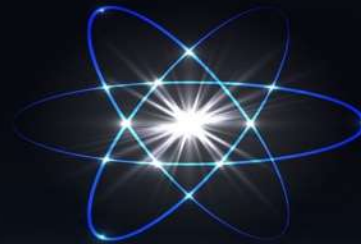




Nuclear Criticality Safety Program Support for HALEU and other DOE programs

WANDA-2025 Workshop



Presented by:
Douglas G. Bowen, Ph.D.
NCSP Execution Manager
Section Head, Nuclear Data, Criticality Safety, and Radiation Transport
Oak Ridge National Laboratory

NCSP Integral Experiments



- NCSP integral measurements are performed at
 - Sandia National Laboratories (SNL) and
 - **National Criticality Experiments Research Center (NCERC), currently operated by Los Alamos National Laboratory**
 - NCERC is located at the Nevada National Security Site (NNSS) inside the Device Assembly Facility (DAF)
- Types of experiments that can be performed
 - Subcritical
 - Rocky Flats shells, BeRP ball, Np-237 sphere, TACS shells, etc.
 - Critical/Delayed Supercritical
 - NCERC: Planet, Comet, Godiva IV, Flattop
 - Sandia: Sandia Pulse Reactor critical assembly (2 fuel types, currently)
 - Prompt Supercritical
 - NCERC: Godiva IV (< 300 deg. C pulse)

DAF/NCERC

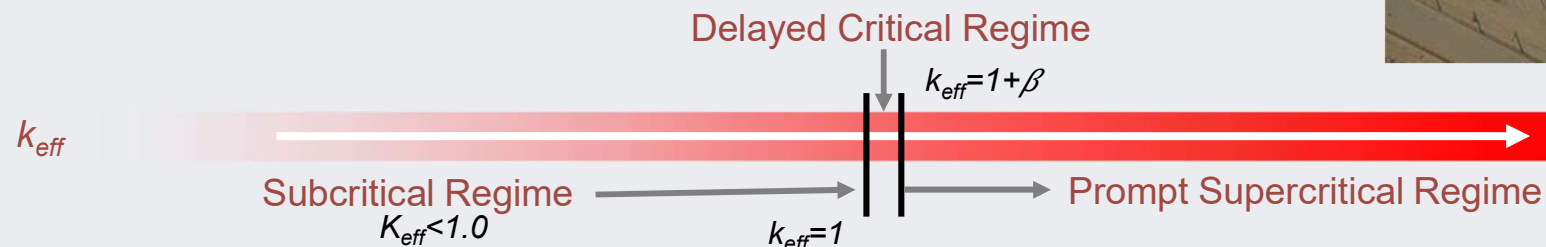


SNL/TA-V/SPR Facility



SPR Facility

FY2025 Integral
Experiment
Funding:
\$20,194K (65%)



NCERC Support and Experiment Staff

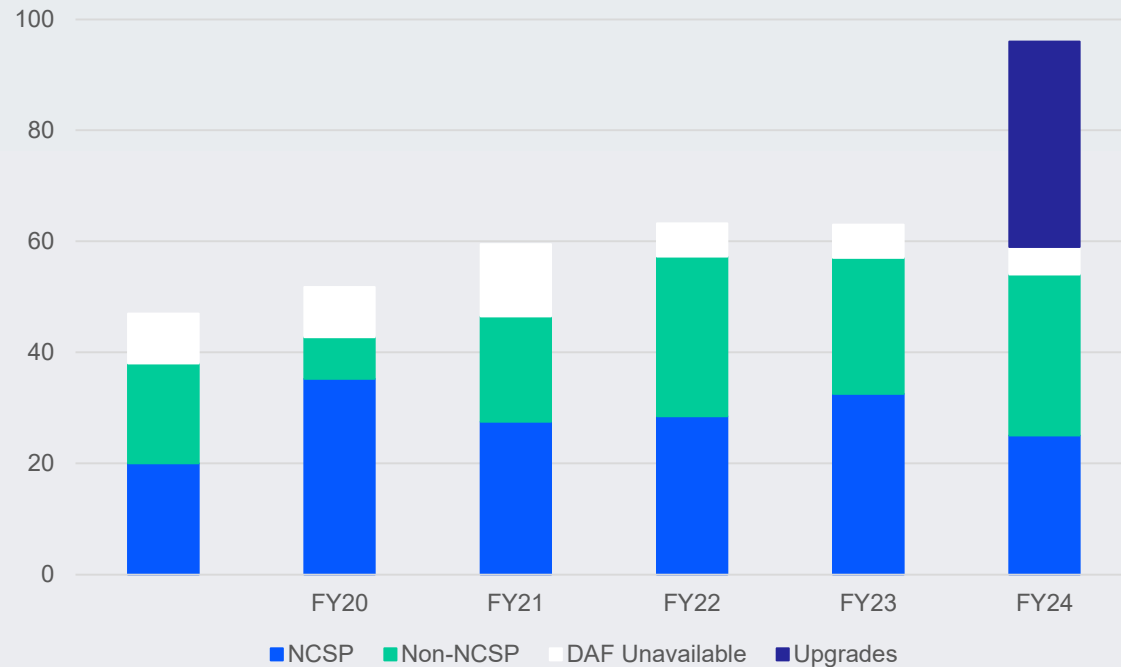


- Permanent LANL staff at NCERC-FO personnel – 8.1 FTE
- NCERC NEN-2 experimenter personnel – 8.3 FTE
- NNSS direct funded support to NCERC -11.5 FTE
 - 0.5 full time equivalent for Program Management
 - 11.0 full time equivalent direct-funded operations support personnel to include:
 - 4 Radiological Control Technicians (RCTs), 2 Operations Technicians, 1.5 DAF Operations Supervisor, 1.0 Material Control and Accountability (MC&A) Specialist, 1.0 Operations Controller, 0.5 Operations Coordinator, 0.5 RCT Supervisor, and 0.5 Teamster

FY24 NCERC Utilization



Weeks of NCERC Operations



DAF Unavailable (5 weeks)

- 3 weeks Holiday Closures
- 2 weeks Maintenance/Other

Control Room 2 Upgrade (37 weeks)

NCSP (25 weeks)

- 4 weeks NCSP Classes (IER 462)
- 6 weeks PFUNS (IER 153)
- 4 weeks TEX-U-CI (IER 499)
- 2 weeks CAAS Testing (IER 605)
- 1 week PAHN ZPPR Measurements (IER 578)
- 1 week Inventory (IER 466)
- 3 weeks Demonstrations/Crew Training
- 4 weeks MNT/SRV/ISI/PMT (IER 466)

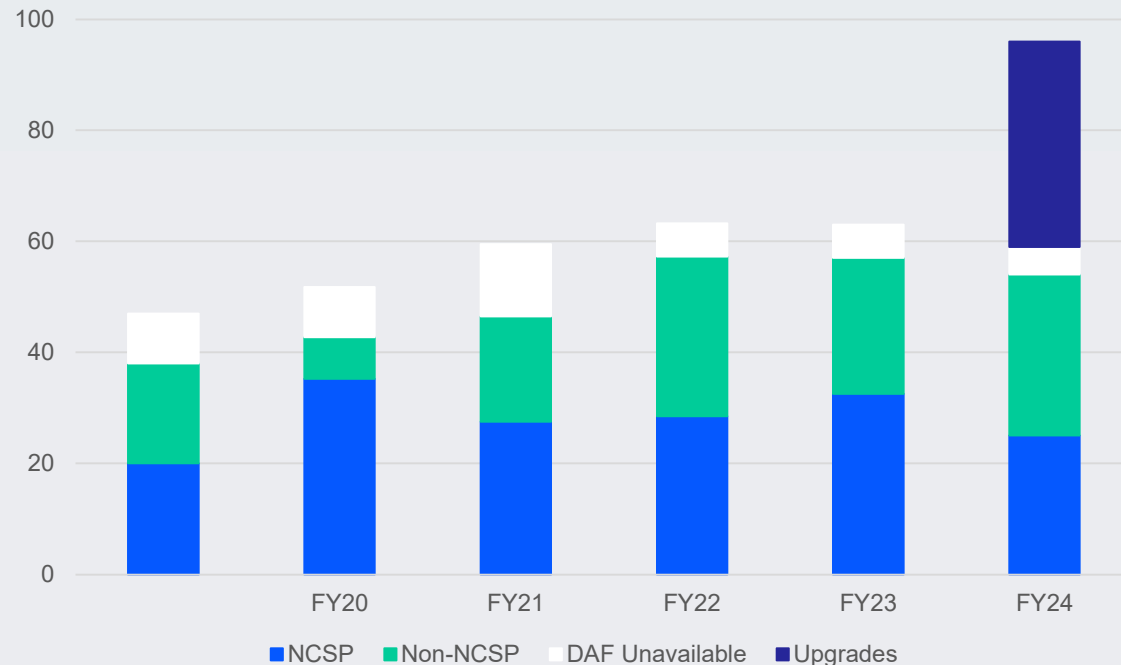
Non-NCSP (29 weeks)

- 8 weeks NA-10:
 - PF-4 Class, NDSE
- 5 weeks NA-20:
 - University Measurements
 - TREATI, Flattop APY
- 7 weeks NA-80, DTRA:
 - ER Classes, RTOs
- 9 weeks Other: Deimos, Staging/Measurements

FY24 NCERC Utilization



Weeks of NCERC Operations



NCSP (25 weeks)

- 4 weeks NCSP Classes (IER 462)
- 6 weeks PFUNS (IER 153)
- 4 weeks TEX-U-CI (IER 499)
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- 3 weeks Demonstrations/Crew Training
- 4 weeks MNT/SRV/ISI/PMT (IER 466)

Non-NCSP (29 weeks)

- 8 weeks NA-10:
 - PF-4 Class, NDSE

Non-NCSP funded experiments provide experimenters the ability to enhance and maintain skills and knowledge that would not be attainable if only NCSP experiments were conducted.

- 9 weeks Other: Deimos, Staging/Measurements

FY2025 NCSP "Strategic Priorities List" NCSP-Funded Experiments



Five Year Execution Plan –
for the
Mission and Vision
of the
United States Department of Energy
Nuclear Criticality Safety Program

OCTOBER 1, 2024 (REV. 1)

FY 2025 through FY 2029

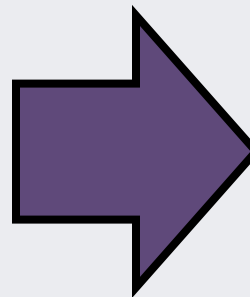
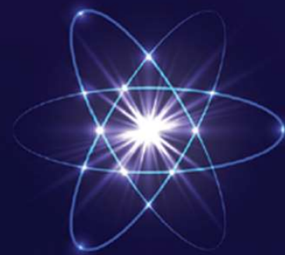


Table 2.2 NCSP "Strategic Priorities List" for FY2025

#	Milestone Description	TPE	Lead Site
1	Process ENDF/B-VIII.1 into ACE format for MCNP and release via the LANL nuclear data website	AM	LANL
2	Complete updated SlideRule plutonium calculations	AM	IRSN/ORNL/LLNL
3	Document investigated analysis methods associated with criticality monitoring for Fukushima fuel debris removal. (IE35)	IE	LANL
4	Increase Planet's rated load capacity.	IE	LANL
5	Perform NCERC critical experiment for Ta validation supporting plutonium processing operations. (IER 607)	IE	LANL
6	Complete Section 1 draft of the PFUNS ICSBEP benchmark evaluation (IER 153).	IE	LANL
7	Submit CERBERUS benchmark evaluation to the ICSBEP TRG. (IER 537)	IE	LANL
8	Submit Godiva Benchmark Evaluation to ICSBEP TRG (IER 555)	IE	LANL
9	Execute MOX Experiments at NCERC in collaboration with IRSN (IER 296)	IE	LANL/IRSN
10	Report on CAAS testing for AWE (IER 605)	IE	LANL/AWE
11	Submit TEX-CI (IER 499) benchmark to ICSBEP TRG.	IE	LLNL
12	Complete TEX-Fe Experiments (IER 519)	IE	LANL/LLNL
13	Complete procurement of materials for Low Temperature TEX (IER 479)	IE	LANL/LLNL
14	Complete procurement of materials for SPRF/CX temperature dependent benchmark (IER 304).	IE	SNL/ORNL
15	Complete NCERC Control Room #1 upgrades*	IE	LANL
16	Submit benchmark evaluation of epithermal experiments to the ICSBEP TRG (IER 441)	IE	SNL/ORNL
17	Complete final design for TEX-Li (CED-2) (IER 575)	IE	LLNL
18	Update Pu-240 evaluation to include new LANSCE / Chi-Nu prompt fission neutron spectra	ND	LANL
19	Complete Zr-92 nuclear data measurements at GELINA	ND	ORNL
20	Complete Phase 2 of RPI LINAC refurbishment	ND	RPI/NNL
21	Complete unit acceptance tests for accelerator sections #2 and #3	ND	RPI/NNL
22	Provide a summary of LFE Database entries provided by the NCS community	IPD	ORNL/LLNL

*Funding for control room upgrades provided by NA-19's Capabilities-based Investment Program (CBI)

FY2025 NCSP "Strategic Priorities List" NCSP-Funded Experiments



Five Year Execution Plan –
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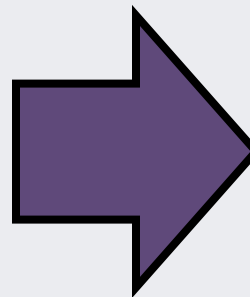
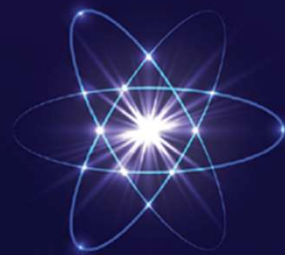


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FY2025 NCSP "Strategic Priorities List"

NCSP-5



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NCSP Integral Experiments/Measurements Non-NCSP Funded Experiments with Partners



Benefits	Title
AWE; NA-20	Arms Control
DOD; NA-80	MHCC / CRIT 4 JTOT FY24-25:
DOE/DOD	Staging/Measurements
DOE-EM; Westinghouse	Critical Experiment with Westinghouse Electric Company
DOE-NE	Deimos Pilot Benchmark Experiment
DOE-NE	THETA
DTRA	Diagnostic Challenge
DTRA/NA82	Global Security Measurements (LLNL)
LANL	PARADIGM
LANL	Support and Maintenance
LANL, NA-10, NA-20	Godiva-Transparency Measurements
NA-10	Criticality Safety Class for PF-4 Personnel
NA-10	30 Day Measurements
NA-10	Godiva: Thermo-Mechanical Data Collection
NA-10	Godiva Characterization for future testing
NA-10	Diagnostic Development for materials testing

Benefits	Title
NA-20	SMVP
NA-20, LANL	TREATI
NA-22; NCSP	Fission/Activation Product Yield Measurements on Flattop
NA-30, NNL	Be reflected HEU
NA-80	CRIT 4 RESPONDERS FY24
NA-80	Engineering Study Hall FY24-25:
NA-80	NA-83 RTO Build
NA-80; DOD	NWWC-3D
NA-80; DOJ	STAB RTO Builds FY24
NCSP	Control Room Upgrades
Uni. Consortium, NA-22	University Measurements

Questions



DAF at the NNSS. Photo from <https://nss.gov/mission/stockpile-stewardship-program/device-assembly-facility-daf/>