Department of Energy Nuclear Science User Facilities Issues FY 2015 Access Awards

IDAHO FALLS — The U.S. Department of Energy (DOE) Nuclear Science User Facilities (NSUF) (formally Advanced Test Reactor National Scientific User Facility) has competitively selected four new projects, whose facility access is valued at over $3 million within the Consolidated Innovative Nuclear Research (CINR) Funding Opportunity Announcement (FOA). These projects will advance the mission of the DOE Office of Nuclear Energy (NE) by increasing the fundamental knowledge and understanding of nuclear fuel and materials irradiation behavior.

The NSUF, first established at Idaho National Laboratory (INL), is the nation's only designated nuclear energy user facility. NSUF provides research teams with no-cost access to state-of-the-art neutron and ion irradiation testing, post-irradiation examination facilities, synchrotron beamline capabilities, and technical expertise in the design and analyses of experiments at a diverse mix of affiliated partner facilities in university, national laboratory, and industry institutions across the country.

Research teams from INL, Boise State University, and University of Illinois-Urbana Champaign will work with the NSUF on their proposed experiments. The projects include irradiation testing in the Advanced Test Reactor (ATR), PIE activities in the Hot Fuel Examination Facility (HFEF), Electron Microscopy Laboratory (EML), and Microscopy and Characterization Suite (MaCS), and synchrotron beamline studies at the Materials Research Collaborative Access Team (MRCAT) beamline at the Advanced Photon Source (APS). The selected proposals include both R&D + NSUF and NSUF Access Only projects. The newly awarded projects are:

Title	Institution	Facilities Used	Award Description
Irradiation Influence on Alloys Fabricated by Powder Metallurgy and Hot Isostatic Pressing for Nuclear Applications	Boise State University	ATR, HFEF, EML, MaCS	The objective of this project is to assess the viability of using alloys manufactured by powder metallurgy and hot isostatic pressing (PM-HIP) for nuclear reactor internals to enhance weldability and inspectability. This project will conduct an ATR neutron irradiation campaign of common LWR and candidate ALWR and SMR structural alloys. Alloys will be prepared by PM-HIP and casting or forging, enabling a side-by-side comparison of the irradiation behavior of PM-HIP to conventional manufacturing.

Advanced Characterizations of Low-dose Neutron Irradiated T91 and HT9 Alloys	University of Illinois, Urbana Champaign	HFEF, EML, MaCS	The objective of this research is to conduct a coordinated set of experiments with PIE and analyses that will provide significant new insight into the irradiation performance of advanced ferritic alloys for future reactor applications. The research is based on T91 and HT-9 alloys irradiated in the ATR using a well-designed matrix of irradiation conditions. The research is to characterize the microstructural evolution in T91 and HT-9 as a function of irradiation temperature and dose.
In-situ Synchrotron Wide-Angle X-ray Scattering (WAXS) Tensile Investigation of Neutron Irradiated Ferritic Alloys	University of Illinois, Urbana Champaign	HFEF, EML, MRCAT	The purpose of this program is to investigate and determine the impact of ATR neutron irradiation-induced microstructural changes on the mechanical properties of Fe-Cr base alloys using in-situ synchrotron wide-angle X-ray scattering (WAXS) tensile tests. The objective of this research program is to utilize the special capabilities of the Materials Research Collaborative Access Team (MRCAT) beamline at APS to analyze the evolution of tensile properties of these alloys during tensile loading.
Microstructural Evolution in Low Fluence Irradiated Metallic Fuels	Idaho National Laboratory	HFEF, EML, MRCAT	The purpose of this research is to develop understanding of the early stages of fuel performance through the investigation of the irradiation-induced microstructural changes in U-Zr and U-Mo alloys subjected to low neutron

			fluences. In addition to assisting in fuel design, these experiments can be utilized to both parameterize and validate fuel performance models, such as the efforts being undertaken by the Nuclear Energy Advanced Modeling and Simulation (NEAMS) program.

The NSUF reviews proposals submitted within the CINR FOA once a year. The call is open to interested researchers from universities, national laboratories and industry laboratories. The four awards being announced today were submitted during the call that began in October 2014 and closed in February 2015. More information on the NSUF awards can be found at: https://inlportal.inl.gov/portal/server.pt/community/neup_home/600/FY15_NSUF_Awards

For user guides and more information about submitting proposals, visit the NSUF website at http://nsuf.inl.gov.