Risk Evaluation of Leachable Mercury From Concrete Products Made With Fly Ash

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ABSTRACT

AES Hawaii, Inc. operates a 203 Megawatt circulating fluidized bed coal and alternative fuel-fired cogeneration facility. A portion of the byproduct fly ash may be used as a concrete admixture. Per AES Hawaii's solid waste management permit (SWMP), composite samples of fly ash are routinely tested for total and leachable metals content. In 2005, several samples exceeded the permit limit for leachable mercury (0.00025 mg/L) determined through the Synthetic Precipitation Leaching Procedure. AES Hawaii prepared a risk evaluation to determine if mercury from fly ash posed an environmental concern when intermixed in concrete products.

The primary objectives of the risk evaluation were to: 1) evaluate whether incorporating fly ash into concrete/flowable fill reduces mercury leachability to acceptable levels; and 2) determine if a threshold fly ash content exists that results in unacceptable mercury concentrations in concrete/flowable fill leachates. The study demonstrated that, even in cases where mercury in the raw fly ash exceeds the SWMP limit, no detectable mercury is leachable from the final concrete products containing such fly ash. In addition, since no mercury was detected in leachates, no threshold of fly ash content (up to 90 percent cement replacement) appears to exist where leachable mercury exceeds the applicable risk-based limits. As such, mercury in AES Hawaii fly ash used as an admixture in concrete products does not pose an unacceptable risk to human health or the environment. The Hawaii Department of Health therefore proposed an increased mercury limit for such fly ash from 0.00025 mg/L to 0.0055 mg/L.

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