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Nuclear Explosion Signatures Experiment (UNESE) Phase 2: Gas migration studies in a tunnel test location

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Phase 2 of the Underground Nuclear Explosion Signatures Experiment (UNESE) included the injection of tracer gases into the chimney of a historic horizontally-emplaced nuclear test at the Nevada National Security Site. The purpose of these injections was to observe the migration of gases from the chimney to the adjacent tunnel complex and their migration within the surrounding geology. Two tracer injections occurred – one of a single stable tracer gas (freon) in January of 2018, and a second of two radioactive tracers, Ar-37 and Xe-127, and the stable tracer sulfur hexafluoride (SF6) in June 2018. Measurements were made of gas collected from multiple locations within the tunnel and two locations were monitored semi-continuously using gamma-ray detectors to measure gas recirculated from the measurement points. Samples were also collected at various depths within an adjacent borehole that was drilled from the surface to emplacement level in May and June 2018. The injections, subsequent monitoring and sample collection, and results will be presented and discussed.

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