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**Abstract**
Recognizing the potential for mercury regulation, the U.S. Department of Energy's National Energy Technology Laboratory (DOE/NETL) initiated comprehensive mercury research under the DOE Office of Fossil Energy's Innovations for Existing Plants program in the early 1990s to insure that effective pollution control strategies are available for the existing fleet of coal-fired utility boilers. Building on promising advances that resulted from the Phase I field testing program, DOE/NETL selected fourteen full-scale mercury control technology field testing projects under two distinct Phase II solicitations. The Phase II projects focus on longer-term (~ 1 month at optimized conditions), large-scale field testing at plants burning primarily low-rank coals or blends (with some units burning bituminous coal) and equipped with a variety of air pollution control devices.

While Phase II field testing is still ongoing, DOE/NETL completed a preliminary economic analysis of mercury control via ACI based on results obtained at six coal-fired units. The control costs, with an estimated accuracy of ± 30%, were derived for conventional (untreated) activated carbon injection (ACI), brominated ACI, and conventional ACI coupled with the introduction of sorbent enhancement additives to the coal prior to combustion. The economic analyses were conducted on a plant-specific basis meaning that the economics are dependent on the actual power plant operating conditions and coal properties observed during Phase II field testing. In addition, the analyses yield the cost required to achieve low (50%), mid (70%), and high (90%) levels of mercury control "above and beyond" the baseline mercury removal. In other words, the levels of mercury control are directly attributable to ACI. To calculate the ACI mercury capture, a data adjustment methodology was developed to account for the level of baseline mercury capture observed during parametric testing and incorporate the average level of mercury removal measured during the long-term continuous ACI trial.

Mercury control costs via ACI were amortized on a current dollar basis. Using a 20-year book life, levelized costs for the incremental increase in cost of electricity (COE), expressed in mills per kilowatt-hour (mills/kWh), and the incremental cost of mercury control ($/lb Hg removed) were calculated for each level of ACI mercury control. For this analysis, the increase in COE varied from 0.14 mills/kWh to 3.92 mills/kWh. Meanwhile, the incremental cost of mercury control ranged from $3,810/lb Hg removed to $166,000/lb Hg removed.

The preliminary Phase II field testing results are very encouraging both in terms of the level of mercury removal achieved and the cost of control on a mills/kWh and $/lb Hg removed basis. However, it must be kept in mind that the field tests still represent relatively short-term testing at optimum conditions. While such testing provides a sound basis for evaluating performance and cost, the limited duration of the testing does not allow for a comprehensive assessment of several key operational and balance-of-plant issues associated with mercury control via ACI. It should also be noted that the economic analyses represent “snapshots” in time based on the methodology used, assumptions made, and conditions that were specific to the time when DOE/NETL field testing occurred.