Methods for Testing Trace Metal Mobility in Coal Fly Ash and FGD Solids

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ABSTRACT

The US Department of Energy/National Energy Technology Laboratory (DOE/NETL) contracted Frontier GeoSciences to develop several specialty methods for assessing the mobility of mercury and trace metals in coal utilization by-products (CUBs). The specialty methods were designed to mimic various end uses and environmental exposures for CUBs material such as impoundment, fill material, asphalt, wallboard, cement, precipitation, and runoff. These methods were then utilized for examining CUBs from a variety of test sites where mercury control technologies (MCT) were being investigated.

Results to date indicate that MCT resulted in an increase of mercury in CUBs for all facilities and Se for several facilities. Thermal release of mercury in CUBs heated to 190°C for 1 hour increased in some facilities using MCT while others were decreased, leading to speculation that the mercury is stabilized in some cases. At 1200°C for 5 minutes, mercury emissions are significantly increased with MCT. High percentages of selenium (15-100%) were volatilized from all CUB samples. Microbial leaching resulted in significant methyl mercury production and mobilization of nickel, arsenic, selenium and cadmium. The chemical leaching procedure released a very low amount of target metals, except for selenium at some facilities.