

# Factors Controlling the Solubility of Mercury Adsorbed on Fly Ash

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KEYWORDS Coal Utilization By-Products, leaching, activated carbon, pH

## ABSTRACT

It is expected that increased controls on Hg emissions will shift the environmental burden from the flue gas to the solid coal utilization by-products (CUB), such as fly ash and flue-gas desulfurization residues. If Hg can be leached from fly ash, it will have an impact on utilization, particularly for those uses that may allow for transport of the mercury into surface or ground water. Assuming that powdered activated carbon (PAC) injection will be the dominant control technology, researchers at NETL have compared the stability of Hg on fly ash samples containing PAC to samples containing unburned carbon. Column leaching studies of nine high mercury fly ash samples (3 from high mercury coal, 3 from pilot scale studies of PAC injection, and 3 from full scale PAC injection tests), indicated that mercury on both types of fly ash is only slightly soluble. The cumulative amount of mercury leached was less than 1 % of the amount present in the fly ash sample. However, unlike other metals, the dominant control on Hg stability does not appear to be pH. Although in different samples Hg was most soluble in alkaline or acidic solutions, it was more soluble in acetic acid (pH 2.9) than in sulfuric acid (pH 1.2). Also, acetic acid soluble Hg continues to be released at a low but constant rate. Comparing samples with similar C concentrations, lower Hg release was more frequently associated with samples containing PAC rather than unburned carbon.

Submitted for consideration in the 2005 World of Coal Ash, April 11-15, 2005, Lexington, Kentucky, USA.