ABSTRACT

Speciation of As, Se, Cr, and Hg in Field Leachate at CCP Management Sites

Bruce R. Hensel[1], Kenneth J. Ladwig[2], Brian G. Hennings[1], Dirk Wallschlager[3], and Jacqueline London[3]

[1]Natural Resource Technology, 23713 W. Paul Rd. Suite D, Pewaukee, WI 53072; [2]EPRI, 3420 Hillview Avenue, Palo Alto, CA 94304; [3]Trent University, Environmental and Resource Study Program, 1600 West Bank Road, Peterborough, ON K9J 7B8, Canada

KEYWORDS: fly ash, FGD sludge, field study, leachate, speciation

ABSTRACT

EPRI, with support from the U.S. Department of Energy, performed a broad field leachate study to develop a reference database of high-quality data for CCP sites. Results are presented for the completed study, encompassing 81 samples from 29 sites. Sampled sites included 15 impoundments, 13 landfills, and 1 mixed site; 23 receiving fly ash and 6 receiving FGD products; 11 receiving CCP from bituminous coal, 11 from subbituminous coal or lignite, and 7 from mixed sources; and 25 receiving CCP from pulverized coal boilers and 4 from cyclone boilers.

The samples were analyzed for 33 inorganic constituents, and for speciation of arsenic, selenium, chromium, and, in some cases, mercury. Sulfate was the only constituent with a median concentration greater than 100 mg/L. Minor constituents with median concentrations greater than 1 mg/L were boron and silicon in fly ash leachate, and boron, strontium, lithium, and silicon in FGD leachate. The predominant oxyanion species were As(V) in 37 of 43 samples, Cr(VI) in 24 of 27 samples, and Se(IV) in 29 of 46 samples. Total mercury concentrations were very low, with a median below 10 ng/L; organic species concentrations were typically less than 5 percent of total concentration. Concentrations as a function of CCP type, coal type, management method, or boiler type were examined.

Submitted for consideration in the 2007 World of Coal Ash Conference, May 7-10, 2007.