



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

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OFFICE OF
AIR AND RADIATION

Cynthia Johnson
Senior Environmental Coordinator - Health, Safety, Environment
Authorized Account Representative
BP Amoco Chemical Company
Flint Hills Resources, LP - Joliet Facility
P.O. Box 941
Joliet, IL 60434

Re: Petition to Use the GCV of Pipeline Natural Gas to Represent the
GCV of Natural Gas/Biogas Mixtures Unit CB-706 at BP Amoco
Chemical Company's Joliet, Illinois Plant (Facility ID (ORISPL)
880089)

Dear Ms. Johnson:

EPA has reviewed your January 30, 2004 petition under §75.66 in which BP Amoco Chemical Company (BP) requested permission to use the gross calorific value (GCV) of pipeline natural gas to represent the GCV of a mixture of natural gas and biogas, during hours when this mixture is combusted in Unit CB-706 at the Joliet, Illinois facility. EPA approves the petition, for the reasons given below.

Background

BP owns and operates an industrial boiler, Unit CB-706, at its chemical manufacturing plant in Joliet, Illinois. Unit CB-706 is used to supply steam for the manufacturing process. The boiler has a maximum heat input capacity of 370.2 mmBtu/hr and is configured to fire either pipeline natural gas or a mixture of natural gas and biogas. The biogas is produced in the facility's wastewater anaerobic reactor.

Unit CB-706 is subject to the NO_x Budget Trading Program, under Title 35, Subtitle B, Chapter I, Subchapter c, Part 217, Subpart U of the Illinois Administrative Code (IAC). This regulation requires BP to continuously monitor and report nitrogen oxides (NO_x) mass emissions during the ozone season (i.e., from May 1 through September 30) in accordance with Subpart H of 40 CFR Part 75, beginning with the 2003 ozone season. BP is further required to hold allowances equal to the ozone season NO_x mass emissions from Unit CB-706, as of May 31, 2004.

For oil and gas-fired units, there are three possible compliance options under Part 75 for NO_x monitoring. The owner or operator may either: (1) install continuous emission monitoring systems (CEMS); or (2) use the methodology in Appendix E (for peaking units, only); or (3) use the low mass emissions (LME) methodology in Section 75.19. BP has determined that Unit CB-706 qualified for LME status based on the NO_x mass emissions from the 2001, 2002, and 2003 ozone seasons. BP has proposed to use the following standard LME options to quantify the NO_x mass emissions:

- Long-term fuel flow (using a certified fuel flow meter) to monitor unit heat input; and
- Fuel-and-unit-specific NO_x emission rates, derived from historical CEMS data.

Long-term fuel flow monitoring with a certified fuel flowmeter requires periodic sampling to determine the fuel's GCV. As previously noted, Unit CB-706 combusts either natural gas or a mixture of natural gas and biogas. Biogas is never combusted alone in the unit. A dedicated fuel flowmeter monitors the fuel flow rate to Unit CB-706. At any given time, this meter monitors the natural gas flow rate or the combined flow rate of the natural gas/biogas mixture, depending on the firing scenario.

According to BP, the natural gas combusted in Unit CB-706 meets the definition of "pipeline natural gas" in §72.2. However, the biogas and the natural gas/biogas mixture do not meet the definition of either "pipeline natural gas" or "natural gas" in §72.2. Both of these definitions exclude process gases. Therefore, the biogas from BP's wastewater anaerobic reactor must be classified as a gaseous fuel "other than pipeline natural gas or natural gas." For these "other" gaseous fuels, the LME methodology requires daily sampling of the GCV unless the results of a 720-hour demonstration under section 2.3.5 of Appendix D show that the fuel has a low GCV variability and qualifies for monthly sampling (See §75.19(c)(3)(ii)(C)(3)).

According to BP, the company does not currently have the capability of performing daily GCV sampling of the biogas, and believes that this requirement is unduly burdensome. In view of this, in the January 30, 2004 petition BP proposed to use the GCV of natural gas to represent the GCV of the natural gas/biogas mixture during hours when this mixture is combusted. BP obtains GCV data every month from its natural gas supplier.

To support the January 30, 2004 petition, BP analyzed three years of historical fuel usage data for Unit CB-706, and determined that:

- The natural gas/biogas mixture is fired for only about 25% of the unit's operating hours; and
- The percentage by volume of biogas in the mixture averages about 6%, with a maximum percentage of 14.3%; and
- Biogas is typically composed of approximately 50 to 68% methane, the remainder being inert materials or other very low GCV components that do not significantly contribute to the fuel heating value.

These results indicate that the biogas has a lower methane content than natural gas, which, according to the definition in §72.2, consists of at least 70% methane by volume. Therefore, the GCV of the biogas (and hence, the natural gas/biogas mixture) will be lower than that of natural gas. Hence, using the GCV of natural gas to quantify Unit CB-706's heat input when the natural gas/biogas mixture is combusted will conservatively overestimate both the unit's heat input and its NO_x mass emissions for those hours.

EPA's Determination

EPA approves BP's request to use the GCV of pipeline natural gas to represent the GCV of the natural gas/biogas mixture during hours when this mixture is combusted in Unit CB-706, in lieu of performing daily GCV sampling of the biogas. To determine the heat input to the unit during these hours, BP shall use the monthly GCV values provided by the supplier of the pipeline natural gas.

This approval is granted for the following reasons. First, the historical data analyzed by BP show that biogas provides only a small fraction of the total heat input to Unit CB-706. Second, the fuel composition data provided by BP demonstrates that biogas has a lower GCV value than pipeline natural gas. Therefore, using the GCV of the pipeline natural gas when the natural gas/biogas mixture is combusted will overestimate the unit heat input for those hours. This ensures that the NO_x mass emissions for those hours (which are calculated by multiplying the NO_x emission rate by the unit heat input) will not be underestimated. If, based on the results of periodic fuel sampling, the composition of the biogas changes such that there is reason to believe that the GCV of the biogas exceeds that of pipeline natural gas, then BP must either: (a) perform daily GCV sampling; or (b) perform the 720-hour demonstration in section 2.3.5 of Appendix D; or (c) re-petition for an alternative method of determining the GCV of biogas.

EPA's determination relies on the accuracy and completeness of the information provided by BP in the January 30, 2004 petition and is appealable under Part 78. If you have any questions or concerns about this determination, please contact Louis Nichols, at (202) 343-9008.

Sincerely,



Sam Napolitano, Director
Clean Air Markets Division

cc: Cecilia Mijares, EPA Region V
Scott Owens, Illinois EPA
Louis Nichols, CAMD