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## SRS Trees Perform Like “Hydraulic Pumps” to Evaporate and Disperse Groundwater Containing Legacy Tritium

AIKEN, S.C., September 17, 2021 – Scientists at the Savannah River Site (SRS) are using natural resources, including a 62-acre plantation of pine trees, to greatly limit radioactively contaminated groundwater from reaching an onsite stream.

The trees effectively act like a forest of tall “hydraulic pumps,” each drawing up irrigated water containing legacy tritium, pumped from a nearby holding pond and harmlessly released into the atmosphere through photosynthesis.

“We knew that capturing and containing the contaminated groundwater seeping to the surface and into a manmade pond would be of great benefit,” said Jeff Thibault, Savannah River Nuclear Solutions (SRNS) Engineer.

The extensive irrigation system uses piping and sprinkler heads to evenly spread the tritiated water over the forest floor debris. Large-scale evaporation takes place during this process as well, releasing additional tritium into the Earth’s vast atmosphere where it’s harmlessly diluted.

USDA Forest Service-Savannah River (USFS-SR) researchers along with engineers from SRNS and the Department of Energy (DOE), began designing this interim treatment in 1999.

Since 2001, when this process began, approximately 190 million gallons of water nearly 7,000 curies of tritium that otherwise would have entered the Savannah River, has been safely sprayed throughout thousands of loblolly pine trees.



*At the Savannah River Site, U.S. Forest Service employees Secunda Hughes (left), Civil Engineering Technician, and Andrew Thompson, Forester, inspect irrigation piping and sprinkler heads, part of a 62-acre pine plantation used to safely disperse tritium into the earth’s vast atmosphere and away from local waterways*

# News from Savannah River Nuclear Solutions

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“Traditional remediation costs associated with this level of tritium removal would cost close to \$220 million dollars over a 20-year period,” said Marsue Lloyd, USFS-SR Civil Engineer. “Our costs over that same span of time for this project are approximately \$12 million dollars.”

The costs associated with phytoremediation are low because only a few operators are needed, and the contaminated groundwater flows naturally to the surface without a need for mechanized pumping. In addition, the process, which includes 51 irrigation zones, is largely computerized for optimal evaporation efficiency. “With this project, we learned a lot about harnessing nature to continually move towards passive, low-energy, and sustainable cleanup technology with minimal cost. And it’s accomplished effectively without the generation of any waste,” explained Philip Prater, Senior Physical Scientist with DOE-Savannah River.

Thorough sampling and testing conducted annually by the Savannah River Ecology Lab demonstrates that nearly 90% of the tritium within the water applied to the pine plantation is evaporated. “Public concerns about managing contaminated water at SRS are understandable,” said Thibault. “However, test results validate the level of tritium found within the plants and animals effected by this process are so low as to be insignificant. The fact is optimal water levels are being maintained in the pond while the evaporated tritium becomes virtually immeasurable beyond the irrigated section of forest, much less at the site boundary.

“What we’ve achieved for 20 years now is the protection of nearby waterways, and we’re doing so safely and cost-effectively. This project has been extremely effective and the data supporting this success has been verified by South Carolina Department of Health and Environmental Control officials,” said Thibault. “This project represents what can be accomplished through the partnership of multiple organizations sharing the same vision, building on the unique contribution each provides.”

*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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