Experimental Fuels Facility

Fuel Fabrication, Process Development

The Experimental Fuels Facility (EFF) is a 5,000-square-foot nuclear fuel fabrication facility at Idaho National Laboratory's Materials and Fuels Complex. EFF houses a wide range of fuel fabrication and material handling capabilities. Established in 2012, EFF supports INL's mission as the lead nuclear energy research lab for the nation.

Equipment and processes in EFF support customers in DOE's Office of Nuclear Energy and private industry partners. EFF hosts a wide range of INL's new lab-scale capabilities for supporting the nation's need to develop even safer, more reliable nuclear fuels.

Basic uses of EFF include uranium and uranium alloy casting and extrusion, processing uranium metal and ceramics at all enrichments, fabrication and handling of alloys and powders, and a machine shop with radiological and non-radiological areas.

KEY EQUIPMENT:

- 4 fume hoods (3 radiological)
- Inert atmosphere uranium processing glovebox line for fabrication and handling of alloys and powders
- High-temperature applications (arc melting furnace, molten salt bath, billet casting furnace, high-temperature annealing furnace)
- Cold crucible gas atomizer with a 5kg capacity able to process uranium alloys
- Fuel experiment assembly equipment (annealing quench furnace, sodium glovebox, sodium settling furnace, orbital capsule, and cladding welding)
- Various other mills, presses, and other fabrication capabilities to support advanced fuels development
- Machine shop for machining encapsulated fuel components
- 150-ton extrusion press system (including a molten salt furnace and a straightener/draw bench)

EFF includes uranium metal forming equipment, including a computer numerical control (CNC) lathe, electrical discharge machine, a cold rolling mill, and other fabrication equipment, which enable the creation of virtually any fuel type.

Idaho National Laboratory

The Experimental Fuels Facility supports customers in the Department of Energy's Office of Nuclear Energy and private industry partners.

The Experimental Fuels Facility (EFF) houses a wide range of fuel fabrication capabilities, supporting customers in the Department of Energy's Office of Nuclear Energy and private industry partners through Idaho National Laboratory's cooperative research & development program.

BASIC CAPABILITIES:

- Uranium and uranium-alloy processing (all enrichments):
- Alloying
- Casting
- Extrusion
- Atomization
- Machining
- Inert-atmosphere uranium processing glovebox line for fabrication and handling of alloys and powders
- Multiple furnaces with temperature capability up to 2,000°C in vacuum, argon, air, hydrogen and nitrogen atmospheres
- Machine shop with both radiological and non-radiological areas to support advanced fuel development

KEY INSTRUMENTS:

- Radiological fume hoods (3)
- Inert-atmosphere, radiological gloveboxes (3)
- Powder metallurgy process equipment
- Fuel experiment assembly equipment
- Annealing quench furnace
- Sodium glovebox
- Sodium-settling furnace
- Orbital capsule and cladding welding
- Uranium forming and machining
- Computer numerical control (CNC) lathes and mills
- Electrical discharge machine
- Centerless grinder
- Rolling mill
- Shears and punches
- 150-ton extrusion press
- Hydraulic straightener/ draw bench
- Gas atomizer
- Arc-melting furnaces
- Molten salt bath
- Billet-casting furnace
- High-temperature annealing furnace

FOR MORE INFORMATION

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