



Irradiation Testing Summary for 2020

January 2022

Changing the World's Energy Future

Joe Palmer, Calvin Myer Downey, Ian D Stites



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Re-instrumentation Facility Procurements and System Checks

PI: Joe Palmer – Idaho National Laboratory

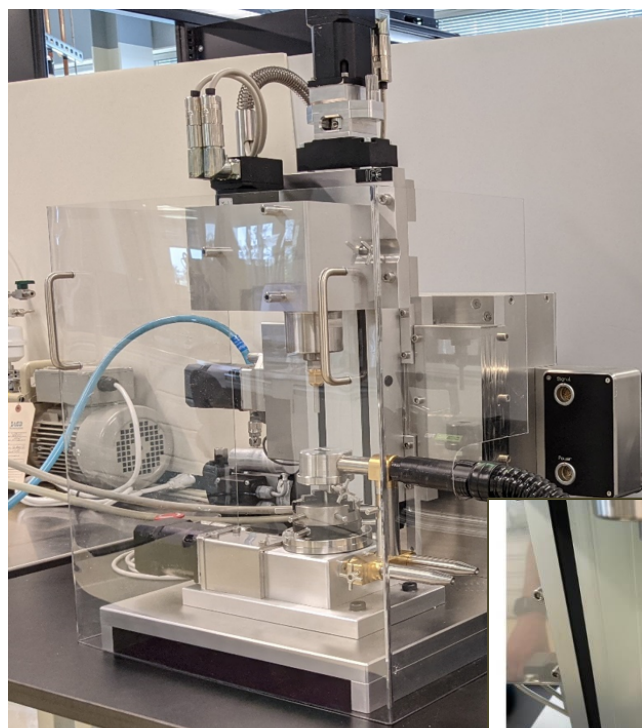
Collaborators: Calvin Downey, Ian Stites – Idaho National Laboratory

Funding: \$979,678 (FY 2020–2021)

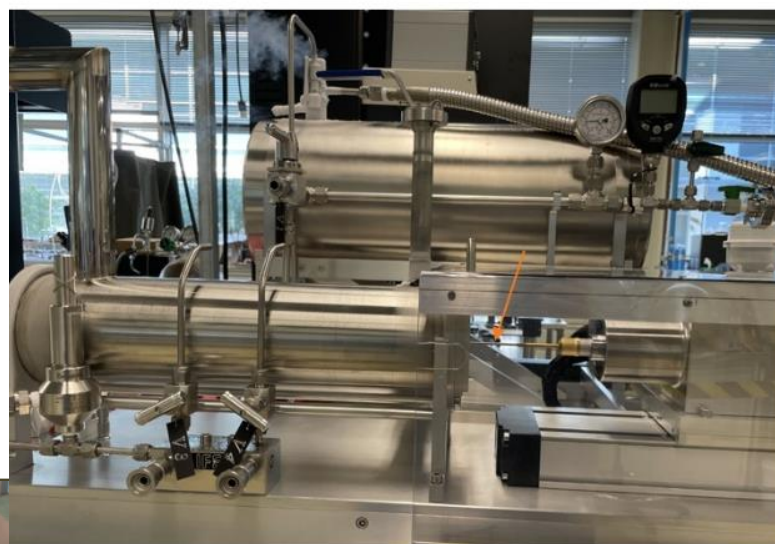
Project Description: To procure and begin testing a set of prototype equipment modules from the Norwegian Institute for Energy Technology (IFE) (Halden Reactor Project) to serve as a test bed for developing the capability to incorporate thermocouples—and later, advanced instruments—into previously irradiated fuel rods, prior to re-irradiating them in the Advanced Test Reactor (ATR), the Transient Reactor Test Facility (TREAT), or a similar test reactor.

Impact and Value to Nuclear Applications: For decades, the Halden Boiling Water Reactor (HBWR) in Norway has been a key resource for assessing the behavior of nuclear fuels and materials in order to address performance issues and regulatory questions. However, the HBWR was shut down in 2018. To avoid losing the unique experimental techniques developed at Halden, Idaho National Laboratory (INL) is procuring equipment modules designed to instrument irradiated sections of light-water reactor (LWR) fuel rods prior to re-inserting them into a test reactor. This approach has proven uniquely successful—and thus invaluable—for enabling in-pile measurements for irradiated nuclear fuels. This project enhances the capability to deploy and demonstrate advanced in-core instrumentation, thereby contributing to the broader effort to transfer technology and expertise developed at Halden to Department of Energy facilities. This approach to fuel testing is key to advancing and qualifying new LWR technologies.

Recent Results and Highlights: As shown in the images below, two of the three equipment modules from Halden have been received at INL. Initial checkout activities on this equipment have begun.



“Defueling” module



Drilling Module



Top pellet removed and oxidation cleaned from inner and outer surfaces of the cladding

Start of a cryo-drilling practice run

