

IDAHO NUCLEAR INFRASTRUCTURE

The U.S. Department of Energy's Office of Nuclear Energy

ADVANCED TEST REACTOR

The Department of Energy supports nuclear science and technology through one of the world's most comprehensive research infrastructures.

The Idaho National Laboratory (INL) serves as the center for U.S. nuclear energy research and development (R&D) efforts. INL combines the expertise of government, industry, and academia in a single laboratory dedicated to the development of advanced reactor and fuel-cycle technologies.

A MULTI-PROGRAM NATIONAL LABORATORY

INL employs more than 3,900 personnel located primarily at the Idaho Site and in the city of Idaho Falls. In addition to its broad spectrum of nuclear energy and national security programs, the laboratory provides essential site services to DOE and other governmental agencies and private-sector companies doing business on the Idaho Site. INL conducts science and technology research across a wide range of disciplines. Its core missions include:

- Developing advanced, next-generation reactor and fuel-cycle technologies;
- Promoting nuclear technology education; and
- Applying technical skills and unique features of the laboratory site to enhance the Nation's security.



Under the oversight of the Department's Office of Nuclear Energy (NE), INL provides technical leadership to support long-term nuclear science and engineering R&D activities to address the Nation's energy and nuclear security goals. Key technical areas include nuclear fuel cycle science-based research, the development of alternative radioactive waste management strategies for the United States, and technology programs that support nuclear nonproliferation and other critical infrastructure protection.

INL also supports NE by conducting R&D and technical integration support for the new Reactor Concepts Research, Development and Demonstration program. INL is the lead laboratory for the Next Generation Nuclear Plant (NGNP) program and, together with Oak Ridge National Laboratory (ORNL), is the principal laboratory responsible for the development of advanced gas reactor fuel and materials R&D. INL is also responsible for staffing the Technical Secretariat for the Generation IV International Forum.

INL provides technical support for cross-cutting technologies including advanced fuels, fabrication and construction methods, and proliferation risk assessment within the new Nuclear Energy Enabling Technologies program. INL has the lead on the development of advanced instruments and sensors for the existing light water reactor fleet.

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INL also provides the facilities and expertise needed to fuel and test radioisotope power systems for space and defense applications, and to accomplish national and homeland security missions, including critical infrastructure protection and nuclear nonproliferation.

NUCLEAR ENGINEERING AND SCIENCE EDUCATION

The Center for Advanced Energy Studies (CAES) is a public-private partnership including the State of Idaho and its academic research institutions, DOE, and INL.

CAES serves to advance the educational opportunities at the Idaho universities in energy-related areas, creating new capabilities within its member institutions and delivering technological innovations leading to technology-based economic development for the intermountain region. CAES also provides students and professors from across the country with access to the Laboratory's unique capabilities.

CAES also administers the Nuclear Energy University Program (NEUP), which includes three components — R&D, scholarships and fellowships, and research infrastructure enhancements. The goal is to improve America's competitiveness and develop more effective collaborations among universities, national laboratories, and industry in direct support of DOE's NE R&D programs.

INL'S NUCLEAR INFRASTRUCTURE

Two programs support the nuclear infrastructure at INL:

- **Idaho Facilities Management (IFM) Program.** Through IFM, NE maintains its research facilities in a safe, reliable, and environmentally compliant condition to support national nuclear programs.
- **Idaho Site-Wide Safeguards and Security Program.** Through this program, NE supports activities that are required to protect the assets of the Idaho complex from theft, diversion, sabotage, espionage, unauthorized access, compromise, and other hostile acts.

The Department manages and operates three main engineering and research complexes at INL:

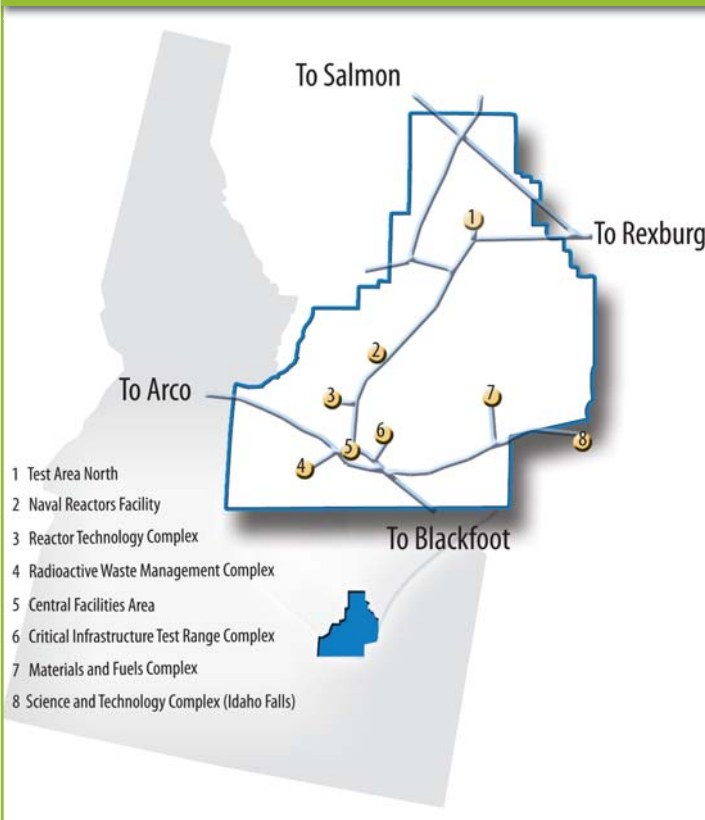
Advanced Test Reactor (ATR) Complex —

This is the site of the ATR, a 250-megawatt test reactor used to provide irradiation services for a range of users. ATR is the largest and most versatile thermal test reactor in the world. Its current primary mission is to provide irradiation and testing services to the Naval Reactors Program.

ATR supports the NE R&D programs, as well as National Nuclear Security Administration (NNSA) programs. ATR also provides irradiation and testing services on a cost-reimbursable basis to other national and international nuclear energy research groups and medical and industrial isotope producers.

In April 2007, DOE designated ATR as a National Scientific User Facility (NSUF).

IDAHO NATIONAL LABORATORY MAP



This designation has enabled ATR to become a cornerstone of nuclear energy R&D in the United States and allows a broader use of ATR capabilities. The extensive capabilities of ATR allow a wide range of advanced nuclear energy irradiation testing to be conducted simultaneously by universities, commercial industry, international organizations, and other national laboratories without interfering with its primary missions. Increasing accessibility to ATR through the NSUF is an important step for INL in building strong ties with the nuclear industry and universities conducting nuclear energy R&D.

NE, through its IFM program, funds the ATR Life Extension Program to ensure the long-term availability of this essential nuclear power research capability.

Materials and Fuels Complex (MFC) —

The facilities at MFC are used to conduct advanced nuclear energy technology R&D. The facilities, personnel, and infrastructure at MFC support several important DOE nuclear energy, defense, and environmental management programs, most notably the development of alternative nuclear fuel-cycle technologies. MFC includes the following major facilities:

- Fuel Conditioning Facility;
- Fuel Manufacturing Facility;
- Hot Fuels Examination Facility;
- Analytical Laboratory;
- Electron Microscopy Laboratory; and
- Radioactive Scrap and Waste Facility.

Research and Education Campus (REC) —

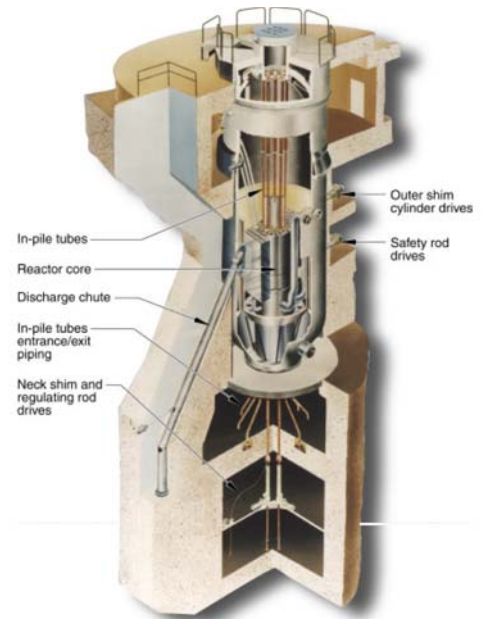
Located in Idaho Falls, Idaho, REC includes more than 30 DOE-owned and leased buildings that house office space, CAES, and extensive laboratory facilities. The laboratories support NE's research and development activities, national security programs, and a wide range of research for other disciplines.

PLANNED PROGRAM ACCOMPLISHMENTS

FY 2010

- Enable INL facility operations supporting nuclear science, engineering, and energy-related R&D programs for DOE, NNSA, and U.S. universities.
- Conduct ATR base operations that enable 275 days of safe, compliant reactor operations per year, serving national security and civilian nuclear power R&D programs at this National Scientific User Facility.
- Continue the ATR Life Extension Program (LEP) to restore hardware, analyze system performance, and complete safety analysis required to reliably operate this \$1.2B nuclear research reactor for at least another 20 years.
- Perform almost 1,000 single and recurring preventive equipment/system maintenance activities to maintain more than 150 laboratories, hot cells, and shops at the MFC and ATR complex.
- Prepare surplus nuclear material at INL for off-site shipment to improve nuclear material management.
- Establish the cost and schedule range for the new Remote-Handled Low-Level Waste Disposal Project to sustain critical laboratory capability.

ADVANCED TEST REACTOR



Program Budget

Idaho Nuclear Infrastructure
(\$ in Millions)

Idaho Facilities Management

FY 2010 Actual	FY 2011 Request
\$173.0	\$162.5

Idaho Site-wide Safeguards & Security

FY 2010 Actual	FY 2011 Request
\$83.4	\$88.2

FY 2011

- Enable INL facility operations supporting nuclear science, engineering, and energy-related R&D programs for DOE, NNSA, and U.S. universities.
- Conduct ATR base operations to support more than 40 irradiation campaigns as scheduled while maintaining an operating efficiency greater than 80 percent.
- Award three to five university experiments using the ATR and other INL research facilities and support six university partnerships to increase available capabilities for NSUF experiments.
- Perform almost 1,000 single and recurring preventive equipment/system maintenance activities to maintain greater than 150 laboratories, hot cells, and shops at the MFC and ATR complex.
- Process approximately 400 kilograms of Experimental Breeder Reactor (EBR)-II sodium-bonded fuel, consistent with the settlement agreement.
- Approve the performance baseline for the new Remote-Handled Low-Level Waste Disposal Project to sustain critical laboratory capability.