ANS NCSD

2017 NUCLEAR CRITICALITY SAFETY DIVISION TOPICAL MEETING

September 10-15, 2017

Pecos River Village Conference Center,

Carlsbad, NM

Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations

OFFICIAL PROGRAM

PROUD SPONSORS:

NAVARRO

NWP Nuclear Waste Partnership LLC

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CARLSBAD ENVIRONMENTAL MONITORING & RESEARCH CENTER

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PLENARY, SPECIAL SESSIONS & EVENTS

2017 NCSD TECHNICAL SESSIONS

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Meeting Officials

Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations

2017 Nuclear Criticality Safety Division Topical Meeting

HONORARY CHAIR
Mr. Todd Shrader
Department of Energy

HONORARY CHAIR
Mr. Jeff Carswell
Department of Energy

GENERAL CHAIR
Dr. Jef Lucchini
Los Alamos National Laboratory

TECHNICAL PROGRAM CHAIR
Pr. Sedat Goluoglu
University of Florida

TECHNICAL PROGRAM CO-CHAIR
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TECHNICAL COMMITTEE
Dr. Kaushik Banerjee
Oak Ridge National Laboratory

TECHNICAL COMMITTEE
Dr. Larry Berg
Department of Energy

TECHNICAL COMMITTEE
Dr. Doug Bowen
Oak Ridge National Laboratory

Keynote Speakers

Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations

2017 Nuclear Criticality Safety Division Topical Meeting

Dr. Robert Wilson
Department of Energy

Robert Wilson obtained a Bachelor and Masters of Science degree in Engineering Physics from the University of California at Los Angeles and a PhD in Nuclear Engineering from the University of Washington.

His dissertation was in experimental critical mass physics and post-doctoral work was in fast reactor safety analysis. Following academia he assumed responsibility for the Criticality Safety Program at the Idaho Chemical Processing Plant (ICPP). While at ICPP he managed the safety response to a criticality accident in 1978 and managed the rebuilding of the criticality safety program. Following ICPP, he worked as the senior criticality safety specialist for the U.S. Nuclear Regulatory Commission and later assumed responsibility for the criticality safety program at the Rocky Flats Site.

He has served as a member of the Argonne National Laboratory Nuclear Facility Safety Committee, the Los Alamos National Laboratory Nuclear Criticality Safety Committee (current), the DOE Nuclear Criticality Technology and Safety Panel and the DOE Criticality Safety Support Group. He has been the General Chairman and Program Chairman for ANS topical meetings in criticality safety. He has twice served as chair of the ANS Nuclear Criticality Safety Division. He has served as an Affiliate Professor of Nuclear Engineering for the University of Idaho and has lectured at dozens of University of New Mexico Short Courses on Nuclear Criticality Safety.

He is a member of several ANSI writing groups for criticality safety related standards and is a member of the Nuclear Criticality Safety Consensus Committee for the American National Standards Institute.

Mr. Calvin M. Hopper
Oak Ridge National Laboratory retiree

Mr. Calvin M. Hopper retired from the Oak Ridge National Laboratory (ORNL) in 2008 as a Distinguished Development and Design Engineer in the Radiation Transport and Criticality Group within the Nuclear Science and Technology Division.

Over the past 47 years, following his receipt of a B.S. in Physics from Southern Colorado State College, Hopper has held various technical, administrative and consulting positions within the Oak Ridge, Tennessee contractor facilities. In his continuing consultancies he has performed part-time on-going work for ORNL contracts to the US Department of Energy (DOE) and US Nuclear Regulatory Commission (NRC) [2008 – 2017], three years of consulting to the Oak Ridge Y-12 National Security Complex [2008 – 2011], and two years of support to the US Defense Nuclear Facility Safety Board as well as incidental support to the US DOE Nuclear Criticality Safety Program, and the Canadian Chalk River Repatriation of HEU to the US.

Throughout his career Hopper has provided both training and NCS analyses/evaluations consulting services to industries in the US and Canada. Additionally, he has provided educational services through the University of Tennessee – Nuclear Engineering Department graduate classes and Tennessee Industries Week programs and lectured for the US DOE Prevention of Significant Nuclear Events and Potential Safety Impacts of New Technologies on the Operation of DOE Nuclear Facilities. He is currently providing sporadic services to ORNL in the areas of NCS. Independently he has provided NCS program assessments and mentoring support to the US Defense Nuclear Facility Safety Board.

Dr. Thomas P. McLaughlin
Los Alamos National Laboratory retiree

Dr. McLaughlin has been active in performing, analyzing and designing critical experiments, performing theoretical reactor safety analyses and conducting all aspects of criticality safety for 50 years. The last 40 have been focused almost exclusively in criticality safety, with 30-plus years at Los Alamos National Laboratory. Since his retirement from Los Alamos in 2004 he has consulted for the DOE and the NRC and many of their contractors and licensees. He has also consulted for Canadian and Australian research laboratories.

He has been active in providing training in criticality safety throughout his career. His work at Los Alamos included criticality safety responsibility for all US nuclear weapons of Los Alamos design and providing written guidance in manuals and training in-person training to members of the three military branches. He is a charter member of the DOE's Criticality Safety Support Group. He has been active in ANS-8 Standards for over 30 years and was chair of ANS-8 for 20 of those.

A highlight of his career was reaching out to, and successfully interacting with, his Russian counterparts at various sites in Russia shortly after the fall of the Soviet Union in 1991. Throughout the 90's he and co-workers at Los Alamos gathered, from personal interviews, undocumented accounts of both their process criticality accidents as well as their critical experiment accidents and published them in the report "A Review of Criticality Accidents" - 2000 Revision. After the Japanese criticality accident at Tokai-Mura in 1999 he was selected as the criticality safety expert on the US government's 3-person team providing immediate technical assistance to the Japanese government.

Dear Colleagues,

The ANS Carlsbad Section and the local community welcome you to the 2017 NCSD Topical meeting! It will be held at the Pecos River Village Conference Center (PRVCC) in Carlsbad, NM, September 10-15, 2017.

The purpose of the NCSD Topical meetings is to offer an international forum for discussion of all the aspects of the safety of fissile material operations outside of reactors. The 2017 NCSD Topical will provide an opportunity for national and international individuals, professionals and students, technical experts and program managers in the nuclear criticality safety community to meet and discuss their research and work face-to-face. These interactions can help establish good working relationships and collaborations to solve common problems across multiple disciplines. Also, old friendships can be cultivated and new ones established.

The city of Carlsbad, NM, is a great venue for the 2017 NCSD Topical meeting! The area is home to unique nuclear facilities (Waste Isolation Pilot Plant, URENCO Enrichment Facility, and Waste Control Specialists) and is an excellent tourist destination (Carlsbad Caverns National Park, Guadalupe Mountains National Park, UFO Museum).

We are looking forward to seeing you in Carlsbad, NM!

Jef Lucchini
General Chair of the 2017 NCSD Topical meeting

Daily Schedule

Sunday, September 10

7:30 am – 7:00 pm	Registration
8:00 am – 5:00 pm	Tutorial-D: SCALE 6.2 Criticality Safety Calculations and Sensitivity/Uncertainty Methods for Criticality Safety Validation
9:00 am – 5:00 pm	Tutorial-B: Monte Carlo Criticality Calculations with MCNP6-Whisper
10:00 – 10:20 am	Morning Break
12:00 – 1:00 pm	Lunch
1:00 – 5:00 pm	Tutorial-A: Automated As-loaded and Design-basis Criticality Analysis for Dry Spent Nuclear Fuel Systems Using UNF-ST&DARDS
3:00 – 3:20 pm	Afternoon Break
5:20 – 8:00 pm	Opening Reception

Monday, September 11

7:30 am – 5:00 pm	Registration
8:20 – 9:45 am	Plenary-I: Nuclear Waste Management in Southeast New Mexico
9:00 – 1:00 pm	Waste Isolation Pilot Plant (WIPP) Roadshow Exhibition - I
10:00 – 10:20 am	Morning Break
10:20 am – 12:20 pm	Plenary-II: Nuclear Criticality & Safety in Our World
12:20 – 1:20 pm	Lunch
1:20 – 3:00 pm	Technical Sessions • Experiment Needs/Proposals • Validation/Applicability Studies I
3:00 – 3:20 pm	Afternoon Break
3:20 – 5:00 pm	Technical Session • Validation/Applicability Studies II

Daily Schedule

Tuesday, September 12

7:30 am – 5:00 pm	Registration
8:20 – 10:00 am	Technical Session • Burnup Credit I
9:00 – 1:00 pm	WIPP Roadshow Exhibition - II
10:00 – 10:20 am	Morning Break
10:20 am – 12:00 pm	Technical Sessions • Burnup Credit II • Storage, Transportation, and Disposal of Fissile Materials
12:00 – 1:20 pm	Lunch
1:20 – 3:00 pm	Technical Session • Criticality Safety – General I
3:00 – 3:20 pm	Afternoon Break
3:20 – 5:00 pm	Technical Session • Criticality Safety – General II

Courtesy of the Department of Energy, Carlsbad Field Office (DOE-CBFO)

Daily Schedule

Wednesday, September 13

7:30 am – 5:00 pm	Registration
8:20 – 10:00 am	Technical Sessions • Information Access • Nuclear Data (Including ENDF/BVIII) and Libraries • Spent Nuclear Fuel and Other Fissile Materials Criticality Safety from Applicants and Regulators Perspective
10:00 – 10:20 am	Morning Break
10:20 am – 12:00 pm	Technical Sessions • Qualification Programs • University Initiatives/Course/Distance Educ.
12:00 – 1:20 pm	Lunch
1:20 – 3:00 pm	Technical Session • Criticality Safety – General III
3:00 – 3:20 pm	Afternoon Break
3:20 – 5:00 pm	Technical Sessions • Disposal Criticality and Criticality Consequences Analysis in the Disposal Time Frame • Fuel Fabrication and Operational Practices • Student Competition
6:00 – 9:00 pm	Banquet at the Living Desert Zoo & Gardens State Park Visitor Center

Courtesy of the Living Desert Zoo & Gardens State Park

Daily Schedule

Thursday, September 14

7:30 am – 3:00 pm	Registration
8:20 – 10:00 am	Technical Sessions • Criticality Safety - General IV • Accident Analysis and Alarm Systems
10:00 – 10:20 am	Morning Break
10:20 am – 12:00 pm	Technical Session • Methods and Software Development I
12:00 – 1:20 pm	Lunch
1:20 – 2:20 pm	Technical Session • Methods and Software Development II

Friday, September 15

7:30 am – 5:00 pm	Technical Tours • WIPP • URENCO + Waste Control Specialists (WCS) Tour
7:30 am – 5:00 pm	Carlsbad Caverns Excursion
12:00 – 1:00 pm	Lunch

Courtesy of the National Park Service, Carlsbad Caverns

General Information

LOCATIONS

Registration, tutorials, opening reception, plenaries, and technical sessions will be held at the Pecos River Village Conference Center (PRVCC), 711 Muscatel Avenue, Carlsbad, NM 88220.

The banquet will be held at the Living Desert Zoo & Gardens State Park Visitor Center, 1504 Miehls Drive N., Carlsbad, NM 88220.

REGISTRATION

Meeting registration is required for all attendees and speakers. Badges are required for admission to all plenaries, technical sessions and events.

REGISTRATION HOURS

Sunday, September 10	7:30 am – 7:00 pm
Monday, September 11	7:30 am – 5:00 pm
Tuesday, September 12	7:30 am – 5:00 pm
Wednesday, September 13	7:30 am – 5:00 pm
Thursday, September 14	7:30 am – 3:00 pm

NOTICE FOR SPEAKERS

All speakers and Session Chairs must check in at the Conference front desk during registration hours.

ATTENDEE MEAL FUNCTIONS

Morning Breaks will be provided to all registered meeting attendees, Sunday – Thursday. Afternoon Breaks will be provided to all registered meeting attendees, Sunday – Wednesday.

Lunch will be provided to all registered meeting attendees, Sunday – Friday.

Opening Reception is included with a full meeting registration. Hors d'oeuvres will be served, and a cash bar will be available.

Banquet is included with a full meeting registration. Dinner will be served, and a cash bar will be available.

General Information

ABOUT ANS

Mission

ANS provides its members with opportunities for professional development. It also serves the nuclear community by creating a forum for sharing information and advancements in technology, and by engaging the public and policymakers through communication outreach.

Code of Ethics

Recognizing the profound importance of nuclear science and technology in affecting the quality of life throughout the world, members of the American Nuclear Society (ANS) are committed to the highest ethical and professional conduct.
ANS members as professionals are dedicated to improving the understanding of nuclear science and technology, appropriate applications, and potential consequences of their use.
To that end, ANS members uphold and advance the integrity and honor of their professions by using their knowledge and skill for the enhancement of human welfare and the environment; being honest and impartial; serving with fidelity the public, their employers, and their clients; and striving to continuously improve the competence and prestige of their various professions. The Code of Ethics can be found at www.ans.org/about/coe.

Statement on Diversity

The American Nuclear Society (ANS) is committed, in principle and in practice, to creating a diverse and welcoming environment for everyone interested in nuclear science and technology. Diversity means creating an environment – both in ANS and in the profession – in which all members are valued equitably for their skills and abilities and respected equally for their unique perspectives and experiences. Diverse backgrounds foster unique contributions and capabilities, and so creation of an inclusive Society ultimately leads to a more creative, effective, and technically respected Society.
ANS believes that everyone deserves opportunities for learning, networking, leadership, training, recognition, volunteering in Society activities, and all the other benefits that involvement in the Society brings, regardless of age, color, creed, disability, ethnicity, gender identity and expression, marital status, military service status, national origin, parental status, physical appearance, race, religion, sex, or sexual orientation. The selection of a member to serve in ANS's volunteer leadership structure shall be based solely on the member's ability, interest and commitment to serve. In particular, ANS encourages members at each level of the Society and in each Professional Division and Technical Group to make special efforts to recruit underrepresented minorities and women to ensure that they are adequately represented in the Society.

Respectful Behavior Policy (Abbreviated)

The open exchange of ideas, freedom of thought and expression, and productive scientific debate are central to the mission of the American Nuclear Society (ANS). These require an open and diverse environment that is built on dignity and mutual respect for all participants and ANS staff members, and is free of bias and intimidation.
ANS is dedicated to providing a safe, welcoming, and productive experience for everyone participating in Society events and other Society activities regardless of age, color, creed, disability, ethnicity, gender identity and expression, marital status, military service status, national origin, parental status, physical appearance, race, religion, sex, or sexual orientation. Creation of a safe and welcoming environment is a shared responsibility held by all participants. Therefore, ANS will not tolerate harassment of or by participants (including ANS volunteer leaders and staff members) in any form. Disciplinary action for participants found to have violated this principle may include reprimand, expulsion from an event or activity with or without a refund, temporary or permanent exclusion from all ANS events and activities, suspension or expulsion from volunteer leadership positions or groups, and/or suspension or expulsion from Society membership, as appropriate.
If you or someone else experiences harassment, regardless of how you otherwise choose to initially handle the situation, you are encouraged to report the situation to ANS. It is possible that the behavior you experienced is part of a larger pattern of repeated harassment. Please alert ANS to behavior you feel to be harassment regardless of the offender's identity or standing in the Society.
The designated contact person for reports at the 2017 NCSD Topical meeting is General Chair Jef Lucchini, who can be reached at 575-706-0213 during the event. In addition, you may contact ANS Executive Director Robert C. Fine during or after the event at 708-476-7096 or rfine@ans.org.
The complete Respectful Behavior Policy can be found at www.ans.org/about/rbp. If you have questions about the policy, please contact ANS Executive Director Robert C. Fine at 708-579-8200 or rfine@ans.org.

Plenary, Special Sessions & Events

SUNDAY, SEPTEMBER 10

Tutorial-D: SCALE 6.2 Criticality Safety Calculations and Sensitivity/Uncertainty Methods for Criticality Safety Validation

Organizer: Chris Perfetti *(Oak Ridge National Laboratory)*
Location: Pecos River Village Conference Center **Time:** 8:00 am – 5:00 pm

This course will cover the theory and use of tools in the SCALE 6.2 Code Package for criticality safety calculations and sensitivity/uncertainty-informed criticality safety validation. The first half of the course will provide instruction on performing criticality safety calculations using the KENO-VI code, a 3-D generalized geometry Monte Carlo code that allows for versatile modeling of complex geometries using either continuous-energy or multigroup physics. This class will use the Fulcrum user interface for interactive model setup, visualization of inputs and results, execution of SCALE, and output review. Instruction will also be provided on the SCALE material input and resonance self-shielding capabilities, including Fulcrum capabilities for visualizing fluxes, reaction rates, and cross-section data. By the end of the first half of this course, users will understand the basic steps involved in building KENO-VI geometries and will develop KENO models for several simple systems. More experienced users are encouraged to attend and develop more complicated models for their applications of interest.
The second half of this course will focus on SCALE sensitivity and uncertainty methods for criticality safety validation. This block will begin by discussing the TSUNAMI-3D methods for sensitivity analysis, and will discuss sensitivity coefficient calculations for eigenvalue responses using continuous-energy physics models. This course will then discuss SCALE's comprehensive library of cross-section covariance data, which can be used to estimate the uncertainty present in eigenvalues and other system responses when combined with TSUNAMI sensitivity coefficients. An alternate approach for uncertainty quantification will also be presented using the SAMPLER tool, which allows for uncertainty analysis by randomly sampling cross section data, geometry information, and other parameters. This course will conclude by briefly discussing how sensitivity and uncertainty analysis methods enable advanced techniques for code and data validation, including the identification of appropriate benchmark experiments, detailed quantification of bias and bias uncertainty, and identification of gaps in available experiments.

The tutorial is open to all registered meeting attendees who signed up at the time of registration. Participants wishing to follow along with the tutorial should bring their own computer, have a valid license for SCALE 6.2.0 or a more recent version, and have this SCALE version installed on their computer.

Tutorial-B: Monte Carlo Criticality Calculations with MCNP6-Whisper

Organizers: Forrest Brown, Jennifer Alwin, Michael Rising *(Los Alamos National Laboratory)*
Location: Pecos River Village Conference Center **Time:** 9:00 am – 5:00 pm

Review of MC criticality fundamentals (9am - 11am)
This portion of the tutorial session is targeted at new or early-career criticality safety analysts to provide a review of basic concepts, including: best practices for MC criticality calculations, spectra, lethargy, sensitivity, nuclear data uncertainties, etc.
What's new with MCNP6.2 & Whisper-1.1 (11am – 12pm)
An update on what is the same or different with the Spring 2017 release of MCNP6.2 & Whisper-1.1.
Tutorial on using MCNP6-Whisper-1.1 for NCS validation (1pm – 5pm)
Whisper-1.1 makes use of MCNP6-generated sensitivity profiles and cross-section covariance data to provide guidance for setting baseline USLs for NCS validation. Background & practical application of the new tool will be covered, along with discussion of ANS standards.

The tutorial is open to all registered meeting attendees who signed up at the time of registration. Discussion time will be available for specific issues concerning installation, problem resolution, user issues, computational details, etc. Laptops are not required, but participants with laptops & installed MCNP6 can follow the demonstrations hands-on.

Plenary, Special Sessions & Events

SUNDAY, SEPTEMBER 10 CONTINUED

Tutorial-A: Automated As-loaded and Design-basis Criticality Analysis for Dry Spent Nuclear Fuel Systems Using UNF-ST&DARDS

Organizer: Kaushik Banerjee *(Oak Ridge National Laboratory)*
Location: Pecos River Village Conference Center **Time:** 1:00 – 5:00 pm

The Used Nuclear Fuel-Storage, Transportation & Disposal Analysis Resource and Data System (UNF-ST&DARDS) is being developed at Oak Ridge National Laboratory in collaboration with multiple national laboratories and nuclear industry participants (utilities, fuel vendors, and cask vendors) for integrating spent nuclear fuel (SNF) management through its final disposition. When basic information about the SNF and the cask system is provided, the data relationships defined in UNF-ST&DARDS allow inputs to the respective codes (e.g., SCALE) to be built autonomously. This tutorial will include (1) as-loaded (using actual cask loading maps) criticality analysis of currently loaded casks for storage, transportation, and disposal (over disposal time periods), (2) discussion of as-loaded criticality analysis to support licensing/certification of dry SNF systems, (3) misload analysis methodology to support as-loaded criticality analysis, and (4) design-basis criticality analysis using user-defined loading patterns and fuel assembly types.

The tutorial is open to all registered meeting attendees who signed up at the time of registration. Laptops are not required, but participants with valid licenses for UNF-ST&DARDS 3.1Beta (by invitation only) and SCALE 6.2.2 installed on their computer (windows machine) can follow the demonstrations hands-on.

Opening Reception

Location: Pecos River Village Conference Center **Time:** 5:20 – 8:00 pm

All attendees are invited to enjoy an evening of networking!
Nice boat ride tours on the Pecos River will be kindly offered by the Carlsbad Chamber of Commerce (departure at 5:30 pm and 6:30 pm – duration: about 40 min). Carlsbad Mayor Dale Janway will give a welcome address at 6:15 pm. The unique Carlsbad Mariachi Unido band will be performing some authentic Mariachi music during the evening. Heavy hors d'oeuvres will be served, and a cash bar will be available.

This event is included in your full meeting registration. Additional tickets are available for purchase at the following cost: $25.

Courtesy of the City of Carlsbad, NM

Plenary, Special Sessions & Events

MONDAY, SEPTEMBER 11

Plenary-I: Nuclear Waste Management in Southeast New Mexico

Chair: Jef Lucchini *(Los Alamos National Laboratory)*
Location: Pecos River Village Conference Center **Time:** 8:20 – 9:45 am

Invited speakers will welcome the meeting attendees, and highlight the projects and successes in nuclear waste management in Southeast New Mexico.

8:20 am: Welcoming Address, D. Janway *(Carlsbad Mayor)*
8:30 am: The Waste Isolation Pilot Plant, J. Carswell *(Department of Energy, Carlsbad Field Office)*, Honorary Chair
9:00 am: A Centralized Interim Storage Facility for Used Nuclear Fuel, J. Heaton (*Eddy-Lea Energy Alliance, LLC)*
9:20 am: Welcoming Address, C. Brown (*New Mexico Representative)*
9:30 am: Los Alamos National Laboratory in support of the Waste Isolation Pilot Plant, N.Z. Elkins (*Los Alamos National Laboratory)*

Waste Isolation Pilot Plant (WIPP) Roadshow Exhibition - I

Location: Pecos River Village Conference Center parking lot **Time:** 9:00 am – 1:00 pm

The Department of Energy, Carlsbad Field Office (DOE-CBFO) and the Waste Isolation Pilot Plant (WIPP) operator, Nuclear Waste Partnership LLC, will have a Roadshow Exhibition featuring the TRUPACT-II and/or HalfPACT packaging that are used in the transportation of nuclear waste across the nation. Specialists will be present to answer questions from the audience.

This free event is included in your meeting registration.

Courtesy of the Department of Energy, Carlsbad Field Office (DOE-CBFO)

Plenary, Special Sessions & Events

MONDAY, SEPTEMBER 11 CONTINUED

Plenary-II: Nuclear Criticality & Safety in Our World

Chair: Jef Lucchini *(Los Alamos National Laboratory)*
Location: Pecos River Village Conference Center **Time:** 10:20 am – 12:20 pm

Invited keynote speakers will make presentations on various major topics of nuclear criticality safety.

10:20 am: Criticality Safety in Waste Streams, R. Wilson *(Department of Energy, Environmental Management Consolidated Business Center)*
11:00 am: Relative Acceptable Societal Risks and Their Relevance to Nuclear Operations, C. Hopper *(Oak Ridge National Laboratory, retiree)*
11:40 am: Criticality Accidents – History and Current Impacts, T.P. McLaughlin (*Los Alamos National Laboratory, retiree)*

TUESDAY, SEPTEMBER 12

Waste Isolation Pilot Plant (WIPP) Roadshow Exhibition - II

Location: Pecos River Village Conference Center parking lot **Time:** 9:00 am – 1:00 pm

The Department of Energy, Carlsbad Field Office (DOE-CBFO) and the Waste Isolation Pilot Plant (WIPP) operator, Nuclear Waste Partnership LLC, will have a Roadshow Exhibition featuring the TRUPACT-III packaging that is used in the transportation of nuclear waste across the nation. Specialists will be present to answer questions from the audience.

This free event is included in your meeting registration.

Courtesy of the Department of Energy, Carlsbad Field Office (DOE-CBFO)

Plenary, Special Sessions & Events

WEDNESDAY, SEPTEMBER 13

Banquet

Location: Living Desert Zoo & Gardens State Park Visitor Center **Time:** 6:00 – 9:00 pm

All attendees are invited to enjoy an evening of celebration in the relaxing atmosphere of the Carlsbad Living Desert Zoo & Gardens State Park Visitor Center!
Even though the zoo and the park will be closed at that time, you will still be able to get a good idea of the richness and diversity of the native wildlife of the Chihuahuan Desert with the various exhibits displayed in the foyer of the Visitor Center. Additionally, the zoo gift shop & book store will be exceptionally open for a couple of hours for the conference attendees to purchase some characteristic souvenirs of the area, and a 10% discount will be applied to all purchases.
DJ Jose Ornelas will play your favorite music on demand. A cash bar will be available. A typical Southeast New Mexican dinner will be served.

This event is included in your full meeting registration. Additional tickets are available for purchase at the following cost: $50.

Courtesy of the Living Desert Zoo & Gardens State Park

Plenary, Special Sessions & Events

FRIDAY, SEPTEMBER 15

Technical Tour-A: Waste Isolation Pilot Plant (WIPP) Tour

Time: 7:30 am – 5:00 pm **Transportation included**; **Lunch included**

The WIPP is the only U.S. deep geological repository licensed to permanently dispose of the nation's defense-related transuranic waste. The waste have been emplaced in a 2,000 ft.-deep salt basin formed during the Permian Period approximately 250 million years ago. Located in the Chihuahuan Desert, approximately 26 miles east of Carlsbad, NM, WIPP began disposal operations in March 1999. Two incidents forced disposal operations to stop in February 2014. After a nearly 3-year recovery process, the WIPP has been resuming activities this year.
The Tour will include an extensive presentation of the WIPP mission, achievements and challenges. It will take place at the site. A visit of the key areas at the surface of the site will be followed with a unique tour of the underground, should this latter not interfere with the operations going on that day.

This free event is open to registered meeting attendees who signed up at the time of registration, provided the additional information requested by the site (if any), and received final approval.

Courtesy of the Department of Energy, Carlsbad Field Office (DOE-CBFO)

Plenary, Special Sessions & Events

FRIDAY, SEPTEMBER 15 CONTINUED

Technical Tour-B: URENCO + Waste Control Specialists (WCS) Tour

Time: 7:30 am – 5:00 pm **Transportation included**; **Lunch included**

This Technical Tour will combine two exceptional facilities located at the New Mexico-Texas border, approximately 75 miles east of Carlsbad, NM: the URENCO Enrichment Facility, and the Waste Control Specialists (WCS) Facility.

URENCO USA is the first enrichment facility to be built in the U.S. in 30 years and the first ever using centrifuge enrichment technology. The URENCO USA facility began operations on June 2010. At the end of December 2016, capacity at URENCO USA stood at 4,700 tSW/a. It is anticipated that at full planned 5,700 tSW/a capacity, the facility will produce sufficient enriched uranium for nuclear fuel to provide approximately 7% of America's electricity needs.

Located within a 1,200-ft. thick nearly impermeable red-bed clay formation, the Waste Control Specialists (WCS) site ensures secure, compliant, safe and permanent disposal of radioactive waste by combining this unique natural barrier with a custom designed and engineered, 7-ft. thick, steel-reinforced concrete liner system. WCS operates a fully licensed 1,338-acre facility located on a 14,900-acre site in western Andrews County, Texas.

This free event is open to registered meeting attendees who signed up at the time of registration, provided the additional information requested by the site (if any), and received final approval.

Courtesy of the Waste Control Specialists (WCS)

Plenary, Special Sessions & Events

FRIDAY, SEPTEMBER 15 CONTINUED

Excursion: Carlsbad Caverns

Time: 9:00 am – your time **Lunch included; Transportation on your own (organizers can help)**

We invite you to discover (or re-discover) the remarkable Carlsbad Caverns National Park!
Beneath the scenic and rugged Chihuahuan Desert, in the rocky slopes and deep canyons of Guadalupe Mountain range, sit the largest chambered cavern in North America, and other underground wonders! Above grounds, around sunset time, the ballet of hundreds of thousands of bats will leave you amazed!

Your Carlsbad Caverns Excursion will include the following:

- The outstanding Big Room, which you can access either hiking down a 1.25 mile paved trail through the cave's Natural Entrance, or … taking an elevator ride!
- The beautiful King's Palace, the deepest portion of the cavern open to the public. On this ranger-guided tour, you will leisurely stroll through 4 naturally decorated chambers of the cave. You will also experience the natural darkness of the cave, when the ranger conducts the impressive "black-out"!
- Should you decide to stay until dark, the spectacular Bat Flight program will take place at dusk, when thousands of bats exit the cave to look for food.

General information on the Carlsbad Caverns National Park can be found at https://www.nps.gov/cave/index.htm.

This free event is open to registered meeting attendees who signed up at the time of registration. Additional tickets are available for purchase at the following cost: $25.

Courtesy of the National Park Service, Carlsbad Caverns

Technical Sessions: Monday September 11

MONDAY, SEPTEMBER 11

TECHNICAL SESSIONS - 1:20 PM

Experiment Needs/Proposals

Session Organizer: Dr. John Darrell Bess *(INL)*, **Co-chairs:** Angela Chambers *(NNSA)*, Kent Wood *(NRC)*
Time: 1:20 - 2:00 pm

1:20 pm: Thermal/Epithermal Experiments with Hafnium (TEX-Hf), Anthony J. Nelson, Catherine M. Percher, William J. Zywiec, David P. Heinrichs *(LLNL)*

1:40 pm: Use of Advanced Optimization Algorithms for the Design of Critical Experiments, Nicolas Leclaire *(IRSN (French Institute for Nuclear Safety))*, Mathieu Monestier *(URANUS)*, Isabelle Duhamel *(IRSN)*

Validation/Applicability Studies I

Session Organizer: Dr. John Darrell Bess *(INL)*, **Co-chairs:** Angela Chambers *(NNSA)*, Kent Wood *(NRC)*
Time: 2:00 - 3:00 pm

2:00 pm: Validation and Bias Quantification of Criticality Safety Codes for Srns Operations, Scott Finfrock *(Fluor Government Group)*, David G. Erickson *(Savannah River Nuclear Solutions (SRNS))*, Tracy E. Stover *(Savannah River Nuclear Solutions, LLC)*

2:20 pm: Validation of MVP Code with HTC Critical Experiments, Shigeki Shiba *(Nuclear Regulation Authority)*, Tomohiro Sakai *(NRA)*

2:40 pm: Convergence of Correlation Coefficients of Critical Experiments Derived by Monte Carlo Sampling, Maik Stuke, Fabian Hans Dominik Sommer *(Gesellschaft für Anlagen und Reaktorsicherheit gGmbH)*

Validation/Applicability Studies II

Session Organizer: Dr. John Darrell Bess *(INL)*, **Co-chairs:** Nicolas Leclaire *(IRSN)*, Hannah Morbach *(CNS)*
Time: 3:20 - 5:00 pm

3:20 pm: Results of TRIPOLI-4 Version 10 on TRIPOLI Criticality Validation Suite, Thermal Spectra, Jean-Christophe P. Trama, Fadhel Malouch *(CEA)*

3:40 pm: Evaluation of SCALE 6.1.2 Tsunami Module for Selection of Representative Benchmarks for Validation of Criticality Safety Studies, David Noyelles, Emmanuel Gagnier *(CEA)*

4:00 pm: Development of Criticality Safety Validation Guidance for NRC-Regulated Activities, William J. Marshall, Donald E. Mueller, Justin B. Clarity, Stephen M. Bowman *(ORNL)*

4:20 pm: Simulated Rossi-Alpha Analysis of an Asymmetrically Coupled Bare Metal HEU Reactor System, Kimberly L. Klain *(LANL)*

4:40 pm: Investigations into Validation of Plutonium Solutions for Criticality Safety Analysis, Jennifer L. Alwin, Forrest B. Brown, Alicia Salazar-Crockett, Michael E. Rising *(LANL)*

TUESDAY, SEPTEMBER 12

TECHNICAL SESSIONS - 8:20 AM

Burnup Credit I

Session Organizer: Dr. Kaushik Banerjee *(ORNL)*, **Co-chairs:** Kaushik Banerjee *(ORNL)*, William J. Marshall *(ORNL)*
Time: 8:20 - 10:00 am

8:20 am: Application of Peaking Factor Credit in Spent Fuel Pool Criticality Analysis, Charles T. Rombough *(CTR Technical Services, Inc.)*, Dale B. Lancaster *(NuclearConsultants.com)*, Matt C. Harris *(NETCO - Curtiss Wright)*

8:40 am: Fuel Pin Zoning to Improve the Accuracy of the Palisades Spent Fuel Pool Criticality Analysis, Charles T. Rombough *(CTR Technical Services, Inc.)*, Dale B. Lancaster *(NuclearConsultants.com)*, Tom Wiggins *(Entergy)*

9:00 am: An Assessment of Total Depletion Uncertainties for a GBC-32 Dry Storage Cask with Plus7 Fuels Using Monte Carlo Sampling and Two-Way Anova F-Test, Ser Gi Hong, Hyungju Yun, Kwangheon Park *(Kyung Hee University)*

9:20 am: Sensitivity and Uncertainty Analysis for a Combined Depletion and Criticality Calculation Chain of a BWR FA, Fabian Hans Dominik Sommer, Volker Hannstein *(GRS, Germany)*

9:40 am: Impact of Grid Growth on PWR Spent Fuel Pool Criticality Analysis, Dale B. Lancaster *(NuclearConsultants.com)*, Charles T. Rombough *(CTR Technical Services, Inc.)*

Burnup Credit II

Session Organizer: Dr. Kaushik Banerjee *(ORNL)*, **Co-chairs:** Henrik Liljenfeldt *(ORNL)*, Justin B. Clarity *(ORNL)*
Time: 10:20 - 11:00 am

10:20 am: Impact of Assembly-Specific Conditions on BWR Burnup Credit, Brian J. Ade, William J. Marshall, Stephen M. Bowman *(ORNL)*

10:40 am: A Burnup Credit Approach for Margin Estimation of Loaded Boiling Water Reactor Canisters in UNF-ST&DARDS, Justin B. Clarity, Kaushik Banerjee, William J. Marshall, Henrik Liljenfeldt *(ORNL)*

Storage, Transportation, and Disposal of Fissile Materials

Session Organizer: Dr. Kaushik Banerjee *(ORNL)*, **Co-chairs:** Henrik Liljenfeldt *(ORNL)*, Justin B. Clarity *(ORNL)*
Time: 11:00 am - 12:00 pm

11:00 am: Investigation of Reactivity Differences in Cylinder Arrays Using Various Mass Fill Geometries with Constant Mass, Quentin T. Newell *(URENCO USA)*, Charlotta E. Sanders *(d/b/a Sanders Engineering)*

11:20 am: Investigation of Reactivity Differences in UF6 Cylinder Arrays with Different Masses at Various Mist Conditions, Charlotta E. Sanders *(d/b/a Sanders Engineering)*, Quentin T. Newell *(URENCO USA)*

11:40 am: Which Parameters Might Help to Predict an Impact on Reactivity for Mixed Fissile Units in a Storage Array?, Mathieu Milin *(IRSN (French Institute for Nuclear Safety))*, Sacko Mariame *(Ausy)*

Technical Sessions: Tuesday September 12

TUESDAY, SEPTEMBER 12

TECHNICAL SESSIONS - 1:20 PM

Criticality Safety – General I

Session Organizer: Dr. Kevin H. Reynolds *(Y-12 NSC)*, **Co-chairs:** Jennifer Alwin *(LANL)*, Alfie O'Neill *(National Nuclear Laboratory)*
Time: 1:20 - 3:00 pm

1:20 pm: Atalante Research Facility- Implementation of a Rule of Fractions for the Management of Reflecting Materials in Mass-Limited Units, Laurent Cholvy, Beatrice Batifol, David Noyelles *(CEA)*

1:40 pm: Criticality Accident Intervention: a Slide-Rule for Dose Estimation, Michael Laget, Emmanuel Gagnier *(CEA)*

2:00 pm: A Novel Approach to Criticality Accident Detection for a Legacy Facility, Sonny Gan, Andrew Malcolm Sutton *(Sellafield Ltd)*

2:20 pm: Developing a New Criticality Methodology to Support Decommissioning of Legacy Plutonium facilities, Andrew Malcolm Sutton *(Sellafield Limited)*

2:40 pm: Consistent Criticality Safety Approach to Nuclear Sites, External Transport, and Final Disposal, Dennis E. Mennerdahl *(E Mennerdahl Systems)*

Criticality Safety – General II

Session Organizer: Dr. Kevin H. Reynolds *(Y-12 NSC)*, **Co-chairs:** Lawrence J. Berg *(NNSA)*, Dennis Mennerdahl *(E Mennerdahl Systems)*
Time: 3:20 - 5:00 pm

3:20 pm: The Potential NCS Issue Process - A Method to Screen Emerging Issues, Kristan M. Wessels *(Y-12 NSC)*, Christopher F. Haught *(CNS)*, V. Tom Young *(Y-12 NSC)*

3:40 pm: Improving Nuclear Criticality Safety in Maintenance and Construction Activities at Y-12 National Security Complex, Travis L. Wilson *(CNS)*

4:00 pm: DELETED

4:20 pm: Criticality Accident Dosimetry at CEA Facilities: Use of SNAC2 Type Neutron Zone Spectrometer, Pierre Casoli, Emmanuel Gagnier, Michael Laget, Laurence Lebaron-Jacobs *(CEA)*

4:40 pm: Seventy-Five Years of Nuclear Criticality Safety Documents--A Bibliography, Brian L. Koponen, David P. Heinrichs, Chuck K. Lee *(LLNL)*

Courtesy of the Living Desert Zoo & Gardens State Park

WEDNESDAY, SEPTEMBER 13
TECHNICAL SESSIONS - 8:20 AM

Information Access
Session Organizer: Dr. John D. Bess *(INL)*, **Co-chairs:** Michael Zerkle *(NNL)*, Margaret Marshall *(INL)*
Time: 8:20 - 8:40 am

8:20 am: Additions to the ICSBEP and IRPhEP Handbooks since NCSD 2013, John Darrell Bess, Margaret Marshall *(INL)*, J. Blair Briggs *(INL, retired)*, Tatiana Ivanova *(OECD Nuclear Energy Agency)*, Ian P. Hill *(Nuclear Energy Agency)*, Nigel (Jim) T. Gulliford *(OECD/NEA)*

Nuclear Data (Including ENDF/BVIII) and Libraries
Session Organizer: Dr. John D. Bess *(INL)*, **Co-chairs:** Michael Zerkle *(NNL)*, Margaret Marshall *(INL)*
Time: 8:40 - 9:40 am

8:40 am: Benchmarking of Activation Rates in Special Core in LR-0 Reactor, Michal Kostal *(Research Center Rez)*, Vlastimil Juricek *(Research Center Rez)*, Evzen Losa *(UJV - Nuclear Research Institute, Rese)*, Vojtěch Rypar *(Research Center Rez)*

9:00 am: ENDF/B-VIII.0 Testing with AMPX and SCALE, Andrew M. Holcomb, Doro Wiarda, William J. Marshall *(ORNL)*

9:20 am: The Thermal Neutron Scattering Law for Hydrogen Bound in Plutonium Dihydride and Predicted Critical Mass for Several Configurations, Michael L. Zerkle, Jesse C. Holmes, Adam G. Nelson *(Naval Reactors)*

Spent Nuclear Fuel and Other Fissile Materials Criticality Safety from Applicants and Regulators Perspective
Session Organizer: Dr. Kaushik Banerjee *(ORNL)*, **Co-chairs:** Michael Zerkle *(NNL)*, Margaret Marshall *(INL)*
Time: 9:40 - 10:00 am

9:40 am: Accident Analysis of Spent Fuel Storage and Transportation Cask with Gd Based Neutron Absorber, Mijin Kim, Dong-Seong Sohn *(UNIST)*

Courtesy of the City of Carlsbad, NM

Technical Sessions: Wednesday September 13

WEDNESDAY, SEPTEMBER 13

TECHNICAL SESSIONS - 10:20 AM

Qualification Programs

Session Organizer: Dr. Douglas G. Bowen *(ORNL)*, **Co-chairs:** Douglas G. Bowen *(ORNL)*, Ellen M. Saylor *(ORNL)*
Time: 10:20 - 11:20 am

10:20 am: Developing a Streamlined Approach to Criticality Safety Analyst Training/Qualification, Alicia Salazar-Crockett, Mary Beth Lujan, Andrew R. Wysong *(LANL)*

10:40 am: Safety Analysis Report for Packaging (SARP) Shielding & Nuclear Criticality Safety Generalist and Analyst Courses Developed and Conducted by Oak Ridge National Laboratory, Douglas G. Bowen, Joel M. Risner, Brian L. Broadhead, Ellen M. Saylor, Cecil V. Parks *(ORNL)*

11:00 am: Current Status of the DOE/NNSA Nuclear Criticality Safety Program Hands-On Criticality Safety Training Courses, Douglas G. Bowen *(ORNL)*

University Initiatives/Courses/Distance Educ

Session Organizer: Dr. Douglas G. Bowen *(ORNL)*, **Co-chairs:** Douglas G. Bowen *(ORNL)*, Ellen M. Saylor *(ORNL)*
Time: 11:20 am - 12:00 pm

11:20 am: A Perfect Amalgam - The Combination of Company In-house Training with an Academic Online Certificate Program, Charlotta E. Sanders *(d/b/a Sanders Engineering)*, Quentin T. Newell *(URENCO USA)*

11:40 am: Los Alamos National Laboratory Nuclear Criticality Safety Pipeline for Expedited Qualification of Personnel, Andrew R. Wysong, Mary Beth Lujan, Alicia Salazar-Crockett, Travis A. Smith *(LANL)*

Criticality Safety – General III

Session Organizer: Dr. Kevin H. Reynolds *(Y-12 NSC)*, **Co-chairs:** Kevin Hahn *(NNSA)*, Forrest Brown *(LANL)*
Time: 1:20 - 3:00 pm

1:20 pm: Creation of a Database Dedicated to Nuclear Criticality Events that Occurred in Fuel Cycle Facilities, Regis Cousin *(IRSN (French Institute for Nuclear Safety))*

1:40 pm: Computational Study of Critical Mass Curves for Various Ratios of 238Pu to 239Pu, Alan Joseph Yamanaka, Natasha N. Glazener *(LANL)*

2:00 pm: Characteristics of Concrete Reflection of U-235 Systems, Richard G. Taylor, Ronald E. Pevey *(Univ. of Tennessee)*

2:20 pm: A Perspective on the Interaction Between the NCSD and ANSI/ANS-8 Standards, John A. Miller *(SNL)*, Robert D. Busch *(Univ. of New Mexico)*, Douglas G. Bowen *(ORNL)*, Larry L. Wetzel *(BWX Technology)*

2:40 pm: Seventy-Five Years of Nuclear Criticality Safety Documents-A Bibliography, Part II--Online Links to Full-Text Documents, Brian L. Koponen, Chuck K. Lee, David P. Heinrichs *(LLNL)*

WEDNESDAY, SEPTEMBER 13

TECHNICAL SESSIONS - 3:20 PM

Disposal Criticality and Criticality Consequence Analysis in the Disposal Time Frame

Session Organizer: Dr. Kaushik Banerjee *(ORNL)*, **Co-chairs:** Kaushik Banerjee *(ORNL)*, Dale Lancaster *(NuclearConsultants.com)*
Time: 3:20 - 3:40 pm

3:20 pm: Criticality Effects of Long-Term Changes in Material Compositions and Geometry in Disposal Canisters, Fredrik Sten Johansson *(SKB)*, Kastriot Spahiu *(Swedish Nuclear Fuel and Waste Management Co)*, Lennart Agrenius *(Agrenius Consulting)*

Fuel Fabrication and Operational Practices

Session Organizer: Dr. Kaushik Banerjee *(ORNL)*, **Co-chairs:** Kaushik Banerjee *(ORNL)*, Dale Lancaster *(NuclearConsultants.com)*
Time: 3:40 - 4:20 pm

3:40 pm: Means and Procedures for Stopping a Criticality Accident in the Melox Homogeniser, Olivier Ravat, Alexandre Tassis *(AREVA NC MELOX)*

4:00 pm: Demonstrating Compliance with Moderator Content Limits in Uranium Dioxide Powder upon Leaving a Furnace Environment, A. O'Neill *(National Nuclear Laboratory - Preston Laboratory)*

Student Competition

Session Organizer: Dr. Douglas G. Bowen *(ORNL)*, **Chair:** Douglas G. Bowen *(ORNL)*
Time: 4:20 - 5:00 pm

4:20 pm: Characterization of Accumulated Nuclear Spent Fuel in South Korea with Scenario Study, GyeongMi Kim, Ser Gi Hong, GeonHee Jung *(Kyung Hee University)*, Dae Sik Yook *(KINS)*

4:40 pm: Refinements of a Treat Model for Transient Analysis, Zachary J. Weems *(Univ. of Florida)*, Mark David DeHart *(INL)*, Sedat Goluoglu *(Univ. of Florida)*

Courtesy of the National Park Service, Carlsbad Caverns

Technical Sessions: Thursday September 14

THURSDAY, SEPTEMBER 14
TECHNICAL SESSIONS - 8:20 AM

Criticality Safety – General IV
Session Organizer: Dr. Kevin H. Reynolds *(Y-12 NSC)*, **Co-chairs:** Kristan Wessels *(Y-12 NSC)*, Lawrence J. Berg *(NNSA)*
Time: 8:20 - 9:40 am

8:20 am: Overview and Status of Domestic and International Standards for Nuclear Criticality Safety, Douglas G. Bowen *(ORNL)*

8:40 am: Applying Whisper Results to Traditional USL Calculational Methods, Shawn J. Henderson *(SNL)*, John A. Miller *(Sandia National Labs)*

9:00 am: Criticality Detection Method Based on Measurement of FP Gamma Radiations, Kazuo Azekura, Yoshitaka Naito *(NAIS Co., Inc.)*

9:20 am: An Evaluation of In-Line Component Process Modules, Hannah Morbach *(Consolidated Nuclear Security)*, Marc Rosser *(Y-12 NSC)*

Accident Analysis and Alarm Systems
Session Organizer: Mr. Lawrence J. Berg *(NNSA)*, **Co-chairs:** Kristan Wessels *(Y-12 NSC)*, Lawrence J. Berg *(NNSA)*
Time: 9:40 - 10:00 am

9:40 am: Introduction of Plutonium Systems to the Nuclear Criticality Slide Rule, Matthieu Duluc *(IRSN (French Institute for Nuclear Safety))*, David P. Heinrichs, Soon Sam Kim *(LLNL)*, Thomas M. Miller, Cihangir Celik, Calvin M. Hopper *(ORNL)*, Alex Brown *(Atomic Weapons Establishment)*, Christopher L. Wilson *(AWE Plc)*, Marc Troisne *(Millennium)*

Methods and Software Development I
Session Organizer: Dr. John D. Bess *(INL)*, **Co-chairs:** Deborah A. Hill *(National Nuclear Laboratory)*, John A. Miller *(Sandia National Labs)*
Time: 10:20 am - 12:00 pm

10:20 am: Release of MCNP6.2 & Whisper-1.1 - Guidance for NCS Users, Forrest B. Brown, Michael E. Rising, Jennifer L. Alwin *(LANL)*

10:40 am: CRISTAL V2: New Package for Criticality Calculations, Jean-Michel Gomit *(Institut de Radioprotection et de Surete)*, Isabelle Duhamel, Yann Richet *(IRSN/France)*, Arnaud Entringer, Christine Magnaud, Fadhel Malouch, Coralie Carmouze *(CEA/France)*

11:00 am: Using Whisper-1.1 to Guide Improvements to Nuclear Data Evaluations, Michael E. Rising, Forrest B. Brown, Jennifer L. Alwin *(LANL)*

11:20 am: Determination of Critical Experiment Correlations for Experiments Involving High-Enriched Uranium Solutions, William J. Marshall, Bradley T. Rearden *(ORNL)*, Ronald E. Pevey *(Univ. of Tennessee)*

11:40 am: Determination of Critical Experiment Correlations for Experiments Involving Arrays of Low-Enriched Fuel Rods, William J. Marshall, Bradley T. Rearden *(ORNL)*, Ronald E. Pevey *(Univ. of Tennessee)*

THURSDAY, SEPTEMBER 14

TECHNICAL SESSIONS - 1:20 PM

Methods and Software Development II

Session Organizer: Dr. John D. Bess (INL), **Co-chairs:** William J. Marshall *(ORNL)*, Christopher M. Perfetti *(ORNL)*
Time: 1:20 - 2:20 pm

1:20 pm: Template Engine Applied to Rapid Modeling, Robert Lefebvre, William J. Marshall *(ORNL)*

1:40 pm: FULCRUM User Interface for SCALE 6.2, Robert Lefebvre, Adam B. Thompson, Brandon Langley, Bradley T. Rearden *(ORNL)*

2:00 pm: Verification Suite for the Application of the Limiting Surface Density Method to Arrays of 9975 Packages, James S. Baker, Michael D. Ratliff, Tracy E. Stover *(Savannah River Nuclear Solutions, LLC)*

Courtesy of the Department of Energy, Carlsbad Field Office (DOE-CBFO)

2017 NCSD

Nuclear Criticality Safety Division Topical meeting

Criticality Safety – pushing boundaries by modernizing and integrating data, methods, and regulations

September 10-15, 2017
Pecos River Village Conference Center
Carlsbad, NM

Courtesy of the Department of Energy, Carlsbad Field Office (DOE-CBFO)