



## News from the Savannah River National Laboratory

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**FOR IMMEDIATE RELEASE**

### **SRNL RESEARCH AND DEVELOPMENT PAVES WAY**

AIKEN, S.C. (Jan. 29, 2009) – Long before the shovels broke ground for the Savannah River Site’s Waste Solidification Building (WSB), work began on the research and development to define and test the waste product that the facility will produce. That’s where the U.S. Department of Energy’s (DOE) Savannah River National Laboratory came in.

The National Nuclear Security Administration (NNSA) is building the WSB to treat and solidify the liquid waste that will be generated by the Mixed Oxide (MOX) Fuel Fabrication Facility and planned pit disassembly and conversion activities.

The NNSA had selected cement as the best method for solidifying the liquid radioactive waste and preparing it for disposal. Then they turned to SRNL, whose research teams have extensive experience in cement, grout, glass and other materials for waste solidification, to work out the specifics of the formula to be used for the transuranic portion of the waste.

“Cement waste forms are important disposal techniques for radiological waste, with proven success in waste stabilization in applications around the world,” says Dr. Jeff Griffin, SRNL’s acting associate laboratory director for Environmental and Chemical Process Technology. “SRNL has long been a leader in the development and application of cementitious waste forms through our contribution to the successful development and operation of the SRS Saltstone facility, the closure of SRS waste tanks, and our key role in international work on cement waste form applications.”

Last Monday, SRNL’s Dr. Alex Cozzi gave a presentation he co-authored with Erich Hansen about SRNL’s research and development for the WSB to the American Ceramics Society’s International Conference on Advanced Ceramics and Composites. Their goal was to develop and test a cement waste form that could be processed in the planned facility and would meet the disposal requirements of the Waste Isolation Pilot Plant (WIPP), where the solidified transuranic waste will ultimately be disposed.

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“Our first task was to develop simulants of the waste that the facility will actually process,” says Dr. Cozzi. “When you’re doing this type of research, initial work with a non-radioactive substitute that mimics the chemical properties of the actual radioactive waste is both safer and more cost effective. In this case, we also needed to find a way to mimic the chemical behavior of silver and gallium. We could use those actual elements in smaller-scale experiments, but once we got to larger-scale experiments, it wasn’t practical to include such expensive elements.” Because the waste stream will vary a good bit, a range of simulants had to be developed to demonstrate the robustness of the process.

As part of the waste form development, the research team conducted experiments to identify a filler material that could be added to the cement recipe to make the resulting waste-cement mix denser, reducing the radiation level on the outside of the drums of waste, so that the drums could be handled safely by the facility. They also conducted experiments to identify the best ratio of liquid waste to dry cement, and to evaluate the heat that the waste mixture would produce. The research team evaluated the metal filter that will be used to dissipate hydrogen before it can build up in the drums, which will be needed for the drums of solidified waste to meet the requirements for disposal at WIPP.

In addition to the transuranic waste (waste that is contaminated with radioactive elements with an atomic number greater than uranium), SRNL is performing testing on the process that WSB will use to solidify in a cement form liquid low-level radioactive waste. The nature of low-level waste means that the requirements of the facilities where the final waste form will be disposed are less complex than for transuranic waste.

SRNL is DOE’s applied research and development national laboratory at the Savannah River Site (SRS). SRNL puts science to work to support DOE and the nation in the areas of environmental management, national and homeland security, and energy security. The management and operating contractor for SRS and SRNL is Savannah River Nuclear Solutions, LLC.