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T1.4-O3. Selecting Targets for OSI Drilling to Obtain Radioactive Samples Based on Test Site Observations

There have been a number of studies concerning underground migration of radionuclides from nuclear explosion test cavities at the Nevada Test Site (now the Nevada National Security Site) as part of the US Department of Energy's Hydrology and Radionuclide Migration Program. Radionuclides have been detected outside of the immediate vicinity of nuclear test explosion cavities that are identifiable as the source of the radio nuclides, as well as cases where radionuclides might have been expected and were sought but not found. This report examines some of these cases as a guide for identifying underground targets for OSI drilling to obtain radioactive samples. Several underground test locations below the water table were selected where identifiable radionuclide migration was detected, one where migration was purposely induced by pumping, and some where migration might be expected but was not found. Prompt fracture injection into the surrounding rock immediately following the detonation occurred in many cases. In the other cases, the migration mechanism is thought to be groundwater movement. There is somewhat limited data available but inferences can be made regarding the potential post-test location of relevant radionuclides that could guide the selection of drilling and sampling targets for OSI.

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