## Track 1 - Water Cooled Reactor Programs and Issues

### 1.01 Components Design
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11350 Evaluation of Core Designs and Safety Analyses for APR+ Development  
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By Satoshi Hanada, Koji Ito (Mitsubishi Heavy Industries, Ltd.), Kenji Mashio (Mitsubishi Nuclear Energy Systems, Inc.)  

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By Grant Hawkes, James Sterbentz, John Maki (Idaho National Laboratory)

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By S.C. Chetel (Indira Gandhi Centre for Atomic Research), Prabhat Kumar (Bharatiya Nabhikiya Vidyut Nigut Limited), P. Chellapandi, Baldev Raj (Indira Gandhi Centre for Atomic Research)

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By Vladimir Poplavsky, Alexander Chebeskov (IPPE)

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By A. Vasile, G. L. Fiorini, Ph. Dufour, J.M. Bonnerot, Ch. Latgé (CEA), B. Riou (AREVA), R. Stainsby (AMEC), M. Rini (JRC), D. Struwe, R. Stieglitz, F. Badea (KIT)

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By Craig F. Smith (NPS/LLNL), Luciano Cinotti (MERIVUS), Hiroshi Sekimoto (Tokyo Institute of Technology)

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By Luis E. Herranz, Mónica García (CIEMAT)

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By Hyung M. Son, Kune Y. Suh (Seoul National Univ)

11480 Heavy Liquid Metal Network: HeLiMnet Project Overview
By Enrica Ricci (CNR-IENI), Silvia De Grandis (SINTEC), Dolores Gomez Briceno (CIEMAT), Fosca Di Gabriele (UJV), Mariano Tarantino (ENEA), Concetta Fazio (KIT), Paul Schuurmans (SCK-CEN), Christian Latge (CEA), Werner Wagner (PSI), Sven Eckert (HZDR), Janis Freibergs (IPUL), Aram Karbojian (KTH), Jordi Abella (IQS)

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By Charles Ahlfeld, Tom Burke, Tyler Ellis, Pavel Hejzlar, Kevan Weaver, Chuck Whitmer, John Gilleland, Michael Cohen, Brian Johnson, Stephen Mazurkiewicz, Jon McWhirter, Ash Odedra, Nick Touran, Chal Davidson, Josh Walter, Robert Petroski, George Zimmerman, Tom Weaver, Pat Schweiger, Rob Russick (TerraPower, LLC)

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11099 Preliminary Assessment of Modeling Issues Related to Dynamics and Control of Graphite-Moderated MSRs
By Claudia Guerrieri, Carlo Fiorina, Antonio Cammi, Lelio Luzzi (Politecnico di Milano)

11190 Launching the Thorium Fuel Cycle with the Molten Salt Fast Reactor
By E. Merle-Lucotte, D. Heuer, M. Allibert, M. Brovchenko, N. Capellan, V. Ghetta (LPSC-IN2P3-CNRS / Grenoble INP / UJF)

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11432 Advanced CANDU Instrumentation & Control Technologies – Application to the Enhanced CANDU 6 Design
By J. de Grosbois, G. Raiskums, M. Soulard (AECL)

11335 Development of Critical Digital Review Procedure and the Preliminary Application Experience
By Hui-Wen Huang (Institute of Nuclear Energy Research), Chunkuan Shih (National Tsing Hua Univ), Tsu-Mu Kao (Institute of Nuclear Energy Research)

11312 Development of Top-level Control Systems of NPP for Reactors of the VVER-1000 Type at the V.A. Trapeznikov Institute of Control Sciences of the Russian Academy of Sciences
By Nadyr E. Mengazetdinov, Aleksei G. Poletikin, Vitaly G. Promyslov (V.A. Trapeznikov Institute of Control Sciences)

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<td>11075</td>
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<td>Vitaly Promyslov (V.A. Trapeznikov Institute of Control Sciences)</td>
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4.03 Initiatives to Improve Material Reliability or Material Performance-I
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<td>Kirby Woods (InnoTech Engineering Solutions, LLC), Ken Thomas (Nebraska Public Power District)</td>
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<td>11088</td>
<td>Development of Hi-F Coat to Reduce Recontamination for Carbon Steel</td>
<td>Makoto Nagase, Satoshi Oouchi, Ichirou Kataoka (Hitachi-GE Nuclear Energy, Ltd.), Tsuyoshi Ito, Hideyuki Hosokawa (Energy and Environmental Systems Laboratory, Hitachi, Ltd.)</td>
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4.04 Initiatives to Optimize Operation
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<td>A. L'Abbate, A. Lefevbre de Rieux, E. Rousseau (AREVA NP)</td>
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of Ulchin Units 1&/2
By Duk-Joo Yoon, Jae-Yong Lee, In-Hwan Kim (KEPRI)

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11062 Modeling of Artificial Stiction in Steam Turbine Control Valve
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11043 Application of GO-FLOW Methodology for Reliability Analysis of Auxiliary Feedwater System in Nuclear Power Plant
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11064 Enhancing Seismic Safety at Kashiwazaki Kariwa Nuclear Power Station
By Hideki Masui (TEPCO)

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By Ivan Scivetti, Cian O’Duffy, Timothy Hattrell, Matthew Jones (Rolls-Royce Civil Nuclear)

11228 The Application of Novel Technologies to Nuclear Service Issues
By Rod Webster (Rolls-Royce)

11069 Experience in the Maintenance of Sodium Systems of Fast Breeder Test Reactor
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11438 Flow Accelerated Corrosion Problem in Steam Condensate Piping and Valves: Problems Faced & Actions Taken
By K.C. Upreti, Sai Vamsidhar Bontha (Reliance Industries Limited)

11411 Impact of Residual Stress on Reactor Vessel Nozzle Dissimilar Metal Weld PWSCC Crack Growth
By C.K. Ng, A. Udyawar, S. Swamy (Westinghouse)

11296 Improvement on the EDF Monitoring System for the Evaluation of Thermal Stratification
By C. Naudin (EDF/SEPTEN), S. Blairon (EDF/R&D/STEP), S. Vidard (EDF/SEPTEN), B. Barthelet (EDF/DPN/UNIE)

4.08 Initiatives to Improve HMI and HSI
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11415 Development of a Framework to Measure Communication Quality of Human Operators in Nuclear Power Plants
By Seunghwan Kim, Jinkyun Park (KAERI)
By Mauro Cappelli (ENEA), Adam Maria Gadomski (ECONA), Massimo Sepielli (ENEA)

Life Cycle Planning For Nuclear Plant Staffing
By Charles T. Goodnight (Goodnight Consulting, Inc.)

Discernment as a Key Factor for Resilience at a Nuclear Power Plant
By Margaretha Engström (Vattenfall Research & Development AB)

A Proactive Alarm Reduction Method and its Human Factors Validation Test of a Main Control Room for SMART
By Gwi-sook Jang, Sang-moon Suh, Sa-kiI Kim, Sung-chul Lee, Yong-suk Suh (KAERI)

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5.01 International and Experimental Programs on Severe Accidents
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Some Outcomes of the SARNET Network on Severe Accidents at Mid-term of the FP7 Project
By Jean-Pierre Van Dorsselaere (IRSN), Ari Auvinen (VTT), David Beraha (GRS), Patrick Chatelard (IRSN), Christophe Journeau (CEA), Ivo Kijenak (JSI), Alexei Massoedov (Karlsruhe Institute of Technology (KIT)), Sandro Paci (Univ. of Pisa), Th. Walter Tromm (Karlsruhe Institute of Technology (KIT)), Roland Zeyen (JRC/IE)

ASTEC Validation on OECD/THAI HM2
By Ahmed Bentaib, Alexandre Bleyer (IRSN)

Phebus FPT3: Overview of Main Results Concerning Core Degradation and Fission Product Behaviour
By Tim Haste, Bernard Clement, Bruno Biard, Christelle Manenc, Frederic Payot, Philippe March, Beatrice Simonidi-Teisseire (IRSN), Roland Zeyen (EC JRC/IE)

Source Term Computation with ASTEC Code
By F. Cousin, L. Cantrel, C. Seropian, K. Chevalier-Jabet (IRSN)

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Hydrogen Distribution and Management During Postulated Severe Accident in KAPS # 3&4 700 MWe Containment
By Sanjeev Kr Sharma, D.K. Bhartia, Nalini Mohan, P.K. Malhotra, S.G. Ghadge (Nuclear Power Corporation of India Limited)

Hydrogen Combustion in the EPR™ Containment after a Postulated Reactor Pressure Vessel Failure
By Harald Dimmelmie, Jürgen Eyink (AREVA NP)

Chemistry of Iodine and Aerosol Composition in the Primary Circuit of a Nuclear Power Plant
By Mélan Gouello (IRSN), Marion Lacoue-Nègre (IRSN, CNRS), Hervé Mutelle, Frédéric Cousin (IRSN), Sophie Sobanska, Elisabeth Blanquet (CNRS)

High-temperature Reaction of alpha-Zr(O) with Nitrogen
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<td>11320 Using Accident Management to Address Phenomenological Uncertainties Related to Lower Plenum Debris Bed Chemistry and Mixing during AP1000 In-Vessel Retention (IVR) of Molten Core Debris By James H. Scobel, Yves Masset, Rachel A. Salano, John T. Kitzmiller, Robert J. Lutz, Camille Zozula, Luca Oriani (Westinghouse), Martin G. Plys (Fauske and Associates, Inc.)</td>
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By Liangxing Li, Aram Karbojian, Pavel Kudinov, Weimin Ma (KTH)

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By Frank Kretzschmar (KIT)

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By Bronislaw Vinnikov (RRC "Kurchatov Institute")

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By Kyoko Ishii, Hisato Matsumiya, Hideki Horie (Toshiba Corporation)
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<td>Richard F. Wright, Toby Burnett, Alan J. MacDonald (Westinghouse), Qiao Wu (Oregon State Univ)</td>
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<td>11011 Analysis of Pressurizer Pressure Control System Using MAAP5 Code</td>
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<td>11478 An Integrated Software Platform for Best Estimate Safety Analyses of Nuclear Power Plants</td>
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11013 Study on Self-initialization Algorithm of SCDAP/RELAP5 Code
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11230 Loss of Coolant Accident Analysis using Best Estimate Plus Uncertainties Considering the Change of Fuel Thermal Conductivity with Burnup
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11389 Experimental Investigations of BWR Pressure Suppression Pool Behaviour under Loss of Coolant Accident Conditions
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11041 The Study of Loss-of-coolant Accident Parameter Identification for a BWR-4 Plant
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11198 Nuclear Reactor Simulations for Unveiling Diversion Scenarios: Capabilities of the Antineutrino Probe Applied to VHTR Monitoring
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11092 HEMERA V2: An Evolutionary Tool for PWR Multiphysics Analysis in SALOME Platform
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By Sorouch Kheradmand, Masayuki Kauchi (MHI), Yasuo Ogura (MNEC), Toshikazu Ida (MHI)

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By Sara Bortot, Antobio Cammi, Stefano Lorenzi (Politecnico di Milano)

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11018 European Developments in Thermal-hydraulics for Innovative Nuclear Systems
By Ferry Roelofs (NRG), Andreas Class (KIT), Paride Meloni (ENEA), Katrien van Tichelen (SCK-CEN), Pascal Boudier (CEA), Michael Prasser (ETHZ), Xu Cheng (KIT)

7.02 Advances in CHF and Rod Bundle Thermal Hydraulics
Tuesday May 3, 10.30 am – 12.10 pm

11273 CHF Enhancement in Pool Boiling System with Additives under Atmospheric Pressure
By Juno Lee, Soon Heung Chang (KAIST)

11118 Boiling CHF Enhancement by Micro and Nano Scale Structures on Modified Zirconium Alloy
By Ho Seon Ahn, Soon Ho Kang, Hang Jin Jo, Gunyeop Park, Moo Hwan Kim (POSTECH)

11131 Experimental CHF Study on the Scaling Effect of 2-D Slice Test Section for In-Vessel Retention through External Reactor Vessel Cooling Strategy
By Hae Min Park, Yong Hoon Jeong (KAIST), Sun Heo, Dong Soo Song (KHNP)

7.03 CFD Application to Water, Liquid Metal and Others-I
Thursday May 5, 10.30 am – 12.10 pm

11221 Computational Fluid Dynamics Analysis of Flow/Temperature Distribution of Moderator Inside Calndria and Comparison of Two Different Approaches
By J.S. Bharj, R.R. Sahaya, S.P. Dharne, S.G. Ghadge (Nuclear Power Corporation of India Limited)

11247 Coupled Computational Fluid Dynamics and Heat Transfer Analysis of the VHTR Lower Plenum
By Sal B. Rodriguez (Sandia National Laboratories, Univ of New Mexico), Mohamed S. El-Genk (Univ of New Mexico)

11406 Coarse-Grid-CFD for Pressure Loss Evaluation in Rod Bundles
By A.G. Class, M.O. Viellieber, A. Batta (Karlsruhe Institute of Technology (KIT))

11238 CFD Analysis of Turbulence Enhancement Appendages for Pressure Tube Nuclear Reactors
By Alexandru Catana, Ilie Turcu (Institute for Nuclear Research), Ilie Prisecaru, Daniel Dupleac (Univ. POLITEHNICA)

7.03 CFD Application to Water, Liquid Metal and Others-II
Thursday May 5, 13.10 pm – 14.50 pm

11135 Numerical Simulation of the Multi-dimensional Two-Phase Flow Phenomena in the
Downcomer Boiling Test Using the CUPID Code
By Hyyoung Kyu Cho, Byong Jo Yun, Jae Ryong Lee, Jae Jun Jeong (KAERI)

11096 Application of the CFD CONV Code to the Simulation of LIVE L-4 Test
By A. Palagin, F. Kretzschmar (Karlsruhe Institute of Technology), V. Chudanov (IBRAE)

11066 CFD-aided Investigation of Heat Transfer from Nuclear Fuel Rod to Low Flow Steam
By Naugab E. Lee, Bronwyn K. Edwards (Westinghouse)

11117 Evaluation of Debris Transport in ECCS Long Term Core Cooling Period Using VOF Method and Particle Tracking Method
By Tae Hyub Hong, Sang Won Lee, Hyeong Taek Kim (Nuclear Engineering & Technology Institute, KHNP)

7.04 SET and IET Thermal Hydraulics Experiments
Wednesday May 4, 13.10 pm – 14.30 pm

11194 Scram Vessel Experiments for KERENA™
By Thomas Zacharias, Stephan Leyer, Vassili Herbst, Stefan Uhrig, Thomas Wagner, Doris Pasler, Michael Wich (AREVA NP GmbH)

11156 Full Scale Tests with the Passive Core Flooding System and the Emergency Condenser at the Integral Test Stand Karlstein for KERENA™
By T. Wagner, M. Wich, M. Doll, S. Leyer (AREVA NP GmbH)

11426 An Integral Effect Test Program for the SMART Design: VISTA-ITL
By Hyun-Sik Park, Byoung-Yeon Min, Yong-Chul Shin, Ki-Yong Choi, Seok Cho, Nam-Hyun Choi, Sung-Jae Yi (KAERI)

7.05 System Analysis and Assessment-I
Wednesday May 4, 14.45 pm – 16.05 pm

11123 The Development of SBLOCA Evaluation Methodology Using SPACE Code
By Suk-Ho Lee, Byung-Sup Kim, Han-Gon Kim (NETEC, KHNP)

11397 Simulation of a Small-Break LOCA Experiments from the RD-14M Facility Using the CATHENA Code
By Hyoung Tae Kim, Bo Wook Rhee, Joo Hwan Park (KAERI)

11183 Experimental Characterization of Two-Phase Flow Instability Thresholds in Helically Coiled Parallel Channels
By Davide Papini, Marco Colombo, Antonio Cammi, Marco E. Ricotti (Politecnico di Milano), Dario Colorado (Univ Autonoma del Estado de Morelos (UAEM)), Matteo Greco, Gaetano Tortora (SIET)

11128 Assessment of the TRACE Code Using Transient Data from SBLOCA Experiment
By Jong-Rong Wang, Hao-Tzu Lin (Institute of Nuclear Energy Research, Atomic Energy Institute)
Council, R.O.C.), Wei-Xiang Zhuang, Chunkuan Shih (Institute of Nuclear Engineering and Science, National Tsing Hua Univ)

7.05 System Analysis and Assessment-II
Thursday May 5, 10.30 am – 12.10 pm

11385 Development and Validation of a Thermal-Hydraulic Model of the SPES-99 Facility with the French System Code CATHARE
By P. Meloni, G. Bandini, C. Lombardo, M. Polidori, M. Zaccarelli (ENEA)

11383 TRACE5 Simulation of a Cold Leg Intermediate Break LOCA
By S. Gallardo, G. Verdu (Univ Politecnica de Valencia)

11174 Comparative Study of Two Models Simulate a Large Break LOCA on the Pressurized Envelope of a Typical Irradiation Test Loop Using Relap5/SCDAP3.2 System Code
By Ahmed Hadjam (1,3Centre de Recherche Nucléaire de Birine), Ferhat Souidi (USTHB), Ahcene Loubar (1,3Centre de Recherche Nucléaire de Birine), Marcel Weber (SCK• CEN)

11283 Thermal Hydraulic Simulation of Containment Experimental Facility with Passive Cooling Systems
By Rajesh Kumar, A.J. Gaikwad, A.D. Contractor, H.G. Lele, K.K. Vaze (Bhabha Atomic Research Centre)

7.05 System Analysis and Assessment-III
Thursday May 5, 13.10 pm – 14.50 pm

11396 Prediction of Void Fraction in PWR Subchannel by CATHARE2 Code
By L. Michelotti, A. Del Nevo, D. Rozzia, F. D’Auria (Univ of Pisa)

11423 Assessment of the KAERI 6x6 Reflood Experiment Using the SPACE Code
By Sang-Ki Moon, Jungwoo Kim, Kyung-Doo Kim, Ki-Yong Choi, Hyun-Sik Park, Seok Cho (KAERI)

11153 Relap5 and TRACE Calculations with Quantitative Assessment against Achilles Natural Reflood Experiment
By Ovidiu-Adrian Berar, Andrej Prosek (Jozef Stefan Institute)

11055 Validation of the TASS/SMR-S Code for the Core Heat Transfer Model on the Steady Experimental Conditions
By In Sub Jun, Kyu Hwan Bae, Young Jong Jeong, Won Jae Lee (KAERI)

7.06 Thermal Hydraulics Measurements and Modeling Fundamentals
Wednesday May 4, 10.30 am – 12.10 pm

11471 Experimental Analysis of the Effects of the Graphite Dispersion on the Thermal-Hydraulic Phenomena inside the Reactor Cavity Cooling System
By Luigi Capone, R. Vaghetto, Yassin A. Hassan (Texas A&M Univ)

11291 Applicability of Wire-Mesh Sensor to Acquire Multidimensional Churn Flow Dynamics
By Taizo Kanai, Masahiro Furuya, Takahiro Arai, Kenetu Shirakawa, Nobuyuki Ueda (CRIEPI)

11191 An Experimental Study on Bubble and Film Dynamics Related to Boiling in a Horizontal Liquid Layer
By Shengjie Gong, Liangxing Li, Weimin Ma (Royal Institute of Technology)
11126 Experiment Study on the Magnetic Field Effect of Pool Boiling CHF Enhancement in Water-based Magnetic Fluid with Lower Concentration  
By Jong Hyuk Lee, Yong Hoon Jeong (KAIST)  
1973

7.07 System Simulation Models and Codes  
Tuesday May 3, 13.10 pm – 14.30 pm

11444 Assessment of Subcooled Boiling Model in MARS and SPACE with Two-Phase Parameters at Low Pressure  
By Jin-Hwa Yang, Ji-Hun Kim, Jong-Won Kim, Ji-Hwan Jung, Goon-Cherl Park (Seoul National Univ)  
1981

11425 On the Implementation of Upwind Numerical Method for a Hyperbolic Two-fluid Model  
By Yeon-Gyu Jung (KAIST), Moon-Sun Chung (Korea Institute of Energy Research), Sung-Jae Yi (KAERI), Keun-Shik Chang (KAIST)  
1990

11109 Analysis of Thermal Hydraulic Processes in Wendelstein 7-X Experimental Nuclear Fusion Facility  
By Algirdas Kaliatka, Eugenijus Uspuras, Tadas Kaliatka (Lithuanian Energy Institute)  
1996

7.08 Thermal Hydraulics of Boiling Water Reactors  
Wednesday May 4, 10.30 am – 12.10 pm

11338 Loop Studies Conducted at Low Pressure of Void Fractions and Pressure Drop Characteristics of Air-Water Flows Through Two Mock-Ups of One BWR Fuel Assembly Design  
By Hamid Sadeghi, Jan Blomstrand (KTH), Guillermo Urrutia (CNEN)  
2005

11336 TRACE Analysis of Inadvertent Startup of HPCI Transient in Chinshan BWR/4  
By Wei-Shao Chen, Chunkuan Shih (Institute of Nuclear Engineering and Science, National Tsing Hua Univ), Jong-Rong Wang, Hao-Tzu Lin (Institute of Nuclear Energy Research, Atomic Energy Council)  
2014

11256 Development and Implementation of Effective Models in GOTHIC for the Prediction of Mixing and Thermal Stratification in a BWR Pressure Suppression Pool  
By Hua Li, Pavel Kudinov, Walter Villanueva (Royal Institute of Technology (KTH))  
2021

11130 The Steamline Break Inside Containment LOCA Transient Analysis of Lungmen ABWR with TRACE  
By Jong-Rong Wang, Hao-Tzu Lin (Institute of Nuclear Energy Research, Atomic Energy Council, R.O.C.), Wei-Chen Wang, Chunkuan Shih (Institute of Nuclear Engineering and Science, National Tsing Hua Univ)  
2030

11129 Water Hammer Modeling in MSIV Closure Transient of Lungmen ABWR with TRACE  
By Hao-Tzu Lin, Jong-Rong Wang (Institute of Nuclear Energy Research, Atomic Energy Council, R.O.C.), Wei-Chen Wang (Institute of Nuclear Engineering and Science, National Tsing Hua Univ), Chunkuan Shih (National Tsing Hua Univ)  
2037

7.09 Uncertainty Analysis  
Tuesday May 3, 13.10 pm – 14.30 pm

By Alessandro Petrucci, Francesco D’Auria (Univ of Pisa)  
2045
7.10 Thermal Hydraulics of Liquid Metal Reactors
Wednesday May 4, 13.10 pm – 14.30 pm

11289 TRACE Analysis of Selected ISPRA Experiments on Dryout in Sodium Two-phase Flow
By A. Chenu, K. Mikityuk, R. Chawla (PSI)

11231 Quantitative Evaluation of Gas Entrainment by Numerical Simulation with Accurate Physics Model
By Kei Ito (JAEA), Yasuo Koizumi (Shinshu Univ), Hiroyuki Ohshima (JAEA), Takumi Kawamura (NESI.Inc.)

11047 Thermal Hydraulics Test for Validation of 4S Safety Analysis Code ARGO
By Nobuhiko Usui, Hisao Watanabe, Atsuko Matsuda, Jun Ohno, Mitsuo Wakamatsu (Toshiba Corporation)

11316 Investigation on the Heat Exchange Efficiency of Bayonet Tube Steam Generator of Lead-Cooled ALFRED Reactor with RELAP5 Code
By Francesco Belloni (Sapienza, Univ di Roma), Giacomino Bandini, Massimiliano Polidori (ENEA)

11158 Thermal-Hydraulic Analysis of ADS Using RELAP5 Code
By Indu Kumari, A. K. Trivedi, Ashok Khanna, Prabhat Munshi (Bhabha Atomic Research Centre), H.G.Lele, A.J.Gaikward, P. Satyamurthy (Indian Institute of Technology Kanpur)

11455 Development of the Thermohydraulic Module for SOCRA-BN Complex for Reactor with Sodium Coolant
By S.I. Lezhnin, N.A. Pribaturin, V.N. Semenov, E.V. Usov (Nuclear Safety Institute)

Track 8 - Fuel Cycle and Waste Management

8.01 LWR Fuel Cycle
Tuesday May 3, 10.30 am – 12.10 pm

11044 Study of Specific Burn up of Curium in Thermal Reactors
By Rei Kimura, Tadashi Yoshida, Tomoaki Akamatsu (Tokyo City Univ)

11315 Innovation in Transport Storage Technology
By Hervé Issard, Michel Hartenstein (TN International (AREVA group))
**11386 The Back-End Question for Depleted Uranium**  
By Charles W. Forsberg (MIT), Massimo Zucchetti (MIT, Politecnico di Torino,)

**11462 Advanced Evaluation of Spent Fuel in Long Term Wet Storage in Slovakia**  
By Vladimir Slugen, Matus Stacho, Veronika Sabelova, Martin Petriska (Slovak Univ of Technology Bratislava)

**11473 Industrial View on Reprocessing and Recycling as Essential Elements towards Sustainable Nuclear Energy Systems**  
By Luc Van Den Durpel, Isabelle Leboucher, Mustapha Chiguer (AREVA)

### 8.02 Waste Management
Tuesday May 3, 14.45 pm – 16.05 pm

**11005 Proposed Flexibility to USA Nuclear Waste Management Strategy**  
By Salomon Levy (Levy & Associates)

**11306 Minimized Waste Volumes from Optimized Low and Intermediate Level Waste Management at the Loviisa NPP in Finland**  
By Esko Tusa (Fortum Power and Heat Oy)

**11001 Immobilization of Radwaste in Synthetic Rock: An Alternative to Cementation**  
By Bernard Rottner (Onet Technologies)

**11267 Impermeable Graphite: A New Development for Embedding Radioactive Waste**  
By J. Fachinger, K.H. Grosse (FNAG), R. Seemann, M. Hrovat (ALD)

### 8.03 Advanced Fuel Cycles
Thursday May 5, 10.30 am – 12.10 pm

**11441 ACSEPT – Status in Advanced Separation Process Developments in Europe**  
By Stephane Bourg (CEA), Andres Geist (KIT-INE), Concha Caravaca (CIEMAT), Chris Rhodes (NNL), Christian Ekberg (CHALMERS)

**11356 Development of Advanced Aqueous Reprocessing Process in Fast Reactor Cycle Technology Development (FaCT) Project**  
By Tadahiro Washiya, Tomozo Koyama (JAEA)

**11114 Development of FBR Fuel Reprocessing by Fluoride Volatility Method**  
By Jan Uhlir, Martin Marecek, Jan Skarohilid, Frantisek Lisy, Richard Bican (Nuclear Research Institute Rez plc)

**11164 Selective Uptake of Palladium by Novel Hybrid Microcapsules Enclosing Insoluble Copper Ferrocyanides**  
By Hitoshi Mimura, Yuichi Niibori (Tohoku Univ), Takashi Ohnishi, Shin-ichi Koyama (JAEA)

**11232 The Assessment of the Fuels Thermal Conductivity by Molecular Dynamics**  
By Sergii Nichenko, Dragos Staicu (EC, JRC/ITU)

### 8.04 Nuclear Energy Systems Analysis
Thursday May 5, 13.10 pm – 14.50 pm

**11384 Enhancing the Sustainability of Nuclear Energy by Increasing the Efficiency of actinide Recycling Processes: Overview of the Major Guidelines**  
By Christophe Poinssot, Dominique Warin, Christine Rostaing, Michel Masson (CEA)
11418 Is it Worth to Start Fast Reactors Using Uranium Fuels?
By H. Safa (CEA, DEN, Scientific Direction), P. Dumaz, J.F. Luciani (CEA, High Commissioner Cab.), L. Buiron, B. Fontaine, J.P. Grouiller (CEA/DEN/DER/SPRC)

11392 Fuel Cycle Performance Characteristics of Advanced Once-Through Nuclear Energy Systems
By Temitope A. Taiwo, Taek K. Kim (ANL)

11479 Use of a Systems Engineering Approach to Prioritize Fuel Cycle Research and Development Choices
By Bhupinder P. Singh (U.S. Department of Energy)

8.05 Thorium Fuel Cycle
Wednesday May 4, 14.45 pm – 16.05 pm

11349 Innovative Use of Thorium in LWR Fuel Assemblies
By Cheuk Wah Lau, Christophe Demazière (Chalmers Univ of Technology), Henrik Nylén (Ringhals AB), Urban Sandberg (Ringhals AB)

11404 Core Design of Heavy Water Cooled Thorium Breeder with negative void Reactivity and Improved Breeding Performance
By Naoyuki Takaki (Tokai Univ), Argala Srivastava (Tokai Univ, Bhabha Atomic Research Centre), Ayumu Takeda (Tokai Univ)

11236 Thorium Self Sustaining BWR Cores
By Francesco Ganda (INL), Jasmina Vujic, Ehud Greenspan (Univ of California, Berkeley)

11447 Pyrochemical Reprocessing of Thorium-based Fuel
By S. Jaskierowicz, S. Delpech (INPO), P. Fichet, C. Colin (CEA), C. Slim, G. Picard (LECIME, ENSCP)

Track 9 - Materials and Structural Issues

9.01 Gen II/III Fuel
Wednesday May 4, 14.45 pm – 16.05 pm

11442 Kinetics of Gaseous Atoms in Uranium Plutonium Mixed Oxide
By N. Nakae, T. Baba, K. Kamimura (JNES)

11402 Capabilities of TRANSURANUS Code in Simulating BWR Super-Ramp Project
By D. Rozzia, M. Adorni, A. Del Nevo, F. D'Auria (Univ of Pisa)

11374 Photoelectrochemical Approach for Understanding the Radiation Enhanced Corrosion of Zr Alloy in a Simulated BWR Water
By Young-Jin Kim (GE Global Research Center)

11340 Steady-State Nitride Fuel Behavior Modeling with FRAPCON-EP and its Application to PWRs
By Bo Feng, Aydin Karahan, Mujid S. Kazimi (MIT)

9.02 Gen II/III Structural Mechanics, Testing and Analysis-I
Thursday May 5, 10.30 am – 12.10 pm

11391 Evolution of Seismic Design Basis for Nuclear Plants: Standard Response Spectra Vs. Site-Specific Response Spectra
By Ram Srinivasan, Jean-Michel Thiry, Calvin Wong (AREVA NP)

11435 Measurement of Residual Stresses in Thick Reduced Pressure Electron Beam Welded Components
By X. Ficquet, D.M. Goudar, E.J. Kingston, K. Ayres, P. Hurrell, C. Gill (VEQTER) 2295

11468 Influence of Sand Fineness on Tensile Behavior of High Performance Fiber Reinforced Cement Composites for Containment Building
By Dong Joo Kim, Seok Hee Kang (Sejong Univ) 2309

11469 Investigation of Statistical Behavior of Nuclear Power Plant Reinforced Concrete Cooling Tower Shell due to Randomness in Material and Geometrical Parameters Using Simulation Approach
By Hyuk Chun Noh, Dae Young Kim (Sejong Univ) 2309

9.02 Gen II/III Structural Mechanics, Testing and Analysis-II
Thursday May 5, 13.10 pm – 14.50 pm

11436 Cyclic Oxidation Kinetics and Oxide Scale Morphologies Developed on IN 600 Superalloy in Air at High Temperatures
By KH.A. AL-Hatab, F.S. Alariqi, M.A. Al-Bukhaiti (Sana'a Univ), U. Krupp, M. Kantehm (Univ of Applied Science) 2317

11301 Development of the Analytical Method to Estimate the Allowable Horizontal Load on the RCCA Guide Tube
By Shinjiro Inomata, Makoto Nakajima, Jun Shimizu, Toshio Ichikawa, Kaina Teshima, Yoichi Iwamoto, Hiroshi Ogawa (Mitsubishi Heavy Industries, LTD) 2327

11157 Surveillance Program Assessment for Critical Components of Next Generation Nuclear Reactors
By R. Chaouadi, S. Gavrilov, R. Fernandez, K. Lambrinou, M. Scibetta (SCK-CEN) 2334

9.04 Gen II/III Durability of Metallic Structures and Concrete
Tuesday May 3, 10.30 am – 12.10 pm

11010 Manageable Reactor Pressure Vessel Surveillance Programme - Flexible and Adaptable to Innovations
By E.A. Krasikov (RRC Kurchatov Institute) 2342

11009 Degradation and Damage Extension Lessons from the Decommissioned RPVs
By E.A. Krasikov (RRC Kurchatov Institute) 2346

11361 Irradiation Effects on Concrete Durability of Nuclear Power Plants
By Osamu Kontani, Yoshikazu Ichikawa, Akihiro Ishizawa (Kajima Corporation), Masayuki Takizawa, Osamu Sato (Mitsubishi Research Institute, Inc) 2352

9.05 Gen IV Fuel and Cladding
Tuesday May 3, 13.10 pm – 14.30 pm

11433 SiCf/SiC Composite Materials for Fast Reactor Applications
By L. Chaffron, J. L. Séran, C. Sauder, C. Lorrette, A. Michaux, L. Gélébart, A. Coupè (CEA Saclay) 2361

11220 Lanthanide Fission Product Migration in U-Zr Alloy Fuel
By Yeon Soo Kim, G.L. Hofman, T. Wieneck, E. O'Hare, J. Fortner (ANL), T. Ogata (CRIEPI) 2366
9.07 Gen IV Material Selection and Environment Effects-I
Wednesday May 4, 10.30 am – 12.10 pm

11368 Corrosion of Fe-9Cr Steels in Sodium Fast Reactors Environments
By F. Balbaud-Célérier, J.L. Courouau, C. Desgranges, L. Martinelli, F. Rouillard (CEA, DEN, DPC, SCCME, Laboratoire d’Étude de la Corrosion Non Aqueuse,)

11327 Liquid Metal Embrittlement of T91 Steel by Liquid Sodium
By Ingrid Proriol Serre, Ouadie Hamdane, Jean-Bernard Vogt (Univ de Lille 1), Jean-Louis Courouau (CEA)

11328 Fatigue Resistance in Liquid Lead-bismuth Eutectic Alloy of T91 Steel
By Jean-Bernard Vogt, Ingrid Proriol Serre (Univ de Lille1), Laure Martinelli (CEA), Nicolas David, Michel Vilasi (Faculté des Sciences)

11262 Finite Element Analysis of Creep Crack Growth for Compact Tension and Thumbnail Crack Specimens
By W. Sun, C.J. Hyde, T.H. Hyde, A.A. Becker, R. Li, M. Saber (Univ of Nottingham)

11461 Influence of Chromium in Defects Production in Fe-Cr Alloys
By V. Slugen, S. Sojak (FEI STU), W. Egger (Univ of Bundeswehr Munich), V. Krsjak, M. Petriska, J. Veternikova, V. Sabelova, M. Stacho (FEI STU)

9.07 Gen IV Material Selection and Environment Effects-II
Wednesday May 4, 13.10 pm – 14.30 pm

11439 Corrosion Behavior of Structural Materials in Liquid Gallium Environments
By Sang Hun Shin, Jong Jin Kim, Jeong Seok Park, In Cheol Bang, Ji Hyun Kim (UNIST)

11152 Corrosion by Liquid Sodium of Materials for Sodium Fast Reactors: The CORRONa Testing Device
By J-L. Courouau, F. Balbaud-Célérier, V. Lorentz, T. Duffrenoy (CEA)

11314 Thermomechanical Improvement of High-Temperature Mechanical Properties of 9-12% Martensitic Steels for Nuclear Applications
By Stéphanie Hollner, Benjamin Fournier (CEA/DEN/DANS/DMN/SRMA), Peter Mayr (IWS, Graz Univ of Technology), André Pineau (ENSMP Centre des Matériaux Mines Paris Tech)

11149 Study of the Tunneling Effect within Lattices with Cubic Structure on Varying Temperature
By Fulvio Frisone (Univ of Catania)
Track 10 - Nuclear Energy and Global Environment

10.01 Environmental Issues
Tuesday May 3, 13.10 pm – 14.30 pm

11318 CO2 Emission from Nuclear Electricity
By Henri Safa (CEA)

11133 Life Cycle CO2 Emissions by New Power Generation Technologies in Japan
By Ei-ichi Imamura, Koji Nagano (CRIEPI)

11072 New Challenges for Radioactive Releases Estimation in Normal Operation for Latest PWR
By Yves Barles, Kazutaka Mogi, Muneyuki Nakada, Hiromasa Nishino (Mitsubishi Heavy Industries)

11006 Risk Assessment of Coastal Defense against Typhoon Attacks for Nuclear Power Plant in China
By Defu Liu, Guilin Liu, Huajun Li, Fengqing Wang (Ocean Univ of China)

10.02 Long-term Deployment: Scenario Analysis of Nuclear Role
Tuesday May 3, 14.45 pm – 16.05 pm

11422 German Energy Concept and the Consequences on Nuclear Reactor Life Time
By J. Guidez (CEA)

11208 Position Vector of Minimum Regret Analysis for the Selection of Electricity Expansion Plans with External Costs Internalized
By Cecilia Martin-del-Campo, Guillermo Estrada-Sarti (Univ Nacional Autónoma de México)

11169 Codes Comparison on an Italian Case Study Scenario
By R. Calabrese (ENEA, Reactor and Fuel Cycle Safety and Security Methods Section), G. Fesenko (Obninsk State Technical University for Nuclear Power Engineering)

11050 Roles and Expectations on South Korea’s Nuclear Energy
By Whan-Sam Chung, Sung-Won Yun, Dae-Sung Lee (KAERI)

Track 11 - Deployment and Cross-Cutting Issues

11.01 Deployment and Cross-Cutting Issues-I
Tuesday May 3, 10.30 am – 12.10 pm

11428 The Impact of Differences in Operating Practices on the Development and Use of Advanced Reactor Design Operating Procedures: Results from the US-APWR HSI Test Program
By Robert Hall (REH Technology Solutions), Timothy Clouser (Luminant Power), James Easter (Consultant), Emilie Roth (Roth Cognitive Engineering), Kenji Mashio (Mitsubishi Nuclear Energy Systems), Masashi Hirahatake (Mitsubishi Electric Corporation)

11265 Challenges and Chances of the Nuclear Energy Development in Asia
By Eunju Jun (KAERI)

11240 Building the Manufacturing R&D Infrastructure for the UK’s Nuclear New Build
By Nigel Hart (Rolls-Royce), Keith Ridgway, Steve Court (Nuclear AMRC), Andrew Sherry (Univ of Manchester)
11.02 Deployment and Cross-Cutting Issues-II  
Wednesday May 4, 10.30 am – 12.10 pm

11193 Multiple nuclear power plants investment scenarios: Economy of Multiples and Economy of Scale Impact on Different Plant Sizes  
By Sara Boarin, Marco E. Ricotti (Politecnico di Milano)

11020 Nuclear Technology Cost Assessments using G4Econs and it's Cost Accounting System  
By Ferry Roelofs, Aliki van Heek (NRG)

11019 Impact of Plant Lifetime Extension on New Reactor and Fuel Cycle Development  
By Ferry Roelofs, Jaap Hart, Aliki van Heek (NRG)

11008 Overcoming the Limits to the Growth of Nuclear Power  
By Ron Cameron, Martin Taylor (OECD NEA)

11.03 Deployment and Cross-Cutting Issues-III  
Thursday May 5, 10.30 am – 12.10 pm

11451 International Training Program in Support of Safety Analysis: 3C S.UN.COP - Scaling, Uncertainty and 3D Thermal-Hydraulics/Neutron-Kinetics Coupled Codes Seminars  
By Alessandro Petruzzi, Francesco D'Auria (Univ of Pisa, DIMNP), Tomislav Bajs (Univ of Zagreb, FER), Francesc Reventos (School of Industrial Engineering, Barcelona)

11282 Education and Training Guidelines for Countries Embarking on NPP, Lesson Learnt by Pakistan  
By Muhammad Ammar Mehdi, Shahid A. Mallick, Muhammad Ayub (Pakistan Nuclear Regulatory Authority)

11155 A New Quality Standard in the Nuclear Industry  
By Thierry Zumbihl (AREVA), Philippe Jeanmart (Bureau Veritas)

11217 Comprehensive Dynamic Analyses for Fast Reactor Cycle Deployment by the Combinations of Energy Economic Models and Dynamic Analyses Model  
By Hiroki Shiotani, Kiyoshi Ono (JA EA), Masanori Heta, Naoto Yasumatsu (NESI Inc.)

11.04 Deployment and Cross-Cutting Issues-IV  
Wednesday May 4, 13.10 pm – 14.30 pm

11250 Assessing the Competitiveness of SMR with the INCAS Model: The Bulgaria Case Study  
By Giorgio Locatelli, Mauro Mancini, Ana Georgieva (Politecnico di Milano)

11260 Interdisciplinary Prospective Analysis of Nuclear Power Technological Transition  
By Abdou-Aziz Zakari (Laboratoire de Physique Subatomique et de Cosmologie (LPSC)), Sylvana Mima (Laboratoire d’économie de la production et de l’intégration internationale (LEPII)), Adrien Bidaud (Laboratoire de Physique Subatomique et de Cosmologie (LPSC)), Patric Criqui, Philippe Menateau (Laboratoire d’économie de la production et de l’intégration internationale (LEPII)), Sylvain David (Institut de Physique Nucléaire), Maurice Pagel (Univ de Paris-Sud 11)

11465 Effect of Potential Energy Stored in Reactor Facility Coolant on NPP Safety and Economic Parameters  
By A.V. Zrodnikov, G.I. Toshinsky, O.G. Komlev, I.V. Tormyshev (State Scientific Center)
### Track 12 - Plant Licensing and International Regulatory Issues

#### 12.01 International Standardization Initiatives

**Tuesday May 3, 10.30 am – 12.10 pm**

1. **11040 International Standardisation of Reactor Designs - Views of the Global Nuclear Industry**  
   By Michael Micklinghoff (*E.On Kernkraft GmbH*), Irina Borysova (*World Nuclear Association*)  

2. **11323 Towards an In-depth Update of the EUR Document**  
   By Pierre Berbey, François Hedin (*EDF/SEPTEN*), Luc Vanhoenacker (*GDF SUEZ TBL Engineering*), Olivier Rousselot (*EDF/SEPTEN*), Valérie Bellens (*GDF Suez TBL Engineering*)

3. **11266 Contribution of European Nuclear Licensees Toward Harmonization of Regulations for Nuclear Installations**  
   By Jean-Pierre Berger (*FORATOM/ENISS*), Luc Vanhoenacker (*Tractebel Engineering*), Muriel Gilbert (*FORATOM/ENISS*)

4. **11257 Design Scope and Level for Standard Design Certification of SMART under a Two Step Licensing Framework**  
   By Namduk Suh (*KINS*)

5. **11104 Licensing Opportunities and Challenges for ABWR and ESBWR in the International Nuclear Renaissance**  
   By Hugh A. Upton, Jerald G. Head, Richard E. Kingston, Patrick J. Looney (*GE Hitachi*)

#### 12.02 Licensing Issues

**Thursday May 5, 10.30 am – 12.10 pm**

1. **11398 Generation III Advanced Pressurized Water Reactors Safety Assessment, IRSN Practice**  
   By Borislav Dimitrov, Emmanuel Wattelle, Karine Herviou, Gabriel Georgescu, Giovanni Bruna (*IRSN*)

2. **11363 AP1000 Licensing in the United Kingdom**  
   By Simon J. Marshall, Luca Oriani, Paul A. Russ (*Westinghouse*)

3. **11101 Keys to the Successful ESBWR Design Certification under 10 CFR Part 52, Licenses, Certifications, and Approvals for NPPs**  
   By Hugh A. Upton, Jerald G. Head, Richard E. Kingston, Patricia L. Campbell (*GE Hitachi*)

4. **11459 Licensing Challenges and Lessons Learned in New Reactors in the U.S.**  
   By Frank M. Akstulewicz, Amy Snyder (*US NRC*)

5. **11467 The Benefits of International Cooperation via the Boiling Water Reactor Owners’ Group (BWROG)**
12.03 Risk Informed Applications
Thursday May 5, 13.10 pm – 14.50 pm

11325 Implementation of Performance-Based Fire Protection at Operating US Nuclear Power Plants
By John A. Grobe, Steven A. Laur (US NRC)

11324 Regulatory Aspects of Digital Systems Retrofit at a U.S. Operating Nuclear Power Plants
By John A. Grobe, Steven A. Arndt (US NRC)

11175 Risk Informing Nuclear Power Plant Emergency Preparedness
By Randolph Sullivan (US NRC)

11464 Use of Risk Insights to Enhance Safety Focus of Small Modular Reactor Reviews
By Stewart L Magruder (US NRC)

11187 Improved Best Estimate Plus Uncertainty Methodology Including Advanced Validation Concepts to License Evolving Nuclear Reactors
By C. Unal, B. Williams, F. Hemez (LANL), S.H. Atamturktur (Clemson Univ), P. McClure (LANL)

12.04 Construction and Supply Chain Inspection
Wednesday May 4, 10.30 am – 12.10 pm

11477 Oversight Program for the Assurance of Quality in the Construction of Nuclear Power Plants in the US
By John Tappert (US NRC)

11474 Current Activities and Lessons Learned in the Construction of Nuclear Power Plants in Finland
By Petteri Tiippana (STUK)

11475 Experiences and Challenges of New Reactor Construction in Korea
By Kjumyeng Oh (KINS)

11472 NSSS Components Manufacturing without Prior Allocation to a Project
By V. Castellan, E. Touzain, F. Bouteille, A. Verse (AREVA NP)

5th European Nuclear Education Network PhD Event

Session 1
Wednesday May 4, 8.10 am – 10.10 am

11490 Development and Validation of a Coupled CFD/System-Code Tool
By Davide Bertolotto, Annalisa Manera, Rakesh Chawla (Paul Scherrer Institut)

11481 Analysis of the Multi-Application Small Light-Water Reactor (MASLWR) Design Natural Circulation Phenomena
By F. Mascari, G. Vella (Univ degli Studi di Palermo), B.G Woods (Oregon State Univ), F. D’Auria (Univ of Pisa)

11482 Modeling and Experimental Investigation of Two-Phase Flow Instabilities in
Helically Coiled Steam Generator Tubes
By Davide Papini (Politecnico di Milano)

Session 2
Wednesday May 4, 10.30 am – 12.30 pm

11483 Study of the Hardening in Thermally Aged and Neutron-irradiated Iron-copper Alloys on the Basis of Combined Mechanical and Magnetic Relaxation Phenomena
By Boris Minov (SCK•CEN)

11484 Acoustic Techniques for SFR Continuous Monitoring Illustration with the Continuous Characterisation of a Bubble Cloud
By M. Cavaro, J.Ph. Jeannot (CEA DEN Cadarache), J. Moysan, C. Payan (LCND – Univ de la Méditerranée), O. Gastaldi (CEA DEN Cadarache)

11485 Modelling of Solidification Effect in Fuel Coolant Interactions
By Mitja Uršič, Matjaž Leskovar, Borut Mavko (Jožef Stefan Institute)

Session 3
Wednesday May 4, 14.00 pm – 16.00 pm

11486 Monte Carlo and Molecular Dynamics Simulation of Plasma-Material Interactions
By M. Di Prinzio (Ansaldo Nucleare), D. Aquaro (Univ di Pisa)

11487 New Neutron Data Measurements at 175 MeV for Accelerator Driven Systems
By Riccardo Bevilacqua (Uppsala Univ)

11488 Preliminary Experimental and Numerical Assessment of a Secondary Scram System for Liquid Metal Cooled Reactors
By Simon Vanmaercke (Univ Catholique de Louvain/ SCK.CEN), Gert Van den Eynde (SCK.CEN), Bert Tijskens (KULeuven), Yann Bartosiewicz (Univ Catholique de Louvain)

11489 A Computational Approach for LDI Erosion of Ductile Materials
By Stefan Nicolici (Univ Politehnica of Bucharest)