Chemical Composition and Leaching Characteristics of Ash collected from the Ohio State Coal Ash Regeneration (OSCAR) Process

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ABSTRACT

Ohio state coal ash regeneration (OSCAR) process was installed as a slip-stream at the McCracken Power Plant located on the Ohio State University main campus. During the transitional testing phase, OSCAR sorbent was generated utilizing lime spray dryer (LSD) ash from the existing baghouse at the McCracken Power Plant. A series of OSCAR ash samples were collected from two locations in the process; the cyclone immediately following the riser reactor and the baghouse which was some distance downstream from the cyclone.

In this study, the chemical composition and leaching characteristics of ash samples collected during the transitional testing phase of the OSCAR process were examined to assess potential re-use opportunities for this material. The low concentration of elements in leachate indicated that ashes collected from the cyclone were not hazardous material. However, results indicated that the arsenic concentration in cyclone ash was as much as 95 mg/kg, which is above the limit at 75 mg/kg for land application (EPA 503 Rule). For baghouse ash, arsenic and selenium concentrations were above the land application limits especially arsenic which was as high as 570 mg/kg. Compared with LSD ash, ashes collected from the OSCAR process had less calcium and sulfur but contained more trace elements. Measurement results for polycyclic aromatic hydrocarbons (PAHs) on selected cyclone and baghouse samples showed low concentrations (e.g. µg/kg). In addition, the results showed that the sorbent injection rate and gas flow rate affected the elemental composition and PAH concentrations.

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