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

MAR 19 2001

OFFICE OF
AIR AND RADIATION

Walter F. McGuire
Vice President, Environmental Safety & Industrial Health
Reliant Energy
P.O. Box 4567
Houston, TX 77210-4567

Re: Response to Petition to Use an Alternative Fuel Flow Rate Apportionment Method at Reliant Energy's Shelby County Generating Station, ORIS Code 55237, Units 1-8

Dear Mr. McGuire:

The U. S. EPA has reviewed Reliant Energy's April 7, 2000 petition under 40 CFR 75.66(a) to use an alternative gas flow rate apportionment method to apportion the hourly gas flow rate from a common commercial billing meter to each individual unit at the Shelby County Generating Station (Shelby) under part 75, appendix D, section 3.4.3. In the petition, the designated representative requests approval to use an alternative method to part 75, appendix D, section 3.4.3 to apportion the hourly fuel flow rate from a common fuel flowmeter. The common fuel flowmeter is the commercial billing meter for natural gas for eight units at Shelby.

Background

The commercial billing meter at Shelby accounts for the gas flow to eight simple-cycle, combustion turbines at that facility. The use of the commercial billing meter to measure, record, and report hourly fuel flow rate for units is allowed under 40 CFR, part 75, appendix D, section 2.1.4.2. Under 40 CFR part 75, section 3.4.3 of appendix D, Equation D-10 is used to apportion the gas flow rate from a common pipe utilizing a common gas flowmeter (in this instance, the commercial billing meter). Equation D-10 apportions the gas flow rate based on gross electrical output. Gas flow rate is multiplied by the appropriate heat rate value for the natural gas to yield heat input. Instead of prorating the gas flow from the common commercial billing meter based on the operating load from the units as required in section 3.4.3 of appendix D, the petition proposes to apportion the gas flow rate from a common commercial billing meter to the eight units at Shelby by using the gas flow rate of the individual gas flowmeters at the units. The individual gas flowmeters do not meet the accuracy requirements of 40 CFR part 75, appendix D, section 2.1.

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In order to apportion hourly gas flow rates, the petition proposes to modify Equation D-10 in part 75, appendix D by substituting the gas flow rates from the unit gas flowmeters for the respective total unit outputs in megawatts (MW) and by substituting the gas flow rate from the commercial billing meter for the sum of the total unit outputs in megawatts. Equation D-10 is as follows.

$$GAS_{unit} = GAS_{meter}\left(\frac{U_{output}}{\sum_{all-units} U_{output}}\right)$$

(Eq. D-10)

Where:

GAS_{unit} = Gas flow apportioned to a unit, 100 scf.
GAS_{meter} = Total gas flow through the fuel flowmeter, 100 scf.
U_{output} = Total unit output, MW or klb/hr.

According to the petition, apportionment of hourly gas flow rates between the eight units based on data from the unit gas flowmeters is preferable to apportionment based on gross electrical output. During certain periods (e.g., during start-up), a unit at Shelby may combust gas without producing any electricity. In order to take this into account, a load of 1 MW can be arbitrarily assigned to the unit for that period. In addition, to the extent the eight units have different heat rates, apportionment based on gross electrical output may be somewhat inaccurate. The petition proposes apportionment based on data from the unit gas flowmeters in order to avoid these problems.

EPA's Determination

EPA recognizes that apportionment based on gross electrical output creates a problem when a unit is combusting gas without producing electricity.[1] However, it is unclear in this case whether assignment of load to periods of combustion with no electricity production results in any significant distortion in the apportionment. In addition, the eight individual gas flowmeters proposed to be used to apportion based on gas flow are not certified, but it is unclear whether any inaccuracy in these flowmeters results in any significant distortion in the apportionment. Finally, both the approach of apportioning based on load and the approach of apportioning based on gas flow rate can be designed to avoid under-reporting of emissions. Balancing these considerations, EPA concludes that apportionment based on gas flow rate is somewhat preferable and that the petition should be granted in part with certain conditions.

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[1] While differences in heat rates for the eight units at Shelby could also potentially result in inaccurate apportionment, the petition does not establish whether there are any significant heat rate differences among the eight units.

In particular, Equation D-10 does not take into account unit operating time explicitly. Substituting gas flow for load in the equation results in a value for gas quantity (in 100 scf) as opposed to gas flow rate (in 100 scf/hour) as required by section 3.4.3 of appendix D. In addition, unit operating time must be represented in the equation used to apportion based on gas flow rate in order to prevent errors in calculating heat input for partial unit operating hours.

EPA has developed Equation F-21D, which addresses these issues, while providing for apportionment based on fuel flow rate. Equation F-21D is in Table 21 of the Revised EDR Version 2.1 Reporting Instructions, dated June 28, 2000. Where applicable, the heat input rate monitored at a common pipe may be apportioned among units on the common pipe based on fuel flow rate using Equation F-21D as follows:

$$HI_i = HI_{CP}\left(\frac{t_{CP}}{t_i}\right)\left[\frac{FF_i\, t_i}{\sum_{i=1}^{n} FF_i\, t_i}\right]$$

(Eq. F-21D)

Where:

HI_i	=	Heat input rate for a unit, mmBtu/hr.
HI_{CP}	=	Heat input rate at the common pipe, mmBtu/hr.
FF_i	=	Fuel flow rate to a particular unit, in appropriate measurement units.
t_i	=	Operating time at a particular unit, hour or fraction of an hour (in equal increments that can range from one hundredth to one quarter of an hour, at the option of the owner or operator).
t_{CP}	=	Operating time at common pipe, hour or fraction of an hour (in equal increments that can range from one hundredth to one quarter of an hour, at the option of the owner or operator).
n	=	Total number of units using the common pipe.
i	=	Designation of a particular unit.

In order to account for unit operating time, Equation F-21D should be used as the basis for apportioning based on gas flow rate at Shelby, rather than Equation D-10. Heat input rate at the common pipe is, of course, determined by multiplying gas flow rate at the common pipe by the appropriate heat rate value for pipeline natural gas.

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EPA therefore approves the petition in part, on the condition that Equation F-21D is used to apportion the gas flow rate to the units, as discussed above. This approval relies on the accuracy and completeness of the information in the submission of April 7, 2000, and is appealable under part 78 of the Acid Rain regulations. If you have any further questions or concerns about this matter, please contact Louis Nichols at (202) 564-0161 or Nichols.Louis@epa.gov.

Sincerely,

Brian J. McLean, Director
Clean Air Markets Division

cc: Cecelia Mijares, Region V
Shibu Vazha, IEPA

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