

SRNL filter design reduces waste treatment costs

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The Savannah River National Laboratory's redesign of a filtration system is expected to help the US Department of Energy - Office of Environmental Management drastically reduce cost and infrastructure for the treatment and permanent disposal of its inventory of high level radioactive waste. Credit: Savannah River National Laboratory

The redesign of a filtration system by the U.S. Department of Energy's Savannah River National Laboratory (SRNL) is expected to help the DOE Office of Environmental Management drastically reduce cost and infrastructure for the treatment and permanent disposal of its inventory of high level radioactive waste. The U.S. Patent Office has recently

allowed a patent on the reconfiguration of a commercial rotary filter, which has also been licensed by the company that produced the original system – two important steps in putting this technology into the marketplace for use by other potential customers.

SRNL, which is operated for DOE by Savannah River Nuclear Solutions, LLC, is the DOE Office of Environmental Management's (DOE-EM) applied research and development national laboratory. DOE-EM's Office of Technology, Innovation and Development (OTID) provided funding for SRNL to explore ways to separate solid material from radioactive liquid waste. Removing solids would allow large quantities of salt waste to be decontaminated for disposal, and also concentrate the solids, leaving a much smaller volume requiring expensive treatment and disposal as high-level waste.

SRNL examined different filtration methods, and found that a rotary microfilter patented by SpinTek offered filtration rates that were higher than a traditional crossflow filter could provide. As originally designed, however, the rotary microfilter was not suited for use with radioactive waste, so SRNL adapted the system for deployment within the DOE complex.

"DOE-OTID funded us to take that rotary microfilter design, and, working with the folks at SpinTek, develop a version that could be used in a highly radioactive environment," says Dave Herman, who along with David Maxwell designed the reconfigured filter system. "We changed some of the materials of construction from polymers, which don't hold up under radioactive use, to stainless steel. We also made changes in the design so that the unit didn't require hands-on maintenance, which would be a problem in a [radioactive waste](#) facility." The redesign consolidates internal parts of the system, allowing an entire stack of 25 filter disks and other parts to be removed as a single piece.

The initial need for the filtration system was to treat the Savannah River Site's salt waste solutions. SRNL, in collaboration with Oak Ridge National Laboratory and the Savannah River Site's liquid waste operations contractor, Savannah River Remediation, designed a module that allows two or four rotary microfilter systems to be inserted into an existing waste tank. This module eliminates the need to construct a new facility for the filtration process. As the system filters the waste, the liquid filtrate is transferred out of the tank for treatment and disposal, and the concentrated solids are returned to the tank.

SRNL is now testing the rotary microfilter for use to treat the Hanford Site's tank waste. SpinTek's license of the SRNL adaptation will allow this version of the technology to be made available for other potential users.

Provided by DOE/Savannah River National Laboratory

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