

Effects of pH, ORP, and Conductivity on Leaching of Trace Metals from Fly Ash

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KEYWORDS: Fly ash, Leaching, pH, ORP, conductivity

ABSTRACT

Leaching of metals from coal utilization by-products is being studied to assess the potential for environmental damage. Samples (1-kg) contained in fixed-bed columns (5-cm id x 1-meter) have been leached with five lixiviants. The lixiviants simulated environmental liquids and varied from acidic to alkaline (pH 1 to pH 11). Each sample was leached at a rate of approximately 230 mL/day. For the acidic lixiviants, leaching was terminated when the leachates attained a pH of 4 or less (typically 2 to 4 months for Class F fly ash). The leachates were analyzed for major and trace metals. Trace metals that formed cations were leached by acidic lixiviants although, in most cases, the total amount leached was small. The concentrations of acid soluble metals in the leachates were initially low but increased rapidly after the alkaline compounds in the fly ash were depleted. The concentrations of these metals dropped rapidly after the maximum was reached. For most fly ash samples, the maximum concentration of acid soluble trace metals in the leachate was less than 10 mg/L. Correlation of metal release with pH, ORP, and conductivity will be discussed.

Submitted for consideration in the 2005 world of Coal Ash, April 11-15, 2005, Lexington, Kentucky.