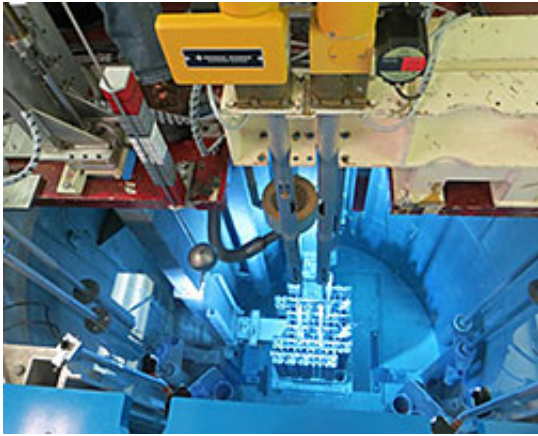


Reactor brought to first criticality after 14-month overhaul

June 16 2015, by Joseph Campbell



The neutron radiography reactor at INL.

An important research tool at DOE's Idaho National Laboratory was restarted recently after completion of a nearly 14-month overhaul-and-upgrade project. The Neutron Radiography (NRAD) Reactor provides researchers with a critical non-destructive tool for conducting post-irradiation examination of nuclear fuel and material samples.

Neutron radiographs can significantly reduce the time and cost for conducting examination of irradiated samples. The images let researchers see inside samples to evaluate their performance and identify features or flaws that may require further study.

Neutron radiographs look like X-rays, but they provide different

information because neutrons and X-rays pass through materials in different ways. Neutron radiographs, for example, are very good at showing liquids, plastics, rubbers and other hydrogen-rich materials, while X-rays are good at showing metal components. Because of these distinct characteristics, neutron radiography and traditional X-ray radiography are complementary processes—using them together often provides a better understanding of the object.

The overhaul and upgrade project included a complete replacement of the control panel with a modern digital system, replacement and upgrade of most sensors used to operate the reactor, and replacement of the control rod drive systems. The overhaul builds on previous improvements—including a conversion to low-enriched fuel in 2010 and a core expansion in 2013 to increase operational durations, providing more time to support radiography for users.

Further upgrades are planned to continue to expand INL's [neutron radiography](#) capabilities, including a conversion to higher-resolution digital image processing, computed and digital radiography, and 3-D tomography.

Provided by Oak Ridge National Laboratory

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