 1999 data, the calculated heat input from the model is 9.9% higher than the measured value. However, for the October, 2001 and November, 2003 tests, a wide discrepancy is observed between the two heat input values. The values calculated using the alternative heat input method are lower than the values obtained from the emission test data, by about 25%.

In view of the results of these data analyses, EPA concludes that the proposed default NO_x emission rates of 0.155 lb/mmBtu for Unit 9 and 0.183 lb/mmBtu for Unit 10 are sufficiently conservative to ensure that NO_x mass emissions from the unit will not be underestimated. The alternative heat input methodology proposed by Shenango (assuming 69% efficiency) is acceptably conservative for Unit 9, but use of this methodology for Unit 10 could result in significant underestimation of NO_x mass emissions. EPA therefore approves, with

conditions, Shenango's petition to use the LME methodology for the 2003 ozone season, to account for the NO_x mass emissions from Units 9 and 10. The proposed alternative heat input methodology is approved for Unit 9, and is conditionally approved for Unit 10. The conditions of these approvals are as follows:

- (1) For Units 9 and 10, Shenango shall report NO_x mass emissions and heat input data for the 2nd and 3rd quarters of 2003, using the low mass emissions (LME) methodology in §75.19. The data shall be reported in version 2.2 of EPA's Electronic Data Reporting (EDR) format. The deadlines for submitting the 2nd and 3rd quarter reports are extended, respectively, from July 30 and October 30, 2003 to February 13, 2004.
- (2) For Unit 9, a NO_x emission rate of 0.155 lb/mmBtu shall be used to calculate the NO_x mass emissions for each unit operating hour in the 2003 ozone season. The unit heat input for each operating day shall be calculated using the alternative heat input methodology described in the August 6, 2003 petition, assuming a boiler efficiency of 69%. The total steam flow for each operating day (klb) and the total feed water flow per day (klb) shall be used to calculate the total unit heat input per day (mmBtu). However, note that the use of this alternative heat input methodology is approved for use only for the 2003 ozone season, in view of Shenango's stated intention to retire Unit 9 prior to the 2004 ozone season (see Condition (7), below).
- (3) For Unit 10, a NO_x emission rate of 0.183 lb/mmBtu shall be used to calculate the NO_x mass emissions for each unit operating hour in the 2003 ozone season. The unit heat input for each operating day shall be calculated using the alternative heat input methodology described in the August 6, 2003 petition, assuming a boiler efficiency of 69%. The total steam flow for each operating day (klb) and the total feed water flow per day (klb) shall be used to calculate the total unit heat input per day (mmBtu), and the calculated result for each day shall be multiplied by 1.30¹. If the calculated heat input for any day exceeds 7,200 mmBtu, a heat input of 7,200 mmBtu shall be used for that day². The use of this alternative heat input methodology is approved for use only for the 2003 ozone season, in view of Shenango's stated intention to retire Unit 10 prior to the 2004 ozone season (see Condition (7), below).

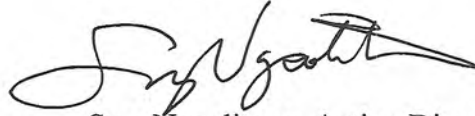
¹ For Unit 10, a 30 percent upward adjustment must be applied to the calculated daily heat input values, since for two of the three emission tests, the proposed alternative heat input methodology underestimated the heat input by about 25%.

² Even though the maximum rated heat input capacity of Unit 10 is 274 mmBtu/hr (or 6,576 mmBtu per day, for 24 hours of operation), the October 19, 2001 test data indicate that the unit can operate at an hourly heat input as high as 295 mmBtu (or 7,080 mmBtu per day). Therefore, a conservatively high daily heat input "cap" value of 7,200 mmBtu/day shall be used in lieu of the unit's maximum rated daily heat input.

- (4) For each unit, a long-term gas system (LTGS) shall be defined in the monitoring plan, in EDR record type 510. The LTGS system shall consist of two components, a flow computer (FLC) and a data logger or recorder (DL).
- (5) In each quarterly EDR, Shenango shall sum the calculated daily heat input values from (2), above (for Unit 9) or from (3), above (for Unit 10), and shall report the cumulative heat input in EDR record type 305, under the LTGS system ID number. The cumulative heat input for the quarter shall then be apportioned by steam load to the individual unit operating hours in the quarter, using Equation LM-8 in §75.19.
- (6) Since Unit 10 did not operate in the second quarter of 2003, a “non-operating quarter EDR report” shall be submitted, as described in section II.C(14) of the EDR v 2.2 Reporting Instructions, for that quarter. Do not include EDR record type 645 in the non-operating quarter report. Rather, submit RT 645 with the 3rd quarter, 2003 report.
- (7) If Units 9 and 10 should operate in the 2004 ozone season, Shenango may continue to use the low mass emissions methodology for the units only if:
 - (a) The unit heat input is quantified in accordance with §75.19(c)(3). That is, either the maximum rated unit heat input is reported for each hour of operation of Units 9 and 10, or certified fuel flowmeters that meet the requirements of Part 75, Appendix D, section 2.1.5 are used to determine the heat input; and
 - (b) Units 9 and 10 continue to meet the on-going LME qualification requirements of §75.19(b).
- (8) If and when Units 9 and 10 are permanently retired, Shenango must file, with the Pennsylvania Department of Environmental Protection (PADEP), the required statements for permanently retired units and provide a copy to EPA’s Clean Air Markets Division (CAMD). Ozone season reporting of NO_x mass emissions and unit heat input is required for Units 9 and 10 until the units have been permanently retired. If the units continue to operate after the 2004 ozone season, Shenango must either comply with the requirements of Subpart H of Part 75 or submit a new application for approval of low mass emission status.

EPA's determination relies on the accuracy and completeness of the information provided by Shenango in the August 6, 2003 petition, as amended on December 3, 2003, and is appealable under Part 78. If you have any questions or concerns about this determination, please contact Robert Vollaro, at (202) 343-9116. Thank you for your continued cooperation.

Sincerely,

A handwritten signature in black ink, appearing to read "Sam Napolitano", with a long horizontal flourish extending to the right.

Sam Napolitano, Acting Director
Clean Air Markets Division

cc: Jerry Curtin, EPA Region III
Joseph Nazzaro, Pennsylvania DEP
Dean Van Orden, Pennsylvania DEP
Robert Vollaro, CAMD
Ujjval Shukla, CAMD