# Mercury Emissions During Steam-Curing of Cellular Concretes That Contain Fly Ash and Mercury-Loaded Powdered Activated Carbon

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ABSTRACT

Approximately 48 tons of U.S. mercury emitted into the atmosphere annually come from coal-fired utility boilers. To reduce mercury emissions from these boilers, injection of powdered activated carbon (PAC) into hot flue gas streams and subsequent collection of the PAC along with fly ash is being developed. If this PAC technology is implemented, the total mercury content in the final coal combustion by-product will increase. Therefore, an understanding of the fate of mercury in re-use applications of these coal combustion by-products including concretes is needed to support future applications of the new fly ash-sorbent by-products.

To evaluate possible mercury emissions, we collected and measured gaseous mercury released from steam-curing cellular concretes that contained different quantities of fly ash and mercury-loaded PAC (HgPAC). All experiments were conducted in a laboratory and were configured to enable estimation of an upper limit on the potential gaseous mercury release from steam-curing concretes that contain fly ash and mercury sorbent material.

The observed emissions of mercury for the complete curing process generally increased with rising mercury concentrations in the concrete, where fly ash and fly ash–HgPAC by-products were the principal sources of mercury. However, release of mercury from concretes that contain these byproducts was less than 0.022% of the total quantity of mercury present in the concrete from all sources. Therefore, the steam-curing of cellular concrete containing fly ash and mercury-laden PAC does not result in a significant release of the mercury captured following coal combustion.

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