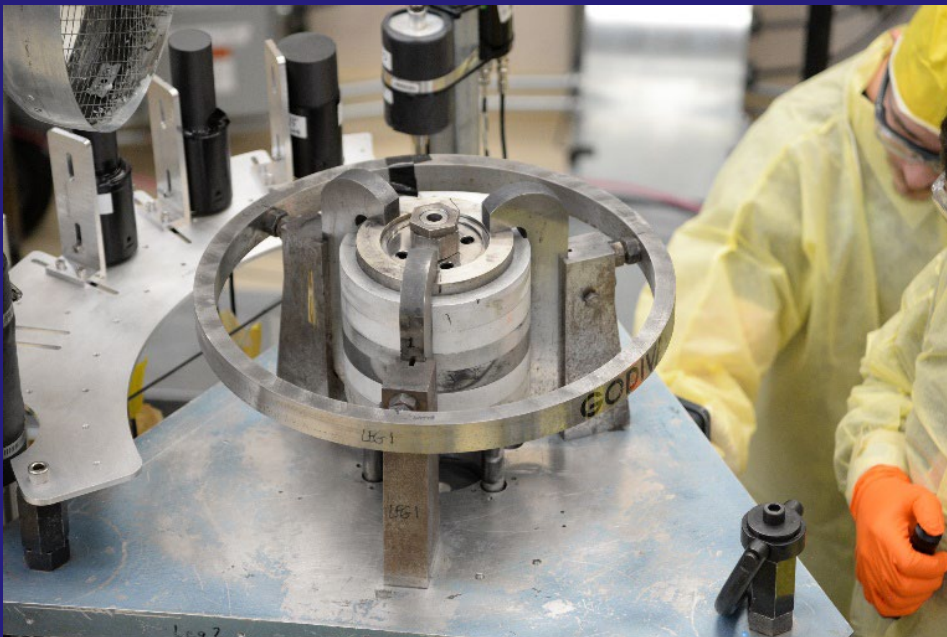


# #NEUTRON PULSE



2<sup>nd</sup> QUARTER 2023 EDITION

LA-UR-23-28588

### OPERATIONS SUMMARY

Experimenters performed Godiva-IV critical assembly operations including Critical Configuration Measurements, Radiation Environment Measurements, and Short-Lived Fission Product Yield (SLFPY) Measurements. Additionally, Planet, Flat-Top and Godiva-IV operations were conducted in support of criticality safety training and four other measurement campaigns.

### GODIVA-IV CRITICAL CONFIGURATION MEASUREMENTS

The current evaluation of Godiva-IV included in the International Criticality Safety Benchmark Evaluation Project (ICSBEP) Handbook was based on measurements taken at TA-18. The goal of the Godiva-IV Baseline Critical Configuration Measurements is to revise the current benchmark to capture differences between TA-18 and the current configuration at NCERC. In March and June, measurements were taken to determine the reactivity worth of the Godiva-IV contamination shielding (Top-Hat), air filtration system (AFS), PMT/DT detectors, and the sample tube. Physical measurements were taken of the Godiva-IV safety block gap using shims. The coordinate measuring machine (CMM), used previously for the Flat-Top benchmark measurements, was utilized to determine the dimensions and top surface profile of Godiva-IV components. The reactivity and dimensional measurement data will be incorporated into an updated Godiva-IV benchmark evaluation to be submitted to the ICSBEP.



▲ *Godiva-IV safety block in an intermediate position.*

▼ *Charlie Kiehne (NEN-2) operates the CMM to image the Godiva-IV core.*



# # NEUTRON PULSE

2<sup>nd</sup> QUARTER 2023 EDITION

## CRITICALITY SAFETY CLASSES

NCERC hosted five Criticality Safety Classes including one for the Nuclear Criticality Safety Program, one for LANL Nuclear Material Management, two for PF-4 personnel, and one for emergency responders. These classes provided a hands-on training experience to understand the effects of changing parameters important to nuclear criticality safety. Participants used the approach-to-critical experiment methodology to guide the construction of a critical configuration.

## PVT TRAINING & MEASUREMENTS

The Plutonium Verification Team (PVT) under NNSA's Office of Nonproliferation and Arms Control (NPAC/NA-24) utilized NCERC facilities during a two-day measurement campaign. The team took measurements of NCERC nuclear material to refine their instrument calibration curves. The team also participated in criticality safety training to gain experience and best practices to use in the field.



▲ PVT members pictured behind NCERC class foils experiment with NEN-2's Garrett McMath (left).

## ADDITIONAL ACTIVITIES

NCERC experimenters, led by Jessie Walker, performed an extensive measurement campaign on Plutonium-Uranium-Molybdenum NUMEC Zero Power Physics Reactor (PUMN ZPPR) fuel plates in support of L'Institut de Radioprotection et de Sûreté Nucléaire's (ISRN) MOX fuel experiment. The campaign included gamma spectroscopy measurements, temperature measurements, and physical dimensions of the fuel plates.

Preventive maintenance, surveillance, and in-service inspection procedures were performed on schedule. NCERC personnel coordinated with MSTs to complete NMC&A inventory and semi-annual source leak checks with no discrepancies. Additionally, NEN-2 crew members and NCERC-FO CSEs replaced Flat-Top Control Rod E stepper motor drive, adjusted the Flat-Top reflector temperature RTD, and completed applicable post-maintenance testing.