OAK RIDGE National Laboratory

NCSP Technical Accomplishment NCSD Session - Brief Overview of the NCSP

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U.S. DEPARTMENT OF ENERGY

Background / History

- Defense Nuclear Facilities Safety Board (DNFSB) Recommendations 93-2 and 97-2:
  - 93-2 (3/23/1993): Need for a general-purpose critical experiment capability to ensure safety in handling and storage of fissionable material
  - 97-2 (5/19/1997): Need for improved criticality safety practices and programs to alleviate potential adverse impacts on safety and productivity of US Department of Energy (DOE) operations
- 97-2 encompassed ongoing DOE activities of 93-2 while broadening scope to address important cross-cutting safety activities needed to ensure nuclear criticality safety (NCS) throughout the complex
- DOE's Implementation Plan for Board Recommendations 93-2 and 97-2 resulted in establishment of the US Nuclear Criticality Safety Program (NCSP)

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 23, 1993

The Honorable Hazel R. O'Leary
Secretary of Energy
Washington, DC 20585

Dear Madame Secretary:

On March 23, 1993, the Defense Nuclear Facilities Safety Board, in accordance with 42 U.S.C. § 2286a(5), unanimously approved Recommendation 93-2 which is enclosed for your consideration. Recommendation 93-2 deals with The Need for Critical Experiment Capability.

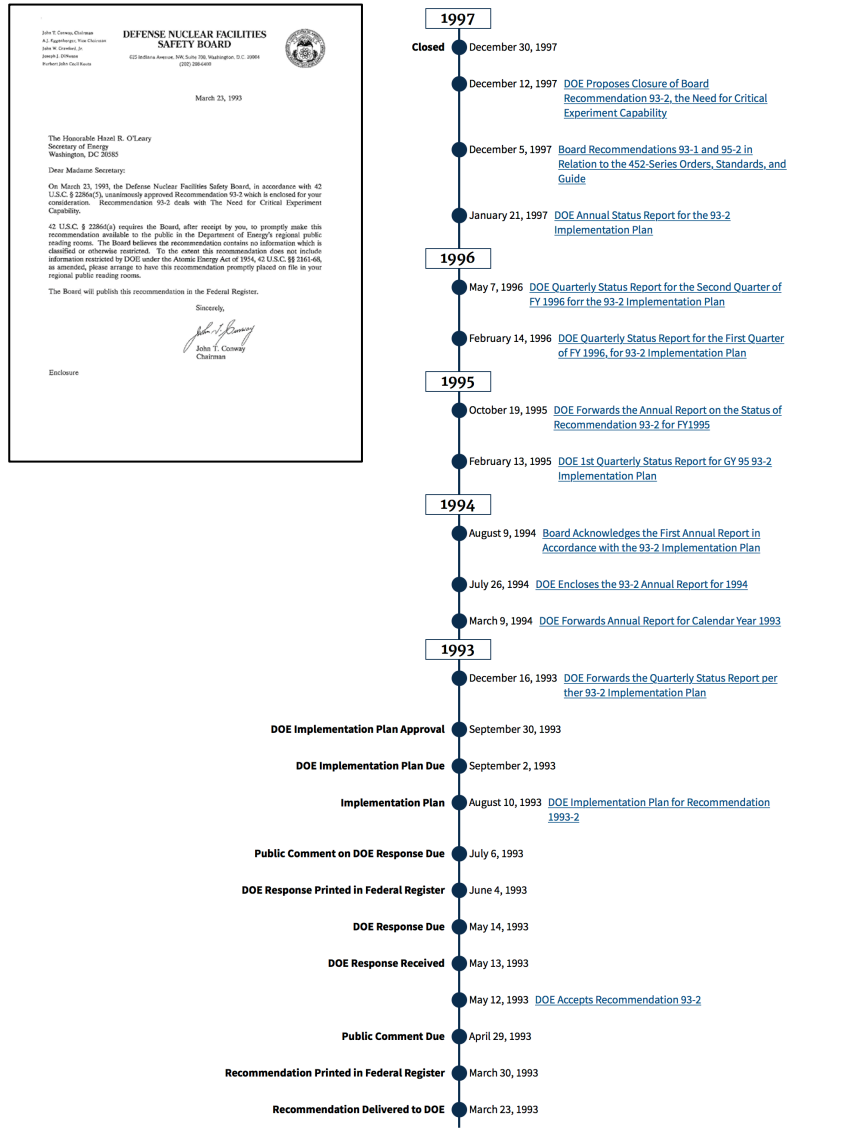
42 U.S.C. § 2286d(a) requires the Board, after receipt by you, to promptly make this recommendation available to the public in the Department of Energy's regional public reading rooms. The Board believes the recommendation contains no information which is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please arrange to have this recommendation promptly placed on file in your regional public reading rooms.

The Board will publish this recommendation in the Federal Register.

Sincerely,

John T. Conway
Chairman

Enclosure



https://www.dnfsb.gov/board-activities/recommendations/need-critical-experiment-capability

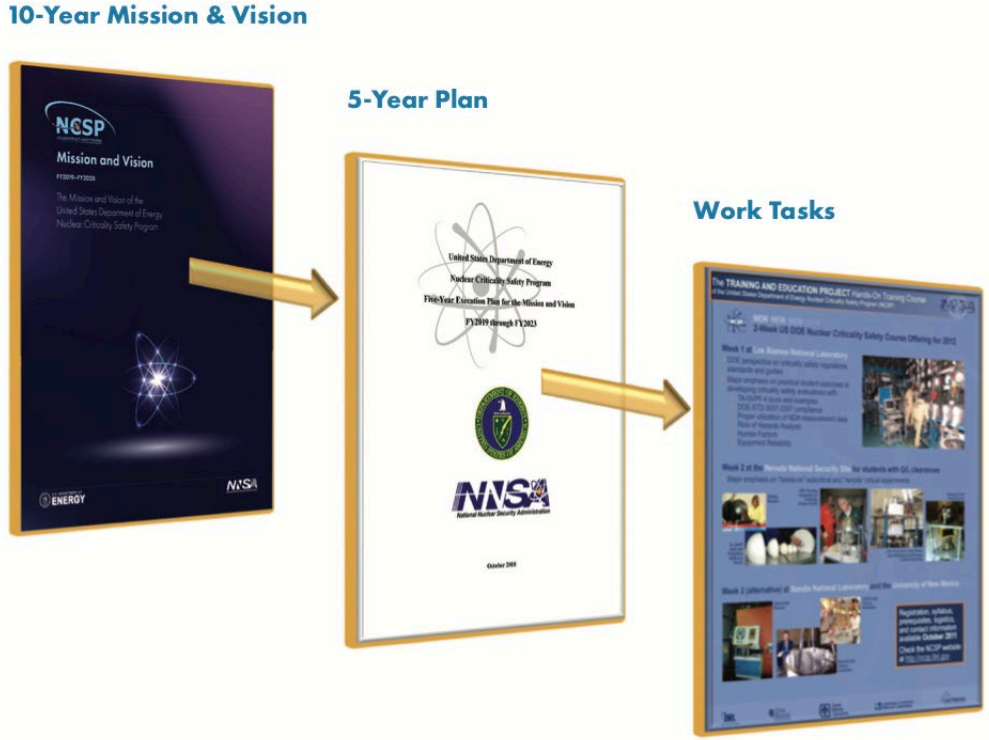
NCSP Organization and Overview

- Mission

  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 the Department of Energy

- Vision

  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



https://ncsp.llnl.gov/docs/NCSP_MISSION_VISION_FY19-28.pdf

NCSP Technical Program Elements

- **Analytical Methods (AM) – 16% of budget**

  Maintain and improve production codes and methods for criticality safety engineers (MCNP/SCALE, NJOY/AMPX)
- **Nuclear Data (ND) – 14% of budget**

  Perform measurements of basic nuclear (neutron) physics cross sections and generate new evaluated cross section libraries and covariance data for use in production criticality safety codes
- **Information Preservation and Dissemination (IPD) – 4% of budget**

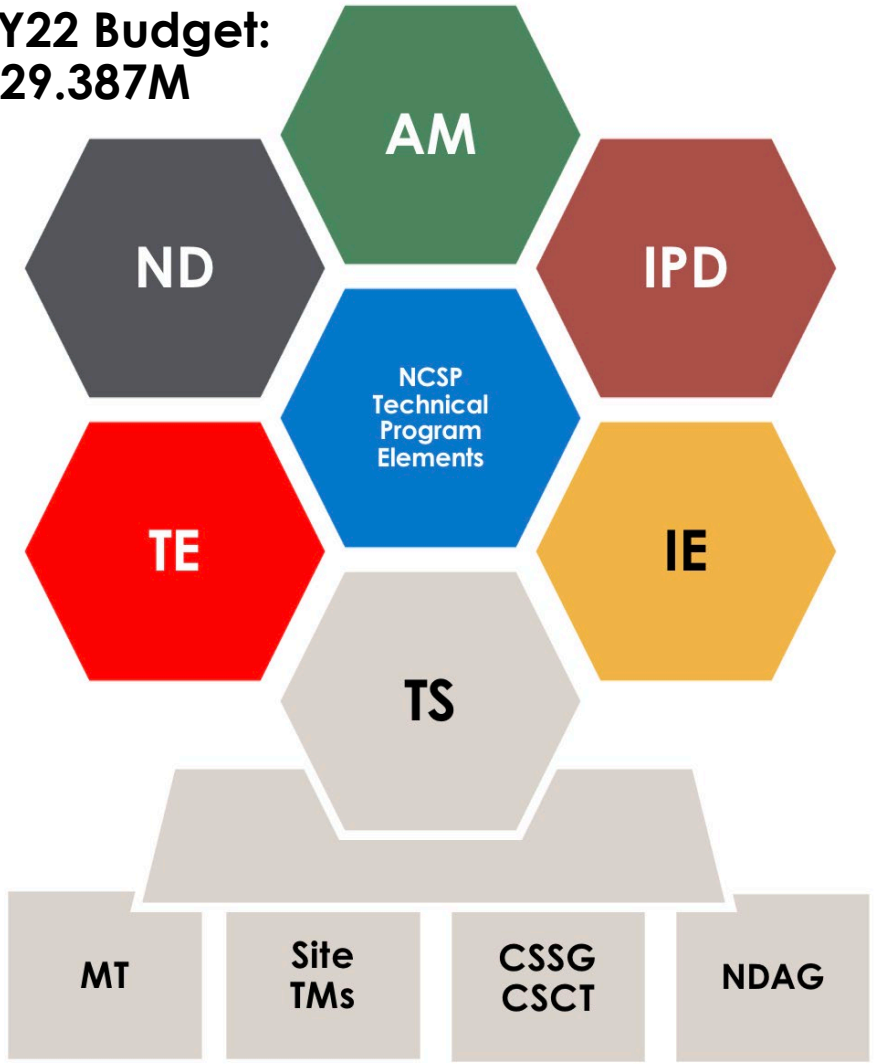
  Protect valuable analyses and information related to criticality safety (including International Criticality Safety Benchmark Evaluation Project [ICSBEP] Handbook)
- **Integral Experiments (IE) – 54% of budget**

  Perform critical and subcritical experiments at the Critical Experiments Facility (CEF) and the Device Assembly Facility (DAF) in Nevada and the Sandia National Laboratory Pulse Reactor Facility, providing integral tests of codes and data
- **Training and Education (TE) – 5% of budget**

  Present web-based training modules and 1- and 2-week hands-on criticality safety courses for criticality safety engineers, line management, and oversight personnel
- **Technical Support (TS) – 8% of budget**

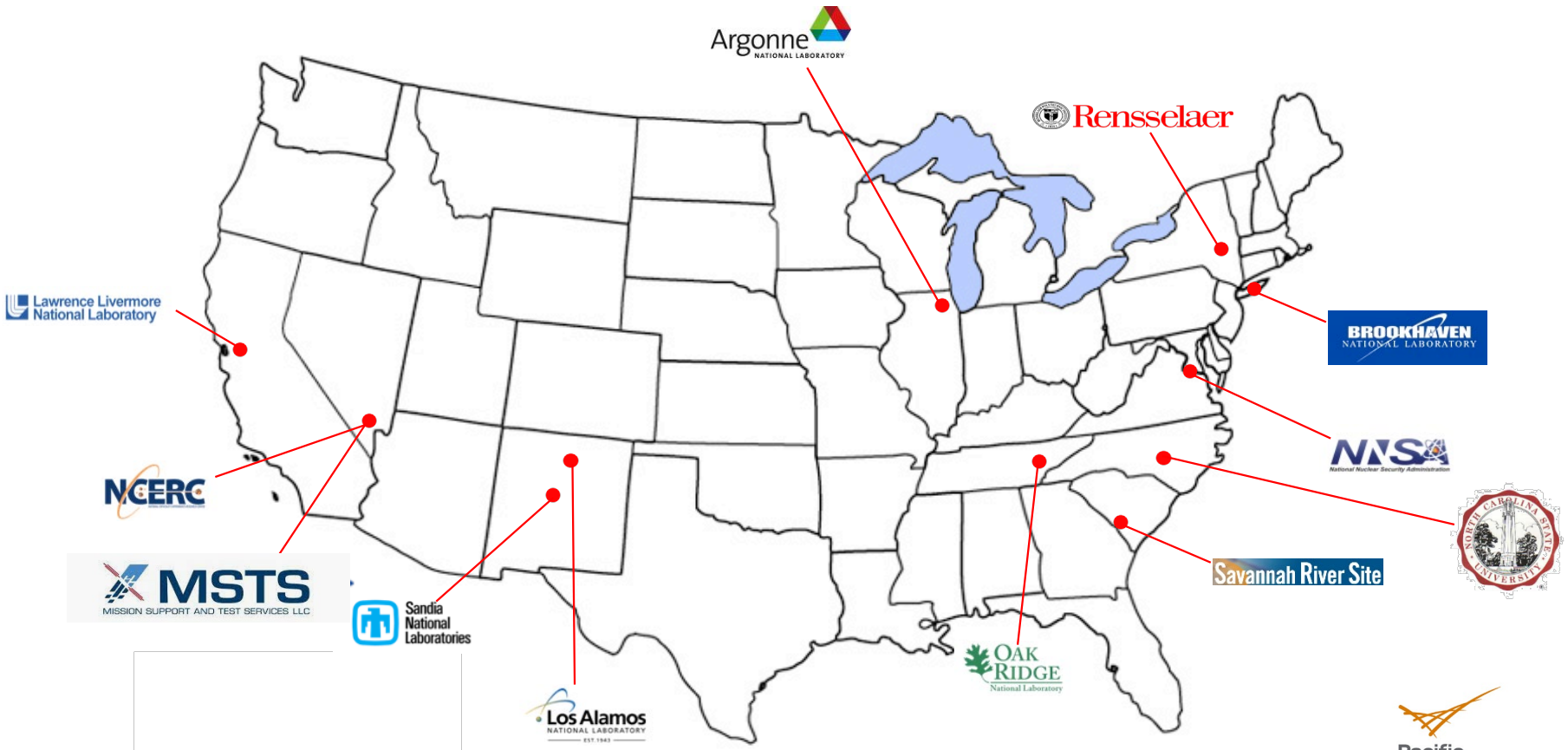
  Provide managerial and technical support

FY22 Budget: $29.387M



AM – Analytical Methods
CSCT – Criticality Safety Coordinating Team
CSSG – Criticality Safety Support Group
IE – Integral Experiments
MT – management team
ND – Nuclear Data
NDAG – Nuclear Data Advisory Group
TE – Training and Education
TMs – task managers
TS – technical support

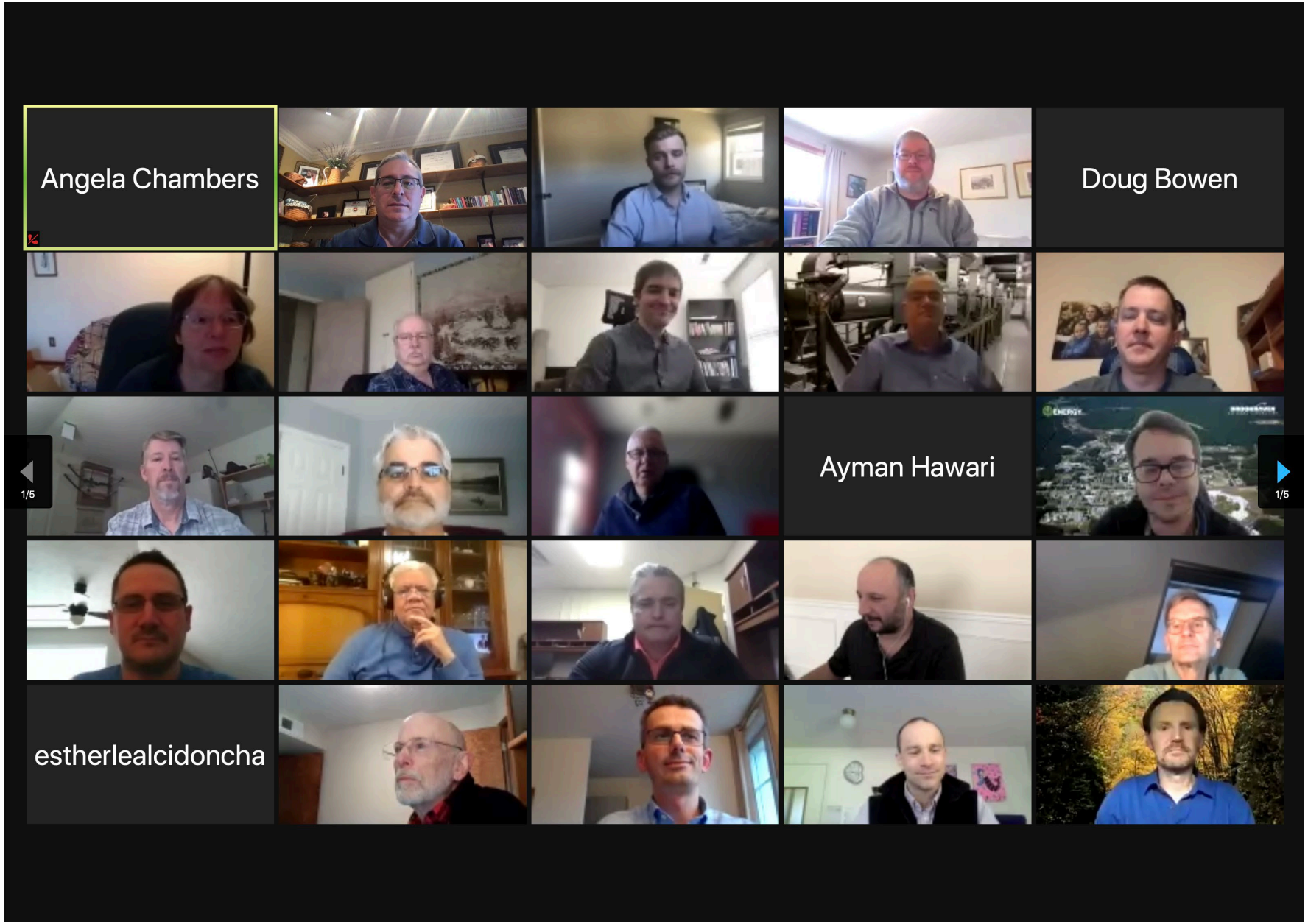
Current NCSP Work Sites and Collaborations



Logos courtesy of those sites collaborating on NCSP projects.

2021 Technical Program Review (Virtual)

- TPR was held virtually from Feb. 23 to Feb. 25, 2021
- More than 180 people attended the meeting



2021 NCSP TPR Best Paper Award Winners

RPI LINAC Refurbishment and Upgrade Project

12:35–12:55PM EST

Yaron Danon (Rensselaer Polytechnic Institute), Peter Brand (Rensselaer Polytechnic Institute), Michael Bretti (Rensselaer Polytechnic Institute), Brian Epping (Naval Nuclear Laboratory), Timothy Trumbull (Naval Nuclear Laboratory)

Summary

Low-Energy Reactions of the n+233U Nuclear Compound System and its Initial Validation

12:55–1:15PM EST

Marco T. Pigni (ORNL), Roberto Capote (IAEA), Andrej Trkov (Jožef Stefan Institute)

Summary

Preliminary RAM-RODD Results for the MUSiC Subcritical Configurations

1:15–1:35PM EST

Robert A. Weldon Jr. (LANL), Theresa E. Cutler (LANL), Joetta M. Goda (LANL), Jesson D. Hutchinson (LANL), William L. Myers (LANL), George E. McKenzie IV (LANL), Alexander T. McSpaden (LANL), Lauren A. Misurek (LANL), Rene G. Sanchez (LANL)

Summary

Design of Temperature-Dependent Critical Experiments with SPRF/CX

1:35–1:55PM EST

Justin B. Clarity (ORNL), Ryan C. Gallagher (ORNL), Mathieu N. Dupont (ORNL), Christopher W. Chapman (ORNL)

Summary

Photo Doppler Velocimetry and Gamma/Neutron Yield Measurements of Godiva-IV Critical Assembly

1:55–2:15PM EST

Lucas Snyder (LLNL), Dan Bower (LLNL), Robert Buckles (Nevada National Security Site), David Fittinghoff (LLNL), Joetta Goda (LANL), Mark May (LLNL), Michael Pena (Nevada National Security Site), John Scorby (LLNL)

Summary

Presentation Slides