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## Effective Access Monitoring at Geological Repositories: A Systems Study

Access points at a geological repository (GR) for the disposal of spent nuclear fuel and other nuclear wastes present potential diversion paths for nuclear material. Such access points can include one or more ramp entrances for fuel-emplacement and construction operations, elevator shafts for moving personnel and equipment, ventilation shafts, and other design features that can provide access to and from the GR's underground workings.

While considerable attention and effort has gone into identifying long-term surveillance measures for monitoring activities at or near a GR, much less progress has been made on identifying reliable containment and surveillance (C/S) measures that can dependably detect movements of materials through the variety of GR access points. Furthermore, given the likely lack of C/S measures underground, GR access points will require unprecedented reliance on C/S measures to maintain continuity of knowledge (CoK) on nuclear materials buried underground, especially during operations when people, equipment, and materials will be entering and leaving the repository. Reliable and redundant C/S measures will be required for all declared access points leading from the repository's surface to its underground. Declared access points will require C/S measures such as radiation detectors and surveillance cameras, but could also include complementary or novel methods to increase confidence in maintaining CoK on nuclear materials emplaced underground.

Sandia National Laboratories has performed a system study of conventional and potentially novel C/S measures that can be applied to a geological repository with multiple access points to optimize the application, placement, and use of C/S measures. The study helps to inform decisions about implementing efficacious safeguards technologies at geological repositories as part of an overall safeguards-by-design approach.

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### Which "Key Question" does your Abstract address?

NEW2.2

### Which alternative "Key Question" does your Abstract address? (if any)

NEW2.1

### Topics

NEW2

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