

## SRNL Fast Facts

- > National Laboratory for DOE  
Office of Environmental Management  
(EM)
- > Supporting customers at SRS,  
DOE and other federal agencies  
nationally and internationally
- > Applied research, development and  
deployment of practical, high-value  
and cost-effective technology solutions  
in the areas of national security, clean  
energy and environmental stewardship
- > Operated by Battelle Savannah River  
Alliance for the U.S. Department  
of Energy

## SRNL Shielded Cell Facility

### Bench-scale Testing of Highly Radioactive Materials



*Shielded cell construction allows for safe manipulation of highly radioactive material.*

The Savannah River National Laboratory's Shielded Cells Facility provides the ability to safely work with a wide variety of highly radioactive materials in support of nuclear technology development. Skilled operators are able to safely remain outside the cells and use manipulator arms to securely perform complex tasks inside the concealed environment. These manipulator arms are specially designed to handle the most delicate of tasks and endure harsh exposure to high level radiation. The SRNL Shielded Cells Facility includes the largest collection of cells with this type of capability in the country.

### Facility Layout and Features

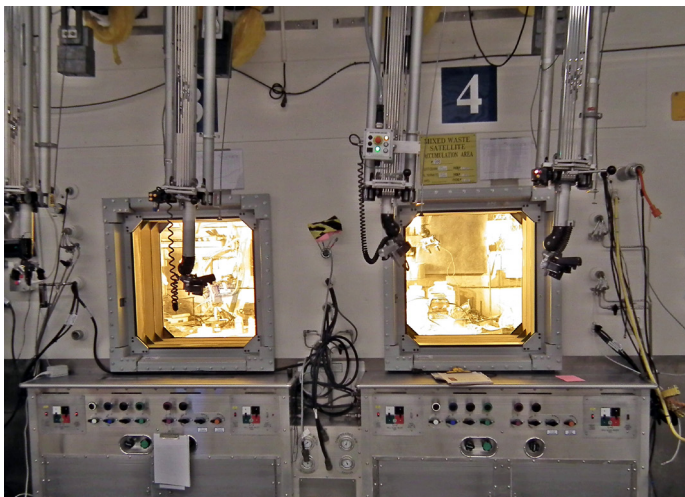
The SRNL Shielded Cells Facility consists of sixteen 6x6-foot work stations, or cells, that feature:

- Exterior walls made of 3-foot thick, high-density, reinforced concrete with an 1/8-inch thick stainless steel liner.
- 3-foot-thick cell shielding windows that feature multiple layers of leaded glass.
- A robust facility design that allows for material handling up to 5,000 curies of 1 Mev gamma radiation.
- Cells independently equipped with two manipulator arms and access to fire suppression, electricity, air, gases and water. Additional services can be installed as needed.
- A high airflow filtration/exhaust system that is triple HEPA filtered and routed through a sand filter system before the air is discharged to the atmosphere.
- Shielded ports located throughout the facility. These 11x11-inch ports allow for easy placement and removal of samples and supplies into the cells.
- Removable cell covers and plugs and transfer ports that provide the ability to safely move equipment and material of many sizes into the cells. The facility is able to handle large shielded shipping casks and transfer highly radioactive materials from casks into the cells.

## Contact Information

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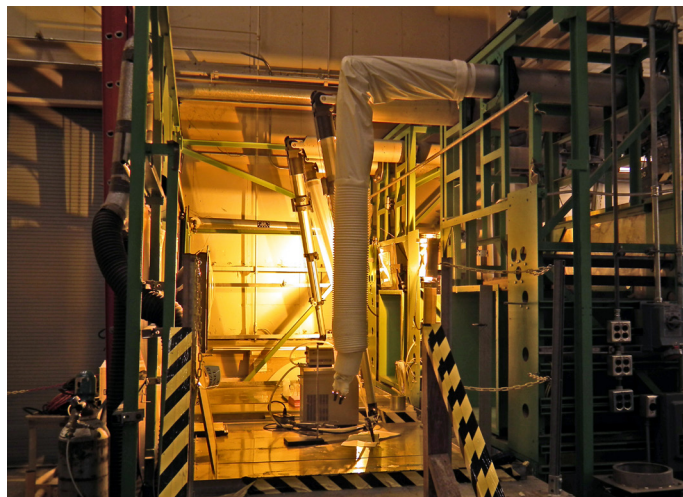
SRNL Shielded Cells

The cells are arranged in two sections, or “cell blocks.” Cell Block A, which has six cells, is equipped with a one-ton crane for transferring material from one cell to another. Cell Block B, which has ten cells, is equipped with two one-ton cranes. An exterior truck dock has a 10-ton crane for use in loading and unloading radiological trailers and transferring large or heavy material into a high-bay receiving area. The receiving area also hosts a 10-ton crane, which is used to move material into and out of the cells, and for maintaining cell covers and plugs.

The Shielded Cell Facility also includes nonradioactive mockup cells that are full-scale replicas of the radioactive cells. These mockup cells provide the same footprint and operational capability of the radioactive cells and are used for staging equipment and developing detailed work procedures for active cell operations. Research equipment is tested here for compatibility with remote operations before being placed inside the radioactive cells.

## Applications in Research and Development

The SRNL Shielded Cells Facility is actively involved in a number of research and development initiatives in support of the DOE-EM missions including the Savannah River Site’s Defense Waste Processing Facility, Sludge and Salt Waste Processing, Saltstone Facilities, and the closure of SRS’ radioactive waste storage tanks. The facility also supports initiatives for other customers requiring the study or manipulation of highly radioactive samples and materials.



Mock-up cells allow for procedure development and planning.

Examples of projects performed in the cells include:

- Physical, chemical, and radionuclide characterization of production (or process) samples
- Demonstration of Cs-137 removal processes for the pretreatment of high-level liquid waste at SRS and Hanford sites
- Demonstration of vitrification process demonstration of high-level wastes in borosilicate glass
- Purification of 2 kilograms of Cm-244 for offsite evaluation as a heat source
- Demonstration of solvent extraction process to purify Pu-239
- Examination of nuclear reactor components and irradiated fuels
- Demonstration of GrayQb™, a device for non-destructive detection and examination of gamma and alpha radiation levels and sources
- Demonstration of Fluidized Bed Steam Reforming

## Customized Capabilities

The cells include specialized equipment for a variety of analytical and research tasks. Examples are rheology studies, destructive examination, and gas analysis. Available equipment also includes an examination periscope with 100x capability, standard analytical balances, drying ovens, and furnace capable of reaching 1100° C. In addition, other testing and analytical equipment can be installed and tailored to user needs.