Influence of Redox Status on the Natural Attenuation of Contaminants Emanating from a Coal Pile. (S02-kaplan153218-Oral)

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Abstract:

Monitored National Attenuation (MNA) is a tool used in environmental remediation to account for the ability of natural processes to attenuate or destroy contaminants. Before invoking MNA for a particular contaminant at a particular site, it is necessary to identify and quantify the geochemical processes involved in the attenuation. Lowering redox, especially as it relates to wetlands, has been proposed as an important attenuating process. The objective of this study was to determine the changes in the partitioning of contaminants between the solid and aqueous phases as the redox status of contaminated soils was gradually decreased. Metal and radionuclide contaminated soils from the Savannah River Site, South Carolina were combined with groundwater and placed in gas and temperature controlled reaction vessels. Contaminant sorption to the soils gradually decreased during the early stages of reduction (through to the Fe(III)/Fe(II) couple), primarily the result of the dissolution of Mn/Fe/Al-oxyhydroxide coatings. Significant decreases in many contaminant concentrations occurred only after the redox status decreased below that of the sulfate/sulfide couple.

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