Mercury Release from Coal Combustion By-Products to the Environment

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ABSTRACT

Mercury emissions from coal-fired power plants and options that may be used to effectively and economically control these emissions have been the topic of numerous research projects. The Energy & Environmental Research Center (EERC) has performed evaluations of the potential for mercury control technologies to impact the character of coal combustion by-products (CCBs). Other questions related to mercury and CCBs are also being investigated: 1) how is mercury associated with typical CCBs and 2) how readily will the mercury be released into the environment under typical management options. There are two primary means for mercury to be released from CCBs into the environment: aqueous transport and vapor-phase transport, but understanding these potential release mechanisms is complicated by the different mercury species that may be inherent in the CCB, the current emission control technologies being employed at a power plant, the CCB handling, and, finally, the broad variety of management options employed for CCBs nationwide.

Learning more about mercury that is present in CCBs currently being generated using no mercury control technologies and comparing that information with laboratory-generated data on proposed mercury sorbents and CCBs that have been subjected to additional mercury is the approach being used at the EERC to determine the potential for mercury release from CCBs. The study was initiated by determining the mercury content of a large number of coal combustion fly ash samples submitted by industry. These samples represented coal of various types from different coal-mining areas in the United States. Several samples will be selected for evaluation by leaching and desorption under a variety of temperatures and simulated atmospheric conditions. These samples will also be subjected to mercury-laden gas streams in an attempt to load higher concentrations of mercury on various fly ash samples. These loaded samples will be reevaluated for leaching and vapor-phase mercury release.