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Prepared by LLNL under Contract DE-AC52-07NA27344

DATE: October 8, 2020

SUBJECT: Report of (Virtual) Foreign Travel for the 2020 Working Party on Nuclear Criticality Safety (WPNCS)

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

FROM: Catherine Percher, Nuclear Criticality Safety Division, Lawrence Livermore National Laboratory

MEETING TITLE:

Working Party on Nuclear Criticality Safety, WPNCS 2020

MEETING LOCATION:

Organisation for Economic Cooperation and Development, Nuclear Energy Agency, 46 Quai Alphonse Le Gallo, Boulongne-Billancourt, Paris, France, 92100

Attended virtually due to COVID-19 travel restrictions.

MEETING DATES:

July 6-10, 2020

ATTENDEES ON BEHALF OF NCSP:

Catherine Percher

BENEFIT OF MEETINGS TO NCSP:

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)
SG-8	Preservation of Expert Knowledge and Judgement Applied to Criticality Benchmarks	IE, ND

The WPNCS and Subgroup Meeting Schedule is provided in Appendix A. The WPNCS Meeting Agenda is included as Appendix B.

C. Percher is one of six official United States Delegates to the WPNCS and is a voting member of the working party. The meeting was held virtually due to COVID-19 travel restrictions. During the week, she virtually attended the subgroup working groups for SG-3 and 8. SG-8 is a new subgroup, headed by W. Wieselquist (ORNL) and entitled "Preservation of Expert Knowledge and Judgement Applied to Criticality Benchmarks." The objective of the activity is to develop a methodology for collected and disseminating feedback on ICSBEP evaluations from knowledgeable experts to inform a quality assessment for benchmark users. Subgroup 5 (Experimental Needs for Criticality Safety Purpose) met outside of the WPNCS week on August 31, 2020, and was also attended by C. Percher. SG-5, headed by Isabelle Duhamel of IRSN, is of specific interest to NCSP, as it is attempting to solicit international nuclear criticality safety integral experiment needs, which tend to be cross-cutting and reflect US needs.

There is considerable interest by the working party in NCSP activities, particularly critical experiment activities to support NCS.

PURPOSE OF MEETINGS:

During the WPNCS week, a subset of the expert subgroups meet to further the goals of the subgroup and report on work completed by the subgroup participants. SG-3 is finishing their mandate, which involved a computational benchmark to examine the effect of low temperatures on a toy problem of one PWR fuel assembly, and finalizing their summary report. SG-8 had its first official meeting, and went through a rating system for ICSBEP benchmarks that will be used to collect expert knowledge about the quality of benchmarks and provide feedback to ICSBEP's technical review group for evaluations that need edits. The information is also important for benchmark users (such as NCS engineers or nuclear data evaluators) to know which benchmarks might have issues that could impact their usage. SG-5 has solicited experimental needs from the international participants, and the final report is currently being drafted. The final report will include the integral data needs identified by the members, and the team's consensus ranking of the experimental priority.

APPENDIX A: WPNCS Meeting Week Schedule

WPNCS and related SG/TRG meetings in 2020

The annual meetings of the Working Party on Nuclear Criticality Safety and its five Expert Groups will take place **on 6-10 July 2020 as FULL-REMOTE meetings in Paris (CEST) time**.

- Registration is open until 3 July, 2020
- **Register from here** to the WPNCS 2020 meetings. Detailed agendas will be made available in due course.
- How to get to NEA Headquarters

Proposed Timetable: 6**-10 July 2020**

Date	Schedule (CEST)	NEA HQ
6 July (Mon)	11:00-14:00	**SG-8**
7 July (Tue)	11:00-14:00	**SG-3**
8 July (Wed)	11:00-14:00	**SG-6** / **SG-1**
9 July (Thurs)	11:00-14:00	**WPNCS**
10 July (Fri)	11:00-14:00	

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

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

SG-8: Preservation of Expert Knowledge and Judgement Applied to Criticality Benchmarks

Last reviewed: 6 July 2020

APPENDIX B: WPNCS Meeting Agenda

OECD NUCLEAR ENERGY AGENCY

Nuclear Science Committee

24th Meeting of the Working Party on Nuclear Criticality Safety (WPNCS)

THURSDAY 9 & FRIDAY 10 JULY 2021

OECD NEA Headquarters (FULL-remote)

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

PROPOSED AGENDA

Meeting Schedule (Day 1):

11h00 – 14h00 CEST

1. Welcome [*0:20*] **11:00 – 11:20** — Secretariat
   - Election of new Chair
2. Administrative [*00:20*] **11:20 – 11:40** — 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 [*00:20*] **11:40 – 12:00** — T. Ivanova
4. Reports from Sub-Groups [*1:40*] **12:00 – 13:40**, (0:20 each, including QA) *impact of Covid-19 on SG activity, and current status of report preparation*
   - 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) — S. Tsuda, on behalf of Y. Yamane
   - Experimental needs for criticality safety purpose (SG-5) — I. Duhamel

----- End of 1st day -----

Meeting Schedule (Day 2):

11h00 – 14h00 CEST

4. Reports from Sub-Groups (Cont.) [***1:00***] **11:00 – 12:00** (0:20 each, including QA) *impact of Covid-19 on SG activity, and current status of report preparation*

- 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
- Preservation of Expert Knowledge and Judgement Applied to Criticality Benchmarks (SG-8) — W.Wieselquist

5. Reports from the technical review groups [*0:40*] **12:00 – 12:40**

- Status of the ICSBEP - September 2019 — J. Bess
- SFCOMPO TRG — G. Ilas

6. Discussion of WPNCS Mandate 2020-2022 [0:30] **12:40 – 13:10** — Chair

7. Discussion of new SG proposal [*0:20*] **13:10 – 13:30** — Chair

8. Any other business [*0:15*] **13:30 – 13:45** — Chair

9. Date and place of the next meeting [*0:05*] **13:45 – 13:50** — Secretariat

10. Adjourn — Chair