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MARK 18A Ribbon Cutting for Mock Up Facility: Turning Nuclear Waste into Valuable Material

AIKEN, S.C.– On August 9, 2019 Savannah River National Laboratory (SRNL) hosted a ribbon cutting ceremony for the mock-up of the operation that will harvest plutonium-244 (Pu-244), a highly valuable nuclear material used in applications such as nuclear forensics, high precision plutonium measurements, and heavy element research.

The Pu-244 was a by-product of the long, high-flux irradiation of “Mark 18 targets,” metal cylinders irradiated in the nuclear reactors that operated at the Savannah River Site many decades ago and are now deactivated. Today, the United States lacks facilities and capabilities to create additional Pu-244 and, because of this lack of facilities, the current inventory of this material in Mark 18 targets is simply priceless.

“Currently, we believe we can extract about 20 grams of Pu-244, a material that exists in only one place in the United States,” said Vahid Majidi, SRNL Director “and that is in the Mark-18A ‘targets,’ stored at SRS.”

“We decided to process the targets at SRNL using special Mark 18A equipment in the shielded cells, which provide the shielding and confinement necessary to



SRNL and DOE officials cut the ribbon on the Mark-18A mock-up facility, useful for employee training in the eventual harvesting of Pu-244. From left to right: Natraj Iyer, SRNL Associate Lab Director Nuclear Materials Management; Mike Budney, DOE SRS Site Manager; Jeff Allison Deputy Manager, National Nuclear Security Administration (NNSA) – Savannah River Field Office; Richard Meehan, NNSA, Director Office of Nuclear Materials Integration; Jay Tilden, Associate Administrator and Deputy Under Secretary for Counterterrorism and Counterproliferation; Vahid Majidi, Laboratory Director, SRNL Director; Bill Swift, SRNL, Mark-18A program manager; Nick Bridges, SRNL; Allan Busby, SRNL.

work with radioactive materials,” said Bill Swift, program manager in SRNL’s Nuclear Materials Management Directorate. “A trained operator can stand safely outside each cell to perform tasks remotely inside the shielded workspace.”

The laboratory has invented unique equipment to enable processing of the 14-foot-long Mark-18A target bundles inside the 6-by-6-foot workspaces of the SRNL shielded cells. One is a shielded cask that will be used to safely transport and deliver a target from wet storage into a shielded cell. Another is a special insert that will seal the open cell; align the target as it is inserted into the cell from the transport cask, so a saw can slice pieces to be processed in the limited workspace of the cell; and provide shielding during operations in the cell. SRNL also adapted a commercial robot typically used in the automotive industry to remotely remove material from the shielded cell and place it in a shielded container for transport.



Jay Tilden, National Nuclear Security Administration (NNSA), Associate Administrator and Deputy Under Secretary for Counterterrorism and Counterproliferation; Jeff Allison Deputy Manager, NNSA – Savannah River Field Office; and Bill Swift SRNL Mark-18A project manager, tour the mock-up of the Mark-18A facility where SRNL staff will train to use equipment to eventually extract valuable Pu-244 from existing waste material on the site.

SRNL is working diligently to verify the design of the equipment, develop procedures, and train personnel to prepare for the start of recovery operations. Recovery of material from the first Mark-18A target is scheduled to begin in late 2021. This ribbon cutting showcased the layout and equipment that will be used in these recovery operations.

The United States Department of Energy (DOE) Savannah River National Laboratory (SRNL) is a multi-program research and development center that puts science to work to protect the nation by providing practical, cost-effective solutions to the nation's environmental, nuclear security, nuclear materials management, and energy manufacturing challenges. SRNL is managed for DOE by Savannah River Nuclear Solutions, a Fluor-led company whose members are Fluor Federal Services, Newport News Nuclear and Honeywell.

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