



Accomplishments and Look-Ahead

March

- The following universities were visited by ATR NSUF staff: Rensselaer Polytechnic Institute, Ohio State, North Carolina State, and Georgia Tech.
- The New User Experiment was initiated. Three separate capsule experiments are offered including: concrete degradation, stress/creep relaxation and in-core instrumentation. University participants are: John Youngsman, Karthik Chinnathambi, and Joshua Kane from Boise State; Wie Ji from Rensselaer Polytechnic Institute; Devesh Ranjan from Texas A&M University; Pedro Romero and Tatjana Jevremovic from University of Utah; Denis Beller, Longzhou Ma, Brendan O'Toole, and Mohamed Trabia from University of Nevada, Las Vegas; Chanwoo Park and Dev Chidambaram from University of Nevada, Reno; and Rasool Denarangui from University of Texas, Arlington.
- Partner Facility visit to UNLV for NSUF PIE capabilities discussions

April

- Several ATR NSUF staff will present "How to Conduct an Irradiation Experiment" workshop at the Student ANS annual meeting April 8 – 10, 2010.
- Todd Allen, Heather MacLean, and Mitch Meyer will judge "Best Material Science" presentation at the Student ANS annual meeting
- Partner Facility visit to University of Michigan for NSUF PIE capabilities discussions

May

- Colloquium speaker, Juan Nino from the University of Florida will present on "Inert Matrix Ceramic Fuel for Destruction of Plutonium and Minor Actinides."

Noteworthy News

Joshua Daw, an instrumentation engineer at the Idaho National Laboratory, recently returned from a six month assignment in Norway where he worked with some of the most advanced instrumentation engineers in the world. Daw's assignment took him to the Norwegian Institute for Energy Technology at the Halden Reactor Project (IFE/HRP) in Halden, Norway, where he supervised efforts on an instrumented fuel assembly test.

Daw was the 'caretaker' on a test involving six fuel rods instrumented with pressure transducers, fuel thermocouples and fuel stack elongation detectors for testing in the Halden Boiling Water Reactor (HBWR). Daw and a team of international engineers will use information gathered during the HBWR test to gain insights on the relative effects of fuel grain size and dopant concentrations on fission gas release.



ATR National Scientific User Facility

“This assignment allowed me to further my knowledge of how instruments behave during irradiation testing,” Daw said. “I was able to learn from some very knowledgeable engineers from several different countries and will be able to apply what I learned to new sensors that we are developing for the Advanced Test Reactor.”

Drawing on the experience of instrumentation experts at the IFE/HRP, Daw measured fission gas release in fuel rods. The rods contained fuel from different manufacturers, and data were collected to assess the performance of the materials. Daw and his team used data collected in previous tests to validate results from the current test.



Joy Rempe, the principal investigator of the ATR National Scientific User Facility (ATR NSUF) program charged with developing and deploying new in-pile sensors, said the IFE/HRP currently leads the world in its in-pile instrumented testing capability. She noted that having an INL engineer participate in the IFE/HRP program and directly contribute is essential to a recently-established working relationship between IFE/HRP and INL in the ATR NSUF program.

“This assignment allowed Josh to directly observe and gain experience from the IFE/HRP staff,” Rempe said. “This investment in our new engineers, allows them to gain hands-on experience from some of the world’s instrumentation experts. That experience is then brought back to INL to improve our instrumentation development and deployment processes.”

Daw’s experience will benefit the ATR NSUF in its goal to enhance sensors for real-time measurement of key parameters in irradiation test capsules and test trains.

“Our interactions with researchers from IFE/HRP have helped us to accelerate our in-pile instrumentation development efforts so that we can more rapidly deploy new sensors in the ATR with lower R&D costs,” Rempe said. “For example, IFE/HRP has been key in helping us develop a test rig for real-time creep testing in the ATR. We are currently conducting laboratory tests on a prototype and plan to include it in a PWR loop that will be re-activated in the ATR in 2011.”

As the INL moves forward with ATR NSUF instrumentation development, Daw will continue to interact with new colleagues at the IFE/HRP and with other international colleagues he met at IFE/HRP during this assignment.



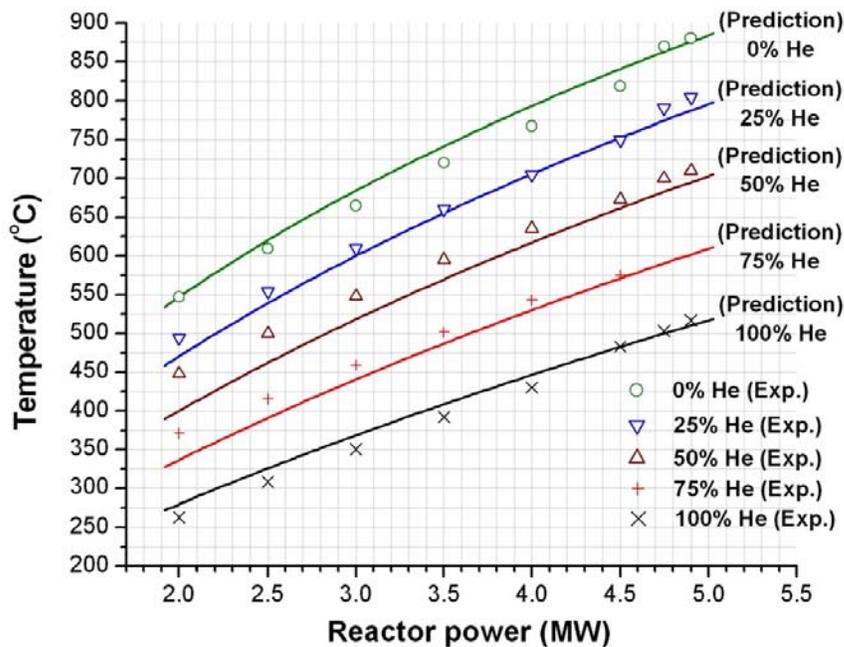
ATR National Scientific User Facility

A new type of in-core experimental facility that offers high temperature irradiation in an inert gas environment up to 900 °C has been demonstrated at the MIT Reactor (MITR), a partner facility of the Advanced Test Reactor National Scientific User Facility.

The MITR is a 5 megawatt research reactor that is located on the MIT campus. The MITR is one of the few university research reactors to offer advanced materials and fuel irradiations using experimental facilities that replicate the PWR and BWR coolant and irradiation environments, and up to 1600 °C in inert gas environments.

“This new type of irradiation facility is designed for temperature range 500 to 900 °C that is of general interest for high temperature reactor materials and instrumentation testing”, said Dr. Linwen Hu, Associate Director of the MIT Nuclear Reactor Laboratory. “Automatic temperature control can be achieved by adjusting the helium/neon gas mixture” explained Dr. Gordon Kohse, who leads the NRL’s in-core experiment program. The new capsule design will be used for several irradiation experiments funded by DOE.

Other NRL staff who contributed to this experiment are Dr. Sung Joong Kim and Mr. Yakov Ostrovsky. Results of this new experiment design and initial measurements will be presented at the ANS Embedded meeting “Nuclear Fuels and Structural Materials for the Next Generation Nuclear Reactors” in June 2010.



Measurement data confirmed that the irradiation capsule temperature can be controlled by adjusting the neon/helium gas mixture.



FY 2010 Reactor Experiments			
Institution	ATR Position or Other Facility	Scheduled Insertion Date	Scheduled Removal Date
University of California, Berkeley	MIT	Newly Awarded *	
Idaho State University	ATR B-9 & B-10	Newly Awarded *	
University of Nevada, Las Vegas	ATR-C	Newly Awarded *	

FY 2009 Reactor Experiments			
Institution	ATR Position or Other Facility	Scheduled Insertion Date	Scheduled Removal Date
Massachusetts Institute of Technology	MIT Reactor	Various	Various
University of California, Santa Barbara	ATR I-10	October, 2010	October, 2011
Utah State University	ATR B-2	May 2010	February, 2011
Idaho State University	ATR-C	May 2010	August, 2010
Drexel University	ATR A or B	October, 2010	October, 2011

FY 2008 Reactor Experiments			
Institution	ATR Position or Other Facility	Scheduled Insertion Date	Scheduled Removal Date
Colorado School of Mines	MIT Reactor	Various – Spring 2009	Various – Spring/Summer 2009
University of California, Santa Barbara	ATR A-10	August, 2009	August, 2010
North Carolina State University	ATR East Flux Trap	February, 2009	Nov 2009/Jan 2010
University of Illinois	ATR A-9	August 2009	December, 2010
University of Florida	ATR B-1	February, 2009	April, 2010
University of Wisconsin	ATR East Flux Trap	August, 2008	Sept 2009/Oct 2010 (update these)

FY 2009 Post Irradiation Examination Experiments		
Institution	ATR Position or Other Facility	Analysis Dates
University of Wisconsin	University of Wisconsin	Various - 2010

FY 2010 Post Irradiation Examination Experiments		
Institution	ATR Position or Other Facility	Analysis Dates
Argonne National Laboratory	Advanced Photon Source	December, 2009
Illinois Institute of Technology	Advanced Photon Source	December, 2009
Idaho National Laboratory	Advanced Photon Source	Spring, 2010
Los Alamos National Laboratory	Advanced Photon Source	Summer, 2010

* Insertion date has not yet been determined.