## Organic Carbon and Iron Oxides as Geochemical Controls of Uranium and Nickel Availability in Contaminated Riparian Sediments. (S02-sowder134419-Oral)

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## Abstract:

The discharge of metallurgical process wastes on the U.S. Department of Energy's Savannah River Site from the 1950's until the 1970's has resulted in contamination of organic, iron rich sediments with uranium, nickel, and other heavy metal ions. Chemical extractions indicate that partitioning of U and Ni is primarily controlled by sediment organic carbon and Fe oxide phases, respectively. Spatially resolved, synchrotron based X-ray fluorescence mapping of elemental distributions corroborates Uorganic and Ni-inorganic associations and reveals contaminant heterogeneity at the micrometer scale. Size exclusion chromatography (SEC) and field flow fractionation (FFF) indicate that aqueous speciation of U is dominated by low molecular weight organic complexes and colloidal forms, while Ni is present primarily as the free ion. The coupling of solid phase partitioning information and aqueous phase chemical speciation data for U and Ni is useful for establishing clear linkages between natural attenuation processes at work in aged-contaminated sediments and key aqueous phase phenomena such as environmental transport, biological uptake, and ecological toxicity of heavy metals.

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