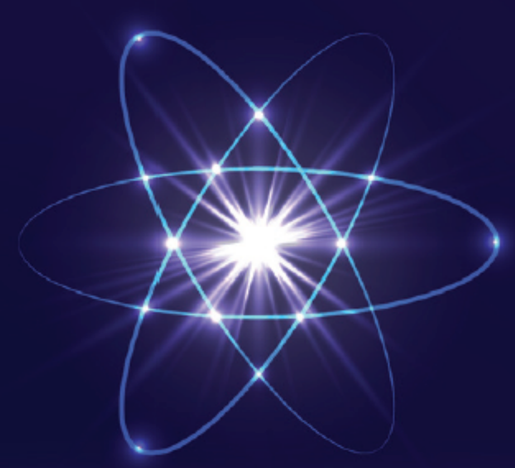
FY2027 Request for Proposals

October 1, 2025

Proposal Call for the United States Department of Energy Nuclear Criticality Safety Program



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Description of Announcement

Background

The US Department of Energy (DOE)/National Nuclear Security Administration (NNSA) Nuclear Criticality Safety Program (NCSP) is chartered with maintaining the technical infrastructure necessary to ensure safe, efficient operations from a Nuclear Criticality Safety (NCS) perspective.

Project Mission

The US Department of Energy (DOE) Nuclear Criticality Safety Program (NCSP) is chartered with maintaining the technical infrastructure necessary to ensure safe, efficient operations from a criticality safety perspective. The NCSP mission is to provide sustainable expert leadership, direction, and the technical infrastructure necessary to develop, maintain, and disseminate the essential technical tools, training, and data required to support safe, efficient fissionable material operations within DOE.

The NCSP vision is to be a continually improving, adaptable, and transparent program that communicates and collaborates globally to incorporate technology, practices, and programs to be responsive to the essential technical needs of those responsible for developing, implementing, and maintaining nuclear criticality safety. Information about the NCSP, including its Mission and Vision document, can be found at the NCSP website: https://ncsp.llnl.gov.

The NCSP Mission and Vision is achieved by identifying and accomplishing a set of five-year programmatic goals that correspond with five broad technical program elements supporting the identified ten-year goals. The NCSP Five-Year Plan defines tasks designed to accomplish specific goals identified in the NCSP Mission and Vision. The current Five-Year Plan has been developed to accomplish these mission and vision goals with the advice and assistance of experts appointed by the NCSP manager or working under charters approved by the NCSP manager.

The NCSP is organized around six technical program elements: Analytical Methods (AM), Information Preservation and Dissemination (IPD), Integral Experiments (IE), Nuclear Data (ND), Training and Education (TE), and Technical Support (TS).

Proposal Topic Areas

The proposal topic areas are limited to the following topics and priorities to support the NCSP and NCS community in DOE.

Priority #1 – Pit Production

The DOE/NNSA pit production mission is focused on ensuring the long-term safety, security, and effectiveness of the U.S. nuclear stockpile by reestablishing and sustaining the capability to manufacture plutonium pits, which are the core components of nuclear weapons. This mission is essential to national security, as many existing pits are decades old and must be replaced to maintain reliability. NCS plays a vital support role by ensuring that fissile materials used in pit production are handled, processed, and stored in ways that prevent inadvertent criticality accidents. By providing technical evaluations, controls, and oversight, NCS ensures that pit manufacturing activities can be conducted safely, protecting workers, the public, and the environment while enabling the successful execution of this national security mission.

Priority #2 – Stockpile Surveillance

The DOE/NNSA stockpile surveillance mission ensures the safety, security, and reliability of the U.S. nuclear weapons stockpile without the need for underground testing by systematically evaluating and assessing the condition of aging warheads and their components. Through disassembly, examination, testing, and data analysis, this mission provides critical information for maintaining confidence in the stockpile's performance and guiding life extension or modernization programs. NCS supports this mission by ensuring that fissile materials encountered during disassembly, storage, or testing operations are managed under strict controls that prevent inadvertent criticality. By providing hazard analyses, engineered controls, and procedural guidance, NCS enables surveillance activities to be performed safely, protecting personnel and facilities while allowing accurate assessments of nuclear weapon components.

Priority #3 – Experiments for the Proposed Horizontal Split Table (HST) to be Implemented at the Idaho National Laboratory (INL) that benefit the NCS Community

(Information provided by INL)

The validation of nuclear transport codes and underlying nuclear data through integral critical experiments is a crucial enterprise for licensing numerous processes in the nuclear fuel cycle (manufacturing, shipping, storage, etc.). This type of data, however, is rather sparse for "large-and-leaky" systems, especially those driven by High Assay Low Enriched Uranium (HALEU) with high sensitivity to intermediate neutron energies. This data gap is primarily due to the lack of large-scale critical experiment capabilities. A new project referred to as the System Physics Advanced Reactor Critical facility (SPARC) plans to establish a Horizontal Split Table (HST) machine at the Idaho National Laboratory (INL) in the next few years which, among other objectives, will be able to support this type of experiment.

The SPARC-HST will be able to support core assemblies up to 24,000 kg in a 2 x 2 x 2 m cube when assembled. The table platforms will be equipped with multi-purpose T-slots and/or threaded holes to allow for experiment-specific mechanical fixtures to support fuels, moderators, and reflectors as needed. Electrically heated experiments are a planned capability at SPARC. The SPARC-HST will be placed in a large "open basement" of the Idaho National Laboratory building PBF-613 where neutron room return will be minimal. Two fuel options are planned to be available for SPARC's early experiment campaigns. One fuel option includes 593 fuel rods from the decommissioning Walthousen Reactor Critical Facility (RCF). The RCF rods consist of 4.81% enriched UO2 (10.08 g/cm3 density) each having a fuel pellet stack 0.420 in. diameter X 36.00 in. long clad in 304 stainless steel tubes 0.426 in. and 0.466 in. inner and outer diameter, respectively. The second fuel option includes 19.75% enriched uranium alloyed with 10wt% molybdenum (U-10Mo, 17.15 g/cm3) with at least 360 rectangular plates (9.5 in. X 3.5 in. X 0.20 in.). These U-Mo plates have natural abundance of molybdenum isotopes and will be clad in aluminum alloy 6061. Additional details about SPARC are available in reference[1]. Efforts are also underway to ascertain other fuel systems of interest for SPARC such as TRISO fuels and HALEU pelletized ceramics.

Proposal Content

Proposals will be reviewed and prioritized/ranked by how close they come to addressing and supporting the proposal topic areas listed in the previous section. Proposals submitted that do not address one of the three priorities listed in this call will likely be screened out and not considered for possible FY2027 funding.

Award Information

Type of Award Instrument

The NCSP Management will contact the proposers directly that their proposals were successful. The accepted proposals, assuming available funding, is identified as a funded task for an NCSP site in the FY2027 NCSP 5-year plan.

Estimated Funding

The available funding is based on anticipated funding for FY2027 and the actual amount of funding available to support this NCSP proposal call not yet known. DOE is under no obligation to pay for any costs associated with preparation or submission of proposals. DOE reserves the right to fund, in whole or in part, any, all, or none of the proposals submitted in response to this Announcement.

Maximum Award Size

The maximum award size is based on available funding. It is known that funding will be limited and due to the need for several awards, the award size will also be limited for each task.

[1] Nicolas Woolstenhulme, Mark Cole, Nicolas Martin, Troy Reiss, Justin Johnson, Matthew Lund, Ronald Claghorn, Kyle Gagnon, Mark DeHart, William Wieselquist, Theresa Cutler, Catherine Percher, Andrew Barto, and Don Algama, "SPARC - Plans for a New Critical Experiment Facility with a Horizontal Split Table", July 2025, INL/RPT-25-84855.

Expected Number of Awards

The number of awards will depend on the number of meritorious proposals and the availability of appropriated funds.

Period of Performance

Typical NCSP proposal tasks are limited to 2-5 years, maximum, depending on the type and scope of the task. For example, the preliminary design for an integral experiment may take 1-year of work and final design may take 1-2 years.

Type of Proposal

Submitted proposals must adhere to the proposal template provided in Appendix A. The proposal template can be downloaded from this location on the NCSP website as well:

https://ncsp.llnl.gov/program-management/five-year-execution-plan-proposals.

Eligibility Information

Eligible Applicants and Topics

Proposals must be sent by the NCSP Site Program Managers to the NCSP Management team. A listing of the NCSP Site Program Managers can be found at the following link: https://ncsp.llnl.gov/program-management/site-program-managers. Awards are provided directly to the NCSP sites as documented in the FY2027 5-year plan. NCSP 5-year plans can be found at this link: https://ncsp.llnl.gov/program-management/ncsp-five-year-execution-plan. The NCSP does not impose any constraints on team members and the distribution of funding within the team, which permits the lead lab Site Program Manager to have international, university, and industry team members. The lab is responsible to ensure any subcontracts can meet funding and time constraints and all data generated is in the public domain—for example, in the form of laboratory reports. Key team members, at least one per institution, should be listed in the proposal submission.

Cost Sharing

Cost sharing is not required but valid, especially for INL HST proposals providing benefit to DOE-NE applications, for example.

Eligible Individuals

Eligible individuals working with an NCSP Site Program Manager with the skills, knowledge, and resources necessary to carry out the proposed research or task as a Laboratory Principal Investigator (PI) are invited to work with their organizations to develop a proposal.

Limitations on Submissions

For this call, only NCSP sites may receive funding for this proposal call. There are two limitations for this NCSP proposal call:

1. Proposals shall be limited to 4 pages, including the cover page.
2. Each NCSP Site Program Manager is limited to submitting a maximum of three proposals for this call.

Proposal and Submission Information

Proposal Submission Dates and Times

NCSP Site program managers shall provide up to three proposals with to the following email address by **November 16, 2025**: ncspteam@ornl.gov.

Proposals must be provided via the NCSP proposal template provided in Appendix A.

Late Submissions

Late submissions cannot be accepted.

Proposal Review Information

Expert Group Review and Funding Decision

The NCSP's Criticality Safety Support Group (CSSG) (https://ncsp.llnl.gov/program-management/criticality-safety-support-group-cssg) and the Nuclear Data Advisory Group (NDAG) (https://ncsp.llnl.gov/program-management/nuclear-data-advisory-group) will each review and rank proposals based meeting the NCSP priorities, provided above. Proposals will be ranked by the CSSG and NDAG for review by the NCSP Manager. Final funding decisions are based on available funding and approval by the NCSP Manager.

Award Administration Information

Award Notices

Funding decisions that are accepted by the NCSP Manager for funding at an NCSP site are usually decided upon at the annual NCSP Budget Execution Meeting in mid-July 2026. The final NCSP task list and budget is determined at this meeting and high-ranked proposals will be considered if there is available funding for the FY2027 budget.

Reporting

NCSP Site Program Managers report progress each quarter to the NCSP Manager at our quarterly reporting meetings. Site Program Managers submit quarterly reports to the NCSP Manager that includes the status of the budget and deliverables. The non-integral experiment tasks accomplishments each quarter are loaded onto the NCSP website (https://ncsp.llnl.gov/program-management/ncsp-quarterly-progress-reports-and-accomplishments) following the quarterly status report meetings.

Questions/Agency Contacts

Questions

General questions about the NCSP proposal process or proposal priorities for this call can be sent to the NCSP Management Team at ncspteam@ornl.gov.

NCSP Contacts

The NCSP contacts for this proposal call are given below.

Nuclear Criticality Safety Program Manager
DOE National Nuclear Security Administration
Dr. Angela Chambers
angela.chambers@nnsa.doe.gov

Nuclear Criticality Safety Program Execution Manager
Oak Ridge National Laboratory
Dr. Douglas Bowen
bowendg@ornl.gov

Appendix A: NCSP Proposal Template

1.0 Proposal Information

Site Program Manager Name/email	
Principle Investigator Name/email	
Collaborator(s) Name/Site/Email	
Site	
Category *(Choose the **primary** NCSP Technical Program Element – Analytical Methods, Information Preservation & Dissemination, Integral Experiment, Nuclear Data, **OR** Training and Education)*:	
NCSP Mission & Vision Need/Gap Addressed in the Proposal *(see NCSP proposal website)*	
Type (*Lab or University Proposal)*:	
Title	
Collaborator PI Name(s) *(if applicable)*	
Collaborator PI Email(s) *(if applicable)*	
Collaborator PI Institution(s) *(if applicable)*	
Length of proposed work *(# of years)*	
Total Budget *(all years and all collaborators)*	

2.0 **Short Description** – 2 – 3 sentences describing your proposal.

3.0 **Long Description** *(<u>concise</u> description of work, including whether it is proposed to replace an <u>ongoing approved activity</u>, or <u>new work to be prioritized against all other proposed new work</u>; what Labs and/or facilities/equipment are involved/required and the timing of their involvement, and a sense of the technological risk involved).*

4.0 **Milestones and Deliverables** for each year (2025-2029), as applicable *include very specific, <u>measurable</u> milestones and deliverables for FY2025, more general milestones and deliverables in FY2026-2029 but still with enough fidelity to demonstrate how the five-year or ten year goals in the NCSP Mission and Vision document will be achieved.*

Subtask 1 – Milestones and Deliverables

- Milestone and Deliverables for subtask 1 including Year(s) for completion.

Subtask 2 – Milestones and Deliverables

- Milestone and Deliverables for subtask 2 including Year(s) for completion.

Subtask 3– Milestones and Deliverables

- Milestone and Deliverables for subtask 3 including Year(s) for completion.

5.0 **Budget** for each year (2025-2029), *provide realistic out year budget projections*.

Note: University proposal costs must be precise and reflect actual costs for students each year (*typically, academic costs are $90k-$120K per year, MS – 2 years, PhD – 3-4 years*) **and** the costs for NCSP site mentoring and support. University proposals must be coordinated with and submitted through an NCSP site task manager.

Example Format per Proposal

Proposal #1 Budget	**2027**	**2028**	**2029**	**2030**	**2031**	**Total Cost by Subtask**
SubTask #1	$X1k					
SubTask #2		$X2k				
		3				
Total Cost by Year	**$Xk**	**$Xk**	**$Xk**	**$Xk**	**$Xk**	

Site #2 Budget	**2025**	**2026**	**2027**	**2028**	**2029**	**Total Cost by Subtask**
SubTask #1	$X1k					
SubTask #2		$X2k				
Total Cost by Year	**$Xk**	**$Xk**	**$Xk**	**$Xk**	**$Xk**	

6.0 Justification (describe how this work builds upon what was done in previous years; or why this *work is of higher priority than currently approved work; what course adjustments, if any are being made; and how the work supports accomplishing the specific five-year or ten-year goals of the NCSP Mission and Vision document)*.

7.0 References (if applicable)

NCSP

NUCLEAR CRITICALITY SAFETY PROGRAM

U.S. DEPARTMENT OF ENERGY

NNSA

National Nuclear Security Administration