

2.2-P22. What Can We Learn About Noble Gas Signatures From Field Experiments And Modeling?

In the absence of performing on-site measurements of noble gases emanating from an actual underground nuclear explosion (UNE), other approaches must be used to understand the nature of radionon and Ar-37 signatures that potentially provide a “smoking gun” indication of the occurrence of a UNE. Surrogate chemical tracers either pumped into old explosion cavities or released during a subsurface chemical explosion can simulate some but not all of the processes and influences of the containment regime that are responsible for creating a signature at the surface. However, the results of such experiments used to define computational simulations of UNE-related gas transport processes and containment properties represent one approach to estimating the spatial, temporal and chemical or isotopic character of a noble gas signature. With a combination of tracer experiments and modeling we have made significant progress in understanding how UNEs, their containment and the effects of gas transport in the subsurface are likely to affect signatures that might be observed. LLNL-ABS-666124

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