



# Microreactor Testing Planned for the National Reactor Innovation Centers DOME Facility - ANS Winter Meeting

November 2024

*Changing the World's Energy Future*

Brad Tomer



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**Brad Tomer**

**November 2024**

**Idaho National Laboratory  
Idaho Falls, Idaho 83415**

**<http://www.inl.gov>**

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**NRIC**

National Reactor  
Innovation Center

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ANS Winter Meeting 2024

November 19, 2024



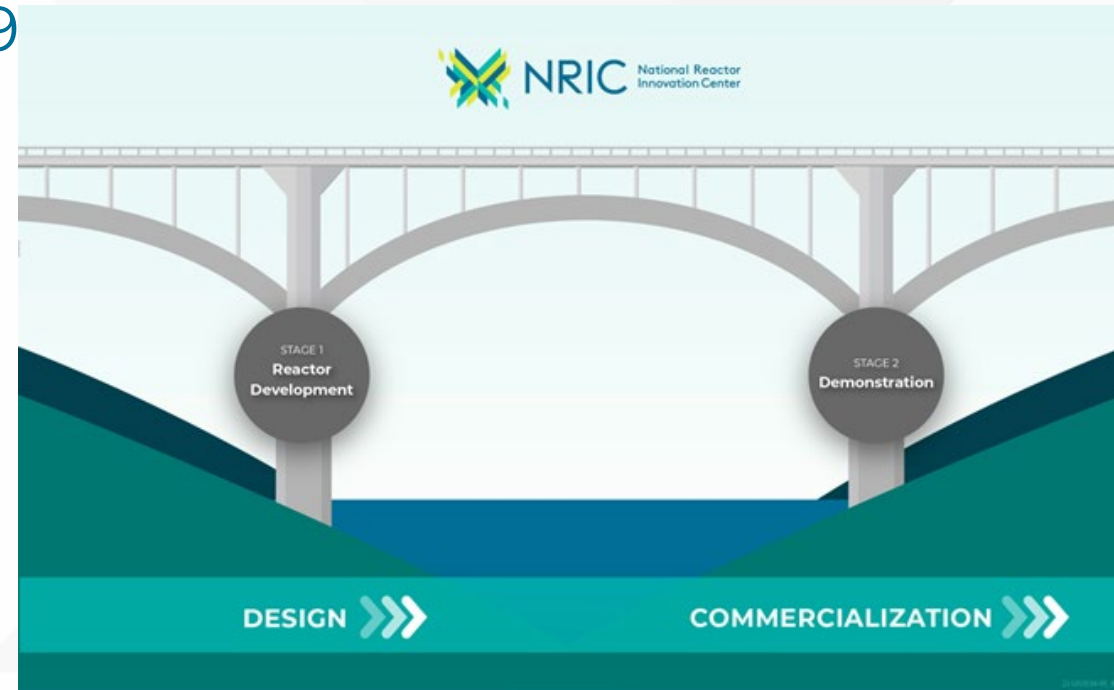
# Panelist

- Joe Halackna, Director, eVinci Technology, Westinghouse Electric Company
- Bob Urberger, Chief Technology Officer, Radiant
- Matthew Griffin, Director of Licensing and Engagement, Antares
- Brad Tomer, Acting Director, National Reactor Innovation Center



# NRIC Enables Advanced Nuclear Technology Tests & Demonstrations

- DOE program launched in October 2019
- Authorized by the Nuclear Energy Innovation Capabilities Act (NEICA)
  - DOE-Office of Nuclear Energy; INL Nuclear Science & Tech
- Partner with industry to bridge the gap between research and commercial deployment
- Leverage national lab expertise and infrastructure



# Portfolio Built to Empower Innovators



- **Infrastructure for Testing Advanced Nuclear**

- Advanced Reactor Test Beds
- Experimental Facilities
- Virtual Test Bed

- **Addressing Costs & Markets**

- Advanced Construction
- Digital Engineering for Nuclear
- Maritime Applications



# Demonstration of Microreactor Experiments (DOME)



Materials & Fuels Complex at INL



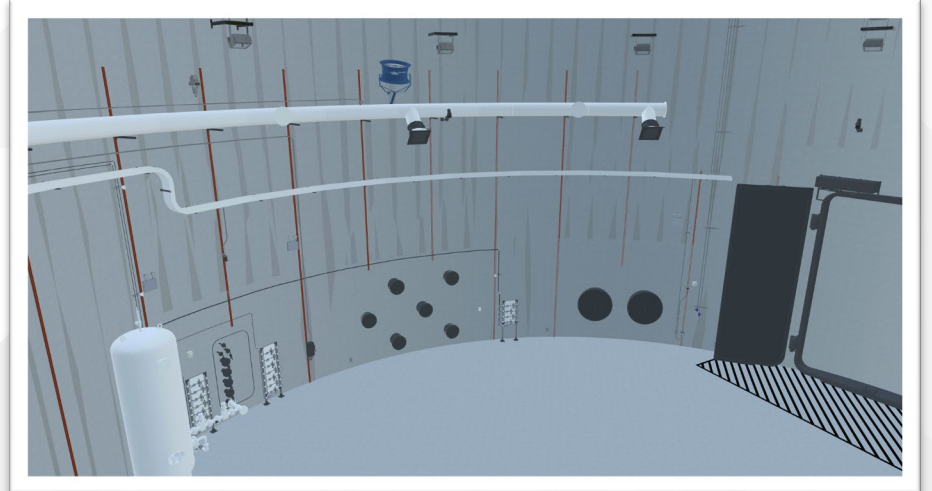
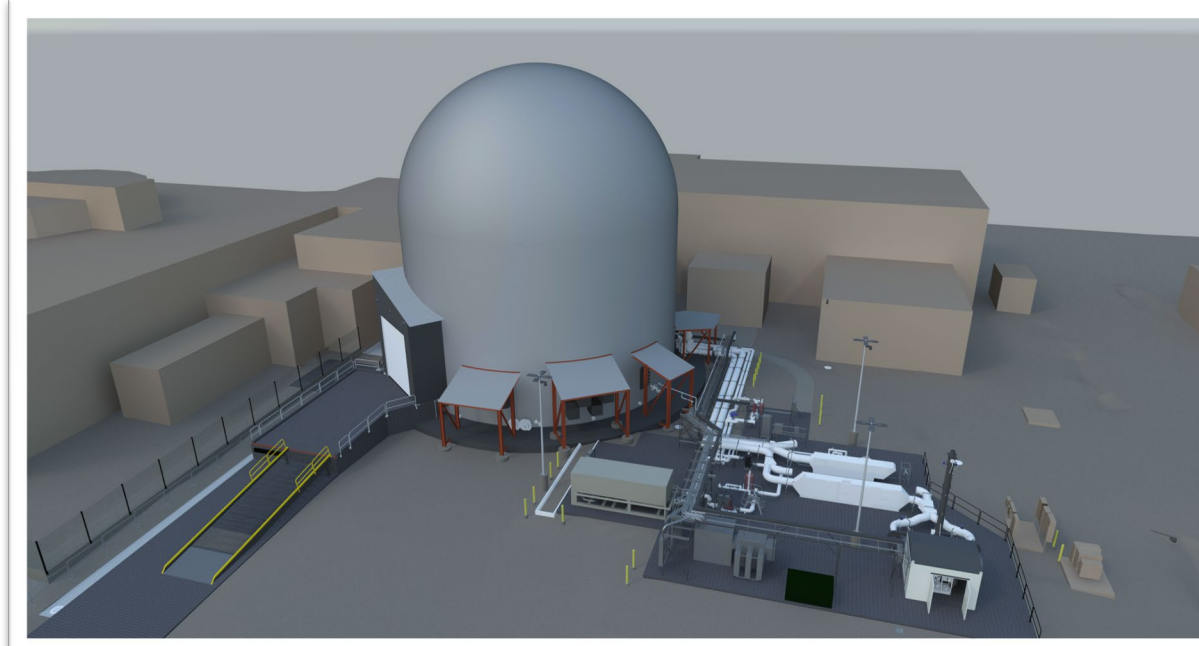
- DOME is the repurposed EBR-II structure
- Designed for Advanced Microreactors up to 20MW<sub>th</sub>
- Designed for High-Assay Low-Enriched Uranium (HALEU) fuels < 20% enrichment
- Accommodates ISO 668 High-Cube Shipping Containers up to 40ft long
- Limited to one reactor test at a time



# NRIC-DOME Test Bed

- **Facility Specifications**

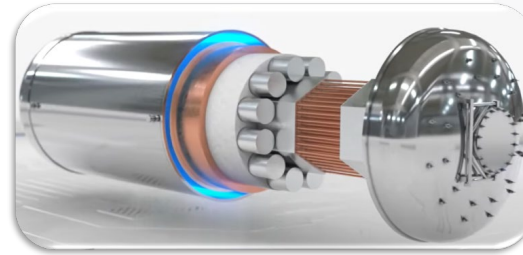
- Hazard category 2 facility
- Provides safety class confinement
- Large floor space for reactor experiments
  - ~65-ft. (~19.8 m) diameter
  - ~46-ft. (~14 m) height to crane
- Hatch opening
  - ~15 ft. (~4.6 m) wide × ~17 ft. (~5.2 m) tall
- Penetrations
  - Small penetrations for process
  - Large penetrations for primary reactor cooling



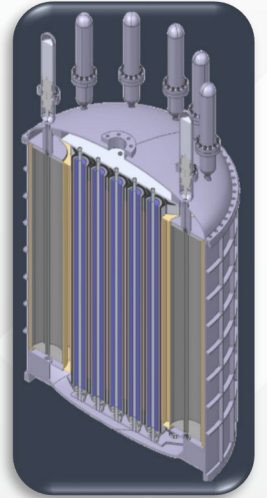
# NRIC-DOME Testbed



- Construction Start Q4 2023
- Operational Readiness – June 2026
- 4 users engaged in front-end engineering and experiment design (2 complete)



Westinghouse - eVinci



Developer	Reactor Name	Design	Power Mwe	Power MWth	Fuel Type	Fuel Enrichment	Primary Coolant	Moderator	Refueling Interval (Years)	Power Conversion System
<b>Radiant</b>	Kaleidos	HTGR	1.2	3.5	TRISO	19.75%	Helium	Graphite	6	Brayton Cycle
<b>USNC</b>	Pylon	HTGR		1	TRISO	9.90%	Helium	Graphite		Rankine
<b>Westinghouse</b>	eVinci NTR	Heat Pipe	1	3	TRISO	19.75	Sodium	Graphite	8	Brayton Cycle
<b>Antares</b>	Antares R1	Heat Pipe	0.1+	0.25	TRISO		Sodium	Graphite	3-5	Brayton Cycle



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