

Technology Testbeds at Savannah River National Laboratory

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SRNL Fast Facts

- > The Savannah River National Laboratory (SRNL) has a unique set of assets that can be accessed to test innovative technologies that address Department of Energy, Office of Environmental Management (DOE-EM) high priority needs.
- > DOE-EM priority concerns include: waste tanks and remote work cells.
- > SRNL Remote Systems Testbeds provide a method to verify remote systems operations and train operators in a safe environment.

Contact Information

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Remote Systems Testbed

Savannah River National Laboratory (SRNL) has supported the Savannah River Site (SRS) facilities for more than fifty years. During this time, SRNL employees have learned about the hazards, conditions, requirements, and issues associated with deploying robotics and remote systems in SRS and DOE facilities. An important lesson learned is that testing systems and training operators in a non-hazardous environment, or testbed, greatly improves the odds of a successful remote system deployment.

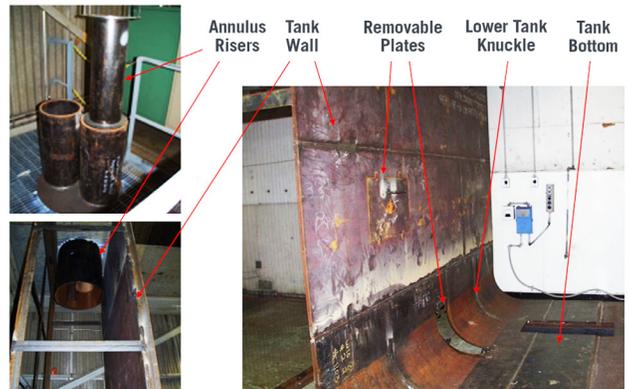
SRNL has the facilities, engineering experience, and facility knowledge to design and build custom remote system testbeds that include the critical features associated with a variety of nuclear facilities. For each testbed, SRNL engineers work with customers to identify the appropriate critical features. These features can include physical limitations, chemical hazards, and/or radiological conditions. SRNL can use multiple facilities to test all of the identified critical features for one system. For example, the materials used to build a remote system can be tested in various radiation fields in one facility and the entire remote system can be tested in a physical testbed in another facility. Following are several examples of SRNL Remote Systems Testbeds.

Waste Tank Annulus Testbed

SRS has several million gallon double walled underground waste tanks. The annulus space between the tank walls is used for tank inspections, but is contaminated and difficult to access. SRNL built the Waste Tank Annulus Testbed, shown below, to test remote systems and train operators before they are deployed in an actual waste tank annulus.

Attributes

The Waste Tank Annulus Testbed is a full scale partial tank setup that includes annulus risers, a tank wall, lower tank knuckle, tank bottom, and removable wall and knuckle plates. The risers restrict the size of system that can enter the tank annulus (2" – 6" diameter) and the carbon steel walls, knuckle, and bottom have the same



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wall thickness and weld pattern as the waste tanks. The removable plates allow different wall samples to be inserted for different tests. For example, a remote system with a wall thickness sensor can be inserted into the annulus to see if it can navigate to and accurately measure the knuckle wall thickness.

Pit Disassembly and Conversion Testbed

SRNL built the Pit Disassembly and Conversion (PDC) Testbed to demonstrate the integration of multiple critical remote operations. These critical remote operations included welding 3013 cans, inspecting welds, radiological survey of 3013 cans, and leak checking 3013 cans. SRNL developed an integrated work cell control system to coordinate the operations.

Attributes

The PDC Testbed is a full scale mock-up that includes a bagless transfer system, outer can welder system, a radiological survey station, a leak test station, a gantry crane and a workcell control system. The gantry crane includes a light curtain to provide the proper safety controls for access to the work area. The systems are designed to handle the DOE 3013 inner and outer cans but could be modified to handle other similar cans.



Impact

The SRNL Remote Systems Testbeds allow SRNL to test remote systems and train operators in a controlled environment before deploying a remote system in a hazardous environment. This testing and training improves efficiency and reduces time in the contaminated area, which reduces risk and increases operational safety. This approach allows SRNL to test and demonstrate the remote systems prior to moving to final design activities. The SRNL Remote System Testbeds have also been used to advance a system's Technology Readiness Level.

