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Fate and Transport of Radionuclides in the Environment: Unique Simulation Challenges

Understanding the interplay of increased pressure, residual heat and geologic and geochemical environment on radionuclide migration from underground nuclear tests

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Understanding the processes that govern migration of radionuclides from underground nuclear tests is a problem of interest in many places in the world. Whether to gain understanding in the risks to human health, to guide water resources management decisions or as a surrogate for nuclear repository safety, there are a number of complex, coupled processes governing fate and form of radionuclides in the subsurface that need to be understood. These processes include the increased pore water pressure that is present after some underground nuclear tests, the residual heat signature from the nuclear detonation and the natural (i.e. pre-test) and altered (i.e. post-test) hydrogeologic and geochemical setting. We will focus on tests in saturated and unsaturated environments in Yucca Flat at the US Nevada Test Site. These tests all encompass a range of the aforementioned process interactions and provide insight into the broader context of understanding radionuclide migration from underground nuclear tests over a range of scale and environment.

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