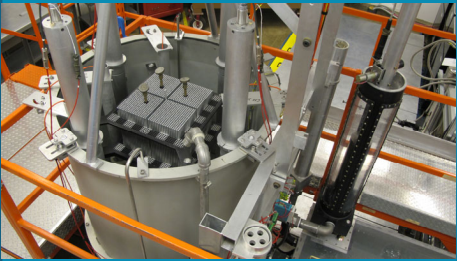
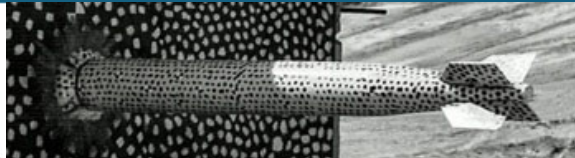
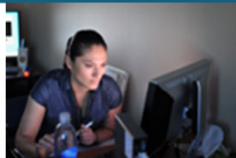


*This work was supported by the DOE Nuclear Criticality Safety Program, funded and managed by the National Nuclear Security Administration for the Department of Energy.*



# The NCSP at Sandia in FY21



*Gary A. Harms*

## NCSP Technical Program Review February 15-17, 2022



Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

SAND2022-1651 PE

## NCSP Funding at Sandia



Element	Task	FY21 Total	Task Funding	Description	Spent	FY21 Carryover
Total		\$2,031,990		NCSP Funding at Sandia	\$1,570,653	\$461,337
IE		\$1,450,491		Integral Experiments	\$1,165,907	\$284,585
	C/O		\$456,491	FY20 Carryover		
	IE1S1		\$409,000	Fixed Cost Items		
	IE1S2		\$548,000	Programmatic Work		
	IE2		\$37,000	Support for NCERC Safety		
	IE3		\$0	CX Control System Upgrade		
	IE4		\$0	Support for AFRRRI Characterization		
T&E		\$301,011		Training & Education	\$169,860	\$131,150
	C/O		\$301,011	FY20 Carryover		
	TE1		\$0	Deliver Hands-On Training		
TS		\$280,488		Technical Support	\$234,886	\$45,602
	C/O		\$32,488	FY20 Carryover		
	TS-3		\$75,000	Succession Planning for Key Staff		
	TS-12		\$173,000	CEdT Manager Support		

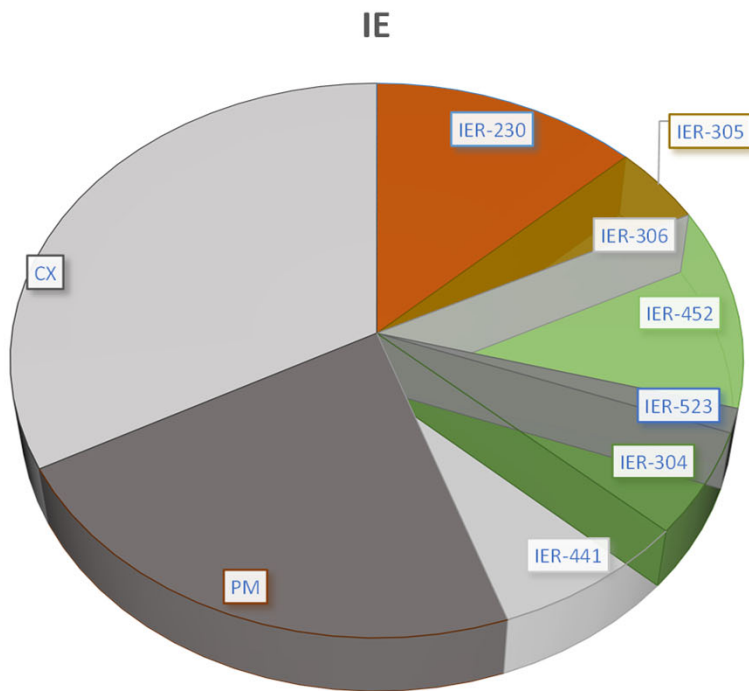
**This work was supported by the DOE Nuclear Criticality Safety Program, funded and managed by the National Nuclear Security Administration for the Department of Energy.**

## Integral Experiment Requests at Sandia

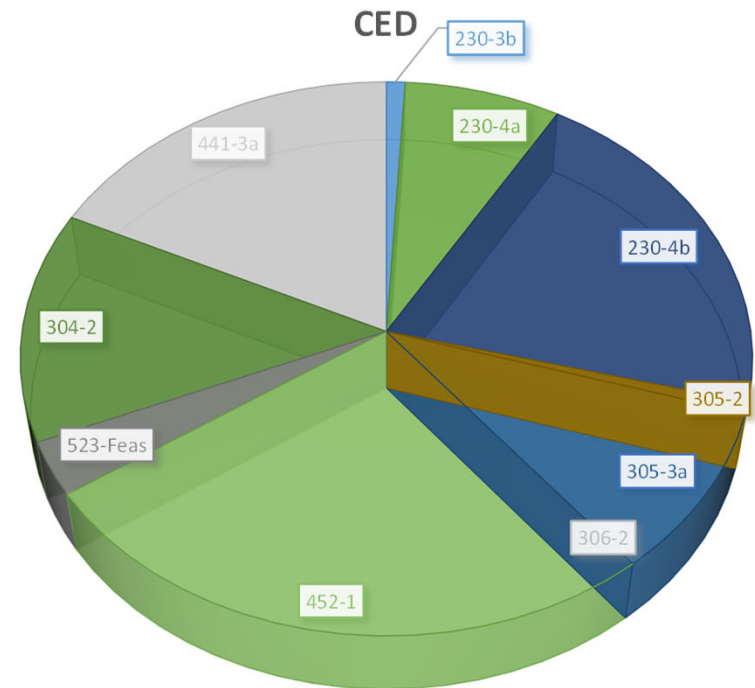


IER	Description	Started FY21	Ended FY21	FY21 Spending
230	Characterize the Thermal Capabilities of the 7uPCX	CED-3b	CED-4b (Complete)	\$151k
304	Temperature Dependent Critical Benchmarks	CED-2	CED-2 (Complete)	\$70k
305	Critical Experiments with UO <sub>2</sub> Rods and Molybdenum Foils	CED-2	CED-3a	\$53k
306	Critical Experiments with UO <sub>2</sub> Rods and Rhodium Foils	CED-1	CED-2	\$0k
441	Epithermal HEX Lattices with SNL 7uPCX Fuel for Testing Nuclear Data	CED-3a	CED-3a	\$93k
452	Inversion Point of the Isothermal Reactivity Coefficient	CED-1	CED-1	\$137k
523	Critical Experiments with ACRR UO <sub>2</sub> -BeO Fuel	Feasibility	Feasibility	\$16k
			Total	\$521k

## Our Integral Experiment Spending



Overall



By CED Phase Gate

## Sandia Highlights (I)



The IER-230 experiments were published.

- Publication and presentation at the ANS Annual Meeting, June 2021, “Sandia 7uPCX Critical Experiments Exploring the Effects of Fuel-to-Water Ratio Variations”.
- Publication of the benchmark evaluation in the 2021 edition of the ICSBEP Handbook, “PITCH VARIATION EXPERIMENTS IN WATER-MODERATED SQUARE-PITCHED U(6.90)O<sub>2</sub> FUEL ROD LATTICES WITH FUEL TO WATER VOLUME RATIOS SPANNING 0.08 TO 0.67,” LEU-COMP-THERM-102.

Completed CED-2 for IER-304 (kudos to ORNL). Sandia is now working on CED-3a

IRSN completed the IER-305 CED-2 final design report. CED-3a was started.

Successfully navigated requirements for the new Sandia Readiness Review process. Gained approval to perform upcoming IER-305 and IER-441 experiments.

## 6 Sandia Highlights (2)



Student intern earned MS Degree in Nuclear Engineering from Missouri S&T. Relocated to Albuquerque to continue working with the SCX program while pursuing a PhD degree.

Delivered make-up sessions of the Hands-on Training for managers and Nuclear Criticality Safety Engineers in July, August, and September.

Taught the Hands-On portion of the NCSP training class for Nuclear Criticality Safety Engineers (NCSEs) in August 2021 as scheduled.

The SPRF/CX operations crew gave excellent support to the NCSP by keeping the experiment facility open and operating through the pandemic.

## 7 COVID-19 Impacts



Uncertainty and new requirements for onsite work pushed the start of IER-230 experiments back. This delayed completion of the experiments but the ICSBEP benchmark evaluation was published on schedule.

Special requirements and approvals were needed to allow student intern to return to Sandia. Although inconvenient, it had minimal impact on tasks.

The February Hands-On class for NCSEs was postponed. Two make-up sessions were scheduled but consolidated into a single session held in September/October (6 students).

The April Hands-On class for managers was postponed. Two make-up sessions were held in July (7 students) and August/September (6 students).

The dispersal of the experiment staff made communication more difficult among the team. There is nothing like walking down the hall for impromptu team meetings.



# Critical Experiments at Sandia

