U.S. Department of Energy's Use of Cost-Effective Passive Groundwater Sampling Grows

http://energy.gov/em/articles/em-s-use-cost-effective-passive-groundwater-sampling-grows

AIKEN, S.C. – U.S. Department of Energy's Office of Environmental Management (EM) increasingly uses passive groundwater sampling as an effective technique to monitor contaminant concentrations post-cleanup, saving the Cold War cleanup program millions of dollars over traditional methods.

Savannah River National Laboratory Engineering Specialist Keith Hyde, right, and Savannah River Nuclear Solutions Geologist Bob Craig use a disposable Hydrasleeve sampler to monitor groundwater as part of efforts to meet regulatory requirements at the Savannah River Site.

A passive sampling strategy involving a device known as Hydrasleeve is employed at about 230 wells at the Savannah River Site (SRS) and is expected to save EM more than $2.5 million over the life of the site's groundwater monitoring program. Preferred for use with wells with small sample volume requirements, the Hydrasleeve, a flexible plastic bag permeable to water and contaminants, allows remediation engineers to onitor for contaminants such as trichloroethylene and tritium left by Cold War operations without purging, a time-consuming practice of removing water that often must be disposed as hazardous or radioactive waste.

EM grant funding supports the Interstate Technology & Regulatory Council (ITRC), a public-private coalition dedicated to reducing barriers in the use of innovative environmental technologies. ITRC has developed guidance documents and training classes to educate environmental professionals on the appropriate use of passive samplers. All guidance documents and training course archives are available for free on the ITRC website.

ITRC works with state environmental regulatory agencies and others to encourage appropriate use of passive samplers as a cost-effective means for collecting groundwater samples, which are analyzed in laboratories to assess cleanup performance and monitor contaminant concentrations over time. The organization has trained thousands of people across the nation on the use of passive samplers. More than 20 state environmental agencies have used the ITRC's passive sample guidance documents to improve cleanup processes.

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Although lack of awareness and misconceptions hinder the use of passive sampling, ITRC cites many benefits, including relative ease of use; effectiveness in wells of any depth; adaptability to most well types, including those with limited accessibility; reduction of field sampling variability, resulting in highly reproducible data; and low field labor and sampling material costs.

Passive samples can measure contaminant concentrations at discrete vertical intervals, allowing remediation engineers to target treatment and better understand contaminant profiles. In contrast, traditional sampling operations assess concentrations of entire vertical spans of up to 20 feet.

SRS has used passive sampling strategies extensively for several years. In addition to monitoring with the Hydrasleeve, which began in 2006, a large number of low-cost diffusion-based samplers were successfully deployed to identify areas where contaminated groundwater outcropped into surface streams.

"We used passive diffusion samplers within a 2.4-mile stream system to identify the 2,000-foot section where the contaminated groundwater was outcropping," said Dennis Jackson, a research engineer with EM's Savannah River National Laboratory, which is part of DOE's network of national laboratories. "Characterization and monitoring efforts were then tailored to target only those impacted regions while uncontaminated areas were left undisturbed."

SRS passive sampling results in lower costs because it does not require mechanical pumps, power sources, and other infrastructure and equipment needed for traditional sampling methods. In turn, long-term maintenance andupkeep costs decrease. Passive sampling also eliminates the cost of mobilizing, setting up, and dismantlingequipment at each well location, as well as minimizing purged water that often must be disposed as hazardous orradioactive waste.