

# Idaho Nuclear Infrastructure

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

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



- In FY 2005, the Department of Energy (DOE) created the Idaho National Laboratory (INL) with public and private partners to serve as the center for its nuclear energy research and development efforts.

- The INL combines the expertise of government, industry, and academia in a single laboratory dedicated to the development of advanced fuel cycle and reactor technologies. The facility combines the strong research components of the former Idaho National Engineering and Environmental Laboratory and former Argonne National Laboratory-West. The new laboratory is managed by Battelle Energy Alliance (BEA). Team members include:

- – Battelle Memorial Institute,
- – BWXT Services Inc.,
- – Washington Group International,
- – The Electric Power Research Institute, and
- – Massachusetts Institute of Technology.

- BEA is tasked with establishing the INL as a premier nuclear energy research center within a decade.

## • A Multi-Program National Laboratory

- The INL employs more than 3,700 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 at the Idaho Site.

The INL conducts science and technology research across a wide range of disciplines. Its core missions include:

- Development of advanced, next-generation fuel cycle and reactor technologies;
- Promoting nuclear technology education; and
- Applying its technical skills to enhancing the Nation's security.

Under the oversight of the Department's Office of Nuclear Energy (NE), the INL will provide technical leadership as the Technical Integration Office for DOE's Global Nuclear Energy Partnership (GNEP) program. The INL will also conduct research and development and provide project support for the GNEP objectives.

The INL will also support NE by conducting research and development and technical integration support for Generation IV nuclear energy systems, as well as leadership in the Generation IV International Forum. Generation IV technologies will feature enhanced safety, reduced waste, better economic performance, and perhaps most importantly, improved physical security and proliferation resistance.

The current focus of Generation IV activities is the Next Generation Nuclear Plant (NGNP), which will provide high temperature heat for chemical processes and electricity generation, and make possible the cost-effective production of large quantities of hydrogen to support the development of a clean and efficient hydrogen economy in the United States.

The INL provides NE with the project and technology development leadership for the NGNP project. This includes research and development for the materials and

fuels needed for the NGNP, as well as development of the basis for commercialization and licensing. This important research will further advance energy and national security by reducing the Nation's dependence on imported fossil fuel.

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 between the State of Idaho and its academic research institutions, the DOE, and the INL. CAES will serve to advance energy security for our nation by expanding 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 will help provide students and professors from across the country with access to the laboratory's unique capabilities.

## INL's Nuclear Infrastructure

Much of DOE's nuclear research and development (R&D) infrastructure was constructed in the 1950s and 1960s. Two programs support the nuclear infrastructure at the INL:

- *The Idaho Facilities Management (IFM) Program.* Through this program, NE maintains its facilities at Idaho in a safe, reliable and environmentally compliant condition to support national nuclear programs.

- *The 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.

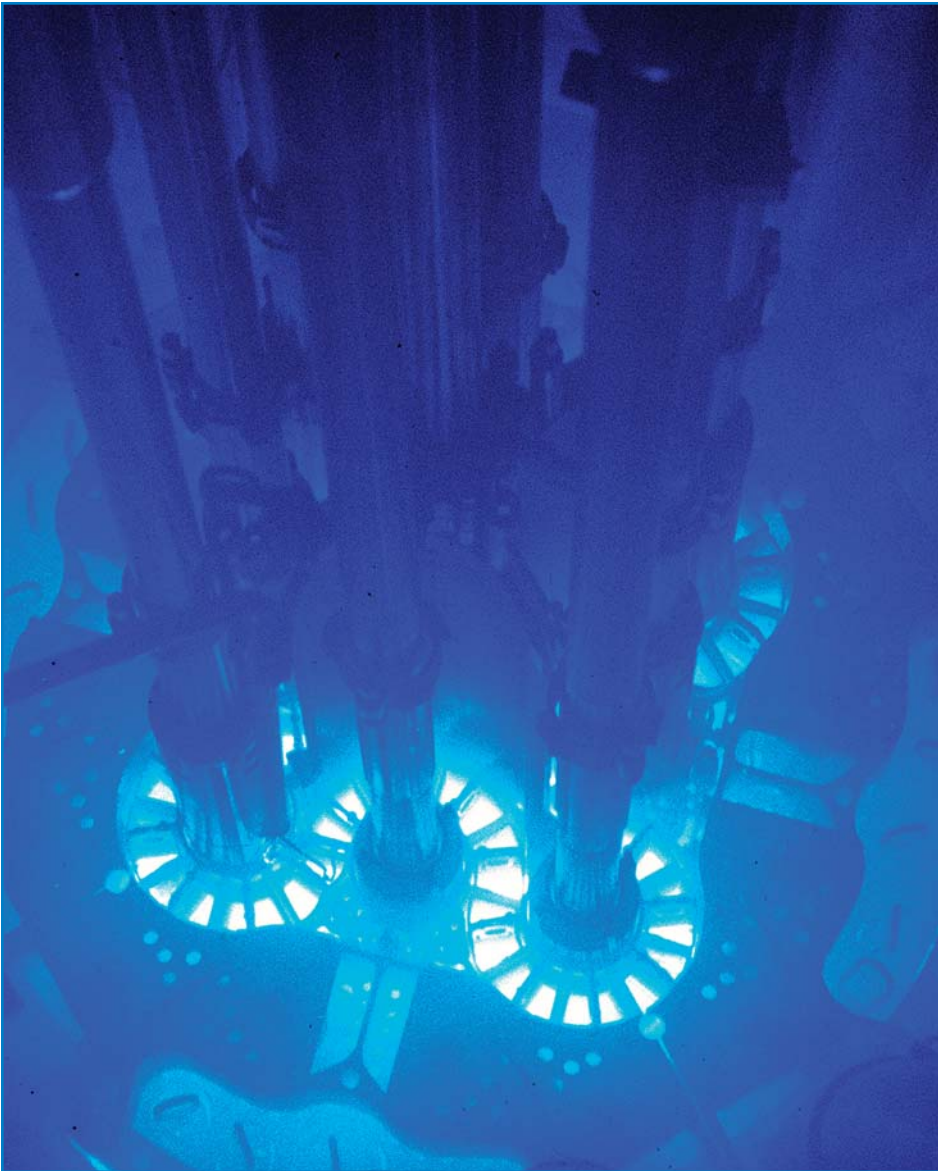
The Department manages and operates the three main engineering and research complexes at INL:

## Reactor Technology Complex (RTC)

— RTC is the site of the Advanced Test Reactor (ATR), a 250-megawatt test reactor used to provide irradiation services for a range of users. The 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.

The ATR supports the Generation IV and GNEP programs. The ATR also provides irradiation and testing services to other national and international nuclear energy research groups and medical and industrial isotope producers on a cost-reimbursable basis.

In April 2007, DOE designated the ATR as a National Scientific User Facility (NSUF). This designation will allow the ATR to become a cornerstone of nuclear energy R&D in the United States. The extensive capabilities of the ATR will allow a wide range of advanced nuclear energy irradiation testing to be conducted simultaneously by universities, the commercial power industry, international organizations, and other national laboratories without interfering with its primary missions. In addition to CAES, increasing accessibility to the ATR through the NSUF is an important step for the INL in building strong ties with the nuclear industry and



*Advanced Test Reactor*

universities interested in nuclear energy programs.

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

### **Materials and Fuels Complex**

**(MFC)** — The facilities at the MFC support National Energy Policy goals by maintaining and operating nuclear facilities required for advanced nuclear energy technology research and development. The facilities, personnel, and infrastructure at the MFC support several important DOE

nuclear energy, defense, and environmental management programs, most notably GNEP.

The MFC includes the following major facilities:

- Zero Power Physics Reactor,
- Fuel Conditioning Facility,
- Fuel Manufacturing Facility,
- Hot Fuels Examination Facility,
- Sodium Process Facility,
- Analytical Laboratory,
- Electron Microscopy Laboratory, and
- Radioactive Scrap and Waste Facility.

### **Research and Education Campus**

**(REC)** — Located in Idaho Falls, Idaho, the REC includes more than 30 DOE-owned and leased buildings that house office space, the CAES (currently under construction), 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**

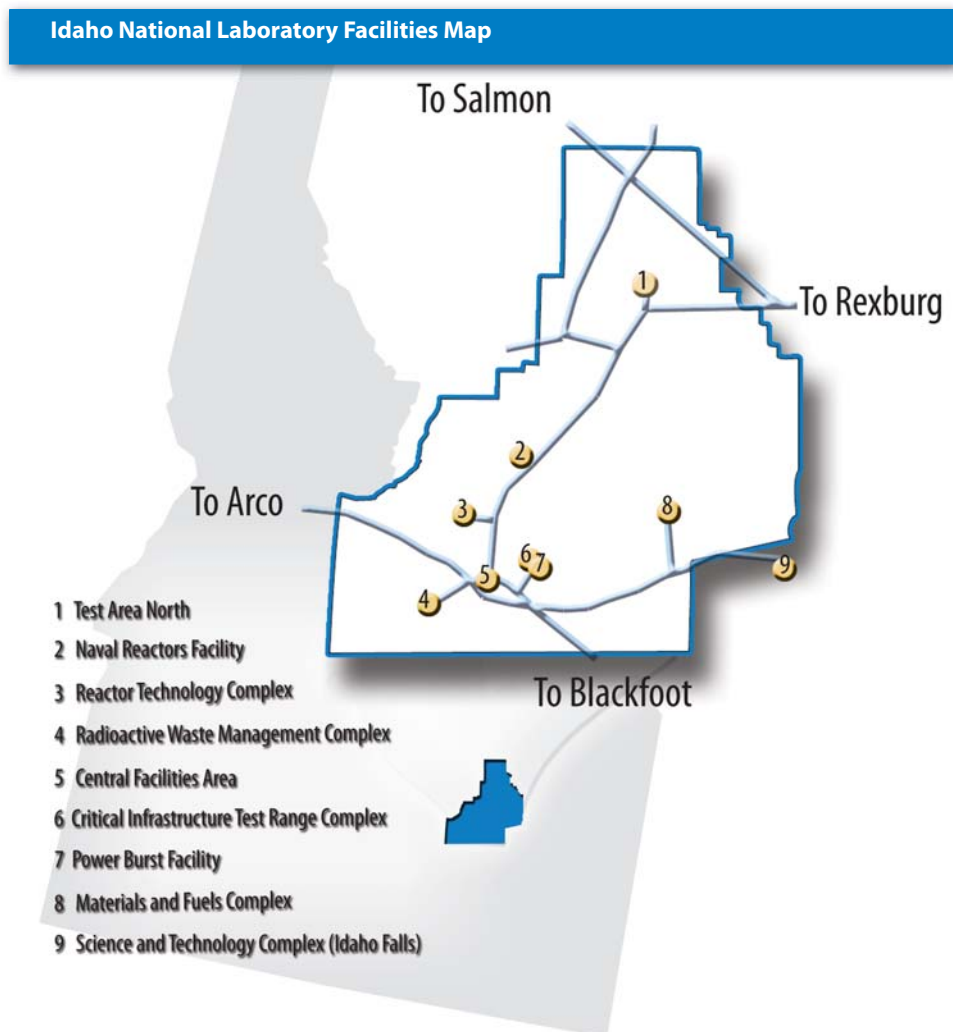
#### **FY 2008**

- Assess IFM planning in accordance with recommendations of the National Academy of Science and revise the INL Ten-Year Site Plan.
- Begin construction of new Research and Education Campus Buildings, consolidating R&D activities to improve program efficiency and reduce maintenance backlog.
- Upgrade both the RTC and the MFC campuses by commencing construction of new general purpose facilities, revitalization of facilities, and consolidation of infrastructure functions.
- Achieve the ATR irradiation program objectives established by the Naval Reactors Program and NE.
- Complete transition of ATR to operate as a NSUF, including the inaugural Summer School, and the conduct of pilot experiments using the new ATR NSUF organization and processes.
- Increase infrastructure efficiency while improving safety performance.
- Commence Post-Irradiation Examination equipment upgrades to support GNEP and other nuclear energy missions.

- Complete and occupy the new CAES building (construction funded by the State of Idaho with loan guarantees from Battelle Memorial Institute).

**FY 2009**

- Perform infrastructure maintenance and recapitalization activities in accordance with a revised INL Ten-Year Site Plan.
- Complete the main Research and Education campus buildings, consolidating in-town research and development activities to improve program efficiency and reduce maintenance backlog.
- Complete the upgrades of both the RTC and the MFC campuses by completing construction of new facilities and consolidating infrastructure functions.
- Achieve the ATR irradiation program objectives established by the Naval Reactors Program, NE, and the new users of the ATR National Scientific User Facility (NSUF).
- Develop new capabilities for the ATR NSUF and expand the user base.
- Increase infrastructure management efficiency while improving safety performance.
- Develop the research, education, and analysis capabilities of the CAES.
- Complete Post-Irradiation Examination equipment upgrades to support GNEP and other nuclear energy missions.



**Program Budget**

**Idaho Nuclear Infrastructure (\$ in Millions)**

	FY 2008 Request	FY 2008 Actual	FY 2009 Request
<b>Idaho Facilities Management</b>	\$104.7	\$115.9	\$104.7
<b>Idaho Site-Wide Safeguards &amp; Security</b>	\$72.9	\$72.3	\$78.8