

Tour of the Advanced Test Reactor and the Materials and Fuels Complex

A tour of the Advanced Test Reactor (ATR) and the Materials and Fuels Complex (MFC) was planned for workshop participations.

The tour took place on Monday, May 21, 2007, from 8:00 am to 5:00 pm. Space is limited – early registration was necessary. A description of the tour, as it was presented to those interested, is provided below:

The Materials and Fuels Complex

Workshop attendees will be offered an opportunity to tour two complexes at the Idaho National Laboratory. MFC has great importance as the nexus of research and development for new reactor fuels and related materials. As such, it will contribute to increasingly efficient reactor fuels and the important work of nonproliferation – harnessing more energy with less risk. While at MFC, enjoy a tour of the Fuel Conditioning Facility (FCF), the Hot Fuel Examination Facility (HFEF), and the Space and Security Power Systems Facility (SSPSF).

Fuel Conditioning Facility

FCF consists of two hot cells, one having an air atmosphere and the other having an inert argon gas atmosphere, which enables technicians to work safely with radioactive nuclear materials from behind 5-ft thick shielding walls. The rectangular air cell is used for handling, storage, and assembly/disassembly of components. The argon cell is a much larger hot cell and is “doughnut” shaped; that is, personnel can work from the outside corridor around the hot cell and monitor in-cell activities from an inner shielded space in the center of the hot cell. All equipment in the cells can be repaired remotely using externally controlled manipulators and cranes.



In addition to the hot cells, the facility contains a mockup area where new equipment can be qualified and tested for remote operations and maintenance prior to installation in the cells. There is also a spray chamber, special glove boxes, and a suited entry repair area (located in the basement) where contaminated equipment can be decontaminated and repaired.

Hot Fuel Examination Facility

HFEF was constructed in the early 70s to provide support to the Liquid Metal Fast Breeder Reactor community with post- and interim-irradiation examination capabilities. In the following 25 years, the facility was upgraded and has evolved into the multi-program hot cell facility that it is today.



Space and Security Power Systems Facility

The Space and Security Power Systems Facility (SSPSF) provides the capability for assembly and testing of radioisotope power sources. These power sources, or batteries, convert the heat from plutonium-238 decay to electrical power for use in space applications or for remote terrestrial locations. After a power source is assembled in one of the specialized glove boxes in the facility, testing is performed to ensure that the power source will work in the desired environment. Testing activities include: vibration testing (simulates lift-off conditions for space applications or vehicle transport for terrestrial missions); mass properties determination (for space and terrestrial applications); and thermal vacuum testing, which duplicates, as close as possible on earth, the conditions under which a space battery will be expected to operate. SSPSF recently completed work to deliver the Radioisotope Thermoelectric Generator (RTG) to power the *New Horizons Spacecraft* for the exploration mission to the planet Pluto.



The Reactor Technology Complex

The Reactor Technology Complex (RTC) is the focal point for designing, testing, and proving new technologies of the nuclear renaissance.

Advanced Test Reactor

Construction on the ATR began 40 years ago, and the reactor went critical three years later.



During its 37 years in operation, ATR has produced much of the world's data on material and fuel response to the high radiation environments of power reactors. ATR was originally designed to study the effects of intense radiation on reactor material and fuels. The reactor has a growing customer base, will play a key part in developing the next phase of nuclear power reactors, and will contribute to this nation's space exploration efforts.