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- 11432 Advanced CANDU Instrumentation & Control Technologies – Application to the Enhanced CANDU 6 Design 859
By J. de Grosbois, G. Raikums, M. Soulard (*AECL*)
- 11335 Development of Critical Digital Review Procedure and the Preliminary Application Experience 870
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 876
By Nadyr E. Mengazetdinov, Aleksei G. Poletikin, Vitaly G. Promyslov (*V.A. Trapeznikov Institute of Control Sciences*)

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By N.E. Mengazetdinov, A.G. Poletykin, V.G. Promyslov (*Trapeznikov Institute of Control Sciences*)

11124 Evaluation of Instrument Drift of RPS & ESFAS for Nuclear Power Plant 889
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11075 Battery-Type-DP-Indicator for Nuclear Power Plant 896
By Kuniyuki Teruya (*Mitsubishi Heavy Industries*)

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By Kirby Woods (*InnoTech Engineering Solutions, LLC*), Ken Thomas (*Nebraska Public Power District*)

11254 A Proposed 80% Service Test To Satisfy the Duty Cycle and to Trend Battery Capacity 913
By Ken Barry (*EPRI*)

11204 Adapting the Gas Turbine Generator to Emergency Electrical Equipment for US-APWR 920
By Shinji Niida, Hiroshi Fujimoto, Katsuhisa Takaura (*Mitsubishi Heavy Industries*), Richard Barnes (*Mitsubishi Nuclear Energy Systems*)

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By Makoto Nagase, Satoshi Oouchi, Ichirou Kataoka (*Hitachi-GE Nuclear Energy, Ltd.*), Tsuyoshi Ito, Hideyuki Hosokawa (*Energy and Environmental Systems Laboratory, Hitachi, Ltd.*)

11077 Status of EPRI SGOG Steam Generators Chemical Cleaning Program in France 934
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11058 Role of Chemistry in the Phenomena Occurring in Nuclear Power Plants Circuits 939
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11287 MAGELAN, an Innovative Core Monitoring System to Optimize Plant Operation 958
By A. L'Abbate, A. Lefevbre de Rieux, E. Rousseau (*AREVA NP*)

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of Ulchin Units 1&2

By Duk-Joo Yoon, Jae-Yong Lee, In-Hwan Kim (*KEPRI*)

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By Joon-Ho Lee, Sung-Ho Cho, Jae-Hwan Bae (*KEPCO*)

11062 Modeling of Artificial Stiction in Steam Turbine Control Valve 972

By B. Halimi, Kune Y. Suh (*Seoul National Univ*)

11043 Application of GO-FLOW Methodology for Reliability Analysis of Auxiliary Feedwater System in Nuclear Power Plant 976

By Yongyue Chu, Ming Yang, Wanqing Chen (*Harbin Engineering Univ*)

11064 Enhancing Seismic Safety at Kashiwazaki Kariwa Nuclear Power Station 984

By Hideki Masui (*TEPCO*)

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By Rod Webster (*Rolls-Royce*)

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By B. Anandapadmanaban, A. Babu, G. Srinivasan (*IGCAR*)

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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 1025

By C.K. Ng, A. Udyawar, S. Swamy (*Westinghouse*)

11296 Improvement on the EDF Monitoring System for the Evaluation of Thermal Stratification 1035

By C. Naudin (*EDF/SEPTEN*), S. Blairon (*EDF/R&D/STEP*), S. Vidard (*EDF/SEPTEN*), B. Barthelet (*EDF/DPN/UNIE*)

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- 11185 [An Experimental Study on Dryout Heat Flux in Particulate Bed Packed with Irregular Particles](#) 1263
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- 11015 [Experiments on In-vessel Melt Pool Formation and Behaviour in the LIVE-2D Test Facility](#) 1309
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- 11039 [Statistical Evaluation of 4S Safety Performance at ATWS](#) 1334
By Kyoko Ishii, Hisato Matsumiya, Hideki Horie (*Toshiba Corporation*)

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11233 A Numerical Analysis on the Hydrodynamics of Heavy Molten Droplets in a Water Pool 1367
By Sachin Thakre, Liangxing Li, Weimin Ma (*KTH (Royal Institute of Technology)*)

11067 Evaluation of the Inadvertent Actuation of the Passive Residual Heat Removal System Event in the AP1000® Nuclear Plant 1374
By Richard F. Wright, Toby Burnett, Alan J. MacDonald (*Westinghouse*), Qiao Wu (*Oregon State Univ*)

11011 Analysis of Pressurizer Pressure Control System Using MAAP5 Code 1380
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11093 Thermal Hydraulic Phenomena Caused by the Interaction of Steam and Steam-Helium Mixture Wall Jets with a Containment Cooler 1381
By Ralf Kapulla, Guillaume Mignot, Domenico Paladino, Nejdett Erkan, Robert Zboray (*PSI*)

11430 A Comparison of Non-Parametric Tolerance Limits with Linear Combinations of Order Statistics in Safety Analysis 1392
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11076 The Technology of High-Temperature Reactors: Design, Commissioning, and Operational Results of AVR-15-MWel Experimental Reactor Jülich, Germany and THTR-300-MWel Demonstration Reactor Schmehausen, Germany and Their Impact on Future Designs 1402
By Urban Cleve, Klaus Knizia, Kurt Kugeler (*Consultant*)

11478 An Integrated Software Platform for Best Estimate Safety Analyses of Nuclear Power Plants 1409
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11239 Loss of Feedwater Flow Analysis for Lungmen ABWR Using RETRAN 1410
By Wen-Hsiung Wu, Jong-Rong Wang, Yng-Ruey Yuann (*Institute of Nuclear Energy Research*), Chunkuan Shih (*National Tsing-Hua Univ*), Su-Chin Cheng, Fong-Lun Lin (*Taiwan Power Company*)

5.09 Thermal-Hydraulic Studies and Modelling

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By J.H. Spencer, D. Novog (*McMaster Univ*), J.K.Hohorst, C.M. Allison (*Innovative Systems Software*)

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11443 Analysis of Thermohydraulic Limits during WWER-1000 Nuclear Power Plants Heat-Up Using RELAP5 System Code 1449
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11013 Study on Self-initialization Algorithm of SCDAP/RELAP5 Code 1457
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By Chih-Ming Tsai (*Institute of Nuclear Energy Research*), Nenzi Wang (*Chang Gung Univ*),

Jr-Ren Tsai (*Navy Command Headquarter*)

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By Sandro Pelloni, Konstantin Mikityuk (*PSI*), Gérald Rimpault (*CEA*)

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By Taira Hazama, Kazuya Takano, Akihiro Kitano (*JAEA*)

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By Taeseung Lee, Jong Hyuk Lee (KAIST)

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By Ferry Roelofs (NRG), Andreas Class (KIT), Paride Meloni (ENEA), Katrien van Tichelen (SCK-CEN), Pascal Boudier (CEA), Michael Prasser (ETHZ), Xu Cheng (KIT)

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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 1751

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

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11221 Computational Fluid Dynamics Analysis of Flow/Temperature Distribution of Moderator Inside Calndria and Comparison of Two Different Approaches 1757

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 1765

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 1773

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 1781

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

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11135 Numerical Simulation of the Multi-dimensional Two-Phase Flow Phenomena in the 1782

Downcomer Boling Test Using the CUPID Code

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11096 Application of the CFD CONV Code to the Simulation of LIVE L-4 Test 1793

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 1801

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 1811

By Tae Hyub Hong, Sang Won Lee, Hyeong Taek Kim (Nuclear Engineering & Technology Institute, KHNP)

7.04 SET and IET Thermal Hydraulics Experiments

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11194 Scram Vessel Experiments for KERENA™ 1816

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™ 1822

By T. Wagner, M. Wich, M. Doll, S. Leyer (AREVA NP GmbH)

11426 An Integral Effect Test Program for the SMART Design: VISTA-ITL 1828

By Hyun-Sik Park, Byoung-Yeon Min, Yong-Chul Shin, Ki-Yong Choi, Seok Cho, Nam-Hyun Choi, Sung-Jae Yi (KAERI)

11437 Measurement of Liquid Droplets Across a Spacer Grid in a Channel with Electrically-heating 2×2 Rods 1837

By Byoung Jae Kim, Hyoung Kyu Cho, Jong Kuk Park, Sang Ki Moon (KAERI)

11183 Experimental Characterization of Two-Phase Flow Instability Thresholds in Helically Coiled Parallel Channels 1843

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)

7.05 System Analysis and Assessment-I

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11123 The Development of SBLOCA Evaluation Methodology Using SPACE Code 1853

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 1860

By Hyoung Tae Kim, Bo Wook Rhee, Joo Hwan Park (KAERI)

11160 Analysis of Small-Break Loss-of-Coolant Accident Test 9.1b at BETHSY Facility with TRACE and RELAP5 1869

By Andrej Prošek, Ovidiu-Adrian Berar (Jožef Stefan Institute)

11128 Assessment of the TRACE Code Using Transient Data from SBLOCA Experiment 1878

By Jong-Rong Wang, Hao-Tzu Lin (Institute of Nuclear Energy Research, Atomic Energy

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

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11385 Development and Validation of a Thermal-Hydraulic Model of the SPES-99 Facility with the French System Code CATHARE 1888

By P. Meloni, G. Bandini, C. Lombardo, M. Polidori, M. Zaccarelli (*ENEA*)

11383 TRACE5 Simulation of a Cold Leg Intermediate Break LOCA 1896

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 1904

By Ahmed Hadjam (*1,3Centre de Recherche Nucléaire de Birine*), Ferhat Soudi (*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 1915

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

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11396 Prediction of Void Fraction in PWR Subchannel by CATHARE2 Code 1921

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 1928

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 1935

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 1943

By In Sub Jun, Kyu Hwan Bae, Young Jong Jeong, Won Jae Lee (*KAERI*)

7.06 Thermal Hydraulics Measurements and Modeling Fundamentals

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11471 Experimental Analysis of the Effects of the Graphite Dispersion on the Thermal-Hydraulic Phenomena inside the Reactor Cavity Cooling System 1950

By Luigi Capone, R. Vaghetto, Yassin A. Hassan (*Texas A&M Univ*)

11291 Applicability of Wire-Mesh Sensor to Acquire Multidimensional Churn Flow Dynamics 1957

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 1965

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 1973
By Jong Hyuk Lee, Yong Hoon Jeong (KAIST)

7.07 System Simulation Models and Codes

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

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

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

7.08 Thermal Hydraulics of Boiling Water Reactors

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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 2005
By Hamid Sadeghi, Jan Blomstrand (KTH), Guillermo Urrutia (CNEN)

11336 TRACE Analysis of Inadvertent Startup of HPCI Transient in Chinshan BWR/4 2014
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)

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

11130 The Steamline Break Inside Containment LOCA Transient Analysis of Lungmen ABWR with TRACE 2030
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)

11129 Water Hammer Modeling in MSIV Closure Transient of Lungmen ABWR with TRACE 2037
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)

7.09 Uncertainty Analysis

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11452 CIAU Method for Uncertainty Evaluation for System Thermal-Hydraulic Code Calculations 2045
By Alessandro Petruzzi, Francesco D'Auria (Univ of Pisa)

- 11179 State of the Art of Best Estimate Plus Uncertainty Methods in Safety Analyses 2055
By Andrea Bucalossi (*European Commission - Joint Research Centre*), Alessandro Petruzzzi (*Univ of Pisa*)
- 11107 Study on Verification of Compliance with Bundle and Channel Power Limits and Uncertainty Analysis of Power Coefficient Considering Aging for CANDU Reactors 2062
By In-young Kim, Yong-won Choi, Un-chul Lee (*Seoul National Univ*), Kap Kim (*KINS*)
- 11045 Sensitivity Analysis by the Use of a Neural Network Model during Large Break LOCA on LOFT L2-5 Experiment with CATHARE-2 V2.5 Code 2069
By Fabrice Fouet, Pierre Probst (*IRSN*)
- 11025 Sensitivity Analysis of a Passive Thermal-Hydraulic System 2077
By Qiao Liu, Toshimitsu Homma (*JAEA*)

7.10 Thermal Hydraulics of Liquid Metal Reactors

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- 11289 TRACE Analysis of Selected ISPRA Experiments on Dryout in Sodium Two-phase Flow 2078
By A. Chenu, K. Mikityuk, R. Chawla (*PSI*)
- 11231 Quantitative Evaluation of Gas Entrainment by Numerical Simulation with Accurate Physics Model 2085
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 2093
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 2103
By Francesco Belloni (*Sapienza, Univ di Roma*), Giacomino Bandini, Massimiliano Polidori (*ENEA*)
- 11158 Thermal-Hydraulic Analysis of ADS Using RELAP5 Code 2112
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 SOCRAT-BN Complex for Reactor with Sodium Coolant 2113
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

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By Rei Kimura, Tadashi Yoshida, Tomoaki Akamatsu (*Tokyo City Univ*)
- 11315 Innovation in Transport Storage Technology 2121
By Hervé Issard, Michel Hartenstein (*TN International (AREVA group)*)

11386 [The Back-End Question for Depleted Uranium](#) 2128
By Charles W. Forsberg (*MIT*), Massimo Zucchetti (*MIT, Politecnico di Torino,*)

11462 [Advanced Evaluation of Spent Fuel in Long Term Wet Storage in Slovakia](#) 2136
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](#) 2140
By Luc Van Den Durpel, Isabelle Leboucher, Mustapha Chiguer (*AREVA*)

8.02 Waste Management

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By Salomon Levy (*Levy & Associates*)

11306 [Minimized Waste Volumes from Optimized Low and Intermediate Level Waste Management at the Loviisa NPP in Finland](#) 2148
By Esko Tusa (*Fortum Power and Heat Oy*)

11001 [Immobilization of Radwaste in Synthetic Rock: An Alternative to Cementation](#) 2154
By Bernard Rottner (*Onet Technologies*)

11267 [Impermeable Graphite: A New Development for Embedding Radioactive Waste](#) 2158
By J. Fachinger, K.H. Grosse (*FNAG*), R. Seemann, M. Hrovat (*ALD*)

8.03 Advanced Fuel Cycles

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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](#) 2168
By Tadahiro Washiya, Tomozo Koyama (*JAEA*)

11114 [Development of FBR Fuel Reprocessing by Fluoride Volatility Method](#) 2174
By Jan Uhlir, Martin Marecek, Jan Skarohlid, Frantisek Lisý, Richard Bican (*Nuclear Research Institute Rez plc*)

11164 [Selective Uptake of Palladium by Novel Hybrid Microcapsules Enclosing Insoluble Copper Ferrocyanides](#) 2178
By Hitoshi Mimura, Yuichi Niibori (*Tohoku Univ*), Takashi Ohnishi, Shin-ichi Koyama (*JAEA*)

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By Sergii Nichenko, Dragos Staicu (*EC, JRC/ITU*)

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- 11418 [Is it Worth to Start Fast Reactors Using Uranium Fuels?](#) 2205
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](#) 2212
By Temitope A. Taiwo, Taek K. Kim (*ANL*)
- 11479 [Use of a Systems Engineering Approach to Prioritize Fuel Cycle Research and Development Choices](#) 2221
By Bhupinder P. Singh (*U.S. Department of Energy*)

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- 11404 [Core Design of Heavy Water Cooled Thorium Breeder with negative void Reactivity and Improved Breeding Performance](#) 2232
By Naoyuki Takaki (*Tokai Univ*), Argala Srivastava (*Tokai Univ, Bhabha Atomic Research Centre*), Ayumu Takeda (*Tokai Univ*)
- 11236 [Thorium Self Sustaining BWR Cores](#) 2238
By Francesco Ganda (*INL*), Jasmina Vujic, Ehud Greenspan (*Univ of California, Berkeley*)
- 11447 [Pyrochemical Reprocessing of Thorium-based Fuel](#) 2248
By S. Jaskierowicz, S. Delpech (*INPO*), P. Fichet, C. Colin (*CEA*), C. Slim, G. Picard (*LECIME, ENSCP*)

Track 9 - Materials and Structural Issues

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By N. Nakae, T. Baba, K. Kamimura (*JNES*)
- 11402 [Capabilities of TRANSURANUS Code in Simulating BWR Super-Ramp Project](#) 2262
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- 11374 [Photoelectrochemical Approach for Understanding the Radiation Enhanced Corrosion of Zr Alloy in a Simulated BWR Water](#) 2272
By Young-Jin Kim (*GE Global Research Center*)
- 11340 [Steady-State Nitride Fuel Behavior Modeling with FRAPCON-EP and its Application to PWRs](#) 2278
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By X. Ficquet, D.M. Goudar, E.J. Kingston, K. Ayres, P. Hurrell, C. Gill (*VEQTER*)

11468 Influence of Sand Fineness on Tensile Behavior of High Performance Fiber Reinforced Cement Composites for Containment Building 2301

By Dong Joo Kim, Seok Hee Kang (*Sejong Univ*)

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 2309

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By Shinjiro Inomata, Makoto Nakajima, Jun Shimizu, Toshio Ichikawa, Kaina Teshima, Yoichi Iwamoto, Hiroshi Ogawa (*Mitsubishi Heavy Industries, LTD*)

11157 Surveillance Program Assessment for Critical Components of Next Generation Nuclear Reactors 2334

By R. Chaouadi, S. Gavrilov, R. Fernandez, K. Lambrinou, M. Scibetta (*SCK-CEN*)

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By E.A. Krasikov (*RRC Kurchatov Institute*)

11009 Degradation and Damage Extension Lessons from the Decommissioned RPVs 2346

By E.A. Krasikov (*RRC Kurchatov Institute*)

11361 Irradiation Effects on Concrete Durability of Nuclear Power Plants 2352

By Osamu Kontani, Yoshikazu Ichikawa, Akihiro Ishizawa (*Kajima Corporation*), Masayuki Takizawa, Osamu Sato (*Mitsubishi Research Institute, Inc*)

9.05 Gen IV Fuel and Cladding

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11433 SiCf/SiC Composite Materials for Fast Reactor Applications 2361

By L. Chaffron, J. L. Séran, C. Sauder, C. Lorrette, A. Michaux, L. Gélébart, A. Coupé (*CEA Saclay*)

11220 Lanthanide Fission Product Migration in U-Zr Alloy Fuel 2366

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- 11197 Length Effects Associated with Metallic Fuel Elements 2373
By Abdellatif M. Yacout, Gerard L. Hofman, Yeon S. Kim (*Argonne National Laboratory*)
- 11359 Status of the Development of Ferritic/martensitic ODS at CEA for Sodium Fast Reactors 2378
By Yann de Caraln, Philippe Dubuisson (*CEA/DEN/DMN*), Véronique Garat (*AREVA NP*), Martine Blat (*EDF R&D*)
- 11333 Study on Realization of Innovative Fast Reactor Utilizing Hydride Neutron Absorber 2383
By Kenji Konashi, Tomohiko Iwasaki (*Tohoku Univ*), Yoshihiko Okubo (*MFBR*), Kunihiro Itoh, Toshiya Kido (*Nuclear Development Corporation*), Masaki Ando, Yoshitaka Fukano (*JAEA*), Ken Kurosak (*Osaka Univ*), Akihiro Suzuki (*Univ of Tokyo*), Masahiko Ariyoshi (*Toshiba*)

9.07 Gen IV Material Selection and Environment Effects-I

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By F. Balbaud-Célérier, J.L. Courouau, C. Desgranges, L. Martinelli, F. Rouillard (*CEA, DEN, DPC, SCCME, Laboratoire d'Etude de la Corrosion Non Aqueuse,*)
- 11327 Liquid Metal Embrittlement of T91 Steel by Liquid Sodium 2403
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 2411
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 2418
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 2425
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

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- 11439 Corrosion Behavior of Structural Materials in Liquid Gallium Environments 2430
By Sang Hun Shin, Jong Jin Kim, Jeong Seok Park, In Cheol Bang, Ji Hyun Kim (*UNIST*)
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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 2450
By Stéphanie Hollner, Benjamin Fournier (*CEA/DEN/DANS/DMN/SRMA*), Peter Mayr (*IWS, Graz Univ of Technology*), André Pineau (*ENSMC Centre des Matériaux Mines Paris Tech*)
- 11149 Study of the Tunneling Effect within Lattices with Cubic Structure on Varying Temperature 2459
By Fulvio Frisone (*Univ of Catania*)

Track 10 - Nuclear Energy and Global Environment

10.01 Environmental Issues

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| 11133 Life Cycle CO2 Emissions by New Power Generation Technologies in Japan
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| 11072 New Challenges for Radioactive Releases Estimation in Normal Operation for Latest PWR
By Yves Barles, Kazutaka Mogi, Muneyuki Nakada, Hiromasa Nishino (<i>Mitsubishi Heavy Industries</i>) | 2475 |
| 11006 Risk Assessment of Coastal Defense against Typhoon Attacks for Nuclear Power Plant in China
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10.02 Long-term Deployment: Scenario Analysis of Nuclear Role

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By J. Guidez (<i>CEA</i>) | 2493 |
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By Cecilia Martin-del-Campo, Guillermo Estrada-Sarti (<i>Univ Nacional Autónoma de México</i>) | 2499 |
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By R. Calabrese (<i>ENEA, Reactor and Fuel Cycle Safety and Security Methods Section</i>), G. Fesenko (<i>Obninsk State Technical University for Nuclear Power Engineering</i>) | 2510 |
| 11050 Roles and Expectations on South Korea's Nuclear Energy
By Whan-Sam Chung, Sung-Won Yun, Dae-Sung Lee (<i>KAERI</i>) | 2518 |

Track 11 - Deployment and Cross-Cutting Issues

11.01 Deployment and Cross-Cutting Issues-I

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By Robert Hall (<i>REH Technology Solutions</i>), Timothy Clouser (<i>Luminant Power</i>), James Easter (<i>Consultant</i>), Emilie Roth (<i>Roth Cognitive Engineering</i>), Kenji Mashio (<i>Mitsubishi Nuclear Energy Systems</i>), Masashi Hirahatake (<i>Mitsubishi Electric Corporation</i>) | 2524 |
| 11265 Challenges and Chances of the Nuclear Energy Development in Asia
By Eunju Jun (<i>KAERI</i>) | 2532 |
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By Nigel Hart (<i>Rolls-Royce</i>), Keith Ridgway, Steve Court (<i>Nuclear AMRC</i>), Andrew Sherry (<i>Univ of Manchester</i>) | 2536 |

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By Sara Boarin, Marco E. Ricotti (*Politecnico di Milano*)
- 11020 Nuclear Technology Cost Assessments using G4Econs and it's Cost Accounting System 2550
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- 11019 Impact of Plant Lifetime Extension on New Reactor and Fuel Cycle Development 2557
By Ferry Roelofs, Jaap Hart, Alike van Heek (*NRG*)
- 11008 Overcoming the Limits to the Growth of Nuclear Power 2573
By Ron Cameron, Martin Taylor (*OECD NEA*)

11.03 Deployment and Cross-Cutting Issues-III

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- 11451 International Training Program in Support of Safety Analysis: 3C S.UN.COP - Scaling, Uncertainty and 3D Thermal-Hydraulics/Neutron-Kinetics Coupled Codes Seminars 2579
By Alessandro Petrucci, Francesco D'Auria (*Univ of Pisa, DIMNP*), Tomislav Bajcs (*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 2590
By Muhammad Ammar Mehdi, Shahid A. Mallick, Muhammad Ayub (*Pakistan Nuclear Regulatory Authority*)
- 11155 A New Quality Standard in the Nuclear Industry 2597
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 2600
By Hiroki Shiotani, Kiyoshi Ono (*JAEA*), 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 2608
By Giorgio Locatelli, Mauro Mancini, Ana Georgieva (*Politecnico di Milano*)
- 11260 Interdisciplinary Prospective Analysis of Nuclear Power Technological Transition 2618
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 Menauteau (*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 2626
By A.V. Zrodnikov, G.I. Toshinsky, O.G. Komlev, I.V. Tormyshev (*State Scientific Center*)

Institute for Physics and Power Engineering (SSC IPPE), A.V. Koudriavtseva, K.Yu. Danilenko
(*JSC "AKME Engineering"*)

11251 Nuclear Power Plants in the Baseload Generation Portfolios: A Probabilistic Study of the Size Role 2634

By Giorgio Locatelli, Mauro Mancini, Diego Agosti (*Politecnico di Milano*)

Track 12 - Plant Licensing and International Regulatory Issues

12.01 International Standardization Initiatives

Tuesday May 3, 10.30 am – 12.10 pm

11040 International Standardisation of Reactor Designs - Views of the Global Nuclear Industry 2644

By Michael Micklinghoff (*E.On Kernkraft GmbH*), Irina Borysova (*World Nuclear Association*)

11323 Towards an In-depth Update of the EUR Document 2648

By Pierre Berbey, François Hedin (*EDF/SEPTEN*), Luc Vanhoenacker (*GDF SUEZ TBL Engineering*), Olivier Rousselot (*EDF/SEPTEN*), Valérie Bellens (*GDF Suez TBL Engineering*)

11266 Contribution of European Nuclear Licensees Toward Harmonization of Regulations for Nuclear Installations 2654

By Jean-Pierre Berger (*FORATOM/ENISS*), Luc Vanhoenacker (*Tractebel Engineering*), Muriel Glibert (*FORATOM/ENISS*)

11257 Design Scope and Level for Standard Design Certification of SMART under a Two Step Licensing Framework 2663

By Namduk Suh (*KINS*)

11104 Licensing Opportunities and Challenges for ABWR and ESBWR in the International Nuclear Renaissance 2672

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

11398 Generation III Advanced Pressurized Water Reactors Safety Assessment, IRSN Practice 2682

By Borislav Dimitrov, Emmanuel Wattelle, Karine Herviou, Gabriel Georgescu, Giovanni Bruna (*IRSN*)

11363 AP1000 Licensing in the United Kingdom 2691

By Simon J. Marshall, Luca Oriani, Paul A. Russ (*Westinghouse*)

11101 Keys to the Successful ESBWR Design Certification under 10 CFR Part 52, Licenses, Certifications, and Approvals for NPPs 2699

By Hugh A. Upton, Jerald G. Head, Richard E. Kingston, Patricia L. Campbell (*GE Hitachi*)

11459 Licensing Challenges and Lessons Learned in New Reactors in the U.S. 2707

By Frank M. Akstulewicz, Amy Snyder (*US NRC*)

11467 The Benefits of International Cooperation via the Boiling Water Reactor Owners' Group (BWROG) 2714

By Ted Schiffley, Craig Nichols (*GE Hitachi Nuclear Energy*)

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 2718
By John A. Grobe, Steven A. Laur (*US NRC*)
- 11324 Regulatory Aspects of Digital Systems Retrofit at a U.S. Operating Nuclear Power Plants 2727
By John A. Grobe, Steven A. Arndt (*US NRC*)
- 11175 Risk Informing Nuclear Power Plant Emergency Preparedness 2734
By Randolph Sullivan (*US NRC*)
- 11464 Use of Risk Insights to Enhance Safety Focus of Small Modular Reactor Reviews 2742
By Stewart L Magruder (*US NRC*)
- 11187 Improved Best Estimate Plus Uncertainty Methodology Including Advanced Validation Concepts to License Evolving Nuclear Reactors 2747
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 2748
By John Tappert (*US NRC*)
- 11474 Current Activities and Lessons Learned in the Construction of Nuclear Power Plants in Finland 2749
By Petteri Tiippana (*STUK*)
- 11475 Experiences and Challenges of New Reactor Construction in Korea 2750
By Kjumyeng Oh (*KINS*)
- 11472 NSSS Components Manufacturing without Prior Allocation to a Project 2751
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 2752
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 2763
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 2774

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 2784
By Boris Minov (*SCK•CEN*)

11484 Acoustic Techniques for SFR Continuous Monitoring Illustration with the Continuous Characterisation of a Bubble Cloud 2794
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 2795
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 2805
By M. Di Prinzio (*Ansaldo Nucleare*), D. Aquaro (*Univ di Pisa*)

11487 New Neutron Data Measurements at 175 MeV for Accelerator Driven Systems 2828
By Riccardo Bevilacqua (*Uppsala Univ*)

11488 Preliminary Experimental and Numerical Assessment of a Secondary Scram System for Liquid Metal Cooled Reactors 2835
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 2843
By Stefan Nicolici (*Univ Politehnica of Bucharest*)