News from the Savannah River Site
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For Immediate Release

The Future is Now: SRS introduces automation into downblended plutonium shipping package receipt/inspection process

AIKEN, S.C. (July 11, 2024) - Contractor employees at the Department of Energy's Savannah River Site (SRS) have recently entered the final testing stage of a multi-year project to introduce automation into two projects related to the Surplus Plutonium Disposition (SPD) Program, resulting in multiple benefits for personnel while saving taxpayer dollars.

The SPD mission will expand the existing plutonium dilute and dispose process in a plutonium handling and interim storage facility at SRS to support the removal of plutonium from the state of South Carolina. The downblended material is packaged in 55-gallon Criticality Control Overpack (CCO) drums and staged on a designated storage pad until it is characterized and ready to be shipped to the Waste Isolation Pilot Plant (WIPP) in New Mexico for disposal.

In 2019, while evaluating potential efficiency improvements to packaging operations, Savannah River Nuclear Solutions (SRNS), the managing and operating contractor at SRS, and the National Nuclear Security Administration (NNSA) identified the benefits of automation. Through NNSA funding, SRNS partnered with the Savannah River National Laboratory (SRNL) to assess a long-term strategy for infusing automation into future operations.

"The SRNS-SRNL team determined that automation could be used for the SPD Program– both for receipt and inspection of incoming empty CCOs and for facilitating movements of loaded drums on an interim storage pad, where they are held until shipment to WIPP for disposal," said Rich Koenig, Advanced Technology Program Manager for SRNS.

Koenig explained that automation serves three primary benefits.

"First, it allows SRNS to reassign operators who would normally perform the receipt and inspection tasks to areas where their skills are better utilized," he said. "The second benefit is the cost savings that will be realized through increased throughput and the reduction in process costs. And the third eventual benefit incorporates ALARA principles by using an Automated Guided Vehicle to remove operators from areas with elevated radiological dose."

ALARA (As Low As Reasonably Achievable) is a set of principles that seeks to limit workers' exposure to radiation as much as possible by limiting the time workers are exposed and providing shielding or alternative work methods, such as automation, to keep workers safe.

"We have tens of thousands of CCOs coming into the plutonium handling and interim storage facility over the next three decades," said Koenig. "Before diluted plutonium is packaged into the CCOs, they have to be inspected and reviewed before delivery into a security area, ensuring the safety and security of the workers and the materials."

The CCO inspection process is the first area to use automation within the SPD program. The process will use a robotic arm to perform pre-use inspections and security checks after the drum is delivered to the inspection area by an Automated Guided Vehicle (AGV). SRNL engineers developed custom tooling and software for the inspection process.

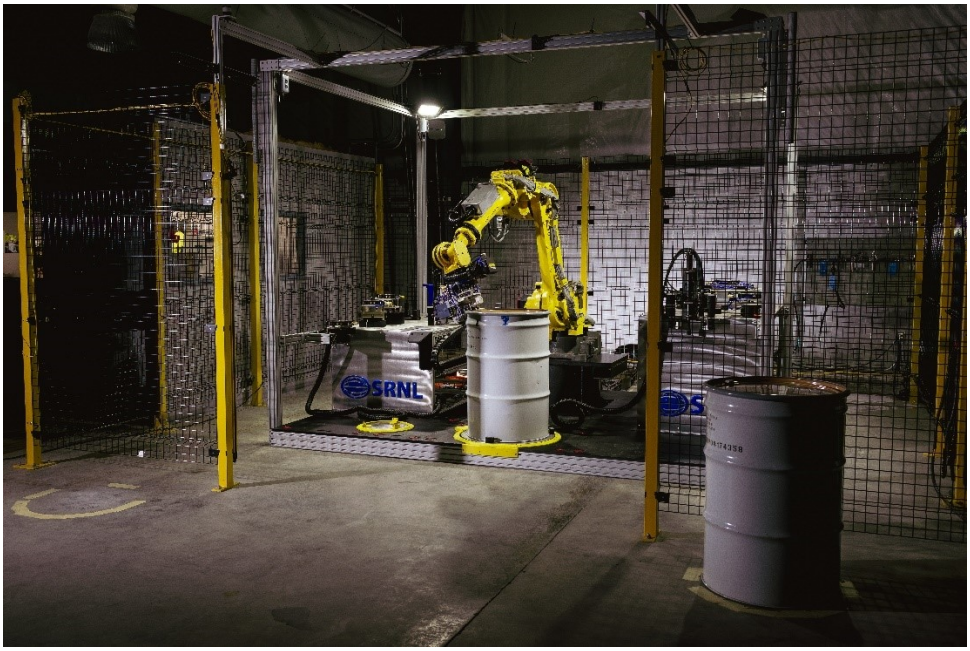
The CCO Characterization and Storage Pad facility at SRS will provide the second automation opportunity, where an AGV will deliver shipping containers between staging and shipping inspection locations. With the addition of a specialized tool on the AGV, drums can be placed in horizontal storage racks to increase the storage capability on the pad by 50% over the current process of storing drums on stacked pallets.

"Using the AGV will allow us to stack drums more safely and efficiently in horizontal positions; without the AGV, that process would take several operators and a forklift working in a radiological area. By automating the process, we remove the operator from specific work hazards, and we incorporate ALARA principles to reduce radiation exposure, all while greatly expanding our storage capacity," said Koenig.

As automation can be used across the Department of Energy Complex, several sites have already visited SRS to learn more. "This is a really exciting venture for SRS," said Koenig. "I am looking forward to seeing how automation can benefit operations and processes in the future."

Plutonium is diluted, or downblended, at SRS in a process that mixes plutonium oxide with a multicomponent adulterant to produce a proliferation-resistant form that can never again be readily used in nuclear weapons.

To see a video highlighting automation, click here.



The Criticality Control Overpack inspection process will use a robotic arm to perform pre-use inspections and security checks after the drum is delivered to the inspection area by an Automated Guided Vehicle.

An Automated Guided Vehicle will be used to deliver shipping containers between staging and shipping inspection locations in a characterization and storage facility at SRS.

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