

Mercury Partitioning in Flue Gas Desulfurization Byproduct Liquors and Solids

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KEYWORDS: mercury, flue gas desulfurization, gypsum, arsenic, selenium

ABSTRACT

Oxidized mercury in coal flue gas can be removed at high efficiency by wet flue gas desulfurization (FGD) systems, while elemental mercury is not. Removal of oxidized mercury is sometimes limited, though, by a phenomenon called re-emission, wherein a portion is reduced to the elemental form and desorbs from the FGD liquor. Furthermore, oxidized mercury has a high aqueous solubility, so one would expect to find the oxidized mercury removed by wet FGD systems in the liquor. However, for many FGD systems mercury is predominately found in the byproduct solids. Tests at wallboard plants show that mercury in gypsum solids from some FGD systems is relatively stable in the wallboard process, while other FGD gypsums lose upwards of half of their original mercury content.

This EPRI project is collecting data from full-scale FGD systems in an attempt to better explain these observations. Samples are being collected, preserved and analyzed to determine mercury concentrations in absorber liquors and solids, dewatered byproducts and blow down streams. The project scope has included developing best practices for sampling and preserving mercury concentrations in FGD byproducts. FGD samples are also being analyzed for concentrations of species that may impact mercury chemistry, such as sulfite and chloride, and for concentrations of other metals such as arsenic and selenium. A wide variety of FGD system types are being investigated. The paper will present results from these field measurements, use these data to interpret mercury chemistry under a range of wet FGD conditions, and report mercury concentrations in FGD byproducts.

Submitted for consideration in the 2007 World of Coal Ash, held May 7-10, 2007.