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**DATE:** October 13, 2021

**SUBJECT:** Report of (Virtual) Foreign Travel for the 2021 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

**Auspices**

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**MEETING TITLE:**

Working Party on Nuclear Criticality Safety, WPNCS 2021

**MEETING LOCATION:**

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

Attended virtually due to COVID-19 travel restrictions.

**MEETING DATES:**

July 5-9, 2021

**ATTENDEES ON BEHALF OF NCSP:**

Catherine Percher

**BENEFIT OF MEETINGS TO NCSP:**

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
SG-9	Heterogeneous media / random geometries	AM
SG-10	Nuclear Data Uncertainties on Spent Fuel Inventory	ND
SG-11	Bias and Correlated Data, Comparison of Methods	IE, ND

The WPNCS Meeting Agenda is included as Appendix A.

#### **PURPOSE OF MEETINGS:**

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-5 and 8. C. Percher was asked by WPNCS leadership to assume the chair position of Subgroup 5 (Experimental Needs for Criticality Safety Purpose), with co-chair George McKenzie of Los Alamos National Laboratory, after Isabelle Duhamel of IRSN stepped down in early 2021. C. Percher and G. McKenzie lead the SG-5 meeting on July 6, 2021. SG-5 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. SG-5 is nearing the end of its mandate and the final report is in the advanced draft stage. SG-8 is headed by W. Wieselquist (ORNL) and its focus and title is the “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.

There is considerable interest by the working party in NCSP activities, particularly critical experiment activities to support NCS. The WPNCS meetings allow for an international forum to share knowledge and resources important to the practice of criticality safety.

At the beginning of the meeting, Dr. Kotaro Tonoike, the chair of the WPNCS, announced that he would no longer be able to serve as the chair for the WPNCS. It is traditional that the chair of the WPNCS rotates amongst the member countries every four years, with the chair coming from the country that will host the next International Conference on Nuclear Criticality (ICNC). As Japan will host the meeting in

2023, the chair should be another Japanese representative. Dr. Kenya Suyama (Japan Atomic Energy Agency) was nominated and elected as the new chair of WPNCS at the July meeting.

There was an extended and contentious discussion as to whether a new subgroup focusing on decay heat calculations should be approved under the auspices of the WPNCS. The new group would use data from SFCOMPO, the spent fuel composition benchmark library that is an activity under the WPNCS (due to burnup credit uses), but the decay heat is not traditionally a criticality concern. Based on objection from the new WPNCS chair, approval of the subgroup was deferred.

# APPENDIX A: WPNCS Meeting Agenda

## Proposed agenda

8 July 2021 (Day 1 of 2)

Time	Topic	Speaker
	<b>Introduction</b>	
13:00	Welcome, self introduction of participants	All
	<b>Administrative items</b>	
13:30	Election of a new chair, and a vice chair	All
13:40	Approval of agenda	Secretariat
13:45	Approval of SR from previous meeting NEA/NSC/WPNCS/DOC(2021)5	Secretariat
13:50	Review of actions from previous meeting	Chair
14:00	Feedback from the Nuclear Science Committee (NSC) by the Head of the Nuclear Science Division	T. Ivanova
<b>14:20</b>	<b>Coffee break (15')</b>	
	<b>Reports from subgroups (20' each)</b>	
14:35	SG2: MOX dump powders	C. Carmouze
14:55	SG4: Accident analysis	Y. Yamane
15:15	SG5: Experimental needs	C. Percher, G. McKenzie
15:35	SG8: Expert knowledge	W. Wieselquist
	<b>Reports from technical review groups - part 1</b>	
15:55	SFCOMPO TRG, and revision of the mandate	G. Ilas
<b>16:20</b>	<b>Adjourn day 1</b>	

**9 July 2021 (Day 2 of 2)**

<b>Time</b>	<b>Topic</b>	<b>Speaker</b>
	<b>Reports from technical review groups - part 2</b>	
13:00	ICSBEP TRG, and revision of the mandate	J. Bess
	<b>Proposals for new subgroups (20' each)</b>	
13:25	Proposal for the life cycle of a WPNCs subgroup	K. Suyama
13:45	Nuclear data uncertainties quantification on spent fuel inventory (follow up to SG7)	C. Carmouze, R. Ichou
14:05	Bias and Correlated Data, Comparison of Methods	A. Hoefer
<b>14:25</b>	<b>Coffee break (15')</b>	
14:40	Transport in random geometries	A. Zoia, C. Larmier
15:00	Spent nuclear fuel decay heat: assessing the confidence level in experimental and computational estimations	D. Rochman
<b>15:20</b>	<b>Country reports</b>	<b>All</b>
	Belgium	A. Kochetkov
	Switzerland	A. Vassiliev
	USA	TBC
	Other countries to be confirmed	TBC
	<b>Conferences</b>	
16:00	Preparation of ICNC2023	K. Suyama
	<b>Closing session</b>	
16:10	AOB	All
16:25	Review of the actions	Secretariat
16:30	Date and place of next meeting	Secretariat
<b>16:35</b>	<b>Adjourn day 2</b>	