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## Throughput Argon-37 Field System

*Friday, 28 June 2019 11:15 (15 minutes)*

PNNL is exploring the use of  $^{37}\text{Ar}$  for detecting nuclear explosion, including for use in the International Monitoring System (IMS). A high throughput  $^{37}\text{Ar}$  separation and measurement system was developed at Pacific Northwest National Laboratory (PNNL) to detect  $^{37}\text{Ar}$  activity generated from an underground nuclear explosion. Argon-37 is an activation product generated when neutrons interact with calcium in the soil surrounding an underground nuclear explosion. As a noble gas, argon is unreactive and migrates through the earth and can be released into the atmosphere with the radionuclide fission gases that are also produced during a nuclear explosion. Detection of  $^{37}\text{Ar}$  can be a confirmatory measurement for a nuclear test, and when combined with radionuclide isotopes from the same sample the confidence that a nuclear explosion occurred improves significantly. PNNL has performed a large number of soil gas and atmospheric background measurements to understand gas migration of naturally occurring Ar-37 in the soil and for experiments where  $^{37}\text{Ar}$  and  $^{127}\text{Xe}$  were injected into a nuclear test cavity. PNNL will present on the newly developed Argon-37 High Throughput system as well as discuss measurements made at locations throughout the northwest region of the United States.

**Primary author:** HAYES, James C. (Pacific Northwest National Laboratory)

**Presenter:** HAYES, James C. (Pacific Northwest National Laboratory)

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