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Coal Fired Power Plant Heat Rate Reduction

Mr. Rae Cronmiller
Sr. Principal Environmental Counsel
National Rural Electric Cooperative Association
Generation and Fuels
4301 Wilson Boulevard
Arlington, Virginia 22203

Dear Mr. Cronmiller,

Sargent & Lundy, L.L.C. (S&L) is pleased to submit the conclusions of the study titled “Coal Fired Power Plant Heat Rate Reduction – NRECA” performed for NRECA. The key conclusions are as follows:

- Sargent & Lundy’s 2009 Report does not conclude that any individual coal-fired EGU or any aggregation of coal-fired EGUs can achieve 6% HRI or any broad target, as estimated by the EPA.
- The results in the 2009 Report were mostly based on publicly available data, data from original equipment manufacturers, and Sargent & Lundy’s power plant experience. Furthermore, the case studies showed that not all of the examined alternatives were feasible to apply to an individual generating unit due to a number of factors, including plant design, previous equipment upgrades, and each plant’s operational restrictions.
- Various limitations exist for applying each heat rate improvement strategy, and these limitations depend on the unit type, fuel type, and many other site-specific conditions. Therefore, the ability to apply each strategy and the amount of heat rate reduction that can be achieved by each strategy is site-specific and must be evaluated on a case-by-case basis.
- It appears as though the EPA assumed that heat rate improvements cited in our 2009 Report were additive and applicable to all coal-fired units. Heat rate improvement ranges described in the 2009 Report case studies were estimated at a conceptual level, and were not based on detailed site-specific analyses. Verification of actual heat rate improvements was not made to

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determine whether any of the strategies were implemented and what actual heat rate improvements were realized based on site-specific design.

- Combinations of strategies to achieve heat rate improvements do not always provide heat rate improvement reductions equal to the sum of each individual strategy's heat rate improvement because many of the technologies affect, or are dependent upon, plant operating variables that are inter-related. Therefore, case-by-case analyses should be conducted to determine whether the incremental heat rate improvement through the application of multiple strategies is economically justified.
- The performance of some of the evaluated heat rate improvement strategies degrades over time, even with best maintenance practices. Therefore, depending on the strategy employed or the technology installed to reduce heat rate at an existing coal-fired EGU, the unit heat rate initially obtained may increase over time.
- Heat rate is increased when plants operate at lower loads, and the benefit of a heat rate improvement strategy is reduced at lower loads. Therefore, if an existing EGU is currently base-loaded and shifts to a load-cycling operating profile in the future, that unit's annual average heat rate will increase, and the heat rate reduction strategy (or strategies) implemented will not lower the annual average heat rate as much as compared to base-load operation. In some cases any HRI improvements achieved by undertaking the relevant options described in S&L's 2009 Report could, in some cases, be negated by HRI losses associated with load-cycling.
- The installation of additional pollution controls such as that required by regulations including BART, MATS, etc. will decrease the heat rate efficiency of any unit as compared to its heat rate efficiency before the installation.
- Many of the options for HRI listed in our 2009 Report have triggered New Source Review actions by EPA and others.
- Based on the case studies performed by S&L, it appears that most of the utilities are employing best operational and maintenance practices. In light of this observation, it appears that significant further reduction in heat rate, such as that assumed by the EPA, may not be feasible.

Sargent & Lundy concludes that the only technically appropriate method to properly evaluate potential HRI is to conduct a unit-by-unit evaluation. Please contact me if you have any questions or need any further information.

Very truly yours



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