Geochemical aspects of nuclear waste management

PETER C. BURNS[1]

[1]Department of Civil & Environmental Engineering & Earth Sciences, University of Notre Dame pburns@nd.edu

Nuclear waste includes radioactive mine and mill tailings, irradiated nuclear fuels, a wide range of materials derived from the production of nuclear weapons, and various other materials with medical and industrial applications. Although the accumulation of weapons-related wastes has slowed following the end of the Cold War, uranium mining continues to fuel the more than 430 nuclear reactors that generate electricity, as well as more than 200 each of experimental reactors and naval propulsion reactions.

This presentation focuses on a how nuclear waste of different types interacts with the geochemical environment, and the processes that facilitate the dispersal of radionuclides in the environment. These include the reasonably well-understood processes of redox reactions, precipitation, and sorption, and the much less well-understood role of nanomaterials and colloids in radionuclide transport in the environment.