The Environmental and Health Effects of the Coal Ash Spill at Kingston, Tennessee: Preliminary assessment

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ABSTRACT

A preliminary investigation of the potential environmental and health effects of the largest coal ash spill in USA history at Tennessee Valley Authority (TVA) Kingston coal-burning power plant has revealed three major effects. First, the surficial release of coal ash formed a sub-aerial deposit that contains high levels of toxic elements (As=75 mg/kg; Hg= 150 mg/kg) and radioactivity ($^{226}Ra+^{228}Ra$=8 pCi/g). These pose a potential health risk to local communities as a possible source of air-borne resuspended fine particles (<10 mm). Second, high concentrations of contaminants from the coal ash leachate in the aquatic environments have caused severe water contamination in areas of restricted water exchange. Farther downstream, in the Emory and Clinch Rivers, much lower levels of these elements were found due to river dilution. Third, accumulation and re-mobilization of Hg- and As-rich coal ash in river sediments have the potential to impact aquatic ecosystems in the downstream rivers, especially by methyl-mercury formation in anaerobic river sediments.