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**22nd PLENARY MEETING OF THE WORKING GROUP ON
ANALYSIS AND MANAGEMENT OF ACCIDENTS (WGAMA)**

Paris, 16-19 September 2019

Specialists Meeting On Transient Thermal-hydraulics In Water Cooled Nuclear Reactors (SM-TH)

F. D'Auria, M. Lanfredini

- ❑ CSNI has a long-lasting history of leadership in nuclear thermal-hydraulics
 - Groups of key report issued
 - The SOAR: TPCF, TECC, BWRS, Scaling
 - The validation reports (e.g. ISP, CCVM)
 - The uncertainty related reports
 - The CFD application & advancement activities
 - Documentation of OECD project starting from LOFT
 - Seminars
 - e.g. THICKET
 - Specialist Meetings on Thermal-hydraulics

Background

- ❑ **Toronto, 1976**, Aug. 3-4, CSNI Specialists Meeting on Transient two-phase flow
- ❑ **Paris, 1978**, June 12-14, 2nd CSNI Specialists Meeting on Transient Two-Phase Flow
- ❑ **Pasadena, 1981**, March 23-25, 3rd CSNI Specialist Meeting on Transient Two-Phase
- ❑ **Aix-en-Provence, 1992**, April 6-8, CSNI Specialist Meeting on Transient Two-Phase Flow - System Thermal-hydraulics
- ❑ **Annapolis, 1996**, Nov. 5-8, OECD/CSNI Workshop on Transient Thermal-hydraulic & Neutronic Codes Requirements
- ❑ **Ankara, 1998**, June 29 -July 1, OECD/CSNI Seminar on Best Estimate Methods in Thermal-Hydraulic Analyses - Ankara (Tr)
- ❑ **Barcelona, 2000**, April 10-13, OECD/CSNI Workshop on Advanced Thermal-Hydraulic and Neutronic Codes: Current and Future Applications
- ❑ **Barcelona, 2011**, Nov. 16-18, OECD/NEA/CSNI Workshop on Best Estimate Methods and Uncertainty Evaluations,

Objective

- ❑ SPECIALISTS MEETING ON TRANSIENT THERMAL-HYDRAULICS IN WATER COOLED NUCLEAR REACTORS (SM-TH)
 - ‘indirect’ objective is to **maintain the leadership of CSNI** in the area of thermal-hydraulics.
 - The main ‘direct’ objective is to **discuss the achievements and defining the needs of safety research** in nuclear reactor accident thermal-hydraulics
 - To report on the major achievements accomplished in recent years
 - To discuss the maturity of nuclear thermal-hydraulics for evaluating safety of existing reactors, identifying strengths and drawbacks of the current analysis approaches
 - To define the needs and priorities of research on safety-related thermal-hydraulics, particularly under accident conditions

TPC, date and location

- ❑ 3-4 days Meeting, 100-200 participants expected
 - Proposed date: **14-17 December 2020**
 - All WGAMA Organization will be invited to attend the SM-TH
- ❑ **Hosted by CSN and CIEMAT in CIEMAT headquarters in Madrid**
- ❑ **Coordination: WGAMA Bureau Members**
 - UNIFI, USNRC, IRSN, CIEMAT, KAERI, JAEA, KTH, plus: CSN, CEA, EDF (not member, if possible)
- ❑ **Proposed TPC Members**
 - F. D'Auria, F. Barré, K.-Y. Choi, L. Herranz, D. Jacquemain, R. Lee, H. Nakamura, M. Sanchez Perea, S. Bechta, (F. Barré should propose somebody from CEA and EdF)



Thank you for your attention

Appendix: Scope

- ❑ Large part deals with the WCNR operation and the related DBA and DEC-a
 - Subchannel and containment included
 - SMR in advanced design state or construction included
- ❑ SYS-TH codes, UQ, Integral type experiments, TH-P will keep the main attention
- ❑ Focus will be put on TH aspects and implications of:
 - Neutron physics modeling
 - Nuclear fuel modeling
 - 3D modelling (e.g. fuel bundle; CFD included)
 - Spent Fuel Pool, SFP (basically thermal-hydraulics of SFP)
 - Severe accidents (basically until core degradation becomes significant and, in any case, looking at TH aspects)

Appendix: Justification

- ❑ Eight CSNI specialist meeting on TH organized from 1976 to 2011
- ❑ WGAMA activity (or closely-related) connected with the proposal in the period 2011-2019
 - THICKET Seminars (next in 2020)
 - 'Internally' financed project: BEMUSE, PREMIUM, SAPIUM, S-SOAR, ISP50, Passive System
 - 'Externally' financed projects: PKL, ROSA/LSTF, ATLAS, PANDA
- ❑ Russia, China, India, Argentina, Romania joined NEA in 2011-2019

timeliness of bringing experts together and come out with a statement of the current state of safety-related thermal-hydraulics and the specific needs in the short- and mid-term

Appendix: Features

- ❑ Area covered by SM-TH restricted to areas of interest of CSNI
- ❑ Speakers: TH specialist with several years of experience
 - All presenters are invited or stimulated (possible open contributions)
- ❑ All papers discussed in plenary sessions
 - Tentatively 37 paper discussed
 - Including from: NEA-NSC, EC, IAEA, CSNI-SESAR
 - Discussion of relevant information including controversial topics
- ❑ Feedback from presentations analyses in post-meeting activities
- ❑ Priority attention:
 - Keeping the expertise
 - (Attempting to) depict the future of research in nuclear thermal-hydraulics
 - Pin-pointing the limitations and the current way to overcome those limitations (e.g. uncertainty analysis)