Strontium and Uranium Transport through Variably Saturated Undisturbed Cores from the Hanford Formation, Richland, WA. (S01-pace155604-Oral)

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Abstract:

Accelerated migration of contaminants in the vadose zone has been observed beneath tank farms at the U.S. Department of Energy's Hanford Reservation, Richland, WA. This paper focuses on quantifying the coupled hydrologic and geochemical processes controlling the fate and transport of contaminants in the unsaturated sediments beneath the Hanford tank farms. Our approach involves the use of field relevant, long-term unsaturated non-reactive and reactive transport experiments in undisturbed sediments from the Hanford Formation. Undisturbed sediment cores were collected from a laminated fine-grained sand unit within the Hanford Formation in both the vertical and horizontal direction. Laboratory scale saturated and unsaturated flow experiments were conducted using multiple non-reactive and reactive tracers to investigate geochemical and hydrologic processes controlling the spread of contaminants. Results suggest that physical non-equilibrium processes such as preferential finger-flow coupled with immobile water as well as sediment characteristics, such as mineralogy and iron oxide content, may control contaminant transport in the Hanford Formation.

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