

Newsletter

Quarterly Update from NRIC



Greetings



Welcome to our first quarterly newsletter. We are well into our second year of operations at the National Reactor Innovation Center (NRIC), and I am excited to share some highlights about NRIC's progress as we advance toward demonstrations of advanced nuclear reactors.

This newsletter underscores how we are moving fast and making significant progress. From the time that NRIC leadership was established in October 2019, we have continued to expand our team of professionals, all of whom are passionate about our mission to inspire stakeholders and the public, empower innovators, and deliver successful outcomes.

We are engaging stakeholders through our website and social media and are now expanding our outreach to include quarterly updates on our progress and activities. We hope you will share our enthusiasm in our accomplishments and milestones.

Warmest Regards,
Ashley Finan, Ph.D
Director, National Reactor Innovation Center

Business Milestones

Federal Agencies, NRIC, Collaborate on Advanced Reactor Demonstration

On Feb. 22, 2021, an addendum to the 2019 memorandum of understanding between the U.S. Department of Energy (DOE) and the Nuclear Regulatory Commission formalized the coordination between these two federal agencies in regard to NRIC projects. This addendum specifically focuses on research, development, and demonstration projects, and it solidifies our partnership in order to deliver successful nuclear reactor demonstrations.

Streamlined Permitting Paves Way for Advanced Reactor Innovation

NRIC collaborated with Pacific Northwest National Laboratory to develop an approach that characterizes the environmental impacts of potential advanced reactors. This [document](#) describes the framework (or “plant parameter envelope”) that developers can use to evaluate expected impacts, enabling a team to begin the environmental assessment process before the final design has been determined. The guidance is specific to microreactors (60 MWt or less) and small- to medium-sized reactors (up to 1,000 MWt). The environmental impact parameters include land use, construction and operation, water demand, transportation and fuel, workforce, waste, decommissioning, and air emissions.

Draft Environmental Analysis on MARVEL Reactor Released for Public Comment

The DOE Idaho Operations Office published an environmental assessment (EA) that was open for public comment from January 11 and extended to February 9, 2021. This marked the first time that a reactor underwent an EA under the National Environmental Policy Act. The Microreactor Applications, Research, Validation, and Evaluation ([MARVEL](#)) project will build a small-scale test microreactor that will provide a platform for testing unique operational aspects and applications.

NRIC Team at INL Produces Fuel Salt for Molten Chloride Reactor Experiment

NRIC, the Nuclear Science & Technology Pyrochemistry group, and the Materials and Fuel Complex (MFC) Fuel Manufacturing Facility produced 500 grams of fuel salt as part of an industry collaboration with Southern Company and TerraPower. The fuel salt will be used for technology development and experimental activities that enable the operation of the Molten Chloride Reactor Experiment (MCRE) in the proposed NRIC-LOTUS (Laboratory for Operations and Testing in the United States) Test Bed at MFC. This fuel salt will be used in experiments that quantify the safety basis for operating the MCRE at INL.



Advanced Reactor Demonstration Program (ARDP)

DOE made tremendous progress under the ARDP and selected performers for each of the three funding areas: demonstrations, risk reduction, and Advanced Reactor Concepts. NRIC is fully engaged with the organizations selected for these awards.

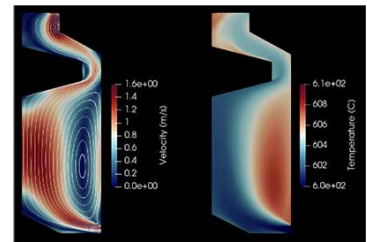
NRIC is supporting TerraPower’s fuel qualification and system design processes for their Sodium reactor — a sodium fast reactor coupled to a molten salt energy storage system. Other companies such as X-energy are also tapping NRIC resources to help move reactors to demonstration. Both were selected to receive \$80M in initial funding under the ARDP.

Last December, under ARDP Risk Reduction for Future Demonstration projects, DOE

announced \$30M in initial funding for five reactor projects. The recipients were Kairos Power (for its Hermes Reduced Scale Test Reactor), Westinghouse Electric Company (for its eVinci Microreactor), BWXT (for its Advanced Nuclear Reactor), Holtec (for designing and engineering its own small modular reactor), and Southern Company Services for the MCRE. Southern Company is working with NRIC to demonstrate the MCRE at a proposed test bed at INL. The process will include completing an environmental compliance permit before construction begins. The project will inform the design, licensing, and operation of the commercial Molten Chloride Fast Reactor that is expected to be operational in the early 2030s.

Virtual Test Bed Project Showcases NEAMS Capabilities to Industry

The Virtual Test Bed is an NRIC-funded project tasked with facilitating adoption of the DOE Nuclear Energy Advanced Modeling and Simulation ([NEAMS](#)) program tools for advanced reactor demonstrations. The development team produced multiphysics simulations of two reactor concepts—a fluoride high-temperature reactor and the Molten Chloride Reactor Experiment, a molten-chloride reactor—to showcase the NEAMS capabilities. Industry stakeholders have a strong interest in adopting NEAMS codes.



Outreach and Communications

“What Inspires Us” Webinars

Last September, NRIC held its first webinar series, “What Inspires Us” ([press release](#)). Nearly 400 people registered for the first event on Sept. 29. It featured conversations with Dr. Mark Peters, then director of INL, and Suzanne Baker, creative director at [Fastest Path to Zero](#). Senators Sheldon Whitehouse and Cory Booker, sponsors of the legislation that led to the creation of NRIC, gave introductory remarks. You can watch a recording of it [here](#), or view the webinar [slides](#).



On January 7, 2021, NRIC held its second webinar, “What Inspires Us: Advanced Reactor Demonstrations” ([press release](#)). It featured opening remarks from Congressman Mike Simpson as well as conversations with Chris Levesque, president and CEO of TerraPower, and Clay Sell, CEO of X-energy. They discussed their advanced reactor designs (i.e., Sodium and Xe-100), which had been selected by DOE for

ARDP funding. About 780 people registered for the event. You can watch it [here](#), or view the webinar [slides](#).

On March 23, NRIC hosted the latest in the “What Inspires Us” webinar series, this one titled [“An Interactive Webinar on Nuclear Narratives.”](#) It included Emma Redfoot, a reactor engineer for Oklo; River Bennett, a graduate research assistant at the University of Michigan; Charlyne Smith, a National Science Foundation fellow and Ph.D. candidate at the University of Florida; and Pierre-Clement Simon, a recent university graduate headed to INL as a computational materials scientist. They led discussions on how storytelling can be used to inspire others about nuclear energy.



“NRIC Tech Talks” Webinars

This series of webinars stemmed from our desire to support nuclear developers via technical briefings and conversations that foster their development, demonstration, and deployment efforts.

On Feb. 16, 2021, NRIC held its first event in the NRIC Tech Talks series, on the topic of digital engineering ([press release](#)). Nearly 200 industry experts participated. The [webinar](#) featured breakout sessions that focused on specific aspects of the digital engineering model, providing an opportunity to interact with experts in the digital engineering field. Ashley Finan gave the opening remarks, and Chris Ritter, NRIC’s technical lead for digital engineering, moderated the panel discussions.

Join us for an upcoming **"NRIC Tech Talk: Environmental Reviews with the NRC,"** on April 20, 2021, 10:00 – 11:00 a.m. MT, 12:00 – 1:00 p.m. ET. The webinar will allow participants to engage with the NRC to learn more about the National Environmental Policy Act process.

[Register Today](#)

NRIC in the News

- [Streamlining Permitting Paves Way for Advanced Reactor Innovation](#)
- [Digital Engineering to Advance Nuclear Deployment](#)
- [INL: New Webinar Series Kicks Off with Digital Engineering](#)

- [Why the Future of Nuclear Power is Tiny and Factory Made](#)
- [Department of Energy Picks Two Advanced Nuclear Reactors for Demonstration Projects](#)
- [Sodium and X-energy are DOE's Picks for Advanced Nuclear Reactor Demonstrations](#)

National Reactor Innovation Center | Nuclear Science Technology Directorate | Idaho National Laboratory