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## Oxidants Neutralize Waste Solvents in Savannah River Site Aquifer

AIKEN, S.C. (February 12, 2019) – Savannah River Site (SRS) management and operations contractor Savannah River Nuclear Solutions (SRNS) is making significant progress towards removing solvents from the groundwater beneath the site.

SRNS has completed the first phase of testing a promising new approach developed at SRS that uses oxidants to neutralize the solvents, according to SRNS Area Cleanup Projects Manager Mike Griffith.

“Removing or destroying these solvents and restoring the aquifer to its original state is a goal we are effectively working towards,” Griffith said. “This long-term project has required the synergistic use of several different cleanup methods, processes, and specialized equipment — a toolkit of groundwater cleanup methods.”

During the Cold War at SRS, the solvents were used to remove grease from nuclear components being produced to support the creation of plutonium for nuclear defense and, later, NASA deep space missions. Clay-bottom basins were initially used to store this waste.

The oxidant approach entails a two-step injection of different oxidants specifically designed for the sediments where the contaminated water resides. The portion of the Lost Lake Aquifer below SRS currently being treated has sand and clay sections. Waste solvents in the clay portions have proven difficult to remove.

The first step uses an aggressive oxidant known as potassium



*Savannah River Nuclear Solutions is using oxidants to neutralize solvents found in groundwater beneath the Savannah River Site in a field-scale test. The oxidants destroy the waste solvents, producing non-toxic byproducts.*

permanganate to clean up the more easily reached contaminants in the sandy zones. EM Savannah River National Laboratory testing shows that once the solvents have been eliminated from the aquifer's sandy portions, solvents in the harder-to-treat clay zones will disperse. Once free from the clay, the solvents can be attacked using sodium persulfate, injected in the same set of wells used for the first step. The long-lasting sodium persulfate seeps into the clay to treat more solvent.

According to SRNS geologist Jeff Ross, data to be gathered through October 2019 from monitoring will determine how the formula of oxidants and concentrations should be modified for treatment during a second injection and monitoring campaign set for 2020.

“Working closely with the Savannah River National Laboratory during the extensive laboratory testing prior to the start of the campaign has shown the effectiveness of this two-step process and given us a high level of confidence,” Ross said. “We believe this multi-year injection campaign and evaluation will be highly effective.”

In this project, samples will be taken frequently from groundwater monitoring wells located at various distances up to 500 feet from the injection site, where a well was placed to draw oxidants through the targeted area of contaminants.

According to Ross, it's not unusual for potassium permanganate or sodium persulfate to be used separately to attack degreasing chemicals. What's innovative is the use of these oxidants in combination, back to back, to treat hard to reach solvents locked in the clay.

*Savannah River Nuclear Solutions, a Fluor-led company with Newport News Nuclear and Honeywell, is responsible for the management and operations of the Department of Energy's Savannah River Site, including the Savannah River National Laboratory, located near Aiken, South Carolina.*

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