Characterization and Remediation of Metals in Groundwater Associated with Coal Combustion Residual Management Sites

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ABSTRACT

Regulatory scrutiny of coal ash landfills and impoundments has increased related to potential impacts to groundwater by metal constituents of interest (COIs). COIs are typically identified from measurement of elevated concentrations of arsenic, boron, mercury, selenium, thallium and vanadium in groundwater associated with fly ash disposals units. Sources other than coal ash impoundments may account for these metals. Environmental forensic approaches can be used to resolve this issue. In addition, testing techniques can be used to establish background metals concentrations at ash disposal facilities and developing a step-wise process for determining scientifically defensible comparisons of ash-related metals with background sources. Geochemical fingerprinting techniques are reasonably well established and include the use of stable isotopes and an evaluation of the geochemistry of leachate and groundwater to identify sources. These techniques, combined with a risk-based strategy, will identify groundwater conditions posing an unacceptable risk that may require remediation. Further, the quantification of natural mechanisms of attenuation due to hydraulic and geochemical processes will allow development of a technically-based solution to be developed for passive vs. active remediation.