Characterization of Hg, As and Se in Lime Spray Dryer By-product

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ABSTRACT

Current research is investigating the feasibility of utilizing lime spray dryer by-product in different applications. However, concerns about the release of trace elements, in particular Hg, As and Se, from lime spray dryer by-product potentially limit re-use applications. In this study, lime spray dryer samples as well as feed coal and lime were collected from McCracken Power Plant located on the Ohio State University main campus. Concentrations and leaching properties of Hg, As and Se were monitored over two years and compared to a previous study performed in 1991. Distributions of Hg, As and Se in unburned coal (>140 mesh, <1.87 g/cm^3) and residual lime (<140 mesh) were also investigated. Results indicate that the levels of Hg, As and Se in lime spray dryer by-product were constant within a factor of two; and the leaching properties were constant within an order of magnitude over the 11-year time period of the study. Removal efficiencies from the flue gas were approximately 48% and 38% for As and Hg, respectively. Fractionation of the lime spray dryer by-product indicated that the As concentration was highest in the residual lime, accounting for 94% of the total As. The Se concentration was highest in unburned coal, accounting for 32% of total Se. More Se (42%) was found in residual lime due to greater mass fraction of residual lime. The concentration of Hg was found to be similar in both unburned coal and residual lime; however, approximately 78% of the Hg mass remained in the residual lime.