



Laboratory for Operations and Testing in the United States (LOTUS): NRIC Test Bed

April 2024

Changing the World's Energy Future

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NRIC

National Reactor
Innovation Center

Laboratory for Operations and Testing in the United States (LOTUS)

NRIC Test Bed

NRIC-LOTUS Project Team – Aaron Balsmeier, Jacob Rymer, Philip Schoonover, Scott Reynolds, and Scott Smith

April 23, 2024



NRIC-LOTUS Test Bed



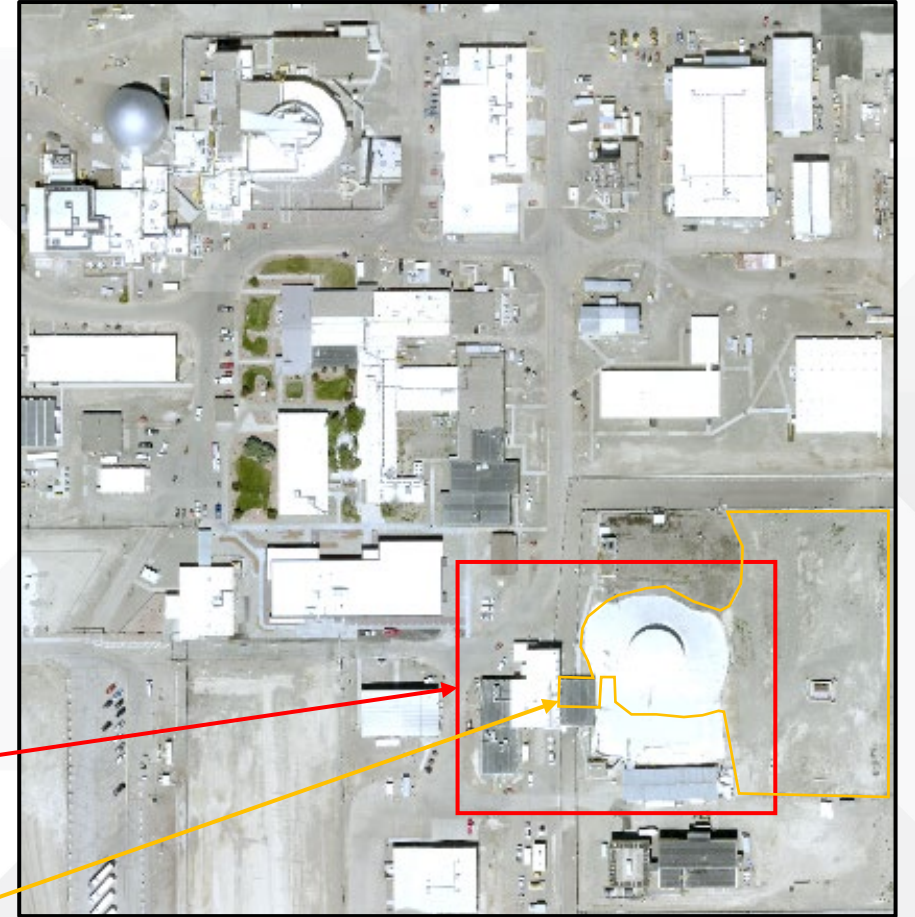
NRIC-LOTUS Information

Location: INL Materials and Fuels Complex (MFC); Zero Power Physics Reactor (ZPPR) Facility

Purpose: Provides infrastructure to support DOE authorized experiments requiring a Hazards Category 2 facility with an elevated security posture

ZPPR Facility Footprint

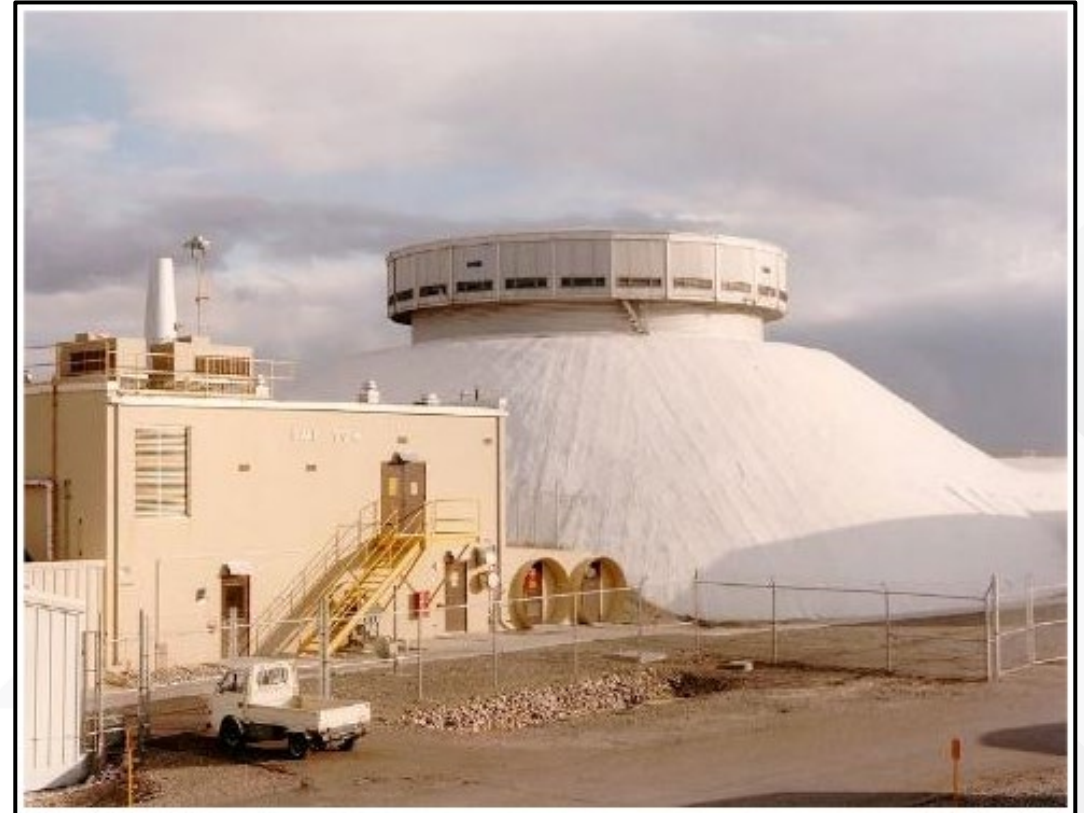
LOTUS Facility Footprint



NRIC-LOTUS Design Details

Advanced Experimental Reactors

- Fuels designs with Highly Enriched Uranium
- Cell Heat Removal – (2) redundant HVAC packages – 50kW_{th}
- Reactor Heat Removal – Design only – Min: 25kW_{th} ; Max: 400kW_{th}
- Argon Cover Gas – 2 scfm, 90 psig (SS), 15 scfm, 90 psig (1 hr max)
- In Cell Equipment Power
 - Normal – 480VAC, 450A, 3 phase
 - Auxiliary – 208VAC, 160A, 3 phase
- Cell Provides Radiological Confinement
- Cell Geometry – 30ft usable inner diameter; 16ft 11in (bottom of crane hook); Recessed pit area
- Entry Tunnel – 13ft x 13ft clear pathway
- Polar Crane Capacity – 5 tons



NRIC-LOTUS Project Schedule

Schedule

- Conceptual design completed - 12/2021
- CD-0 (Mission Need) approved - 3/2022
 - Tailored Approach Changed from CD-1/2/3a – 1/2023
- CD-1 approved - 6/2023
- Awarded prelim/final design - 6/2023
- Preliminary design review completed - 1/2024
- Technical independent project review (TIPR) – 3/2024
- Final design complete - 4Q/FY24
- Submit PDSA – 4Q/FY24
- Submit CD-2/3 – 2Q/FY25
- Construction finish - 2Q/FY27
- Potential first user install (MCRE) – 1Q/FY28
- Operational readiness – 2Q/FY28



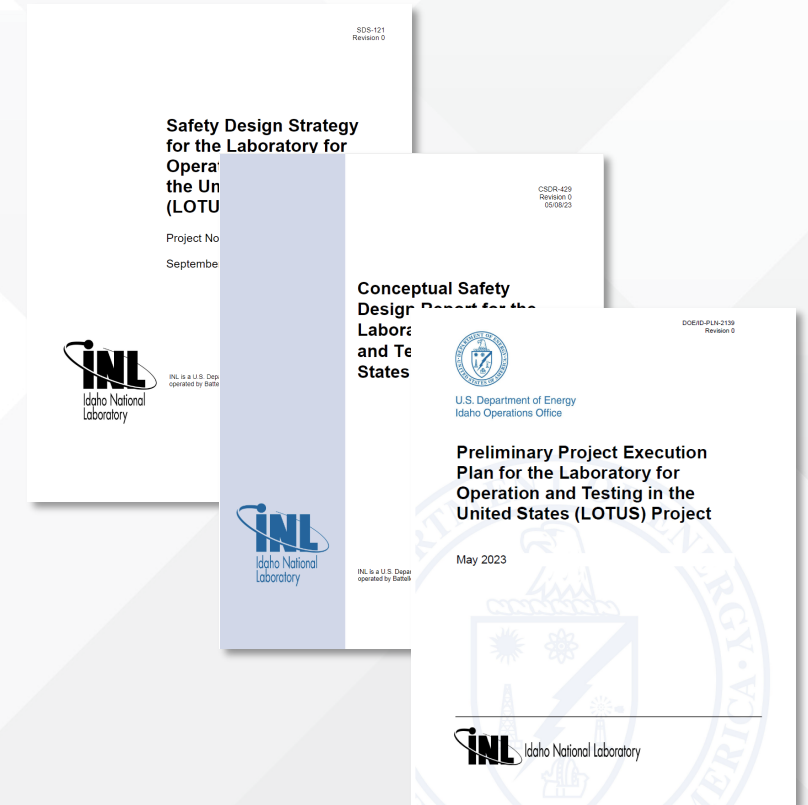
NRIC-LOTUS Project Funding

Major Project Area	FY22 (A)	FY23 (A)	FY24	FY25	FY26	Total	Notes
Total Estimated Costs – Capital Account		\$22.25M	\$32.00M	\$18.75M		\$73.00M	Includes TEC management reserve
Other Project Costs – Capital Account	\$6.56M	-\$1.85M	\$2.90M	\$9.00M	\$8.59M	\$22.20M	Includes OPC management reserve
<u>Total LICP Budget*</u>						<u>\$98.20M</u>	

LICP: Line Item Capital Project

NRIC-LOTUS Next Steps

- Complete Final Design
- Update Safety Design Strategy
- Complete Preliminary Documented Safety Analysis (9/24)
- Update Project Execution Plan
- Establish Performance Baseline
- Submit Documentation for CD-2/3 (estimated 2QFY25)





NRIC-LOTUS Digital Model





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4/23/24

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