

**LAWRENCE LIVERMORE NATIONAL LABORATORY**  
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**DATE:** November 1, 2019

**SUBJECT:** Report of Foreign Travel to France for ICNC, ICTT, and WPNCs

**TO:** Dr. Angela Chambers, USDOE Nuclear Criticality Safety Program Manager, National Nuclear Security Administration, NA-511

**FROM:** David Heinrichs and Catherine Percher, Nuclear Criticality Safety Division, Lawrence Livermore National Laboratory

**MEETING TITLES:**

1. 11<sup>th</sup> International Conference on Nuclear Criticality, ICNC 2019
2. 26<sup>th</sup> International Conference on Transport Theory, ICTT 2019
3. Working Party on Nuclear Criticality Safety, WPNCs 2019

**MEETING LOCATIONS:**

1. Cité des Sciences et de l'Industrie, 30 Avenue Corentin Carjou, Paris, France, 75019
2. Sorbonne University, Pierre and Marie Curie Campus, 4 Place Jussieu, Paris France, 75252
3. Organisation for Economic Cooperation and Development, Nuclear Energy Agency, 46 Quai Alphonse Le Gallo, Boulogne-Billancourt, Paris, France, 92100

**MEETING DATES:**

1. September 15-20, 2019
2. September 22-27, 2019
3. September 23-27, 2019

**ATTENDEES ON BEHALF OF NCSP:**

1. Shauntay Coleman, Ayman Hawari\*, David Heinrichs, Soon Kim, Cole Manring\*, Tony Nelson, Jesse Norris, Catherine Percher, Nina (Colby) Sorrel\*
2. Barry Ganapol\*\*, David Heinrichs
3. David Heinrichs, Catherine Percher

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\* North Carolina State University

\*\* Arizona State University

## **BENEFIT OF MEETINGS TO NCSP:**

### **ICNC**

The International Conference on Nuclear Criticality (ICNC) is convened once every four years and is the premiere technical conference devoted to the discipline of nuclear criticality safety. The conference was organized into eleven technical tracks:

No.	Track	NCSP Element
1	Codes and other calculational methods	AM
2	Nuclear data	ND, TS (NDAG)
3	Uncertainty and sensitivity analysis	AM, IE, ND
4	Measurement, experiments and benchmarks	AM, IE
5	Standards, assessment methodology, regulations	TS (CSSG)
6	Operational practices and safety cases	TS (CSSG)
7	Storage and transport issues	TS (CSSG)
8	Final disposal issues	TS (CSSG)
9	Criticality accidents and incidents	AM, IE, TS (CSSG)
10	Professional development issues and training	T&E
11	Future Challenges	M&V

As shown above, each of the technical tracks is directly relevant to the NCSP elements. The ICNC conference agenda is provided in Appendix A.

### **ICTT**

The International Conference on Transport Theory is convened every other year and is the premiere technical conference devoted to transport theory, including neutron and photon transport, which is directly relevant to NCSP Analytical Methods (e.g., COG, MCNP, SCALE). The ICTT conference agenda is provided in Appendix B.

### **WPNCs**

The Organization for Economic Cooperation and Development (OECD) Nuclear Energy Agency (NEA) Working Party on Nuclear Criticality Safety (WPNCs) is the international organization responsible for the administration of the ICSBEP, IRPhE, and SINBAD Projects. ICSBEP, IRPhE, and SINBAD are directly relevant to NCSP IE and IP&D. The WPNCs also establishes subgroups to research problems of relevance to participants from member countries. These subgroups and their relevance to NCSP are identified below.

No.	Title	NCSP Element
SG-1	Role of integral experiment uncertainties and covariance data in criticality safety validation	AM, IE, ND
SG-2	Blind benchmark on MOX damp powders	AM
SG-3	The effect of temperature on the neutron multiplication for PWR fuel assemblies	AM, ND

SG-4	Analysis of past criticality accidents	AM (multiphysics)
SG-5	Experimental needs for criticality safety purpose	IE
SG-6	Statistical tests for diagnosing fission source convergence and under-sampling in Monte Carlo criticality calculations	AM
SG-7	On the definition of a benchmark on sensitivity/uncertainty on used fuel inventory	AM (burnup credit)

The WPNCS and Subgroup agenda are provided in Appendix C.

## PURPOSE OF MEETINGS:

### ICNC

LLNL provided administrative and technical support for the conference in the following capacities:

Catherine Percher	International Advisory Committee Member, Reviewer
Dave Heinrichs	International Technical Program Committee Member, Track 1 Co-Leader, Reviewer
Greg Keefer	Reviewer
Soon Kim	Reviewer
Tony Nelson	Reviewer
Jim Reus	Reviewer
John Scorby	Reviewer
Sean Walston	Reviewer
Will Zywiec	Reviewer

In the attached agenda, LLNL and NCSU presentations summarizing NCSP accomplishments are circled in **BLUE** and **RED**, respectively. Presentations by others (e.g., IRSN, JSI) with significant, acknowledged LLNL contributions are circled in **GREEN**. Together, these constitute 14 oral presentations and 1 poster, which is a significant contribution to the conference.

### ICTT

The main purpose of attending the International Conference on Transport Theory (ICTT) was to gauge the level of international interest in simplified analytical benchmarks with exact analytical solutions for code verification (SQA) purposes. As the conference had a special session devoted to ‘Analytical and semi-analytical solutions,’ it is fair to say the level of interest is high. Moreover, Professor Garry Ganapol, University of Arizona, the recognized expert in analytical benchmarks, was honored to open the conference, present the first paper, chair the first session, and speak in the plenary session.

Professor Ganapol provided three oral presentations in addition to our joint poster on ‘Precision Benchmark of the COG Monte Carlo Code,’ which received considerable attention from the conference participants. Additionally, there were a number of presentations on ‘neutron fluctuations,’ with relevance to subcritical multiplicity analytical methods and integral experiments (e.g., ISSA).

### WPNCS

Catherine Percher is one of six official United States Delegates to the WPNCS and is a voting member of the working party. She attended the subgroup working groups for SG-1, 2, 3, 4, and 5. Subgroup 5, Experimental Needs for Criticality Safety Purpose, is of specific interest to NCSP as it is attempting to solicit information and identify international nuclear criticality safety integral experiment needs, which tend

to be cross-cutting and also reflect US needs. At the WPNCS meeting on Friday, September 27, 2019, an additional subgroup, SG-8, was proposed by W. Wieselquist (ORNL) entitled “Preservation of Expert Knowledge and Judgement Applied to Criticality Benchmarks.” The objective of this activity is to develop a methodology for collecting and disseminating feedback on ICSBEP evaluations from knowledgeable experts to inform a quality assessment for benchmark users. The proposal was accepted.

**DISTRIBUTION:**

Dr. Angela Chambers, DOE Nuclear Criticality Safety Program Manager, [angela.chambers@nnsa.doe.gov](mailto:angela.chambers@nnsa.doe.gov)

Professor Barry Ganapol, Arizona State University, [Ganapol@cowboy.ame.arizona.edu](mailto:Ganapol@cowboy.ame.arizona.edu)

Professor Ayman Hawari, North Carolina State University, [ayman.hawari@ncsu.edu](mailto:ayman.hawari@ncsu.edu)

**ATTACHMENTS:**

1. ICNC Agenda (5 pages)
2. ICTT Agenda (11 pages)
3. WPNCS Agenda (10 pages)

# Appendix A ICNC 2019 Agenda

## MONDAY, SEPTEMBER 16

9h00/11h30  
**Opening Ceremony**  
③ Conference Room **LOUIS ARMAND**

Coffee Break

12h00/12h50

Session 1 ③ Room A - B	Session 2 ③ Room C - D	Session 3 ③ Room 1	Session 4 ③ Conference Room <b>LOUIS ARMAND</b>
<b>Track 6</b> OPERATIONAL PRACTICES AND SAFETY CASES	<b>Track 2</b> NUCLEAR DATA	<b>Track 1</b> CODES AND OTHER CALCULATION METHODS	<b>Track 7</b> STORAGE AND TRANSPORT ISSUES
<p>The Disposal of the Final Concentrate Mother Liquor from THORP: How Criticality Safety Analysis can Impact Overall Risk <i>A. SUTTON</i></p> <p>Recent Improvements in the K-Area Criticality Safety Program <i>B. WILLIAMSON, J.S. BAKER</i></p>	<p style="border: 2px solid red; border-radius: 50%; padding: 5px;">Development and Implementation of an Improved Liquid TSL Treatment in the FLASSH Code <i>C.A. MANRING, A.I. HAWARI</i></p> <p>Measurement of the Double-Differential Neutron Cross Section of Uo2 from Room Temperature to Hot Full Power Conditions <i>S. XU, G. NOGUIERE, A. FILHOL et al.</i></p>	<p>Solomon: a Monte Carlo Solver for Criticality Safety Analysis <i>Y. NAGAYA, T. UEKI, K. TONOIKE</i></p> <p>Development of Terrenus, a Multiphysics Code for Spent Nuclear Fuel Cask Criticality Analysis <i>G.G. DAVIDSON, S.R. JOHNSON, S. CHATZIDAKIS et al.</i></p>	<p>Evaluation of the Impact of Neutron Absorber Material Blistering and Pitting on Spent Fuel Pool Reactivity <i>H. AKKURT, M. WENNER, A. BLANCO</i></p> <p>Some Insights in Criticality-Safety of Spent Fuel Pools under Loss-of-Cooling and Loss-of-Coolant Accident <i>L. JUTIER, T. ALBERT, O. DE LUZE</i></p>

Lunch

14h00/15h40

Session 1 ③ Room A - B	Session 2 ③ Room C - D	Session 3 ③ Room 1	Session 4 ③ Conference Room <b>LOUIS ARMAND</b>
<b>Track 6</b> OPERATIONAL PRACTICES AND SAFETY CASES	<b>Track 2</b> NUCLEAR DATA	<b>Track 1</b> CODES AND OTHER CALCULATION METHODS	<b>Track 7</b> STORAGE AND TRANSPORT ISSUES
<p>The Benefit of Different Approaches to Bounding Poison Quantification <i>S.A. WATSON</i></p> <p>Cleaning and Dismantling of Hot Cells Dedicated to Mechanical Treatment and Shearing of Spent Fuel – Criticality Safety Issues <i>L. CHOLVY, C. FABRY</i></p> <p>Homogenization Techniques for Bounding Criticality Safety Analyses for Fuel Fabrication and Repair <i>A. HOEFER, O. BUSS, S. GLAUBRECHT et al.</i></p> <p>A Simple Alternative Approach for the Modelling of Fuel Assemblies with Missing Fuel Rods <i>T. ALBERT, A. BARDELAY, L. AGUIAR et al.</i></p>	<p style="border: 2px solid green; border-radius: 50%; padding: 5px;">International Benchmarks Intercomparison Study for Code and Nuclear Data Validation <i>I. DUHAMEL, J.L. ALWIN, F.B. BROWN et al.</i></p> <p>Evaluation updates for Major and Minor Actinides <i>I. STETCU, T. KAWANO, D. NEUDECKER et al.</i></p> <p>Testing New Thermal Scattering Law for Light Water at 600 K using VESTA 2.2 Depletion Calculations <i>R. ICHOU, V. JAISWAL, L. LEAL et al.</i></p> <p>Progress on the RECONR module for NJOY21 <i>W. HAECK, A.P. MCCARTNEY, J.L. CONLIN et al.</i></p>	<p>SIMULATES Analysis of a Spent Fuel Pool <i>J. HYKES, T. BAHADIR, D. DEAN et al.</i></p> <p>TRIPOLI-4@ : Overview of the Code Capabilities for Criticality-Safety in Version 11 <i>E. BRUN, F.-X. HUGOT, A. JINAPHANH et al.</i></p> <p>Recent Developments to the MONK Monte Carlo Code for Criticality Safety and Reactor Physics Analyses <i>S. RICHARDS, G. DOBSON, T. FRY et al.</i></p> <p>Evaluation of MCNP's Fission Matrix Capability for Criticality Calculations <i>S. HENDERSON, J.A. MILLER, F. BROWN</i></p>	<p>Criticality Analysis of the New DN30 Package for the Transport of UF<sub>6</sub> <i>M. HENNEBACH, F. HILBERT</i></p> <p>Assessing the Effects of Low Temperatures on K-effective for AGR Spent Fuel Transport Packages <i>J.D. WATSON, J.S. MARTIN, M. HENDERSON et al.</i></p> <p>Effect of Low Temperatures on Criticality Calculation for the Transport of Fissile Material <i>M. MILIN, C. POULLELAOUEN, R. ICHOU et al.</i></p> <p>AWG-711, a type C transport package <i>W. PHILPOTT, R. JONES</i></p>

Coffee Break

16h10/17h50

<b>Track 6</b> OPERATIONAL PRACTICES AND SAFETY CASES	<b>Track 2</b> NUCLEAR DATA	<b>Track 1</b> CODES AND OTHER CALCULATION METHODS	<b>Track 4</b> MEASUREMENTS, EXPERIMENTS AND BENCHMARKS
<p>Integration of Uncertainties into the Safety Analysis for a Large Number of Movements <i>O. RAVAT</i></p> <p>Nuclear Criticality Safety Assessment Supporting the Integrated Safety Analysis of the Pellet Fabrication Process at the Juzbado Plant <i>J. LOPEZ-MARQUEZ, C. PAREDES-HAYA, O. ZURRON-CIUVENTES</i></p> <p>Uranium Accumulations in Casting Operations <i>T.L. WILSON, S.P. JORDAN</i></p> <p>Managing the Risk from Flooding for a Facility at AWE <i>E. WATSON, M.A. ROYDHOUSE, J. WENNER</i></p>	<p>Measurement of Gamma Rays from Radiative Capture of Uranium-238 and Decay of Short Lived Fission Products from Subcritical System <i>Y. NAUCHI, T. SANO, H. UNESAKI et al.</i></p> <p>Impact of Experimental Correlation on Transposition Method Carry out with Critical Integral Experiments <i>T. NICOL, C. CARMOUZE</i></p>	<p>Automated Acceleration and Convergence Testing for Monte Carlo Nuclear Criticality Safety Calculations <i>F. BROWN, C. JOSEY, S. HENDERSON et al.</i></p> <p style="border: 2px solid blue; border-radius: 50%; padding: 5px;">Critical Experiment Design using Optimus <i>J. NORRIS</i></p> <p style="border: 2px solid blue; border-radius: 50%; padding: 5px;">Validation of Deep Learning Methods for Nuclear Criticality Safety <i>W. ZYWIEC, A.J. NELSON</i></p> <p>Neutron Multiplication in Fuel-Water Random Media <i>P. BOULARD, C. LARMIER, J.C. JABOULAY et al.</i></p>	<p>Investigation of Inferred Parameters in Subcritical Experiments <i>J. HUTCHINSON, J. ARTHUR, R. BAHRAN et al.</i></p> <p>Measurements of Subcriticality in Dollar Units using Time-Domain Decomposition Based Integral Method <i>A. NONAKA, T. ENDO, A. YAMAMOTO et al.</i></p> <p>MUSIC: A Critical and Subcritical Experiment Measuring Highly Enriched Uranium Shells <i>A. MCSPADEN, T. CULTER, J. HUTCHINSON et al.</i></p>

# TUESDAY, SEPTEMBER 17

9h00/10h40

Session 1 Room A - B	Session 2 Room C - D	Session 3 Room 1	Session 4 Conference Room LOUIS ARMAND
<b>Track 6</b> OPERATIONAL PRACTICES AND SAFETY CASES	<b>Track 3</b> UNCERTAINTY AND SENSITIVITY ANALYSIS	<b>Track 1</b> CODES AND OTHER CALCULATION METHODS	<b>Track 7</b> STORAGE AND TRANSPORT ISSUES
The Double Control and its Consistency with the Double Contingency Principle <i>G. KYRIAZIDIS, P. RIEPERT</i>	Effect and Uncertainties of H in Ice Thermal Scattering Laws on the Neutron Multiplication Factor for PWR Fuel Criticality Applications <i>M. TIPHINE, C. CARMOUZE, G. NOGUERES, F. CANTARGI et al.</i>	Validation of the Burn-up Code MOTIVE Using ENDF/B-VIII Data <i>V. HANNSTEIN, M. BEHLER, F. SOMMER</i>	A Misload Analysis Methodology Supporting Criticality Analysis of Spent Nuclear Fuel Canisters Using As-Loaded Configurations <i>K. BANERJEE, H. LILJENFELDT, J.B. CLARITY et al.</i>
Development of a UK Working Party on Criticality Learning from Experience Database <i>M. ERLUND, A. BROWN, M. SAVAGE et al.</i>	Representativity Analysis in Reactor Core Calculations <i>P. LOPEZ, A. BIDAUD, D. PORTINARI</i>	Interpretation of GEDEON-1 and GEDEON-2 Gadolinium Depletion Experimental Analysis with the DARWIN2.3 Package <i>T. NICOL, D. BERNARD</i>	Criticality Safety Analysis of Spent Nuclear Fuel Canisters Using As-Loaded Configurations <i>K. BANERJEE, J.B. CLARITY, H. LILJENFELDT et al.</i>
Nuclear Criticality Safety Lessons Learned in the Design of the Uranium Processing Facility at the Y-12 National Security Complex <i>K. REYNOLDS</i>	Sensitivity and Uncertainty Based Techniques to Extend the Database of Experimental Validation Benchmarks: Practical Example of Use for TRIGA® Fuel <i>C. RECHATIN, G. VUYET, N. COMTE et al.</i>	Verification and Validation of the Depletion Capability of the High-Fidelity Neutronics Code NECP-X <i>X. WEN, Z. LIU, K. HUANG et al.</i>	On the Benefits to Take Account of the Depletion of Fast-Neutron Reactor Fuel Elements for Transportation <i>C. CARMOUZE, M. TARDY, G. GRASSI et al.</i>
	Whisper S/U Benchmark Analysis of Metal-Water Critical Mass Curves <i>W. COOK, J.A. MILLER, S. HENDERSON et al.</i>	High Fidelity KCODE Modeling of Subcritical Benchmarks Using MCNP 6.2 <i>D. TIMMONS, M. RISING, C. PERFETTI</i>	Criticality Safety Analysis for Storage and Transportation Applications Using NRC ISG-8 Rev. 3 <i>R. MIGLIORE, J. LI, P.T.T. PHAM</i>

Coffee Break

11h10/12h50

Track 6 OPERATIONAL PRACTICES AND SAFETY CASES	Track 3 UNCERTAINTY AND SENSITIVITY ANALYSIS	Track 4 MEASUREMENTS, EXPERIMENTS AND BENCHMARKS	Track 7 STORAGE AND TRANSPORT ISSUES
The Use of a Hand-Held Enrichment Device in Support of Uranium Residue Recovery - a Benefit or False Confidence? <i>D. HILL</i>	Use of Whisper S/U Techniques in Support of Benchmark Identification <i>J.A. MILLER, W.M. COOK, S. HENDERSON et al.</i>	Fundamental Physics Subcritical Neutron Multiplicity Benchmark Experiments Using Water Moderated Highly Enriched Uranium Fuel <i>A.J. NELSON, W. MONANGE, S.S. KIM et al.</i>	Determination of Bounding Axial Burnup Distributions for PWR Spent Fuel Assemblies Discharged from Nuclear Power Plants in South Korea <i>K.J. CHOI, D.J. KIM, Y.S. CHO et al.</i>
Nuclear Criticality Safety Analysis: Recovery of Old Containers Holding Fissile Material <i>E. FILLASTRE, A. DORVAL, L. MANDARD et al.</i>	Parametric Analysis of Handbook Metal-Water Critical Mass Curves with MCNP <i>W.M. COOK, J.A. MILLER, S. HENDERSON et al.</i>	Sub-Criticality Monitoring System for the Retrieval of Fuel Debris in Fukushima Dai-ichi Nuclear Power Plants <i>S. WADA, S. KANO, T. MISAWA et al.</i>	Overview of the Recent BWR Burnup Credit Project at Oak Ridge National Laboratory <i>W. MARSHALL, B.J. ADE, I.C. GAULD et al.</i>
Improved Safety Basis for Liquid Waste Processing at BWXT <i>L. WETZEL</i>	Tools for Validation and Uncertainty Quantification with ANSWERS Software <i>P. SMITH, D. HANLON, G. DOBSON et al.</i>	Validation of MCNP® Rossi-Alpha Calculations Using Recent Measurements <i>G. MCKENZIE</i>	Burnup Credit Implementation for Enriched Reprocessed Uranium Used Fuel Transportation <i>L. MILET, M. TARDY, D. LIN et al.</i>
Development of a Criticality Safety Case for Waste Retrieval from a Historical Waste Storage Facility <i>M. HOBSON</i>	Evaluating Sensitivity-based Similarity Metrics between Applications and Benchmarks <i>M. RISING</i>	Conversion from Prompt Neutron Decay Constant to Subcriticality Using Point Kinetics Parameters Based on Alpha- and k-eigenfunctions <i>T. ENDO, A. YAMAMOTO</i>	Using the ORNL Spent Fuel Database Tool UNF-STADGRDS for as Loaded and Scooping Calculations for the Swedish Spent Nuclear Fuel Repository <i>F. JOHANSSON, H. LILJENFELDT</i>

Lunch

14h00/16h05

Session 1 Room A - B	Session 2 Room C - D	Session 3 Room 1	Session 4 Conference Room LOUIS ARMAND
<b>Track 5</b> STANDARDS, ASSESSMENT METHODOLOGY, REGULATIONS	<b>Track 2</b> NUCLEAR DATA	<b>Track 9</b> CRITICALITY ACCIDENTS AND INCIDENTS	<b>Track 8</b> FINAL DISPOSAL ISSUES
Periodic Safety Review in France - Focus on Nuclear Criticality Safety <i>M. DULUC, L. AGUIAR, A. BARDELAY et al.</i>	Resonance Parameters and Covariance Evaluations for the Gadolinium Isotopes <i>L. LEAL, N. LECLAIRE, F. FERNEX et al.</i>	Detection of a Slow Kinetic Criticality Accident by the Radiation Protection Monitoring System <i>O. RAVAT</i>	Options for Demonstrating Criticality Safety for Geological Disposal of UK Spent Fuel <i>L. PAYNE, R. WINSLEY, T. BALDWIN et al.</i>
Development of an ISO Standard Related to Geometrical Dimensions for Subcriticality Control <i>G. NÉRON DE SURGY, A. BARDELAY, Y. BLIN et al.</i>	Neutron Nuclear Data Measurements at GELINA <i>S. KOPECKY, J. HEYSE, C. PARADELA-DOBARRO et al.</i>	Criticality Accident Alarm System Analysis using MCNP6.2 Constructive Solid Geometry/ Unstructured Mesh Hybrid <i>J. ALWIN, J. SPENCER, G. FAILLA</i>	Derivation of Waste Package Criticality Controls that Ensure the Long-Term Criticality Safety of a UK Geological Disposal Facility <i>T.W. HICKS, E.K. PHIPPS, S. DOUDOU et al.</i>
Reprocessing Facility Periodic Safety Review: how Impact of Aging Effects on Geometrically Safe Equipments is Reviewed <i>Y. BLIN, G. NÉRON DE SURGY, B. CHECIAK et al.</i>	Improving Nuclear Data Library Predictability by Accounting for Temperature Effects Using Resonance Parameters <i>I. MEYER, V. SOBES, B. FORGET</i>	MAVRIC-Scale Sequence for Criticality Alarm System Applications <i>C. PAREDES-HAYA, E. ESCANDÓN-ORTIZ, J. LÓPEZ-MÁRQUEZ et al.</i>	A Generic Criticality Safety Assessment for the Geological Disposal of Wastes Packaged in Shielded Containers <i>R.A. HOUGHTON, E.K. PHIPPS, T.W. HICKS et al.</i>
Claims Arguments Evidence <i>S. GAN, J.A. RYAN</i>	Development of a Generalized Lattice Symmetry Formulation for Thermal Scattering Law Analysis <i>N. SORRELL, A.I. HAWARI</i>	The CAAS-3S Next-Generation Criticality Accident Alarm System <i>S. PHILIPS, A. GALLOZZI ULMANN, N. HOUFFLAIN et al.</i>	ANDRA's Post Closure Nuclear Criticality Safety Assessment towards the Licensing Application for CIGEO <i>C. LOPEZ, M. RALLIER DU BATY, S. SOULET</i>
Use of Barrier Assessment in Criticality Fault Analysis <i>L. WHITELEY</i>	Progress of <sup>140,142</sup> Ce Neutron Cross Section Resolved Resonance Region Evaluations <i>C.W. CHAPMAN, M.T. PIGNI, K. GUBER</i>	Presentation on the Future Criticality Incident Detection System at AWE <i>S. GARBETT</i>	The Credibility of Post-Closure Criticality: Considerations for MOX Spent Fuel and Wastes Containing Uranium-233 at Disposal or from Ingrowth <i>R. MASON, T. HICKS, L. PAYNE et al.</i>

16h10/17h50

Poster Session  
(with Coffee Break)

POSTERS Area

N°	TITLE	AUTHORS
<b>Track 1. Codes and Other Calculation Methods</b>		
1	Variations of the Effective Neutron Multiplication Factor Due to the Modelling of Granules and Boundaries in Generic Transport Packages Containing Volumes of Small Fissile Particles in KENO-VI/SCALE 6.2.1	<b>Dirk Schulze Grachtrup</b> , Benjamin Ruprecht, Frederik Kesting
2	Opera – A New Radiation Shielding Platform for Radiation Protection Studies and Criticality Accident Dose Assessment	<b>Arnaud Entringer</b> , Francis Kloss, Michael Laget, Fadhel Malouch, Hocine Oulebsir, Laurence Pangault, Daniele Sciannandrone, Thierry Visonneau
3	Results of Tripoli-4® Version 11 Code for Fast Spectrum Criticality Benchmarks	<b>François-Xavier Giffard</b> , Anne Mijonnet, Mickaël Prigniau
4	Validation of MCNP6.1 and MCNP6.2 Using ENDF/B-VII.1 Nuclear Data for Criticality Safety Application to Plutonium and Highly Enriched Uranium Systems	<b>Shauntay E. Coleman</b> , William J. Zywiec
<b>Track 2. Nuclear Data</b>		
5	Benchmark Monte Carlo Calculations with ENDF/B-VIII and JEFF3.3 Libraries for LWR Criticality Safety Assessments	<b>Marco Pecchia</b> , Alexander Vasilev, Hakim Ferrouki, Gregory Perret
6	Feedback on JEFF-3.3 and ENDF/B-VIII.0 Nuclear Data Using a Suite of Benchmarks from the MORET 5 Experimental Validation Database	<b>Nicolas Leclaire</b> , Luiz Leal, Frédéric Fernex
7	Validation of KENO V.A and KENO-VI in SCALE 6.3 Beta 3 Using ENDF/B-VII.1 and ENDF/B-VIII Libraries	<b>William J. Marshall</b> , Ellen M. Saylor, Andrew M. Holcomb, Dorothea Wiarda, Travis G. Greene
8	Analysis of D <sub>2</sub> O Benchmark Criticality Experiments	<b>Travis M. Greene</b> , William J. Marshall, Guillermo I. Maldonado
<b>Track 3. Uncertainty and Sensitivity Analysis</b>		
9	Analysis of Sufficiency of Benchmark Experiments during Validation of Nuclear Safety Calculations Programs	<b>Vladimir V. Tebin</b> , Dik T. Ivanov
10	Investigating Region-wise Sensitivities for Nuclear Criticality Safety Validation	<b>Bobbi Merryman</b> , Forrest Brown, Jennifer Alwin, Christopher Perfetti
11	Initial Application of TSUNAMI for Validation of Advanced Fuel Systems	<b>William J. Marshall</b> , Justin B. Clarity, Jinan Yang, Ugur Merteyurek, Matthew A. Jesse, Bradley T. Rearden
<b>Track 4. Measurements, Experiments and Benchmarks</b>		
12	Growth of the International Criticality Safety and Reactor Physics Benchmark Experiment Evaluation Projects since ICNC 2015	<b>John D. Bess</b> , J. Blair Briggs, Tatiana Ivanova, Jim Gulliford, Ian Hill, Margaret Marshall, Lori Scott
13	Benchmark Evaluation of Water-Moderated Hexagonal Lattices 21% Enriched Uo2 Fuel Rods at "Rose" Critical Facility	<b>Svyatoslav Sikorin</b> , Andrei Kuzmin, Sjarhei Mandzik, Tatsiana Hryharovich, Yuliya Razmyslovich
14	Critical Experiments on Zirconium Hydride-Moderated Hexagonal Lattices 45% Enriched Uo2 Fuel Assemblies at Crystal Critical Facility	<b>Svyatoslav Sikorin</b> , Sjarhei Mandzik
15	Experimental and Calculated Data on Criticality of Hexagonal Lattices of 36 % Enriched Uranium Fuel Rods with and without the Boron Absorber Rods in Water	<b>Svyatoslav Sikorin</b> , Sjarhei Mandzik, Sjarhei Polazau, Andrei Kuzmin, Tatsiana Hryharovich, Yuliya Razmyslovich
16	CURIE Experiment: An Experiment to Validate and Test Updated URR Information	<b>Theresa Cutler</b> , Jesson Hutchinson, William Myers, Rian Bahrn
17	Caliban Reactor Criticality Benchmark: Calculations and Interpretation of Simulations with Different Versions of TRIPOLI-4® and Different Nuclear Data Libraries	<b>Pierre Casoli</b> , Jean-Sébastien Borrod, Michaël Prigniau
<b>Track 5. Standards, Assessment Methodology, Regulations</b>		
18	Mixing Rule for Uranium and Plutonium Isotopes	<b>Georges Kyriazidis</b> , David Noyelles, Michaël Prigniau
<b>Track 6. Operational Practices and Safety Cases</b>		
19	Enhancement of Neutron Reflector Classification	<b>Aurélien Dorval</b> , David Noyelles, Marc Triballier, Michaël Prigniau
20	Criticality Safety Concept for Organic Additives Introduction In Granulation Process	<b>Nadine Comte</b> , Béatrice Thievenaz, Jean-François Paput
21	The Effect of Particle Size on the Reactivity of Powdered Fuels	<b>Albrecht Kyrieleis</b> , Ahmed Aslam, Andrew Thallon
22	Material Handling Store Concept Design	<b>J. Bell</b> , S. Plummer
<b>Track 7. Storage and Transport Issues</b>		
23	A Parametric Study of the Effect of Reactor Operating Conditions on Gadolinium Peak Reactivity Determination for BWR UO <sub>2</sub> Used Fuel Transport and Storage	<b>Marcel Tardy</b> , S. Kitsos, D. Lin, L. Millet, P. Puppetti, G. Grassi, V. Roland
24	Defining Safe Fissile Mass Limits for Transport Packages Carrying Intermediate Level Waste	<b>Daniel Fisher</b>
25	Evaluation of Criticality Safety Measures for Fuel Storage of Critical Assemblies in STACY	<b>Jun-ichi Ishii</b> , Kazuhiko Izawa, Takuya Okubo, Kazuhiko Ogawa
<b>Track 9. Criticality Accidents and Incidents</b>		
26	Stochastic Behaviour of a Criticality Excursion with Low Source	<b>Phillippe Humbert</b>
27	Review of Criticality Accident Alarm System Requirements in Geological Disposal	<b>Dr Liam Payne</b> , Neil Harris

# TUESDAY, SEPTEMBER 17

## Track 10. Professional Development Issues and Training

28	Little Criticality: A Helpful Tool for a Criticality Safety Engineer	Aurélien Poisson, Steve Duquenne, Ilyes Bouaboud, Alexandre Coulaud, Julie Jaunet
29	Neutronics Lived Up by Computer	Paul Reuss
30	Criticality Safety Training Approach in a Fuel Assembly Manufacturing Site: Testimony and Considerations	Jean-François Paput

# WEDNESDAY, SEPTEMBER 18

9h00/10h40

Session 1 Room A - B	Session 2 Room C - D	Session 3 Room 1	Session 4 Conference Room LOUIS ARMAND
<b>Track 5</b> STANDARDS, ASSESSMENT METHODOLOGY, REGULATIONS Regulating Criticality Safety: The Effect of Temperature on Reactivity A.J. NICHOLS Regulating Criticality Safety: Use of Burn-Up Credit in the Assessment of Criticality Risk E. FLANNERY, W. DARBY Implementation of Fission Products Credit for PWR MOX A. COULAUD, Y. BLIN, G. GRASSI The OXNIT Density Law in CRISTAL Package: an Easy Way to Predict the Composition of Dissolved Oxide in Nitrate Solutions N. LECLAIRE, F. FERNEX, A. BARDELAY et al.	<b>Track 3</b> UNCERTAINTY AND SENSITIVITY ANALYSIS Impact of Covariances between Criticality Benchmarks Experiments on Licensing A. HOEFER, O. BUSS Correlation of HST-001 due to uncertain technical parameters - Comparison of results from SUNCIST, SAMPLER and DICE W.J. MARSHALL, F. SOMMER, M. STUKE The Influence of Changes in Nuclear Covariance Data on the Calculation of Ck for Highly Enriched Uranium Solution Systems J. CLARITY, W.J. MARSHALL UACSA Benchmark Phase IV: Role of Integral Experiment Covariance Data for Criticality Safety Validation, Summary of Results M. STUKE, A. HOEFER, O. BUSS et al.	<b>Track 1</b> CODES AND OTHER CALCULATION METHODS Development of Supercritical Transient Mik Code and its Application to Godiva Core T. OBARA, D. TUYA Employment of the Single Eigenvalue Monte Carlo Technique to some Criticality Safety Problems; Comparison with a Standard, Mixed Deterministic - Monte Carlo Approach K. W. BURN, P. C. CAMPRINI, M. DULUC The High-Speed Statistical Criticality Evaluation Method Based on the Multidimensional Interpolation for On-Demand Criticality Risk Evaluation R. KIMURA, Y. HAYASHI	<b>Track 4</b> MEASUREMENTS, EXPERIMENTS AND BENCHMARKS The Sandia Critical Experiments Program - What Are We Doing for You Now? G.A. HARMS, D.E. AMES, J.T. FORD et al. Neutronic Design of Basic Cores of the New STACY K. IZAWA, J. ISHII, T. OKUBO et al. Improvements in Void Reactivity Worth Measurements Using a Pressure Sensor J. GODA, T. GROVE, G. MCKENZIE Thermal Epithermal eXperiments (TEX): Test Bed Assemblies for Efficient Generation of Integral Benchmarks C.M. PERCHER, A.J. NELSON, W.J. ZYWIEC, et al.

Coffee Break

11h10/12h50

Track 5 STANDARDS, ASSESSMENT METHODOLOGY, REGULATIONS	Track 3 UNCERTAINTY AND SENSITIVITY ANALYSIS	Track 9 CRITICALITY ACCIDENTS AND INCIDENTS	Track 4 MEASUREMENTS, EXPERIMENTS AND BENCHMARKS
Overview and Status of Domestic and International Standards for Nuclear Criticality Safety D.G. BOWEN GRS Handbook on Criticality - New Publication in 2019 F. SOMMER Current Status of Nuclear Regulation in Japan - Focusing on Nuclear Criticality Safety K. NAKAJIMA Feedback from IAEA TRANSSC Working Group and Technical Expert Group on Criticality M. MIJUN, D. MENNERDAHL, B. DESNOYERS et al.	Assessment of Normality for Criticality Safety Bias and Bias Uncertainty Calculation J. CLARITY, W.J. MARSHALL Comparing the Whisper Validation Methodology with Machine Learning Methods P.A. GRECHANUK, M. RISING, T.S. PALMER A Proportionate Approach to EPD B. PHILPOTTS Monte Carlo Uncertainty Analysis Method in «Gadolinium Credit» Applications to BWR Cask Configurations M. CHERNYKH, S. TITTELBACH, J.C. NEUBER et al.	Lessons Learned from the Accumulation of Uranium in a Gas Purification System L. WETZEL, B. O'DONNELL, T. LOTZ et al. Criticality Safety Aspects of the «Bump Latch» Event At Dungeness B J.S. MARTIN, D. PUTLEY, M. HENDERSON Criticality Incident Detection Decision Making: the Evaluation of Unforeseen Risk N. HARRIS Criticality Accidents Detection and Minimum Accident of Concern: Review and Discussions M. DULUC	Titanium and Aluminum Sleeve Experiments in Water Moderated 4.31% Enriched UO2 Fuel Element Lattices D. AMES, G.A. HARMS, J.T. FORD et al. Design Methodology for Fuel Debris Experiment in the New STACY Facility S. GUNJI, J.B. CLAVEL, K. TONONKE et al. Solution Critical Experiments Partially Reflected by Lucite M.L. ZERKLE, S.N. BAUER Warm Critical Runs in Support of the Kilopower Reactor Using Stirling Technology (KRUSTY) Experiment R. KIMPLAND, R. SANCHEZ

Lunch

14h00/15h40

Session 1 Room A - B	Session 2 Room C - D	Session 3 Room 1	Session 4 Conference Room LOUIS ARMAND
<b>Track 5</b> STANDARDS, ASSESSMENT METHODOLOGY, REGULATIONS IRSN Approach for Criticality Accident Assessment A. BARDELAY, M. DULUC, J. RANNOU The New Version of the Criticality Safety Guide Sheets Collection A. DORVAL, M. PRIGNIAU, P. CASOLI et al. Use of ANSI/ANS 8.6 Standard for Criticality Safety Applications in the Modern World of Advanced Simulation Capabilities W. MYERS, J. ALWIN, N. CHISLER et al. Extensive Study of the Heterogeneous Repartition of the Moderation when both the Fissile Mass and the Moderation are Controlled M. DULUC, J. HERTH, F.X. LE DAUPHIN et al.	<b>Track 10</b> PROFESSIONAL DEVELOPMENT ISSUES AND TRAINING Renewal of IRSN Training in Nuclear Criticality Safety C. LENEPEVEU, M. DULUC, M.P. VERAN VIGUIE et al. Maintaining NCS Capability, Capacity and Competence after Enormous Attrition N. GLAZENER, J. KUROPATWINSKI, W. CROOKS et al. Current Status of the DOE/ NNSA Nuclear Criticality Safety Program Hands-On Criticality Safety Training Courses D.G. BOWEN University Pipeline Program for the Education of Future Nuclear Criticality Safety Professionals J. MCCALLUM, A. MEREDITH, J. BUNSEN	<b>Track 9</b> CRITICALITY ACCIDENTS AND INCIDENTS Assessment of Re-Criticality in Severe Accident Configurations Using MCNP and MELCOR M.P. FONTAINE, T. HELMAN, J. MALKINE Experience in Evaluations of Criticality Immediately after Accidents with the Destruction and Melting of Nuclear Fuel at NPP V.V. TEBIN, A.N. BEZBORODOV, A.E. BORISENKOV et al. Numerical Analysis of Criticality of Fuel Debris Falling in Water by Combining Computational Fluid Dynamics and the Continuous Energy Monte Carlo Code M. TAKESHI, J. NISHIYAMA, T. OBARA Exploratory Investigation for Estimation of Fuel Debris Criticality Risk Y. YAMANE, Y. NUMATA, K. TONONKE	<b>Track 4</b> MEASUREMENTS, EXPERIMENTS AND BENCHMARKS History and Future of Temperature Reactivity Experiments at VR-1 Reactor T. BILY, L. SKLENKA, F. FEJT et al. The Effect of Temperature on the Neutron Multiplication Factor for PWR Fuel Assemblies S. GAN, A.R. WILSON Use of BWR Cold Critical Benchmarks for Code Validation A. RANTA-AHO Steady-State Benchmark Evaluation of the TREAT M2 and M3 Calibration Experiments N.C. SORRELL, A.I. HAWARI

Coffee Break

# WEDNESDAY, SEPTEMBER 18

**16h10/17h50**

Track 11 FUTURE CHALLENGES	Track 10 PROFESSIONAL DEVELOPMENT ISSUES AND TRAINING	Track 9 CRITICALITY ACCIDENTS AND INCIDENTS	Track 4 MEASUREMENTS, EXPERIMENTS AND BENCHMARKS
<p>Status of the NEA International Activities on Nuclear Criticality Safety <i>S. TSUDA, F. MICHEL-SENDIS, T. IWANOVA et al.</i></p> <p>An Overview of the United States Department of Energy's Nuclear Criticality Safety Program and Future Challenges <i>D.G. BOWEN, A.S. CHAMBERS</i></p> <p>Future Challenges in Re-Establishing a Solution Critical Capability in the United States <i>C. PERCHER, D. HEINRICHS, S. BATES et al.</i></p> <p>Nuclear Criticality Safety Beyond 2019 <i>D.K. HAYES</i></p>	<p>Criticality Safety Training at CEA <i>M. PRIGNIAU, E. FILLASTRE, F. LESPINASSE et al.</i></p> <p>«Criticality Safety Analysis» Training Course for Engineers to Be Qualified in Criticality Safety <i>A. DORVAL, D. NOVELLES, M. PRIGNIAU et al.</i></p> <p>Criticality Training for the Active Handling Facility <i>J. RENDELL</i></p> <p>Training for Fissile Material Handlers, Supervisors, and General Personnel <i>Q. BEAULIEU, J. BUNSEN</i></p>	<p>Supercritical Kinetic Analysis in a Simple Fuel Debris System by MIK code <i>K. FUKUDA, D. TUYA, J. NISHIYAMA et al.</i></p> <p>Multiphysics Coupling Analysis for Spent Fuel Pool Loss of Coolant Accident <i>J.A. BLANCO, P. RUBIOLO, E. DUMONTEIL</i></p> <p>Multiphysics Simulation of Two Criticality Accident Excursions in Lady Godiva Using MCATK <i>T.J. TRAHAN, S. DOSSA, R.H. KIMPLAND et al.</i></p> <p>Criticality Accident Safety Analysis: Questions and Partial Answers Provided by Dedicated Experiments Conducted on CRAC and SILENE <i>F. BARBRY, M. LAGET, M. PRIGNIAU</i></p>	<p>Criticality Testing of Recent Measurements at the National Criticality Experiments Research Center <i>J. HUTCHINSON, J. ALWIN, R. BARRAN et al.</i></p> <p>Validation of New Silicon Evaluation in Special Core of LR-0 Reactor <i>T. CZANOJ, M. KOŠTÁL, E. LOSA et al.</i></p> <p>Benchmark Evaluation of Saxton Plutonium Program UO<sub>2</sub>-Fueled Critical Lattices <i>B. SAENZ, M.A. MARSHALL, J.D. BESS</i></p> <p>Investigation of the Impact of the Prediction Error of the Burn-Up Code System SWAT4.0 on Neutronics Calculation <i>K. TADA, T. SAKINO</i></p>

# THURSDAY, SEPTEMBER 19

**9h00/10h40**

Session 1 Room A - B	Session 2 Room C - D	Session 3 Room 1	Session 4 Conference Room LOUIS ARMAND
Track 11 FUTURE CHALLENGES	Track 10 PROFESSIONAL DEVELOPMENT ISSUES AND TRAINING	Track 9 CRITICALITY ACCIDENTS AND INCIDENTS	Track 4 MEASUREMENTS, EXPERIMENTS AND BENCHMARKS
<p>Progress of Criticality Control Study on Fuel Debris by Japan Atomic Energy Agency to Support Secretariat of Nuclear Regulation Authority <i>K. TONONKE, T. WATANABE, S. GUNJI et al.</i></p> <p>Nuclear Criticality Safety Impacts of Additive Manufacturing <i>K. WESSELS, M. KNOWLES</i></p> <p>Criticality Characteristics of Fuel Debris Mixed by Fuels with Different Burnups Based on the Fuel Loading Pattern <i>T. WATANABE, K. OHKUBO, S. ARAKI et al.</i></p> <p>Application of the Neutronic Part of the Nuclear Simulation Chain of GRS to Accident Tolerant Fuel systems - First Results <i>R. KILGER, R. HENRY</i></p>	<p>Nuclear Criticality Safety Training at the National Criticality Experiments Research Center <i>D.K. HAYES</i></p> <p>Education and Training at VR-1 Reactor Facility. Can Be Benefiting for Criticality Safety Engineers? <i>T. BILY</i></p> <p>Criticality Augmented Reality Training Aid <i>S. HAY, T. PAGE, C. HOLLAND et al.</i></p> <p>Safety Analysis Report for Packaging (SARP) Shielding &amp; Nuclear Criticality Safety Generalist and Analyst Courses Developed and Conducted by Oak Ridge National Laboratory <i>D.G. BOWEN, J. RISNER, G. RADULESCU et al.</i></p>	<p>Criticality Accident Phenomenology: Numerical Experiments as a Learning Tool <i>M. LAGET</i></p> <p>Review of IRSN Work Regarding Nuclear Criticality Accident <i>M. DULUC, J. RANNOU, F. TROMPIER et al.</i></p> <p>Impact of Criticality Accident Characteristics on Sellafield Criticality Emergency Arrangements <i>D. KIRKWOOD, A. WILSON, C. CUMMING</i></p> <p>Needs and State of the Art in Criticality Dosimetry and Dose Reconstruction Techniques for Medical Management of Criticality Accident's Casualties <i>F. TROMPIER, M.A. CHEVAUER</i></p>	<p>Analysis of the Criticality Benchmark Experiments Utilizing UO<sub>2</sub>F<sub>2</sub> Aqueous Solution in Spherical Geometry <i>T. GORICANEC, B. KOS, G. ŽEROVNIK et al.</i></p> <p>Criticality Analysis of NCA Critical Experiments Simulating SFP of Low Moderator Density Conditions <i>S. SHIBA, D. IWAHASHI</i></p> <p>Detailed Design of Epithermal/Intermediate Spectrum Critical Experiment Using the Sandia National Laboratories Critical Facility <i>J. CLARITY, T. MILLER, M. MARSHALL et al.</i></p> <p>Results of Newly Expanded COG Criticality Validation Suite <i>D.P. HEINRICHS, S. KIM</i></p>

Coffee Break

**11h10/12h40**

**Closing Ceremony**

Conference Room LOUIS ARMAND

**12h40/13h00**

**Departure for the Technical Tours**

RECEPTION DESK

**Workshops**

**14h00/15h20**

Room 3	Room 4
Workshop 1 Second Level Criticality Modelling with CRISTAL Package: Enhancing Criticality Safety Assessments for Industrial Applications <i>Y. RICHEL et al.</i>	Workshop 2 Enhancing Validation of Nuclear Criticality safety Calculations with ICSBEP Handbook an NEA Tools <i>J. BESS, I. HILL, S. TSUDA</i>

Coffee Break

**15h40/17h00**

Workshop 1 Second Level Criticality Modelling with CRISTAL Package: Enhancing Criticality Safety Assessments for Industrial Applications <i>Y. RICHEL et al.</i>	Workshop 2 Enhancing Validation of Nuclear Criticality safety Calculations with ICSBEP Handbook an NEA Tools <i>J. BESS, I. HILL, S. TSUDA</i>
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## Monday, September 23<sup>rd</sup>

**Welcome and introduction, 8h15 – 8h40**

**Transport applications in medical and life sciences, 8h40-10h20**

*One-way Coupled Benchmark for Combined-Hyperthermia-Radiotherapy Treatment in Slab Geometry*, **B. D. Ganapol** (University of Arizona), J. K. Patel, R. Vasques

*Concentration waves of bacteria at the mesoscale*, **V. Calvez** (Institut Camille Jordan & Université Claude Bernard Lyon, France)

*Estimating radiotherapy dose deposition uncertainties due to biological motion*, **R. Barnard** (Western Washington University), J. Kusch

*Kinetic models with non-local sensing determining cell polarization and speed according to independent cues*, **N. Loy** (Politecnico di Torino), L. Preziosi

**Coffee break, 10h20-10h35**

**Plenary talk, 10h35-11h15**

*Issues with material motion corrections for thermal radiative transport simulations*, **N. A. Gentile** (LLNL)

**Hydrodynamics and radiative transfer, 11h15-12h55**

*A new Implicit Monte-Carlo scheme for the transport equation coupled to Stefan's law without teleportation error and without tilt*, **G. Poette** (CEA/CESTA), X. Valentin

*Acceleration of Positivity-Preserving Transport Schemes using the Variable Eddington Factor Method*, **B. C. Yee** (LLNL), T. S. Haut, V. Z. Tomov, M. Holec, S. S. Olivier

*Method of Characteristics Moment Closure, a Numerical Method for Covariant Radiation Magnetohydrodynamics*, **B. R. Ryan** (LANL) J. C. Dolence

*An efficient coupling of thermal radiation transport to Lagrangian hydrodynamics on high-order curvilinear meshes*, **M. Holec** (LLNL), T. S. Haut, V. Z. Tomov, B. C. Yee, B. S. Southworth

**Lunch break, 12h55-14h25**

### **Phonons, charged particles & solid state, 14h25-16h30**

*The Screening Effect in a Fermi Plasma: the Influence of the Motion of Fermi Ions*, V. Molinari, D. Giusti, **B. Bodmann** (Universidade Federal do Rio Grande do Sul)

*The effect of electron-electron scattering in graphene*, M. Coco, **V. Romano** (U. Catania), G. Nastasi

*Modeling of ion beam propagation in matter using entropic moment method*, E. Olivier, **T.-H. Nguyen-Bui** (CELIA, Université de Bordeaux – CNRS – CEA), Ch. Champion, B. Dubroca

*A macroscopic model for phonon transport in graphene*, **G. Mascali** (U. Catania), V. Romano

*A double kinetic equation solver for conducto-radiative heat transfer in porous ceramics*, **B. Dubroca** (CNRS - Univ. Bordeaux – Safran - CEA), R. Turpault, G. Vignoles

### **Coffee break, 16h30-16h45**

### **Methods for reactor physics, 16h45-18h**

*Towards a solver based on a discrete ordinate method for reactor neutron noise simulations in the frequency domain*, H. Yi, **P. Vinaï** (Chalmers University of Technology), Ch. Demazière

*Strange attractors in eigenvalue problems*, **D. Mancusi** (CEA/Saclay), A. Zoia

*A constraint based local refinement methodology for isogeometric analysis (IGA) of the self-adjoint angular flux (SAAF) equation with applications to radiation shielding analyses*, **C. Latimer** (Imperial College London), J. Kophazi, M. D. Eaton, R. G. McClarren

## Tuesday, September 24<sup>th</sup>

### Methods for reactor physics and radiation transport, 8h15-10h20

*Sweep-free high-order negative flux fixup schemes*, **R. P. Smedley-Stevenson** (AWE, PLC)

*The domain decomposition method applied to the discrete-ordinates transport solver IDT: scalability test on high-performance computing machines*, **E. Masiello** (CEA Saclay), R. Lenain, W. Ford

*Reviewing the computational performance of deterministic SN transport sweeps on many-core architectures*, **T. Deakin** (University of Bristol), Simon McIntosh-Smith, Justin Lovegrove, Richard Smedley-Stevenson and Andrew Hagues

*Space-time reduced order model for Boltzmann transport equation*, **Y. Choi** (LLNL), W. Arrighi, P. Brown, R. Anderson

*Core calculation based on the method of dynamic homogenization*, **A. Galia** (CEA Saclay), I. Zmijarevic, R. Sanchez

### Coffee break, 10h20-10h35

### Monte Carlo methods, 10h35-12h40

*Fission matrix application to acceleration and convergence testing for Monte Carlo criticality calculations*, **F. B. Brown** (LANL), C. J. Josey, S. Henderson, W. R. Martin

*Direct and adjoint Monte Carlo methods for alpha-eigenvalue spectral analysis*, **V. Vitali** (CEA Saclay), F. Chevallier, A. Jinaphanh, P. Blaise, A. Zoia

*Scalability of GPU Assisted Reactor Dynamic Analysis (GUARDYAN)*, **B. Molnár** (Budapest University of Technology and Economics), G. Tolnai, D. Légrády

*On the developments of a neutron transport Monte Carlo simulator: flux spectra parametrization*, L. F. F. C. Barcellos, **B. E. J. Bodmann** (Universidade Federal do Rio Grande do Sul), S. Q. Bogado Leite, M. T. M. B. de Vilhena

*Adjoint-weighted tallies in time eigenvalues Monte Carlo calculations*, **A. Jinaphanh** (CEA Saclay), A. Zoia

### Lunch break, 12h40-14h10

**Neutron fluctuations, 14h10-15h25**

*Deterministic transport simulation of neutron counting statistics*, **Ph. Humbert** (CEA/DAM)

*Fluctuations and spatial correlations in zero-power research reactors*, **B. Dechenaux** (IRSN), E. Dumonteil

*One-speed transport calculation of the multiplicity moments in nuclear safeguards*, **I. Pázsit** (Chalmers University)

**Coffee break, 15h25-15h40**

**Plenary talk, 15h40-16h20**

*Fermi and the Boltzmann equation*, **P. Ravetto** (Politecnico di Torino)

**Special session in honor of Prof. Piero Ravetto, 16h20-18h**

*Eigenvalue formulations for the spherical harmonics approximation to the neutron transport equation*, N. Abrate, M. Burrone, **S. Dulla** (Politecnico di Torino), P. Ravetto, P. Saracco

*Recent studies on the discrete ordinates discretization error in the uncollided point-wise scalar flux*, X. Hu, **Y. Y. Azmy** (North Carolina State University)

*Improving computational efficiency of Comet via discrete polynomial expansion*, **F. Rahnema** (Georgia Institute of Technology), D. Zhang

*On Xenon Fission Product Poisoning*, **B. Ganapol** (University of Arizona), S. Schunert, F. Gleicher, R. Martineau and M. DeHart

## Wednesday, September 25<sup>th</sup>

### Methods for reactor physics, 8h15-10h20

*Performance assessment of Boundary Projection Acceleration applied to a short-characteristics heterogeneous Cartesian meshes solver*, **A. Previti** (Framatome), E. Masiello

*Deriving the Time-Dependent Asymptotic PN Approximation*, R. Harel, S. Burov, **S. I. Heizler** (The Hebrew University)

*Application of Anderson acceleration to the neutron transport equation*, **A. Calloo** (CEA Saclay)

*On a Recent Theoretical Result on Diffusion Limits of Numerical Methods for the SN Transport Equation in Optically Thick Diffusive Regimes*, **D. Wang** (The Ohio State University)

*A high-order MOC including a spatial polynomial expansion for cross sections*, **A. Gammicchia** (CEA Saclay), S. Santandrea, S. Dulla

### Coffee break, 10h20-10h35

### Plenary talk, 10h35-11h15

*SPN finale*, **R. Sanchez** (CEA Saclay)

### Kinetic models and gases, 11h15-12h55

*Global existence of solutions of a fluid-kinetic model for respiratory aerosols*, **D. Michel** (Sorbonne Université), L. Boudin, A. Moussa

*Kinetic models of BGK type for mixtures of monoatomic or polyatomic gases*, **M. Bisi** (Università di Parma)

*Cross-coupling effect of mass and heat flows in a rarefied gas around a sphere*, **S. Taguchi** (Kyoto University)

*Rigorous convergence of the Boltzmann multi-species equation towards the Maxwell-Stefan model for diffusion*, **A. Bondesan** (Université Paris Descartes), L. Boudin, M. Briant, B. Grec

### Lunch break, 12h55-14h25

**Analytical and semi-analytical solutions, 14h25-16h30**

*Recent studies on two-dimensional radiative transfer problems in anisotropic media*, K. Rui, L. Basso Barichello (Universidade Federal do Rio Grande do Sul)

*Neutron transport in a multi-region sphere*, R. D. M. Garcia (Instituto de Estudos Avançados)

*Partial Range Completeness of Case Eigenfunctions and Numerical Solution of Singular Integral Equations of Particle Transport Problems*, D.C. Sahni (Terna Engineering College), R.G. Tureci, A.Z. Bozkir

*Radiative transfer in half spaces of arbitrary dimension*, E. d'Eon (Autodesk), N. J. McCormick

*Verification of a Production 2D MOC Code with Manufactured and Semi-Analytical Solutions*, J. Wang, W. R. Martin (University of Michigan), B. S. Collins

**Coffee break, 16h30-16h45**

**Optimal and stochastic transport, 16h45-18h**

*Birthday Monte Carlo (BMC): Using the Monte Carlo Method to Predict the Number of Future Facebook Birthday Posts*, M. O'Brien (LLNL)

*On the optimal control of the Keilson-Storer master equation*, J. Bartsch (Universitat Wurzburg), G. Nastasi, A. Borzi

*A numerical investigation of Brockett's Liouville ensemble optimal control problems*, J. Bartsch (Universitat Wurzburg), A. Borzi, S. Roy

## Thursday, September 26<sup>th</sup>

### General methods for transport problems, 8h15-10h20

*Trefftz methods for transport equations with boundary layers*, **G. Morel** (Inria Rennes), Ch. Buet, B. Després

*Numerical solution of the azimuth-dependent Fokker-Planck equation in 1d slab geometry*, **O. López Pouso** (University of Santiago de Compostela, Spain), N. Jumaniyazov

*Nonlinear Fokker-Planck Acceleration for Forward-Peaked Transport Problems in Slab Geometry*, J. K. Patel, **J. J. Kuczek** (The Ohio State University), R. Vasques

*Angular adaptivity for resolving ray-effects in Boltzmann transport*, **S. Dargaville** (Imperial College London), C.C. Pain, A.G. Buchan, R.P. Smedley-Stevenson, P.N. Smith

*Ray-effect mitigation in the SN method*, **T. Camminady** (KIT), M. Frank, C. D. Hauck, and J. Kusch

### Coffee break, 10h20-10h35

### Plenary talk, 10h35-11h15

*The Albedo Problem in Nonexponential Radiative Transfer*, **E. D'Eon** (Autodesk)

### Transport in porous and random media, 11h15-12h55

*The linear transport in porous media*, K. Amagai, M. Yamakawa, **M. Machida** (Hamamatsu University), Y. Hatano

*A Nonclassical Monte Carlo Algorithm for Transport Problems in Diffusive Binary Stochastic Media*, R. Vasques, P. S. Brantley, **R. K. Palmer** (The Ohio State University)

*On a Consistent Markovian Formulation of Transport in 1D Planar Random Media*, **A. K. Prinja** (University of New Mexico) and C. M. Skinner

*Analysis of linear transport in stochastic media with material sources*, **C. Larmier** (CEA Saclay), S. Lemaire, D. Mancusi, D. Riz, A. Zoia

### Lunch break, 12h55-14h25

#### **Kinetic models and gases, 14h25-16h05**

*Analytical solution of a gas release problem considering permeation with time dependent boundary conditions*, K. Nagatou, **M. Schulz** (KIT), F. Arbeiter, A. von der Weth, R. Dagan

*Transition to turbulence in the weakly stratified Kolmogorov flow*, **F. Gargano** (University of Palermo), M. Sammartino, V. Sciacca

*Influence of the domain of particle pairs interactions on the results of the statistical modeling of rarefied gas flows*, **A.I. Khisamutdinov** (Novosibirsk State University)

*Hydrodynamic equations for binary gas mixtures with dominant elastic collisions*, M. Bisi, Maria Groppi, **G. Martalò** (University of Parma)

#### **Coffee break, 16h05-16h20**

#### **Applications to light transport & computer graphics, 16h20-17h35**

*Photon surfaces for robust, unbiased volumetric density estimation in computer graphics*, X. Deng, S. Jiao, B. Bitterli, **W. Jarosz** (Dartmouth College)

*A null-scattering path integral formulation of light transport*, **B. Miller** (Dartmouth College), I. Georgiev, W. Jarosz

*A radiative transfer framework for rendering non-exponential media in computer graphics*, B. Bitterli, S. Ravichandran, T. Muller, M. Wrenninge, J. Novak, S. Marschner, **W. Jarosz** (Dartmouth College)

## Friday, September 27<sup>th</sup>

### Phonons, charged particles & solid state, 8h15-10h20

*Moving interfacial scattering into the Boltzmann transport equation for transport simulations of phonons*, J. Harter, G. Romano, A. Hosseini, T. Palmer, **P. A. Greaney** (UC Riverside)

*On the Landau Levels and Quantum Diamagnetism*, V. Molinari, D. Giusti, **B. Bodmann** (Universidade Federal do Rio Grande do Sul)

*Quantum decoherence effects on a scattering process in the Wigner picture*, L. Barletti, **E. Giovannini** (Università di Firenze)

*Phonon transport prediction of thermal conductivity in lithium aluminate*, **N. H. Whitman** (Oregon State University), T. S. Palmer

*Quantum drift-diffusion equations for a 2-dimensional electron gas with spin-orbit interaction*, **L. Barletti** (Università di Firenze), Ph. Holzinger, A. Jungel

### Coffee break, 10h20-10h35

### Plenary talk, 10h35-11h15

*Matrix Riccati equation solution of the radiative transfer equation: A Progress Report*, **B. D. Ganapol** (University of Arizona), J. Patel

### Methods for reactor physics, 11h15-12h55

*Shallow Artificial Neural Networks to Accelerate Radiation Transport Sweeps*, M. E. Tano, **J. C. Ragusa** (Texas A&M University)

*On the Ronen method in simple 1-d problems*, **D. Tomatis** (CEA Saclay), R. Gross and E. Gilad

*On the validity and usage of the scattering source term within the Boltzmann transport equation*, **R. Dagan** (KIT), A. Konobeyev

*On the effect of angular and spatial discretization on perturbation calculations*, **Z. I. Böröczki** (Budapest University of Technology and Economics), M. Szieberth, A. Rineiski, F. Gabrielli

### Lunch break, 12h55-14h25

## **Hydrodynamics & radiative transfer, 14h25-16h30**

*Considerations for Monte Carlo transport of thermal X-rays in a higher-order finite element framework*, **K. Zieb** (LLNL), S. Weeratunga, R. Vega, T. Brunner, N. Gentile

*Efficient radiation diffusion for smoothed particle hydrodynamics*, **B. Bassett** (LLNL) and J. M. Owen

*DSA Preconditioning for DG discretizations of High-Order SN transport on Curved Meshes*, **T. S. Haut** (LLNL), B. S. Southworth, P. G. Maginot, V. Z. Tomov, W. Pazner

*Asymptotic analysis of the high-order, low-order method with time-continuous, particle-based transport solvers*, **H. Park** (LANL)

*Accurate solutions of the radiative transfer problem via theory of connections*, **M. De Florio** (University of Arizona; Università di Bologna), E. Schiassi, R. Furfaro, B. D. Ganapol, D. Mostacci

**Coffee break**

## Poster contributions

Throughout the conference, posters will be displayed in **Room 108** and authors will have the possibility of presenting and discussing their work.

- *Event based simulation of 2D particles gas in a gradient of temperature*, **S. Vitali** (University of Bologna), C. E. Montanari, M. Monti, G. Castellani, A. Bazzani
- *A moment closure based on projections on the boundary of the realizability domain*, **T. Pichard** (Ecole Polytechnique)
- *Hybrid CPU-GPU Load Balancing for Monte Carlo Particle Transport*, **M. J. O'Brien** (LLNL), M. S. McKinley, S. A. Dawson, P. S. Brantley, R. C. Bleile, N. A. Gentile
- *Numerical solution of the Boltzmann transport equation for photons*, **O. Lopez Pouso** (University of Santiago de Compostela), T. Kumar Das
- *Methods "Successive approximations over Characteristic interactions" for interpretation of measurements data and evaluation of Transport equation coefficients*, **A. I. Khisamutdinov** (Trofimuk Institute of Petroleum Geology and Geophysics of SB RAS)
- *Charge and phonon transport in suspended monolayer graphene*, **M. Coco** (University of Florence), G. Mascali, V. Romano
- *Nonexponential Radiative Transfer: Reciprocity, Monte Carlo Estimation and Diffusion Approximation*, **E. d'Eon** (Autodesk)
- *Asymptotic Derivation of the Simplified PN Equations for Nonclassical Transport with Anisotropic Scattering*, **R. K. Palmer** (The Ohio State University), R. Vasques
- *Discontinuous Galerkin approach for the simulation of charge transport in graphene*, **G. Nastasi** (University of Catania), V. Romano
- *On Linear Stochastic Theory of Neutron Transport in distributed Reactor Model*, **R. Nesterenko** (Moscow)
- *Precision Benchmark of the COG Monte Carlo Code*, E. Leni, **D. Heinrichs**, **B. Ganapol** (Arizona University)
- *P1 Synthetic Acceleration for Nonclassical Spectral SN Equations in Slab Geometry*, J. K. Patel, L. R.C. Moraes, R. Vasques, **R. C. Barros** (Universidade do Estado do Rio de Janeiro)
- *Analysis of spatial and spectral effects on the neutron flux in the vicinity of absorbers*, **M. Massone** (ENEA), Sandra Dulla

# Appendix C

## WPNCS Agenda

 Search

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### WPNCS and related expert groups

The annual meetings of the Working Party on Nuclear Criticality Safety and its five Expert Groups will take place **on 23-27 September 2019** at NEA and OECD headquarters in Paris.

Registration is open until 11 September, 2019 (CLOSED)

**Register here** to the WPNCS 2019 meetings. Detailed agendas will be made available in due course.

- [How to get to NEA Headquarters](#)

### Proposed Timetable: 23-27 September 2019

Date	Schedule	NEA HQ
<b>Mon. 23 Sept.</b>	<b>09:00-13:00</b>	<b>SG-4</b>
	<b>14:00-18:00</b>	<b>SG-3</b>
<b>Tue. 24 Sept.</b>	<b>09:00-13:00</b>	<b>SG-2</b>
	<b>14:00-18:00</b>	<b>SG-7</b>
<b>Wed. 25 Sept.</b>	<b>09:00-13:00</b>	<b>SG-5</b>
	<b>14:00-18:00</b>	<b>SG-6</b>
<b>Thurs. 26 Sept.</b>	<b>09:00-18:00</b>	<b>SG-1</b>
<b>Fri. 27 Sept.</b>	<b>09:00-18:00</b>	<b>WPNCS</b>

\* Participation to the WPNCS meeting is restricted to WPNCS members.

SG-1: Role of Integral Experiment Uncertainties and Covariance Data in Criticality Safety Validation (EGUACSA, Phase IV)

SG-2: Blind benchmark on MOX damp powders (EGUACSA, Phase V)

SG-3: The effect of temperature on the neutron multiplication factor for PWR fuel assemblies

SG-4: Analysis of Past Criticality Accident

SG-5: Experimental needs for criticality safety purpose

SG-6: Statistical tests for diagnosing fission source convergence and undersampling in Monte Carlo criticality calculations

SG-7: On the definition of a benchmark on sensitivity/uncertainty analysis on used fuel inventory

Last reviewed: 23 September 2019

OECD NUCLEAR ENERGY AGENCY

Nuclear Science Committee

**Second meeting of WPNCS Sub-Group 4 (SG-4):  
Analysis of Past Criticality Accident**

**Monday 23 SEPTEMBER 2019**

OECD NEA Headquarters (Room BB10)

46, quai Alphonse Le Gallo, 92100 Boulogne-Billancourt, France

PROPOSED AGENDA

Meeting Schedule:

9.00 – 13.00

1. Welcome by the co-ordinator Y. Yamane
  - Greetings & self introduction
2. Administrative matters Secretariat/All
  - Approval of the agenda
3. General presentations
  - Current status of the activity Y. Yamane
  - Windscale Works Incident Static Analysis P. Smith
  - Analysis of JCO criticality accident using AGNES code Y. Yamane
  - Schedule and deliverables Y. Yamane
4. Other business
  - Approval of EGCEA Phase-II report Y. Yamane
  
  - Adjourn

OECD NUCLEAR ENERGY AGENCY

Nuclear Science Committee

**WPNCS Sub-Group 3:**

**The effect of temperature on the neutron multiplication factor for PWR fuel assemblies**

MONDAY 23<sup>rd</sup> September 2019

OECD NEA Headquarters (BB10)

46, quai Alphonse Le Gallo, 92100 Boulogne-Billancourt, France

PROPOSED AGENDA

Meeting Schedule:

14.00 – 18.00

- |   |                   |
|---|-------------------|
| 1. Welcome                              | Co-ordinator      |
| 2. SG3 benchmark results: EMS           | Dennis Mennerdahl |
| 3. SG3 benchmark results: CEA Cadarache | Marion Tiphine    |
| 4. SG3 benchmark results: ORNL          | BJ Marshall       |
| 5. SG3 benchmark results: Wood          | Paul Smith        |
| 6. Benchmark update                     | Co-ordinator      |
| 7. Discussion                           | All               |
| 8. Next steps                           | Co-ordinator      |
| 9. Adjourn                              | Co-ordinator      |

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OECD NUCLEAR ENERGY AGENCY  
Nuclear Science Committee  
**2<sup>nd</sup> Meeting of the Subgroup 2 (SG2)**  
**Blind benchmark on MOX damp powders**

**Tuesday 24 September 2019**  
OECD NEA Headquarters  
46, quai Alphonse Le Gallo, 92100 Boulogne-Billancourt, France

PROPOSED AGENDA

Meeting Schedule:

**9h00 – 13h00**

- |  |                  |
|--|------------------|
| <b>1. Welcome</b>  | C. Carmouze      |
| <b>3. Subgroup Activities</b>  | C. Carmouze /All |
| <ul style="list-style-type: none"><li>• Review of ICNC2019 regarding S/U analysis</li><li>• Technical presentation : MONK and ANSWERS SG2 results</li><li>• Draft report of the activities<ul style="list-style-type: none"><li>○ General structure</li><li>○ Further actions</li><li>○ Planning</li></ul></li></ul> | P. Smith         |
| <b>5. Date and place of the next meeting</b>   | S. Tsuda         |
| <b>6. Adjourn</b>  | C. Carmouze      |

OECD NUCLEAR ENERGY AGENCY

Nuclear Science Committee

**First Meeting of the Subgroup 7 (SG7)**

**On the definition of a benchmark on sensitivity/uncertainty analyses on used fuel inventory**

**Tuesday 24 September 2019**

OECD NEA Headquarters

46, quai Alphonse Le Gallo, 92100 Boulogne-Billancourt, France

PROPOSED AGENDA

Meeting Schedule:

**14h00 – 18h00**

- |   |                              |
|---|------------------------------|
| <b>1. Welcome</b>   | C. Carmouze / L. Jutier      |
| <b>2. Subgroup Activities</b>   | C. Carmouze / L. Jutier /All |
| <ul style="list-style-type: none"><li>• WPNCS SG7 survey and results</li><li>• Selected experimental case from SF COMPO<ul style="list-style-type: none"><li>○ Discussion</li><li>○ Approval</li></ul></li><li>• Draft report of the benchmark specifications<ul style="list-style-type: none"><li>○ General structure</li><li>○ Further actions</li></ul></li><li>• Planning</li></ul> |                              |
| <b>4. Any other business</b>  | All                          |
| <b>3. Date and place of the next meeting</b>  | S. Tsuda                     |
| <b>4. Adjourn</b>   | C. Carmouze / L. Jutier      |

OECD NUCLEAR ENERGY AGENCY  
Nuclear Science Committee  
**Second Meeting of the Subgroup 5 (SG-5) on  
Experimental needs for criticality safety purpose**

**Wednesday 25 SEPTEMBER 2019**

OECD NEA Headquarters (Room BB10)  
46, quai Alphonse Le Gallo, 92100 Boulogne-Billancourt, France

PROPOSED AGENDA

Meeting Schedule:

9h00 – 13h00

<b>1. Welcome</b>	I. Duhamel (IRSN-France)
<b>2. Technical Presentations</b>	
VENUS: a flexible spectrum zero power reactor	J. Wagemans (SCK – Belgium)
The experimental capabilities at NNSS	N. Thompson (LANL - USA)
The PIRT Method	P. Blaise (CEA – France))
<b>3. Sub-group activities</b>	
Synthesis of the surveys on experimental needs	I. Duhamel (IRSN – France)
Discussions	All
Deliverables and Milestones	I. Duhamel (IRSN – France)
<b>4. Any other business</b>	All
<b>5. Date and place of the next meeting</b>	Secretariat
<b>6. Adjourn</b>	I. Duhamel (IRSN-France)

OECD NUCLEAR ENERGY AGENCY  
Nuclear Science Committee  
**Second Meeting of the Subgroup 6 (SG-6) on  
Statistical tests for diagnosing fission source convergence and undersampling in  
Monte Carlo criticality calculations**

**Wednesday 25 SEPTEMBER 2019**

OECD NEA Headquarters (Room BB10)  
46, quai Alphonse Le Gallo, 92100 Boulogne-Billancourt, France

PROPOSED AGENDA

Meeting Schedule:

14h00 – 18h00

- |   |             |
|---|-------------|
| <b>1. Welcome</b>   |             |
| <b>2. Subgroup Activities.</b>                              | Brown + all |
| * Discussion of SG-6  |             |
| * Summary of activity                                       |             |
| * Plan for report   |             |
| * Discussion.   | All         |
| <b>3. Technical Presentations</b>                           |             |
| * Brown   |             |
| * Monange   |             |
| * Others  |             |
| * Discussion  |             |
| <b>4. Any other business</b>                                | All         |
| * CEA proposal for random geometry<br>Benchmark calculation |             |
| - Lead technical person                                     |             |
| - Discussion  |             |
| - Schedule  |             |
| <b>5. Date and place of the next meeting</b>                | Secretariat |
| <b>6. Adjourn</b>   |             |

OECD NUCLEAR ENERGY AGENCY  
Nuclear Science Committee  
**Second Meeting of the Subgroup 1 (SG-1) on  
Role of Integral Experiment Uncertainties and Covariance Data in Criticality Safety  
Validation**

**Thursday 26 SEPTEMBER 2019**  
OECD NEA Headquarters (Room BB10)  
46, quai Alphonse Le Gallo, 92100 Boulogne-Billancourt, France

PROPOSED AGENDA

Meeting Schedule:

9h00 – 18h00

- |   |                   |
|---|-------------------|
| 1. Welcome  | Co-ordinator      |
| 2. Subgroup Activities  | M.Stuke/All       |
| • Review of ICNC2019  |                   |
| • “State-of-the-Art” Report / Qualified Feedback to ICSBEP                        |                   |
| ○ General structure of the report   |                   |
| ○ Definition of further actions   |                   |
| • Former EGUACSA Benchmark Phase IV   | A.Hoefler/M.Stuke |
| ○ Approval of the draft report for publication                                    |                   |
| 3. Technical Presentations  |                   |
| • F. Sommer: tba  |                   |
| • W. Marshall: tba  |                   |
| • A. Hoefler: Benchmark covariances in licensing - not necessarily a large effect |                   |
| 4. Any other business   | All               |
| 5. Date and place of the next meeting   | Secretariat       |
| 6. Adjourn  | Co-ordinator      |

OECD NUCLEAR ENERGY AGENCY  
Nuclear Science Committee  
**23rd Meeting of the Working Party on Nuclear Criticality Safety (WPNCS)**  
**FRIDAY 27 SEPTEMBER 2019**  
OECD NEA Headquarters (Room BB2)  
46, quai Alphonse Le Gallo, 92100 Boulogne-Billancourt, France

PROPOSED AGENDA

Meeting Schedule:

9h00 – 18h00

1. Welcome	Chair
2. Administrative	Secretariat/All
• Approval of the agenda	
• Approval of the summary record from the previous meeting	
• Review of Actions from the previous meetings	
3. Feedback from the Nuclear Science Committee Meeting	T. Ivanova
4. Reports from Sub-Groups	
• Role of Integral Experiment Uncertainties and Covariance Data in Criticality Safety Validation (SG-1)	M. Stuke
• Blind benchmark on MOX damp powders (SG-2)	C. Carmouze
The effect of temperature on the neutron multiplication factor for PWR fuel assemblies (SG-3)	S. Gan
• Analysis of Past Criticality Accident (SG-4)	Y. Yamane
• Experimental needs for criticality safety purpose (SG-5)	I. Duhamel
• Statistical tests for diagnosing fission source convergence and undersampling in Monte Carlo criticality calculations (SG-6)	F. Brown
• On the definition of a benchmark on sensitivity/uncertainty analysis on used fuel inventory (SG-7)	C. Carmouze
5. Reports from the technical review groups	
• Status of the ICSBEP - September 2019	J. Bess
• SFCOMPO TRG	G. Ilas (via WebEx)

6. Updates on Nuclear Criticality Safety National Programmes	All
7. ICNC	
• Report and feedback from ICNC 2019	S. Evo
• Introduction of ICNC2023	K. Tonoike
8. Any other business	Chair
9. Date and place of the next meeting	Secretariat
10. Adjourn	Chair