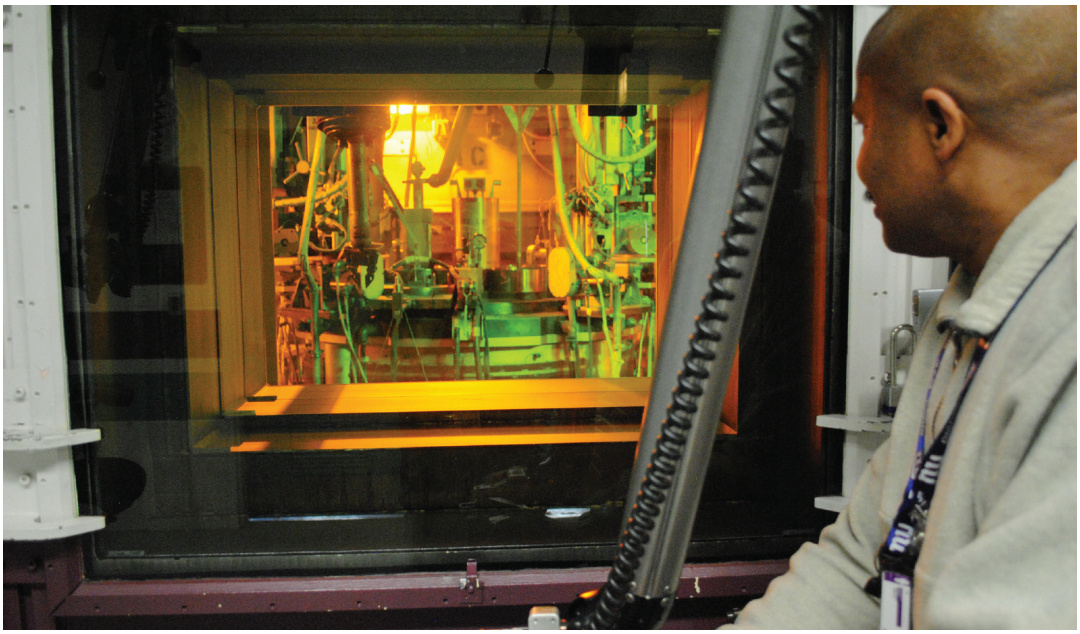
Fuel Conditioning Facility

Waste Forms Separations



INL's Fuel Conditioning Facility supports work to demonstrate the technical feasibility of a nuclear recycling technique called pyroprocessing.

General Information

The Fuel Conditioning Facility (FCF) at Idaho National Laboratory's Materials and Fuels Complex supports nuclear energy research and development for the U.S. Department of Energy and other customers. Its unique capabilities make FCF an ideal facility for its primary mission to support treatment of DOE-owned sodium-bonded metal fuel.

In a secondary role, FCF also supports work to refine the technical feasibility of pyroprocessing technology for treating used nuclear fuel for DOE's Fuel Cycle Research and Development Program. Pyroprocessing refers to a family of technologies involving high-temperature chemical and electrochemical methods for separation, purification, and recovery of fissile elements from used nuclear fuel.

FCF has two hot cells. The air atmosphere cell is where fuel assemblies are disassembled into individual fuel elements. The argon atmosphere cell is where the spent fuel elements are prepared and treated. FCF also has engineering-scale equipment for treatment of sodium-bonded metallic fuel to deactivate the reactive sodium metal, recover fissionable uranium, and separate fission and activation products for incorporation into solid waste forms suitable for geologic disposal.

Key Capabilities:

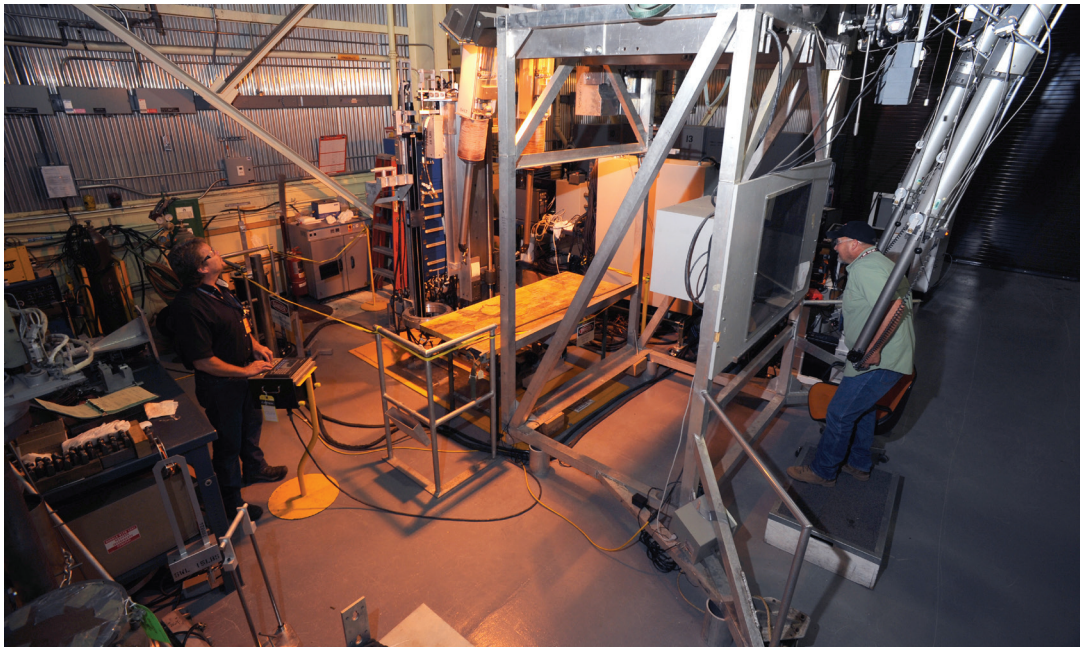
- Two heavily shielded hot cells equipped with remotely operated manipulators to safely handle irradiated fuels and materials.
- Instruments used to prepare and size elements for treatment, such as element choppers, vacuum inspection, and the vertical assembler/dismantler.
- Systems to support handling of heavily shielded shipping casks for fuel receipt and waste disposal.
- Hot repair area equipped with remotely operated decontamination equipment, a specialized manipulator repair facility, and other maintenance and waste-handling equipment.
- Pneumatic "rabbit" system for transfer of material samples to and from MFC's Analytical Laboratory (AL) or its Hot Fuel Examination Facility (HFEF).
- Mock-up area to allow thorough testing of new remotely operated systems prior to their installation into FCF, HFEF or AL hot cells.

Changing the World's Energy Future

INL Idaho National Laboratory

Fuel Conditioning Facility

Technical Information



FCF includes a mock-up shop where technicians can build and test new hot cell equipment before installing it into the hot cell.

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In a secondary role, FCF also supports work to demonstrate the technical feasibility of pyroprocessing technology for treating used nuclear fuel for DOE's Fuel Cycle Research and Development Program. Pyroprocessing is a family of technologies involving high-temperature chemical and electrochemical methods for separation, purification and recovery of fissile elements from used nuclear fuel. FCF has an air- atmosphere cell where fuel assemblies are disassembled into individual fuel elements, an argon-atmosphere cell where the spent fuel elements are prepared and treated, and a hot repair area located in the basement where contaminated equipment can be washed and repaired.

Basic Capabilities:

- Engineering-scale equipment for treatment of sodium-bonded metallic fuel to deactivate the reactive sodium metal, recover fissionable uranium, and separate fission and activation products for incorporation into solid waste forms suitable for geologic disposal
- Systems to support handling heavily shielded shipping casks for fuel receipt and waste disposal
- Hot repair area equipped with remotely operated decontamination equipment, a specialized manipulator repair facility, and other maintenance and waste-handling equipment

Key Instruments:

- Electrochemical separations/sodium neutralization experimentation/treatment
- Pneumatic rabbit transfer system
- Canister-cutting machine
- Remote uranium casting furnace
- Manipulator repair glovebox
- Vertical assembler/dismantler (VAD), vacuum inspection station/bottle cutting, production element chopper, blanket element chopper
- Hot cells
- Suited entry repair area
- Mock-up area

For more information

JC Price
(208) 533-7211
jc.price@inl.gov

www.inl.gov

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