

Argonne-Developed Cleanup Method May Save Oil and Gas Industry Millions

Oil and gas producers may save millions of dollars in cleaning up soils contaminated with naturally occurring radioactive materials thanks to an onsite soil sampling and testing method developed by the U.S. Department of Energy's (DOE's) Argonne National Laboratory.

Naturally occurring radioactive material accumulates when the production of oil and natural gas from underground reservoirs carries small quantities of radium to the surface. Over time, the radium — usually radium-226 and to a lesser extent, radium-228 — can concentrate in pipe scale and sludge deposits, which in turn can contaminate soil and equipment.

The traditional approach to cleaning up such sites involves complicated soil sampling techniques and shipping these samples to offsite laboratories for analysis — a time consuming and costly process. But a recent demonstration has shown that using Argonne's Adaptive Sampling and Analysis Program (ASAP) can dramatically cut the time and money needed to characterize and remediate sites contaminated by naturally radioactive materials. ASAP combines real time data collection techniques with in-field decision-making for faster and more precise characterization of a site. It was first used successfully for faster and cheaper clean up of radioactive contamination at DOE sites.

The demonstration was conducted on a three and a half acre site at Lease Management, Inc. in Mt. Pleasant, Michigan. Pipe salvaged from nearby oil and gas production sites was stacked there prior to being cleaned and reconditioned. Contaminated scale on the outside of the pipes had fallen off during handling and due to exposure to the elements. As a result, soils across the pipe yard had varying levels of radium-226 concentrations.

First, scientists walked over the site with a portable global positioning system and a hand held gamma ray detection device to map surface gross activity levels. The scientists then used a commercial technology called the RadInSoil™ meter to develop a relationship between gross activity values and radium-226 activity concentrations. State guidelines are based on these activity concentrations. Armed with the field data, researchers then used unique Argonne-developed techniques to determine where soil concentrations of contamination exceeded regulatory standards and would need to be excavated for disposal. To confirm the presence of radium-226, scientists used a tripod-mounted, camera-like device called a High Purity Germanium gamma spectroscopy system that directly measures radium-226 concentrations in surface soils. Using the results from ASAP, decisions on excavating contaminated soil for disposal can be made immediately. It took four days to characterize and remediate the Michigan site.

The average cost for soil disposal ranges from about \$100 to \$200 per cubic yard, so keeping soil volumes to an absolute minimum is very important. "The goal is to be as precise as possible in digging up dirt for disposal so you don't take anything clean with you or leave anything above clean-up standards behind," said Argonne researcher Bob Johnson.

For sites contaminated with naturally occurring radioactive materials, it's estimated that using ASAP costs only 10 percent of what a more traditional approach to characterization would cost. In the Michigan demonstration, use of ASAP is expected to save the site owner at least \$36,000 in disposal costs. Johnson says this is a technology that is easily transferred, and plans are underway to host a series of workshops to provide training in ASAP techniques to members of the oil and gas industry.

In the future, Johnson hopes to apply these technologies to stewardship of remediated Department of Energy sites. Once active remediation is done, the department is responsible for long-term monitoring of these sites. There needs to be an efficient and cost effective way to do this, and Johnson believes methods like ASAP could be the answer.

Based on information prepared by Donna Jones Pelkie of Argonne's Office of Public Affairs.

For More Information

Contact Argonne's Office of Technology Transfer (800-627-2596, partners@anl.gov).



Argonne National Laboratory is a U.S. Department of Energy laboratory managed by The University of Chicago