



Glenn T. Seaborg Center Seminar

Biogeochemical Controls on Transport of Plutonium in the Environment

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National Laboratory, Livermore, CA*

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4:00 pm – 5:00 pm

Bldg. 70A, Room 3377

Significant releases of plutonium (Pu) into the environment have resulted from nuclear weapons production and the nuclear fuel cycle. A major scientific challenge is to reliably predict and control the cycling and mobility of Pu that has been deposited into the environment. Although substantial progress has been made, the coupled biological, chemical, and physical processes that control this transport are not well understood.

In the last 15-20 years, it has been generally thought that due to its low solubility and high sorption affinity, Pu migration in the environment will be dominated by transport on particulate matter (i.e., colloidal particles). However, recent work performed by our group and others suggests that colloid-facilitated Pu transport may not be the only mechanism by which Pu is transported in the subsurface. In this presentation, I will discuss our recent work that explores several additional biogeochemical mechanisms that may control Pu migration.

We posit that the biogeochemical processes that ultimately control plutonium subsurface mobility/immobility are driven by the local hydrogeologic and geochemical conditions, in concert with the chemical characteristics of the initial actinide source. This has led to Pu transport as intrinsic colloids, pseudocolloids, and aqueous organic complexes. The temporal and spatial limits to Pu migration are controlled by the stability of each of these forms of Pu in groundwater.

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ANNIE KERSTING is the Director of University Relations and Science Education at Lawrence Livermore National Laboratory. She oversees a broad range of educational science and technology programs and initiatives that advance the mission and vision of the Laboratory. She works with the Laboratory's senior leadership to develop and execute strategies, build strategic partnerships and foster collaborative research and education initiatives to ensure a workforce pipeline of top-tier science and technology talent.

She previously served as the Director of the Glenn T. Seaborg Institute in the Physical and Life Sciences Directorate, where she focused on collaborative research between LLNL and the academic community in nuclear forensics, super heavy element discovery and environmental radiochemistry. The Seaborg Institute serves as a national center for the education and training of undergraduate and graduate students, postdocs and faculty in transactinium science.

Dr. Kersting is an environmental radiochemist with research interests in understanding the fate and transport of radionuclides in the biosphere. Specifically, she is interested in identifying the processes that control actinide interactions on the molecular scale with inorganic, organic, microbial surfaces in the presence of water.

As Director of University Relations and Science Education, she is committed to building upon strong academic relationships that the Laboratory has embraced, and is passionate about expanding external and internal educational initiatives that will help attract and retain a strong and diverse workforce.