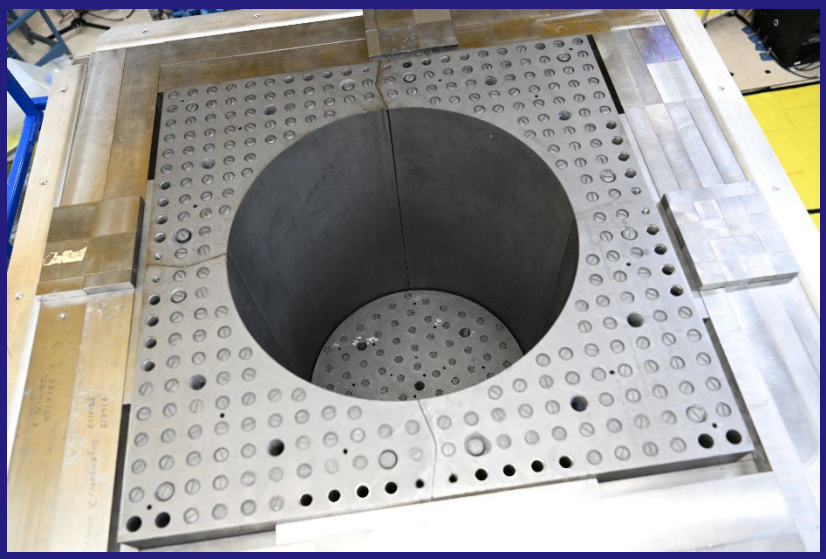
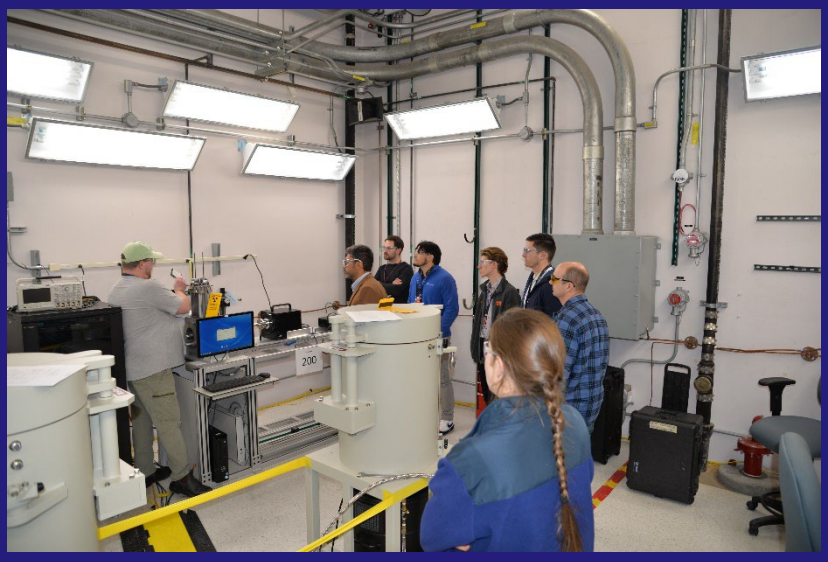
THE NEUTRON PULSE





1ST QUARTER 2025 EDITION

LA-UR-25-25227

THE NEUTRON PULSE

1st QUARTER 2025 EDITION

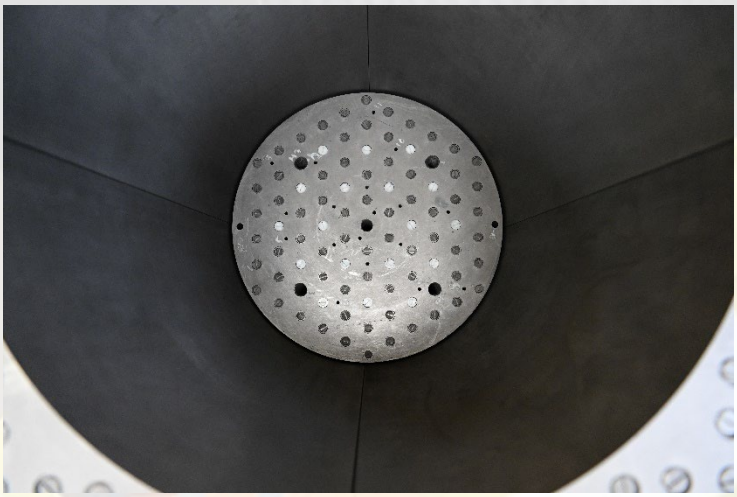
Operations Summary

NCERC conducted four weeks of critical experiment operations this quarter including the TRISO-form HALEU-fueled Experiment for Transport Applications (THETA). Three criticality safety classes were hosted, two sponsored by the National Criticality Safety Program (NCSP) and one targeted for PF-4 personnel. Additionally, NCERC began the field construction of the Control Room 1 Upgrade.

THETA on Comet

The THETA critical experiment was designed to support HALEU TRISO fuel transportation operations by addressing several nuclear data validation gaps. This experiment builds upon the Deimos benchmark configuration completed in 2024 and focuses on three major variables related to HALEU TRISO fuel shipping containers: stainless steel reflectors, unintended water ingress, and boron poison (to limit reactivity). As in Deimos, four graphite quadrant monoliths and a central moveable graphite monolith were loaded with hollow fuel “cups” loaded with HALEU TRISO fuel compacts. Beryllium blocks were stacked radially, and graphite plates were stacked axially on the graphite monoliths to achieve a critical configuration.

▲ *NCERC personnel tacking beryllium reflectors.*

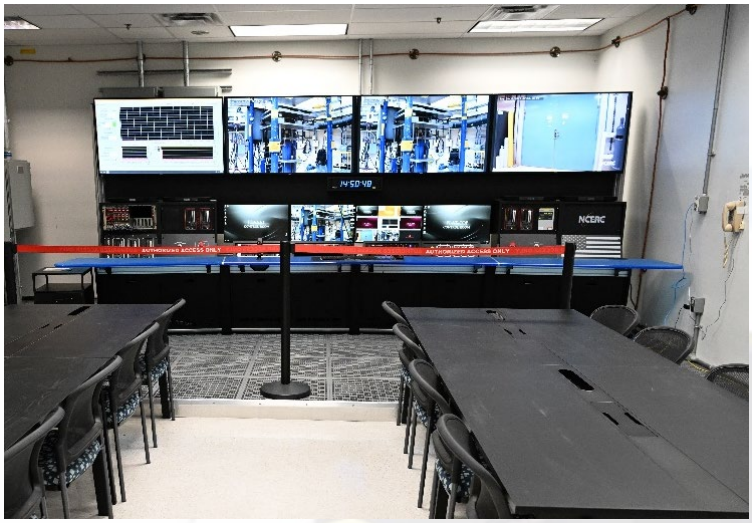


▲ *Movable monolith with polyethylene rods.*

Three critical configurations were achieved exploring the effects of each of the variables. Configuration one used stainless-steel tubing near the edge of the quadrant graphite monoliths. Configuration two added polyethylene rods in the center of the moveable monolith. Configuration three added borated polyethylene rods near the outer edges of the moveable monolith. Data validated by these configurations will be used to ensure the criticality safety of the maximum quantity of fuel per shipping container. This experiment was supported by the DOE/NRC Criticality Safety for Commercial-Scale HALEU for Fuel Cycle and Transportation (DNCSH) project, a collaboration between United States Department of Energy (DOE) and the Nuclear Regulatory Commission (NRC).

THE NEUTRON PULSE

1st QUARTER 2025 EDITION



▲ *Completed Control Room 1 equipment installation showing control console with video wall and tables for students.*

Control Room 1 Upgrade

The installation of all new control room equipment has been completed this quarter for the Control Room 1 upgrade project. This project included new control consoles, a new video monitor wall, camera system and audio system to improve operator efficiency and classroom engagement. All associated wiring was routed through the under-floor cable management system instead of cable trays. Consoles were relocated closer to the back wall to maximize the space available for students and observers. Preliminary software testing has gone well with official control room testing to begin next quarter.

Criticality Safety Classes

NCSP provides two types of criticality safety courses, a two-week course for Criticality Safety Engineers and a special one-week course for Criticality Safety Officers and Managers, both of which took place this quarter. NCERC also taught a course targeted to LANL Plutonium Facility (PF-4) fissionable material handlers. These classes provide a hands-on experience for the students.

▲ *NCSP-CSO students.*

Additional Activities

Annual Maintenance, Surveillance, and In-Service Inspection procedures were performed on schedule. Additionally, NEN-2 crew members and NCERC-FO CSEs performed troubleshooting on the pneumatic valve for the Godiva burst rod pneumatic system. Subsequent replacement of the valve and post maintenance testing allowed for proper operation.

► *NCERC personnel removing Godiva-IV TopHat during annual maintenance.*