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

APR 30 2002

OFFICE OF
AIR AND RADIATION

David J. Toombs
General Manager
Authorized Account Representative
Citizens Thermal Energy
366 Kentucky Avenue
Indianapolis, Indiana 46225-1165

Re: Petition for Alternative Monitoring Requirements at C.C. Perry K Steam Plant, Common Stack 3, Units 11 and 12.

Dear Mr. Toombs:

This is in response to Citizens Thermal Energy 's (CTE) September 10, 2001 petition, under §75.66 to use the alternative monitoring methodologies described in the petition to monitor heat input and nitrogen oxides (NO_x) mass emissions from Unit 11 and 12 at C.C. Perry K Steam Plant. As discussed below, EPA approves the petition in part.

Background

C.C. Perry K Steam Plant operates six boilers (Units 11, 12, 13, 14, 15, and 16) that are subject to the NO_x Budget Trading Program under Part 96 and in the State of Indiana's NO_x State Implementation Plan. Unit 11 is an Acid Rain Program opt-in unit combusting coke oven gas and natural gas and monitors volumetric stack flow. Unit 12, which is not subject to the Acid Rain Program, is a boiler combusting coal. Units 11 and 12 both exhaust through Common Stack 3. No other units exhaust through Common Stack 3. Under Part 75, CTE must monitor NO_x mass emissions and heat input for both units.

CTE wants to avoid the need to install full NO_x and stack flow continuous emissions monitoring systems at both units. Under §§75.16(e)(1) and 75.17(a)(2), CTE may monitor NO_x mass emissions and heat input at the common stack and apportion the heat input to the individual units.

CTE intends to install a volumetric flow monitor and a carbon dioxide (CO_2) monitor on Common Stack 3 to meet the requirements to measure heat input at Common Stack 3. CTE further intends to use Equation F-15 from Appendix F of Part 75, which utilizes the stack

volumetric flow, the percentage of CO_2 in the flue gases, and a carbon based Fc-factor (scf CO_2/mmBtu) as defined in Part 75, Appendix F, section 3.3.5 to measure heat input rate (mmBtu/hr) at Common Stack 3, as required by Part 75. In order to determine the heat input at Common Stack 3, CTE must prorate the Fc-factor between Unit 11 and Unit 12, which combust fuels with different Fc-factors.

In the petition, CTE requests to prorate the Fc-factor utilizing the steam load of each boiler and Equation F-8 from Part 75, Appendix F, section 3.3.6.4, substituting steamload for heat input. CTE would determine the heat input at Common Stack 3, using the prorated Fc-factor and Equation F-15, and then apportion the heat input to Units 11 and 12, using Equation F-21b from Appendix F, section 5.6.2. CTE also requests to use Equation SS-2C from section 22 of the Acid Rain Program Policy Manual to apportion the NO_x mass emissions from Common Stack 3 to the Units 11 and 12.

EPA's Determination

Part 75 requires that the heat input for all units be monitored and reported, but does not address the specific circumstances that CTE faces with Units 11 and 12. Under Appendix F of Part 75, a unit may determine heat input utilizing Equation F-15, which requires that the volumetric flow, the Fc-factor, and the concentration of carbon dioxide be measured. Under §75.16(e)(1), heat input from a common stack must be apportioned to the individual boilers that exhaust through the stack. Two affected units exhausting through a common stack may apportion heat input to each unit using the ratio of steam flow for each unit under §75.16(e)(3) and section 5.6 of Appendix F, provided that the units are combusting fuel with same Fc-factor. Part 75 does not provide for prorating, by steam load, the heat input at a common stack for units that combust with different Fc-factors. However, section 3.3.6.4 of Appendix F provides for a single unit that combusts combinations of fossil fuels to prorate the Fc-factor using Equation F-8, the Fc-factor of each fuel, and the fraction of heat input from each fuel.

CTE's proposed monitoring methodology to apportion the Fc-factor at Common Stack 3 using Equation F-21b and the steam load from Units 11 and 12 is unacceptable. The Fc-factor represents a ratio of the volumetric flow generated to the calorific value of the fuel (mmBtu) combusted and must be apportioned in relation either to the calorific value of the fuel or the volumetric flow. An underlying assumption of Equation F-21b is that the resulting volumetric flows per heat input (mmBtu) are identical for the units involved. Since the Fc-factors for coke oven and natural gas (Unit 11) and for bituminous coal (Unit 12) are different (700 to1040 scf/mmBtu vs 1800 scf/mmBtu), it is clear that the volumetric flows per heat input are not identical. However, since the Fc-factor is related to the volumetric flow, it would be appropriate to apportion the Fc-factor at Common Stack 3 by the volumetric flow from Units 11 and 12. If CTE monitors the volumetric flows from Common Stack 3 and Unit 11, the company can determine the volumetric flow from Unit 12 by subtracting the flow from Unit 11 from the flow at Common Stack 3. The Fc-factor can then be apportioned using the following equations:

Where:

(1) $$Q_{12}\,t_{12} = Q_{cs}\,t_{cs} - Q_{11}\,t_{11}$$

And:

(2) $$Fc_{cs} = [(Q_{11}\,t_{11} / Fc_{11}\,Q_{cs}\,t_{cs}) + (Q_{12}\,t_{12}) / Fc_{12}\,Q_{cs}\,t_{cs})]^{-1}$$

Substitute Equation (1) into Equation (2) to yield Equation (3):

(3) $$Fc_{cs} = [(Q_{11}\,t_{11} / Fc_{11}\,Q_{cs}\,t_{cs}) + (Q_{cs}\,t_{cs} - Q_{11}\,t_{11}) / Fc_{12}\,Q_{cs}\,t_{cs})]^{-1}$$

Fc_{cs} = Fc-factor at the common stack, (scf CO_2/mmBtu)
Fc_{11} = Fc-factor at Unit 11, (scf CO_2/mmBtu)
Q_{11} = volumetric stack flow from Unit 11, (scfh)
t_{11} = unit operating time for Unit 11, (hr)
Fc_{12} = Fc-factor at Unit 12, (scf CO_2/mmBtu)
Q_{12} = volumetric stack flow at Unit 12, (scfh)
t_{12} = unit operating time for Unit 12, (hr)
Q_{cs} = volumetric stack flow for Common Stack 3
t_{cs} = stack operating time at Common Stack 3

Therefore, EPA approves the request to apportion heat input at Common Stack 3 to Units 11 and 12 using a pro-rated Fc-factor, but only if the proration is based on volumetric flow, as described above.

With regard to CTE's request to apportion NO_x mass at Common Stack 3, EPA notes that NO_x mass emissions are not required to be apportioned to the individual units since both Unit 11 and 12 are subject to the NO_x Budget Trading Programs. Consequently, there is no need to use Equation SS -2C from the "Acid Rain Program Policy Manual" to apportion NO_x mass emissions, and EPA denies the requested NO_x mass apportionment.

EPA's determinations in this letter rely on the accuracy and completeness of CTE's submission on September 10, 2001 and are appealable under part 78. If you have any questions regarding this correspondence, please contact Louis Nichols at (202) 564-0161.

Sincerely,

Panagiotis E. Tsirigotis, Acting Director
Clean Air Markets Division

cc: Cecelia Mijares, Region 5
Dave Cline, IDEM