National Criticality Experiments Research Center Overview

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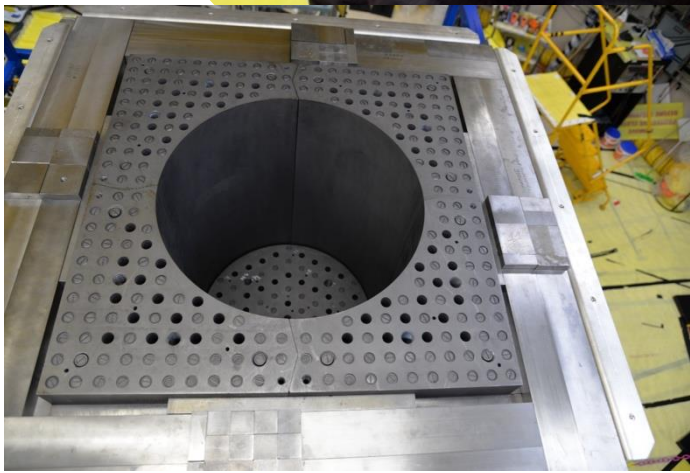
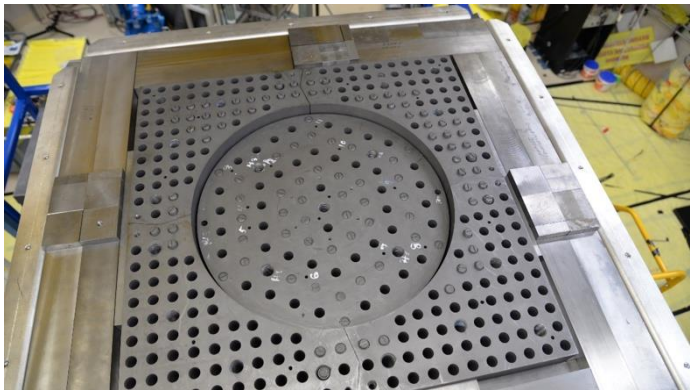
NCERC Overview

- General purpose critical experiments facility
- Four critical assemblies allow for a wide range of critical experiments
- Depending on the assembly, can go from subcritical, to critical, to above prompt critical
- Large variety of SNM (metals, oxides, U, Pu, Np, spheres, plates, etc.)
- Predecessor was the Los Alamos Critical Experiments Facility (LACEF)
  - Between LACEF and NCERC, our group has been performing critical experiments since the Manhattan Project
- Most of our work supports the Nuclear Criticality Safety Program (NCSP)
- Recently we have been doing a lot of work supporting NE

Deimos Overview

- Deimos is an advanced reactor testbed on Comet
- Development was funded by LANL LDRD
- Graphite moderated, Be reflected
- HALEU TRISO fuel
- Center portion is inserted to bring the system critical
- Center portion can be replaced with other materials and geometries



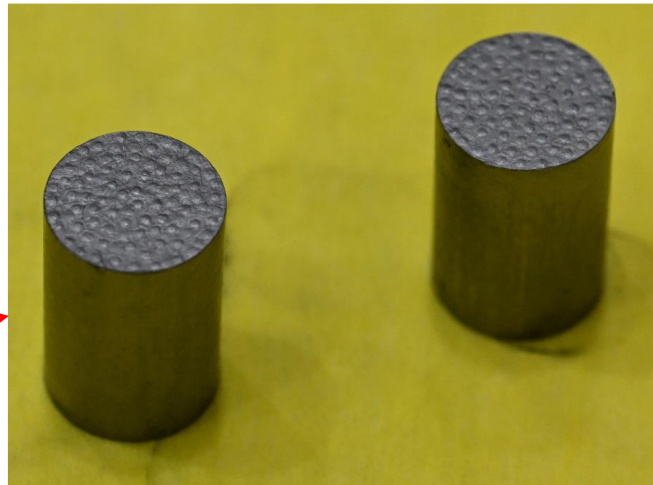


Los Alamos NATIONAL LABORATORY

DNCSH

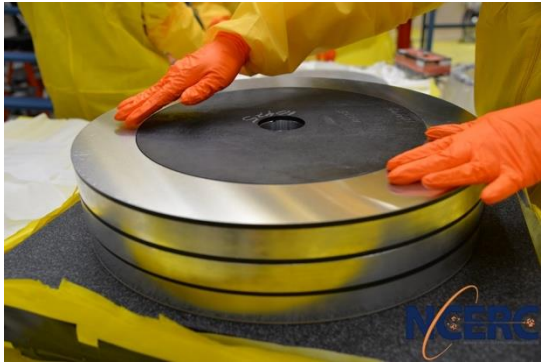
- DOE/NRC Collaboration for Criticality Safety Support for Commercial-Scale HALEU Fuel Cycles and Transportation (DNCSH)
- Authorized by the Energy Act of 2020, Appropriated in IRA (2022)
- Goal is to make new HALEU Criticality Benchmarks specifically for transportation, storage, handling, and processing of HALEU
  - Will help to reduce uncertainties and increase mass limits
- Call 2 results were just released last week
- Call 3 will be announced soon!
- NCERC has been working closely with DNCSH

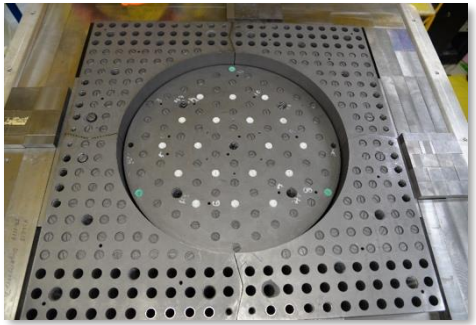
New HALEU TRISO fuel procured through DNCSH program – will be available for use in Call 3

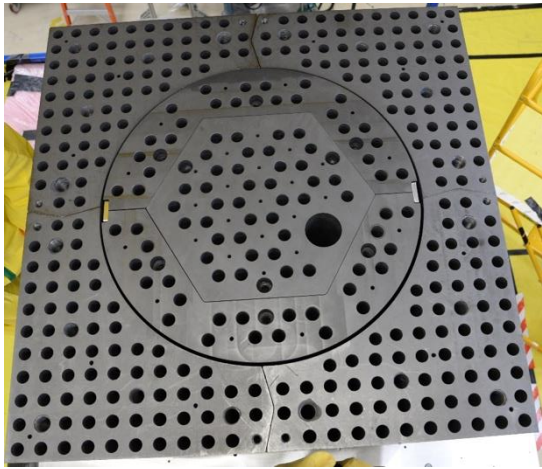


Nuclear Energy Collaborations/Projects

- Valar Atomics (Project NOVA)
- Oklo (POKER)
- Terrapower
- Westinghouse
- Kairos
- Antares
- And others







Some Upcoming Experiments

- ZiaCore – LANL LDRD
  - Design and initial testing for 5 weight % fueled microreactor
  - Uses commercially available fuel
  - Heat pipes and advanced moderators developed at LANL
  - Goal is to be critical using the Deimos testbed
  - Electrically heated vacuum chamber to perform critical experiments at over 800°C
- Westinghouse
  - Small scale demonstration of their eVinci microreactor
  - New HALEU TRISO fuel
  - Also will have heated experiments up to operational temperatures
  - Room temperature measurements will be made into public benchmarks in ICSBEP

Thanks!

- Please feel free to reach out with any questions or collaboration ideas
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