



## **PROGRAMME**

**COMMITTEE ON THE SAFETY OF NUCLEAR INSTALLATIONS (CSNI)**

**WORKSHOP ON EVALUATION OF UNCERTAINTIES  
IN RELATION TO SEVERE ACCIDENTS AND  
LEVEL 2 PROBABILISTIC SAFETY ANALYSIS**

*HOTEL AQUABELLA, AIX-EN-PROVENCE (FRANCE)  
7-9 NOVEMBER 2005*

*Organised in collaboration with the  
Institut de Radioprotection et de Sûreté Nucléaire (IRSN)*

*Monday 7 November 13H30 – 14H00 REGISTRATION*

**MONDAY 7 NOVEMBER**

**SESSION I: INTRODUCTION  
(14h00 – 15h00)**

**SESSION CHAIR: MR. GONZALEZ**

Welcome and Opening Remarks, by *Richard GONZALEZ, Workshop Chairman, Institut de Radioprotection et de Sûreté Nucléaire (IRSN), France*

1. *Ming Leang ANG, NNC Ltd, United Kingdom. Treatment of Uncertainties in Level 2 PSAs and Severe Accident Analysis - An Overview and Some Thoughts Regarding Future Challenges.*

**MONDAY 7 NOVEMBER**

**SESSION II: METHODS FOR UNCERTAINTY ASSESSMENT  
(15H00 – 18H30)**

**SESSION CHAIRS: MESSRS D'AURIA (University of Pisa) AND DEVICTOR (CEA)**

2. *Alessandro PETRUZZI and Francesco D'AURIA, University of Pisa, Italy. The BEMUSE Programme Best-Estimate Methods Uncertainty and Sensitivity Evaluation.*
3. *Eric CHOJNACKI, Institut de Radioprotection et de Sûreté Nucléaire (IRSN), France. The use of Monte-Carlo simulation and order statistics for uncertainty analysis of a LBLOCA transient (LOFT-L2-5).*

*16H00 -16H30 COFFEE BREAK*

4. *Kwang-Il AHN, Korea Atomic Energy Research Institute (KAERI), Korea. Formal Handling of the Level 2 Uncertainty Sources and Their Combination with the Level 1 PSA Uncertainties.*
5. *Ivo KODELI, OECD Nuclear Energy Agency, France. Sensitivity Analysis and Uncertainty Propagation from Basic Nuclear Data to Reactor Physics and Safety Relevant Parameters.*
6. *Nicolas DEVICTOR, Commissariat à l'Energie Atomique (CEA), France and Ricardo BOLADO LAVIN, European Commission (EC), Joint Research Centre, the Netherlands. Uncertainty and Sensitivity Methods, Including PSA L2 Applications.*
7. *Eric CHOJNACKI et al, Institut de Radioprotection et de Sûreté Nucléaire (IRSN), et Université Paul Sabatier de Toulouse, France. Influence of Mathematical Modelling of Knowledge. Application to the Transfer of Radioelements in the environment.*

**TUESDAY 8 NOVEMBER**  
**SESSION III: APPLICATIONS TO UNCERTAINTY ASSESSMENT ON**  
**SEVERE ACCIDENT PHYSICAL PHENOMENA**  
**(08H30 – 12H30) & (14H00 – 15H30)**

**SESSION CHAIRS: MESSRS CHAUMONT (IRSN) AND BOLADO LAVIN (EC)**

8. *Christophe JOURNEAU and Pascal PILUSO, Commissariat à l'Energie Atomique (CEA), France.* Uncertainties on Thermodynamic and physical properties DataBases for Severe Accidents and their Consequences on Safety Calculations.
9. *Adolf RYDL, NRI (Nuclear Research Institute) Rez, Czech Republic.* Simple Probabilistic Approach to Evaluate Radioiodine Behaviour at Severe Accidents: Application to PHEBUS Test FPT-1.
10. *Joelle FLEUROT and Georges REPETTO, Institut de Radioprotection et de Sûreté Nucléaire (IRSN), France.* Sensitivity Studies of Main Uncertain Core Degradation Parameters on Severe Accident Consequences.
11. *Randall GAUNTT, Sandia National Laboratories, United States.* Uncertainty Analyses Using the MELCOR Severe Accident Analysis Code

*10H30 – 11H00 COFFEE BREAK*

12. *Christine BALS et al, Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) mbH, Germany.* Post-Test Calculation and Uncertainty Analysis of the Experiment QUENCH-07 with the System Code ATHLET-CD.
13. *Daniel MAGALLON et al, Commissariat à l'Energie Atomique (CEA), France.* FCI Phenomena Uncertainties Impacting Predictability of Dynamic Loading of Reactor Structures (SERENA Programme).
14. *Hymie SHAPIRO, Atomic Energy of Canada Limited (AECL), Canada.* Design Features of ACR in Severe Accident Prevention and Mitigation.

*12H30 – 14H00 LUNCH*

15. *Seung J. OH, and H. T. KIM, Korea Hydro and Nuclear Power (KHNP), Korea.* Effectiveness of External Reactor Vessel Cooling (ERVC) Strategy for APR1400 and Issues of Phenomenological Uncertainties.
16. *Fernando ROBLEDO SANZ et al., Consejo de Seguridad Nuclear (CSN), Spain.* Development of a simple computer code to obtain relevant data on H<sub>2</sub> and CO combustion in severe accident and to aid in PSA-2 assessments.
17. *Sudhamay BASU, USNRC, United States and M.T. FARMER, ANL, United States.* Significance of the OECD-MCCI Program in Relation to Severe Accident Uncertainties Evaluation

*15H30 – 16H00 COFFEE BREAK*

**TUESDAY 8 NOVEMBER**  
**SESSION IV: APPLICATIONS TO UNCERTAINTY ASSESSMENT IN LEVEL 2 PSA**  
**(16H00 – 18H00)**

**SESSION CHAIRS: MESSRS AHN (KAERI) AND LAJTHA (VEIKI)**

18. *Gabor LAJTHA et al, VEIKI, Hungary.* Uncertainty of the level 2 PSA for NPP Paks.
19. *Satu SILTANEN, Fortum Nuclear Services Ltd, Finland.* Severe Accident Management at the Loviisa NPP - Application of Integrated ROAAM and PSA level 2.
20. *Hossein NOURBAKHSH and T. S. KRESS, USNRC, United States.* Assessment of Phenomenological Uncertainties in Level 2 PRAs.
21. *Emanuel RAIMOND et al, Institut de Radioprotection et de Sûreté Nucléaire (IRSN), France.* Method implemented by the IRSN for the evaluation of uncertainties in level 2 PSA Example of release calculation and perspectives of application.

**WEDNESDAY 9 NOVEMBER**  
**SESSION IV: APPLICATIONS TO UNCERTAINTY ASSESSMENT IN LEVEL 2 PSA**  
**(09H30 -12H30)**

22. *Bernard CHAUMONT et al, France.* Severe Accident Research Network (SARNET). Level 2 PSA work package: comparison of partners methods for uncertainties assessment.
23. *Morgan J. BROWN et al, Atomic Energy of Canada Limited (AECL), Canada.* Influence of Coolant Phase Separation on Event Timing During a Severe Core Damage Accident in a Generic CANDU 6 Plant.

*10H30 – 11H00 COFFEE BREAK*

24. *Osamu KAWABATA and Mitsuhiro KAJIMOTO, Japan Nuclear Energy Safety Organisation (JNES), Japan.* Uncertainty Analysis on Containment Failure Frequency for a Japanese PWR Plant
25. *Francesco D'AURIA et al., University of Pisa, Italy.* IAEA TECDOC, Uncertainty Evaluation in Best Estimate Safety Analysis for Nuclear Power Plants.

*12H30 – 14H00 LUNCH*

**WEDNESDAY 9 NOVEMBER**  
**SESSION V: GENERAL DISCUSSION – CONCLUSIONS AND RECOMMENDATIONS**  
**(14H – 16H30)**

**SESSION CHAIR: MR. ANG (NNC LTD)**

- Session summaries presented by session Chairpersons
- Panel Discussion: Conclusions and Recommendations