

News from the Savannah River Site

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SRS Contractor Uses Unconventional Treatment to Protect Groundwater and Reduce Cleanup Costs

AIKEN, S.C. (March 23, 2016) – You can't fight Mother Nature and win, they say. So less expensive, more natural measures are being used to clean up contaminated groundwater beneath the Savannah River Site (SRS). Savannah River Nuclear Solutions (SRNS) personnel are using new, innovative methods to harness and enhance processes already found at work within the underground water system below this U.S. Department of Energy (DOE) site.

And, it's working. To date, the remedial costs associated with groundwater contaminants near the site's F Area have been reduced, resulting in a cost avoidance of approximately 90 percent. The price tag has gone from about \$1 million a month to \$1 million a year.

This major cost avoidance has been accomplished by moving from using highly mechanized pump and treat facilities to a simple approach that taps into nature's own power to isolate and clean up hazardous waste and has reduced the migration of tritium, uranium, strontium-90 and iodine-129 from the affected aquifer.

One of the biggest innovations involves injecting a non-traditional environmental cleanup material, silver chloride, into the contaminated groundwater beneath SRS to treat radioactive iodine-129. Silver chloride is also used to create photographic paper and as an antidote for mercury poisoning.

"Finely milled silver chloride particles, reduced to about one-quarter-micron in size, are injected with water into the aquifer, and are extremely effective at capturing the iodine-129," said Gerald Blount, SRNS Geologist. "Working with Savannah River National Laboratory scientists, we've found that over a short time period the silver



SRNS operators Stanley Creech (left) and Paul Dobson monitor the injection of silver chloride into the aquifer beneath F Area at the Savannah River Site. Results of a recent test indicate a significant decrease in the hazard posed by contaminants where silver chloride was injected.

chloride can permanently bind the hazardous iodine-129 as silver iodide, because of its strong natural chemical affinity.”

Blount noted that the results of a recent test indicate a significant decrease in the hazard posed by iodine-129 where silver chloride was injected into the aquifer beneath F Area.

“This is the first time submicron silver chloride has been used for this purpose,” said Blount. “The results of this full-scale test created a 30 to 50 percent reduction in the iodine-129 contaminant normally found in water samples taken at the test site. Next, we’ll inject an equivalent amount and measure again the level of effectiveness. Our goal is to eventually inject enough silver chloride in the right locations to remove most of the iodine-129 from the groundwater.”

“These periodic injection campaigns into the aquifer require little power, have no significant operation or maintenance cost and generate no waste,” added Blount. “As a result, the overall cost savings are significant and continue to grow.”

Since the silver chloride step was added to the process in 2005 a total cost avoidance of approximately \$100 million has been obtained.

Another benefit for injecting Silver Chloride into groundwater is that its use is not a public health or environmental concern. Studies have found that the very low solubility of this chemical compound does not negatively impact water quality. In fact, it is not detectable in treated groundwater.

From the 1950s well into the 1980s, SRS produced nuclear materials used for national defense. As a result, a portion of the groundwater beneath F Area in the past became more acidic. Small amounts of radioactive tritium, uranium, strontium-90 and iodine-129 were found as well.

“SRNS and the Savannah River National Laboratory are working together to find innovative remedial solutions at the Savannah River Site that are protective, technically feasible, safe and cost effective,” said Philip Prater, a physical scientist, in the DOE-Savannah River/Infrastructure and Area Completion Division.

Employing more sustainable remediation methods at SRS helps the DOE complex as a whole achieve its remediation objectives, while reducing overall cleanup costs.

Savannah River Nuclear Solutions is a Fluor-led company whose members are Fluor Federal Services, Newport News Nuclear and Honeywell, 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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