October 15, 2008

Gary Gilleland
Designated Representative
Western Farmers Electric Cooperative
P.O. Box 429
Anadarko, Oklahoma 73005-0429

Re: Petition to Use Continuous Gross Calorific Value Analysis at the Anadarko and Mooreland Power Stations (Facility IDs (ORISPLs) 3006 and 3008)

Dear Mr. Gilleland:

The United States Environmental Protection Agency (EPA) has reviewed the July 9, 2008 petition submitted by Western Farmers Electric Cooperative (WFEC) under 40 CFR 75.66, in which WFEC requested to use hourly measurements, rather than monthly averages, of the gross calorific value (GCV) of pipeline natural gas to perform emissions calculations for its Anadarko and Mooreland facilities. EPA approves the petition, with conditions, as discussed below.

Background

WFEC owns and operates a dry-bottom wall-fired boiler, Unit 3, and two combustion turbines, Units 7 and 8, at its Anadarko, Oklahoma facility (Anadarko). In 2009, WFEC plans to expand the Anadarko facility by adding three new gas-fired combustion turbines (Units 9, 10, and 11). WFEC also owns and operates three dry bottom wall-fired boilers (Units 1, 2, and 3) at its Mooreland, Oklahoma facility (Mooreland). All six of the existing units at Anadarko and Mooreland combust pipeline natural gas (PNG), and the three new turbines at Anadarko will also combust PNG (see Table 1, below).

According to WFEC, the six existing units at Anadarko and Mooreland and the three planned new units at Anadarko are all subject to the Acid Rain Program. Therefore, WFEC is required to continuously monitor and report sulfur dioxide (SO_2), nitrogen oxides (NO_x), and carbon dioxide (CO_2) emissions and heat input for these units in accordance with 40 CFR Part 75.

Acid Rain Program units that meet the definition of gas-fired or oil-fired may use the alternative methodology in Appendix D of Part 75, instead of continuous emission monitoring systems (CEMS), to determine the SO_2 mass emission rate and the unit heat input. As shown in Table 1, WFEC has chosen to use Appendix D to account for SO_2 emissions from all of the Anadarko and Mooreland units.

Table 1 – WFEC Facilities

Facility Name & Location	ORIS Code	Unit ID	Size (MW)	Type	Start Date	Fuel	Monitoring Methods	
							SO_2	NO_x
Anadarko (Caddo County, OK)	3006	3	44	Dry bottom wall-fired boiler	1958	PNG	Appendix D	Appendix E
		7	47	Combustion turbine	2001	PNG	Appendix D	Appendix E
		8	47	Combustion turbine	2001	PNG	Appendix D	Appendix E
		9*	47	Combustion turbine	2009	PNG	Appendix D	-
		10*	47	Combustion turbine	2009	PNG	Appendix D	-
		11*	47	Combustion turbine	2009	PNG	Appendix D	-
Mooreland (Woodward County, OK)	3008	1	44	Dry bottom wall-fired boiler	1963	PNG	Appendix D	Appendix E
		2	125	Dry bottom wall-fired boiler	1968	PNG	Appendix D	CEMS
		3	135	Dry bottom wall-fired boiler	1971	PNG	Appendix D	CEMS

* Unit is expected to begin operation in 2009; WFEC has not indicated how NO_x will be monitored at this unit.

The Appendix D methodology requires continuous monitoring of the fuel flow rate and periodic sampling of the fuel characteristics, including sulfur content, gross calorific value (GCV), and density (if needed). According to Section 2.3.4.1 of Appendix D, the GCV of pipeline natural gas must be determined at least once in every month in which PNG is combusted for 48 hours or more[1]. If multiple GCV samples are taken and analyzed in a particular month, section 2.3.4.1 provides that, "the GCV values from all samples shall be averaged arithmetically to obtain the monthly GCV." Furthermore, section 2.3.7(c)(1) of Appendix D states that, "[i]f multiple samples are taken and averaged, apply the monthly average GCV to the entire month"[2].

Thus, for units such as Anadarko 3, 7, and 8 and Mooreland 1, 2, and 3 that combust pipeline natural gas, for each hour of unit operation in a given month, the measured hourly fuel flow rate is used together with the average GCV value for that

[1] However, at least one GCV analysis must be performed for each quarter in which the unit operates for any amount of time.

[2] Note that the requirements to average multiple GCV samples and to apply the average value to the entire month were added to Part 75 in January 2008 (see 73 FR 4312, 4332, January 24, 2008).

month, to determine the hourly unit heat input. The hourly heat input is then multiplied by a default SO_2 emission rate of 0.0006 lb/mmBtu to calculate the hourly SO_2 mass emissions.

Table 1 shows that Anadarko Units 3, 7, and 8 and Mooreland Unit 1, which qualify as gas-fired peaking units, use the NO_x measurement methodology in Appendix E to Part 75. Appendix E requires the use of Appendix D to determine hourly values of unit heat input rate, from which hourly NO_x emission rates are estimated by means of a correlation curve. Once again, each hourly heat input rate is the product of a monthly average GCV and an hourly fuel flow rate.

WFEC operates and maintains continuous gas chromatographs, which provide hour-by-hour measurements of the GCV of the pipeline natural gas at the Anadarko and Mooreland facilities. WFEC believes that the most accurate hourly heat input rates are obtained when hourly GCV values are coupled with hourly measurements of fuel flow rate. In view of this, WFEC submitted a petition to EPA on July 9, 2008, requesting to use hourly GCV values, rather than monthly averages, in the emissions calculations for the Anadarko and Mooreland units.

EPA's Determination

EPA approves WFEC's petition to use hourly measurements of the GCV of pipeline natural gas, instead of using monthly average GCV values, in the emissions calculations for the Anadarko and Mooreland facilities. The Agency concurs that using hourly, rather than monthly, GCV values together with hourly fuel flow rates is likely to provide more accurate hourly heat input rate data. Furthermore, hour-by-hour measurement of the GCV far exceeds the minimum sampling frequency for PNG (i.e., once a month) specified in section 2.3.4.1 of Appendix D.

Conditions of Approval

The conditions of this approval are as follows:

(1) WFEC shall operate and maintain the on-line gas chromatographs at the Anadarko and Mooreland facilities in accordance with the manufacturer's instructions.

(2) At both facilities, the quality control/quality assurance (QA/QC) program required by section 1 of Appendix B to 40 CFR Part 75 shall include information on the maintenance and quality-assurance activities associated with the gas chromatographs.

(3) For periods of missing GCV data, WFEC shall use substitute data values in the calculations, as follows:

a. Provided that at least one valid GCV measurement is obtained in a given month, substitute, for each hour of the missing data period, the arithmetic average of the GCV values from the hour before and the hour after the missing data incident; or

b. In accordance with section 2.4.1 of Appendix D to 40 CFR Part 75, if no valid GCV values are obtained in a given month, substitute, for each hour of the missing data period, the maximum potential GCV value of 110,000 Btu per 100 scf, from Table D-6 in Appendix D.

EPA's determination relies on the accuracy and completeness of the information provided by WFEC in the July 9, 2008 petition and in subsequent clarifying e-mails, and is appealable under Part 78. If you have any questions regarding this determination, please contact Travis Johnson, either at (202) 343-9018 or Johnson.Travis@epa.gov.

Sincerely,

/s/
Sam Napolitano, Director
Clean Air Markets Division

cc: Ms. Jian Yue, Oklahoma Department of Environmental Quality
Joyce Johnson, EPA Region VI
Travis Johnson, CAMD
Ujjval Shukla, CAMD