Sandia National Laboratories

Barrier Verification and Monitoring System

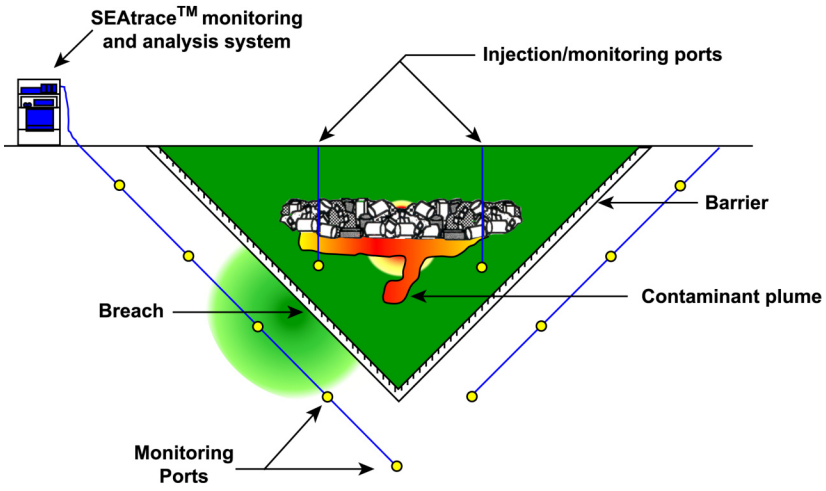
SEAtrace™

Description

The SEAtrace™ system is an integrated solution for barrier verification and monitoring in the unsaturated zone. It can determine the location and size of a breach after construction and continue to monitor performance over time. The SEAtrace™ system was developed and tested in joint collaboration by Sandia National Laboratories and Science and Engineering Associates, Inc. to produce a post-construction, non-destructive, autonomous, real-time barrier verification and monitoring technology.

Field Portable Autonomous SEAtrace™ System

The SEAtrace™ system uses gaseous tracer injection, and in-field, real-time gas analysis and data interpretation to evaluate barrier integrity. Multiple sample ports (up to 64) are installed inside and outside of the barrier. These ports are connected to a stand-alone sample collection, analysis, and evaluation system. An inert, non-toxic tracer gas is injected inside the barrier and allowed to diffuse into the surrounding media. Samples collected over time provide tracer concentration histories that are input to a global optimization code to quickly determine the location and size of the leak(s).



Barrier Verficiation and Monitoring System Schematic

Recent field tests at subsurface barriers installed at Dover Air Force Base and Brookhaven National Laboratory demonstrated that the SEAtrace™ system can simultaneously identify multiple leaks, locate leaks to within 0.5m, and size leaks to within 0.15m. This is quickly accomplished within 30 minutes. These results were independently corroborated with construction QA/QC, hydraulic, geophysical, and excavation techniques. The SEAtrace™ system, obtained the results significantly faster and pinpointed the leaks more accurately than the other verification and monitoring techniques.

Sandia is a multiprogram laboratory operated by Sandia corporation, a Lockheed Martin Company, for the United States Department of Energy under contract DE-AC04-94AL85000.

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Applications

- Low-cost, real-time verification of barrier construction QA/QC
- Monitor integrity and performance of barrier over time

Advantages

- Non-destructive and minimally intrusive
- Completely autonomous and automated
- Within 30 minutes, automatically samples up to 64 ports, analyzes the tracer gas concentration, evaluates resulting data, and locates leaks to within 0.5m and sizes leaks to within 0.15m.
- Uses solar power and has a self-steering back-up generator
- Provides remote communication via cellular modem

Cost Benefit

- ~$7-8 per square foot of barrier wall
- Significantly reduces cost of barrier repair by pinpointing leak locations

Contact

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