

of a Continuous Field Xenon Detection System

Wednesday, 21 June 2023 11:24 (1 minute)

Field studies of underground gas migration are an essential component of ongoing research to better understand how radioactive materials produced from underground nuclear explosions transport through and escape from the subsurface. Considerable research has been made in the past on understanding long term gas migration behavior driven by natural processes at field sites, but in recent years a greater focus has been placed on studying material transport driven by explosive events in early time. Scientists at Pacific Northwest National Laboratory are planning one such field experiment, which will utilize an injected radioactive xenon tracer driven by pressurized air in the subsurface to map out early time tracer arrivals at various sampling locations. As a critical component in this planned experiment, PNNL has developed a simple but robust quantification system that allows for real time gas monitoring in the field as well as rapid switching between various sampling intervals. Here, the system concept is summarized, and evaluation is made of expected xenon detection sensitivities with respect to operational variables like sampling time, sample rate (i.e. gas pressure), temperature and radon background.

E-mail

christine.johnson@pnnl.gov

Promotional text

This presentation details efforts to build a simple and robust real time xenon measurement system deployable against field tracer experiments.

Oral preference format

in-person

Primary author: JOHNSON, Christine (Pacific Northwest National Laboratory (PNNL))

Co-authors: Mr SPADONI, Franco (Pacific Northwest National Laboratory (PNNL)); Mr INMAN, Jacob (Pacific Northwest National Laboratory (PNNL)); Mr KNOX, James (Pacific Northwest National Laboratory (PNNL)); Mr LOWREY, Justin (Pacific Northwest National Laboratory (PNNL)); Mr MAYER, Michael (Pacific Northwest National Laboratory (PNNL)); Ms PEREA, Rose (Pacific Northwest National Laboratory (PNNL))

Presenter: JOHNSON, Christine (Pacific Northwest National Laboratory (PNNL))

Session Classification: Lightning talks: P2.2, P3.2, P3.6

Track Classification: Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.2 Radionuclide Technologies and Applications