



Official Program



ANS Conference

2014 International Congress on Advances in Nuclear Power Plants

Westin Charlotte • Charlotte, NC • April 6-9, 2014





ANS Conference

2014 International Congress on Advances in Nuclear Power Plants

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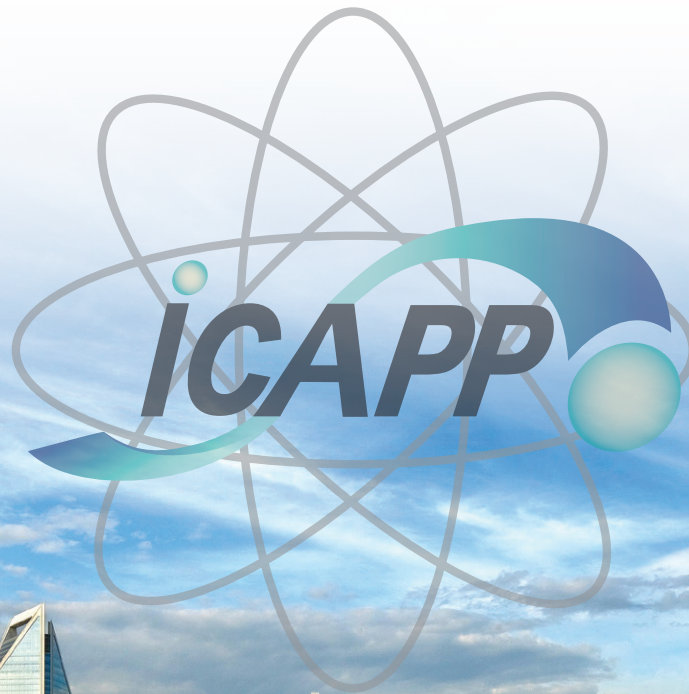
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Sponsors	2
Meeting Officials	4
Meeting Information and Special Events	5
Meeting Schedule	6-7
Monday Technical Sessions	8-13
Tuesday Technical Sessions	14-21
Wednesday Technical Sessions	22-31



Meeting Officials



HONORARY CHAIR:
Peter B. Lyons
DOE



HONORARY CHAIR:
Noël Camarcat
EDF



HONORARY CHAIR:
Takuya Hattori
Japan Atomic Industrial Forum



HONORARY CHAIR:
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Korea Nuclear Society



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AREVA



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Kenji Umeda
Mitsubishi Heavy Industries



GENERAL CHAIR:
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KHNP



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Travis W. Knight
University of South Carolina



TECHNICAL PROGRAM CHAIR:
Frank Carré
C.E.A.



TECHNICAL PROGRAM CHAIR:
Shinsuke Yamanaka
Osaka University



TECHNICAL PROGRAM CHAIR:
Sun Koo Kang
KEPCO E&C



MEETING INFORMATION

The 2014 International Congress on Advances in Nuclear Power Plants (ICAPP) Meeting will be held April 6-9, 2014, in Charlotte, NC.

ACCOMMODATIONS/HOTEL INFORMATION

The Westin Charlotte Hotel will be the location for the ICAPP 2014 Meeting, where all activities and technical sessions will take place.

The Westin Charlotte Hotel is located at 601 S. College Street, Charlotte, NC 28202.

MEETING REGISTRATION

Registration is required for all attendees and presenters. Badges are required for admission to all events. The Full Meeting Registration fee includes one (1) ticket to the Opening Reception, Monday NASCAR Banquet, and a copy of the Meeting Proceedings on CD-Rom.

REGISTRATION HOURS

The Meeting Registration Desk and Message Center will be located in Grand Promenade of the Westin Charlotte Hotel. You may register, purchase tickets for events, and pick up your registration packet during the following hours:

SUNDAY, APRIL 6, 2014

3:00 PM – 8:00 PM

MONDAY, APRIL 7, 2014

7:00 AM – 5:00 PM

TUESDAY, APRIL 8, 2014

7:00 AM – 3:00 PM

WEDNESDAY, APRIL 9, 2014

7:00 AM – 3:00 PM

NOTE:

Additional tickets can be purchased at the ANS Registration Desk for the Sunday Opening Reception, and NASCAR Banquet.

MEETINGS PROCEEDINGS

The meeting proceedings is available on CD-ROM. Copies of the Meeting Proceedings will be available on-site. Each full meeting registrant will receive a copy of the proceedings as part of the full meeting registration fee. Additional copies may be purchased at the meeting registration desk for \$195.00.

This special rate is available at the meeting only. To purchase copies following the meeting, you may contact the ANS Accounting Department at 708-579-8210 (telephone); 708-579-8314 (fax); accounting@ans.org (email); or submit your request in writing to: American Nuclear Society, 97781 Eagle Way, Chicago, IL 60678-9770.

SPECIAL EVENTS

Opening Reception

SUNDAY, APRIL 6, 2014

6:00 PM – 8:30 PM

Location: Grand Ballroom C

The meeting will start with a welcome reception. One ticket to the Opening Reception is included with the full meeting registration.

Additional tickets can be purchased at the ANS Registration Desk for \$95.00 each.

NASCAR Hall of Fame Banquet

MONDAY, APRIL 7, 2014

7:00 PM – 10:00 PM

Located in Uptown Charlotte, NC, the 150,000-square-foot NASCAR Hall of Fame is an interactive, entertainment attraction honoring the history and heritage of NASCAR. The high-tech venue, designed to educate and entertain race fans and non-fans alike, opened May 11, 2010 and includes



artifacts, interactive exhibits, and a 278-person state-of-the-art theater. Also on the property is Buffalo Wild Wings restaurant and the NASCAR Hall of Fame Gear Shop.

The goal of the facility is to honor NASCAR icons and create an enduring tribute to the drivers, crew members, team owners and others that have impacted the sport in the past, present and future.

Enjoy an adventure at the NASCAR Hall of Fame. First test your driving skills at the iRacing simulators with some serious competition. The simulator tracks are laser scanned replicas and the cars have all the setup and feel as their real world counterparts. Then, stroll through the 40,000 square foot exhibit space showcasing the history and heritage of the sport.

Also here is the link to the website: <http://www.nascarhall.com/>

The evening includes cocktails, appetizers and dinner.

One ticket to the NASCAR Hall of Fame is included with the full meeting registration.

Additional tickets can be purchased at the ANS Registration Desk for \$120.00 each.



Meeting Schedule

SUNDAY, APRIL 6, 2014

3:00 PM–8:00 PM	Registration	Stonewall Promenade
3:00 PM–6:00 PM	Exhibit Table Setup	Grand Ballroom AB
6:00 PM–8:30 PM	Opening Reception	Grand Ballroom C

MONDAY, APRIL 7, 2014

7:00 AM–5:00 PM	Registration	Grand Promenade
8:00 AM–10:00 AM	Opening Plenary—Part I: Nuclear Power Accomplishments and Prospects	Grand Ballroom C
9:30 AM–5:30 PM	Tabletop Exhibit	Grand Ballroom AB
10:00 AM–10:30 AM	Coffee Break	Grand Ballroom AB
10:30 AM–12:00 PM	Opening Plenary—Part II: New Plant Construction	Grand Ballroom C
1:00 PM–2:40 PM	Tech Sessions	
	1.01-I Performance of Tight Lattice BWRs: Issues and Solutions I (Invited)	Trade
	2.04 High Temperature Molten Salt-cooled Reactors: Strategy/Overview	Harris
	3.01 Fast Neutron Reactors: Concepts and Performance	Providence Ballroom III
	5.03-I Post-Fukushima Issues and Analyses-I	Tryon
	6.01 Advances in Core Physics Parameter Evaluation	Sharon
	7.04-I Thermal Hydraulics Testing-I	Providence Ballroom I
	7.11-I Single Phase CFD-I	Providence Ballroom II
	9.04 Experimental Analysis	Independence
2:40 PM–3:00 PM	Coffee Break	Grand Ballroom AB
3:00 PM–4:20 PM	Tech Sessions	
	1.01-II Performance of Tight Lattice BWRs: Issues and Solutions II (Invited)	Trade
	2.03 High Temperature Gas-cooled Reactors: Strategy/Overview, Experimental	Harris
	3.02 Fast Neutron Reactors: Programs and Infrastructure	Providence Ballroom III
	5.03-II Post-Fukushima Issues and Analyses-II	Tryon
	7.04-II Thermal Hydraulics Testing-II	Providence Ballroom I
	7.11-II Single Phase CFD-II	Providence Ballroom II
	8.03 Fuel Cycle Economics	Sharon
	9.05 Mechanical Behavior Under Incidental/Accidental Conditions	Independence
4:20 PM–6:00 PM	Plenary 2: Beating the Economic and Business Challenges in Nuclear Power	Grand Ballroom C
7:00 PM–10:00 PM	Night at the NASCAR Hall of Fame Banquet	NASCAR Hall of Fame Museum

TUESDAY, APRIL 8, 2014

7:00 AM–3:00 PM	Registration	Grand Promenade
8:00 AM–9:45 AM	Plenary 3: Sustainability of the Nuclear Fuel Cycle	Grand Ballroom C
9:30 AM–5:30 PM	Tabletop Exhibit	Grand Ballroom AB
9:45 AM–10:20 AM	Coffee Break	Grand Ballroom AB
10:20 AM–12:00 PM	Tech Sessions	
	1.02 Advances in Integral LWRs	Trade
	3.06 Advanced Modeling and Simulation (Invited)	Providence Ballroom III
	4.01 Operation, Risk Based Maintenance and Good Practice	Harris
	5.04-I Severe Accident Core Melt Management Strategy-I	Tryon
	7.01 Containment/Systems Analysis	Providence Ballroom I
	7.09-I Advanced Framework/UQ-I	Providence Ballroom II
	10.01 Innovative Hybrid Nuclear Energy Systems	Sharon
1:00 PM–2:40 PM	Tech Sessions	
	2.02 High Temperature Gas-cooled Reactors: Simulation	Harris
	3.03-I Fast Neutron Reactors: Safety and Accident Analysis-I	Providence Ballroom III
	5.04-II Severe Accident Core Melt Management Strategy-II	Tryon
	6.04-I New Fuels, New Fuel Management, New Reactor Cores Characterization of Spent Fuels-I	Sharon
	7.05-I Reactor Thermal Hydraulics-I	Providence Ballroom I
	7.06-I Multiphase General-I	Providence Ballroom II
	8.02 Performance and Specific Issues on Fuel Cycle Options	Trade
	9.03 Corrosion/CRUD Issues	Independence
2:40 PM–3:00 PM	Coffee Break	Grand Ballroom AB

3:00 PM–4:20 PM	Tech Sessions 2.05 High Temperature Molten Salt-cooled Reactors: Experimental 3.03-II Fast Neutron Reactors: Safety and Accident Analysis-II 4.03 Instrumentation, Sensors and Human-system Interface Major Component Reliability, Repair and Replacement 5.04-III Severe Accident Core Melt Management Strategy-III 6.04-II New Fuels, New Fuel Management, New Reactor Cores Characterization of Spent Fuels-II 7.05-II Reactor Thermal Hydraulics-II 7.06-II Multiphase General-II	Harris Providence Ballroom III Trade Tryon Sharon Providence Ballroom I Providence Ballroom II
4:20 PM–6:00 PM	Plenary 4: Accelerating Nuclear Technology Transfer from Concept to Practice	Grand Ballroom C

WEDNESDAY, APRIL 9, 2014

7:00 AM–3:00 PM	Registration	Grand Promenade
8:00 AM–9:30 AM	Plenary 5: Operating Plant Issues in a Post-Fukushima World	Grand Ballroom C
9:30 AM–10:00 AM	Coffee Break	Grand Ballroom AB
9:30 AM–3:30 PM	Tabletop Exhibit	Grand Ballroom AB
10:00 AM–12:00 PM	Tech Sessions 1.03 Advances in Boiling Water Reactors 2.06 High Temperature Molten Salt-cooled Reactors: Simulation 3.07 Decision Analysis to Support Deployment of Advanced Nuclear Technologies (Invited) 5.02 Radiological Consequences 7.07 LOCA 7.08-I Advanced Concepts-I 9.02 Advanced Reactor Materials 10.02 Advanced Nuclear Reactor Concepts in a Post-Fukushima World	Trade Harris Providence Ballroom III Tryon Providence Ballroom II Providence Ballroom I Independence Sharon
1:00 PM–2:40 PM	Tech Sessions 1.04-1 Advances in Pressurized Water Reactors-1 3.04-I Fast Neutron Reactors: Balance of Plant and Auxiliary Systems-I 5.01-I Transient and Accident Performance-I 6.02 Core Calculation 7.08-II Advanced Concepts-II 7.09-II Advanced Framework/UQ-II 8.01 General Fuel Cycle Analysis 9.07 Mechanical Behavior Fuel/Clad, Experiment and Modeling	Trade Providence Ballroom III Tryon Sharon Providence Ballroom I Providence Ballroom II Harris Independence
2:40 PM–3:00 PM	Coffee Break	Grand Ballroom AB
3:00 PM–4:20 PM	Tech Sessions 1.04-II Advances in Pressurized Water Reactors-II 3.04-II Fast Neutron Reactors: Balance of Plant and Auxiliary Systems-II 4.02 Simulation, Computational Methods, Performance and Reliability Improvements 5.01-II Transient and Accident Performance-II 7.02-I CFD for Large Systems-I 7.03 Two-Phase CFD 7.10-SMR Thermal Hydraulics 9.06 Nuclear NDE and Health Monitoring	Trade Providence Ballroom III Sharon Tryon Harris Providence Ballroom I Providence Ballroom II Independence
3:30 PM–5:30 PM	Exhibit Dismantle	Grand Ballroom AB
4:20 PM–5:40 PM	3.05 Other Advanced Reactor Concepts 7.02-II CFD for Large Systems-II	Providence Ballroom III Harris

Monday Technical Sessions

MONDAY, APRIL 7, 2014 • 8:00 AM - 10:00 AM

ICAPP 2014 OPENING PLENARY -- PART 1: NUCLEAR POWER ACCOMPLISHMENTS AND PROSPECTS

Session Co-Chairs: Dhiaa Jamil (*Duke Nuclear Energy & Duke Energy*) and Makoto Toyama (*Mitsubishi Nuclear Energy System (MNES)*)

Grand Ballroom C

This plenary will address the accomplishments of nuclear power and the future prospects of this important base load energy source. The plenary will include plant operator, government, vendor, regulatory and international perspectives.

Opening Address from ANS President: Donald Hoffman (*CEO, Excel Services Corporation*)

Speakers:

- Dhiaa Jamil (*President, Duke Nuclear Energy & Senior VP, Duke Energy*)
- Peter (Pete) Lyons (*Assistant Secretary, U.S. DOE*)
- Michael (Mike) Rencheck (*President and CEO, AREVA, Inc.*)
- Nils Diaz (*Chief Strategic Officer, Blue Castle Holdings (BCH)*)
- Takuya Hattori (*President, Japan Atomic Industrial Forum*)

MONDAY, APRIL 7, 2014 • 10:30 AM - 12:00 NOON

ICAPP 2014 OPENING PLENARY -- PART 2: NEW PLANT CONSTRUCTION

Session Co-Chairs: Peter (Pete) Lyons (*U.S. DOE*), Françoise De Bois (*AREVA*)

Grand Ballroom C

This plenary will provide an update on new plant construction focusing on experience and lessons learned. While this new construction spans the globe from Asia to North American to Europe, an additional focus of the plenary will be on new construction in the US testing the new Combined License (10 CFR Part 52) application process.

Speakers:

- Steve Byrne (*Chief Operating Officer, SCANA*)
- Koo Woun Park (*President, KEPCO E&C*)
- Jeff Merrifield (*Senior VP, CBI*)
- Noël Camarcot (*Special Advisor Nuclear R&D and International Issues, Generation EDF*)

MONDAY, APRIL 7, 2014 • 1:00 PM - 2:40 PM

1.01-I PERFORMANCE OF TIGHT LATTICE BWRs: ISSUES AND SOLUTIONS-I (INVITED)

Session Chair: Temitope Taiwo (*Argonne National Laboratory*)

Trade

1:00 pm

14271 Core Designs of RBWR (Resource-renewable BWR) for Recycling and Transmutation of Transuranium Elements - an Overview

Tetsushi Hino, Masaya Ohtsuka, Renzo Takeda, Junichi Miwa, Yoshihiko Ishii (*Hitachi, Ltd., Hitachi Research Laboratory*), Kumiaki Moriya (*Hitachi-GE Nuclear Energy, Ltd.*)

1:20 pm

14278 The Fuel-self-sustaining RBWR-Th Core Concept and Parametric Studies

Phillip M. Gorman, Guanheng Zhang, Jeffrey E. Seifried, Christopher R. Varela, Jasmina L. Vujic, Ehud Greenspan (*University of California, Berkeley*)

1:40 pm

14277 Comparison of RBWR and SFR Design and Performance Characteristics

Jeffrey E. Seifried, Phillip M. Gorman, Ehud Greenspan, Christopher R. Varela, Jasmina L. Vujic, Guanheng Zhang (*University of California, Berkeley*)

2:00 pm

14293 Advanced Methods Development for Equilibrium Cycle Calculations of the RBWR

Andrew Hall, Thomas Downar, Andrew Ward, Michael Jarrett, Aaron Wysocki, Yunlin Xu (*University of Michigan*), Koroush Shirvan (*Massachusetts Institute of Technology*)

2.04 HIGH TEMPERATURE MOLTEN SALT-COOLED REACTORS: STRATEGY/OVERVIEW

Session Chair: Charles Forsberg (*Massachusetts Institute of Technology*)

Harris

1:00 pm

14009 Requirements, Ownership, Licensing, and Technology Development Strategies for a Fluoride-Salt-Cooled High-Temperature Test Reactor

Charles Forsberg, Lin-win Hu (*Massachusetts Institute of Technology*)

1:20 pm

14024 Strategies for a Small Transportable FHR with Reduced Security, Safeguards, and Safety Systems

Ruaridh Macdonald, Charles Forsberg (*Massachusetts Institute of Technology*)

1:40 pm

14026 The Coupled Corrosion and Tritium Challenges of Fluoride-salt-cooled High-temperature Reactors
John D. Stempien, Ronald G. Ballinger, Charles W. Forsberg
(*Massachusetts Institute of Technology*)

2:00 pm

14039 Thermal Hydraulic Licensing Limits for a Prismatic Core Fluoride Salt Cooled High Temperature Test Reactor
R.R. Romatoski, L.W. Hu, C.W. Forsberg (*Massachusetts Institute of Technology*)

2:20 pm

14297 Fluoride Salt-Cooled High-Temperature Reactor Development Roadmap
David E. Holcomb, George F. Flanagan, Gary T. Mays, W. David Pointer, Kevin R. Robb, Graydon L. Yoder, Jr. (*Oak Ridge National Laboratory*)

2:40 pm

14083 Passive Compact Molten Salt Reactor (PCMSR) Advanced Nuclear Reactor to Solve Sustainability Problem of Nuclear Fuel
W. Akhmad Aji, Ipin Mas, W. Andang (*Gadjah Mada University*)

3.01 FAST NEUTRON REACTORS: CONCEPTS AND PERFORMANCE

Session Chairs: Sandra Pומרouly (*EDF*), Stefano Monti (*IAEA*)

Providence Ballroom III

1:00 pm

14076 SLIMM-Scalable Liquid Metal Cooled Small Modular Reactor
Mohamed S. El-Genk, Luis M. Palomino (*University of New Mexico*)

1:20 pm

14116 The ASTRID Project: Status and Prospects towards the Conceptual Design Phase
Eric Abonneau, Pierre Le Coz (*CEA*), David Settimo (*EDF*), Jean-Marie Hamy (*AREVA*), Vincent Jourdain (*ALSTOM*), Grégoire Lambert (*COMEX Nucléaire*), Masaru Fukuie (*TOSHIBA*), Thomas Chauveau (*BOUYGUES*), Philippe Audouin (*JACOBS*), John Molyneux (*ROLLS-ROYCE*), René Gefflot (*ASTRIUM*), René-Paul Benard (*ALCEN/SEIV*)

1:40 pm

14176 Multi-physics and Multi-objective Optimization Methodology for Sodium-cooled Fast Reactor Conception
Florent Barjot, Damien Schmitt (*EDF R&D*), Christophe Venard (*CEA*)

2:00 pm

14260 A Dynamic Behavior of the Energy Multiplier Module (EM2)
Hangbok Choi (*General Atomics*)

5.03-I POST-FUKUSHIMA ISSUES AND ANALYSES-I

Session Chair: Jeffrey Lane (*Zachry Nuclear Engineering*)

Tryon

1:00 pm

14098 Application of RELAP/SCDAPSIM/MOD3.5 to a Representative BWR for Fukushima-Daichii-like SBO Transients
C. Allison, J. Hohorst (*Innovative Systems Software*), F. Venturi, N. Forgiione (*University of Pisa*), R. Lopez (*Comision Nacional de Seguridad Nuclear y Salvaguardias*)

1:20 pm

14100 Development of Finite Element Models from Existing Lumped Mass Stick Models
B. Torkian (*Southern Company*), P. Chandran, B. Jebuna Ratnagarar (*All State Technical Services, KBR Company*), R. Miller (*Southern Company*), S. Lu (*Simpson Gumpertz and Heger*)

1:40 pm

14107 Tsunami PRA for Japan Sodium-Cooled Fast Reactor
Hiroyuki Nishino, Kenichi Kurisaka, Hidemasa Yamano, Yasushi Okano, Takaaki Sakai (*Japan Atomic Energy Agency*)

2:00 pm

14138 Research of Seawater Effects on Thermal-Hydraulic Behavior at Severe Accident - Research Plan and Thermal-Hydraulic Data in Annular Tube
Wei Liu, Taku Nagatake, LiFang Jiao, Kazuyuki Takase, Hiroyuki Yoshida, Fumihisa Nagase (*Japan Atomic Energy Agency*)

2:20 pm

14194 Numerical Investigation of Fukushima Daiichi-2 SBO Scenario
Yaodong Chen (*Royal Institute of Technology; State Nuclear Power Research Institute*), Weimin Ma (*State Nuclear Power Research Institute*), Lei Cui (*Royal Institute of Technology*)

6.01 ADVANCES IN CORE PHYSICS PARAMETER EVALUATION

Session Chair: Alexander Ponomarev (*KIT*)

Sharon

1:00 pm

14052 On-the-Fly Sampling of Thermal Scattering S(α,β ,T) Data for Monte Carlo Codes
Andrew T. Pavlou, Megan Wart, Wei Ji, Timothy H. Trumbull (*Rensselaer Polytechnic Institute*)

Monday Technical Sessions

1:20 pm

14096 Coupling of System Thermal-Hydraulics and Monte-Carlo Method for a Consistent Thermal-Hydraulics-Reactor Physics Feedback
Xu Wu, Tomasz Kozlowski (*University of Illinois Urbana-Champaign*)

1:40 pm

14126 Verification of Nuclear Calculation Methodology and Preliminary Uncertainty Qualification in a Sodium-cooled Fast Reactor
Kazumi Ikeda (*Mitsubishi FBR Systems, Inc.*), Yuto Homma (*Mitsubishi Heavy Industries, Ltd.*), Hiroyuki Moriwaki (*Mitsubishi FBR Systems, Inc.*), Shigeo Ohki (*Japan Atomic Energy Agency*)

2:00 pm

14146 Modeling of Reactivity Effects and Non-uniform Axial Expansion of SFR Core on Basis of Neutronics Model with Constant Calculation Mesh
Alexander Ponomarev, Victor Sanchez (*Karlsruhe Institute of Technology*)

2:20 pm

14223 TRIPOLI-4 Simulation of Core Physics Parameters for Two 3600 MWt Sodium-Cooled Fast Reactors
Yi-Kang Lee, Emeric Brun, Xavier Alexandre (*CEA-Saclay*)

7.04-I THERMAL HYDRAULICS TESTING-I

Session Chair: Yassin Hassan (*Texas A & M University*)

Providence Ballroom I

1:00 pm

14089 Study of Strongly Heated upward Turbulent Gas Flow
Yohanes Setiawan Nietiadi, Jeong Ik Lee (*Korea Advanced Institute of Science and Technology*), Yacine Addad (*Khalifa University of Science, Technology & Research (KUSTAR)*)

1:20 pm

14090 Identification of Asymmetry Reactor Flow Characteristics for a Single Pump Failure Condition with 1/5 Scale linearly Reduced Facilities Referring to APR+
D.J. Euh (*KAERI; University of Science and Technology*), K.H. Kim, T.S. Kwon, I.C. Chu, H.S. Choi (*KAERI*), S.T. Lee (*University of Science and Technology*), T.S. Kwon (*KAERI*)

1:40 pm

14161 Experimental Investigation on Hydrodynamic Phenomena Associated with Postulated Vapor Explosion Scenarios in the Phénix Reactor
Emanuele Semeraro, Matteo Bucci, Benjamin Cariteau, Jean-Paul Magnaud, Arnault Monavon (*CEA/DEN/DANS/DM2S/STMF*)

2:00 pm

14203 Development of a Prototypical Condensation Model for the Nearly Horizontal Heat Exchanger Tube of the APR+ PAFS

(Passive Auxiliary Feed-water System)

Tae-hwan Ahn, Byong-Jo Yun, Jae-Jun Jeong (*Pusan National University*), Kyong-ho Kang, Yu-sun Park (*Korea Atomic Energy Research Institute*), Jong Cheon (*KHNP Central Research Institute*)

2:20 pm

14235 LOFT L9-3 Experiment Simulation Using the SPACE Code
Chang-Keun Yang, Yo-Han Kim, Sang-Jun Ha (*KHNP Central Research Institute*)

7.11-I SINGLE PHASE CFD-I

Session Chair: Kazuyuki Takase (*Japan Atomic Energy Agency*)

Providence Ballroom II

1:00 pm

14063 Large Eddy Simulation of Fluid Mixing at High Temperature Differences in a T Junction Piping System
Karthick Selvam, Rudi Kulenovic, Eckart Laurien (*University of Stuttgart*)

1:20 pm

14092 Large Eddy Simulation of Turbulent Penetration in a T-junction
John Kickhofel, Horst-Michael Prasser (*ETH Zürich*)

1:40 pm

14143 Turbulence Model Comparison for Innovative Compact Plate Heat Exchanger Design Application
Francesco Vitillo, Lionel Cachon (*CEA Cadarache*), Pierre Millan, Philippe Reulet, Emmanuel Laroche (*ONERA Toulouse*)

2:00 pm

14160 UTK Twin Jet Water Facility Computational Fluid Dynamics Validation Data Set
Mark Crosskey, Art Ruggles (*University of Tennessee*)

9.04 EXPERIMENTAL ANALYSIS

Session Chair: Djamel Kaoumi (*University of South Carolina*)

Independence

1:00 pm

14086 The Influence of Hydride Morphology on the Crack Propagation through Fuel Cladding Wall
Takeshi Mihara, Yutaka Udagawa, Tomoyuki Sugiyama, Masaki Amaya (*Japan Atomic Energy Agency*)

1:20 pm

14171 Evaluation of Structural Performance of Nuclear Components Considering Weld Mechanical Properties
Kee Nam Song, Sung Deok Hong, Sang Hoon Lee (*KAERI*)

1:40 pm

14210 Dual Mode Sensing for Continuous Crack Monitoring on Grout Nuclear In-Situ Decommissioning Structures
Zhenhua Tian, Lingyu Yu, Paul Ziehl, Mohamed Elbatanouny
(University of South Carolina)

2:00 pm

14261 Adaptation of Crack Growth Detection Techniques to US Material Test Reactors
A. Joseph Palmer, Sebastien P. Teyseyre, Kurt L. Davis, Joy Rempe (Idaho National Laboratory), Gordon Kohse, Yakov Ostrovsky, David M. Carpenter (Massachusetts Institute of Technology)

2:20 pm

14400 Mandrel Test Simulation Using ANSYS Software
A.V. Krupkin, V.I. Kuznetsov, V.V. Novikov, I.R. Segienko (JSC "VNIINM")

MONDAY, APRIL 7, 2014 • 3:00 PM - 4:20 PM

1.01-II PERFORMANCE OF TIGHT LATTICE BWRS: ISSUES AND SOLUTIONS-II (INVITED)

Session Chair: Temitope Taiwo (Argonne National Laboratory)

Trade

3:00 pm

14276 Stability and Safety Analysis of Tight Lattice Breeding LWR
K. Shirvan, M.S. Kazimi (Massachusetts Institute of Technology), L. Cheng, M. Todosow (Brookhaven National Laboratory), A. Hall (University of Michigan), M. Jarrett, A.M. Ward, T.J. Downar (University of Michigan)

3:20 pm

14279 Fuel Performance Analysis of a (ThU)O₂ Fueled Reduced Moderation Boiling Water Reactor
Alexander Mieloszyk, Mujid Kazimi (Massachusetts Institute of Technology)

3:40 pm

14402 Assessment of Shutdown Margin Requirements for High Conversion BWR with Th-U233 Fuel
Yaniv Shaposhnik (NRCN – Nuclear Research Center; Ben-Gurion University of the Negev), Marat Margulis, Dan Kotlyar, Eugene Shwageraus (Ben-Gurion University of the Negev), Ezra Elias (Technion - Israel Institute of Technology)

2.03 HIGH TEMPERATURE GAS-COOLED REACTORS: STRATEGY/OVERVIEW, EXPERIMENTAL

Session Chairs: Michael Fütterer (JRC, IET), Stephen Rhyne (K&L Gates)

Harris

3:00 pm

14017 Advanced Gas Reactor (AGR)-5/6/7 Fuel Irradiation Experiments in the Advanced Test Reactor
A. Joseph Palmer, David A. Petti, S. Blaine Grover (Idaho National Laboratory)

3:20 pm

14226 A Neutronic Evaluation of the HTTR Using Thorium and Reprocessed Fuel
R.V. de Sousa, A. Fortini, C. Pereira, A.H. de Oliveira, F.R. de Carvalho (Universidade Federal De Minas Gerais)

3:40 pm

14284 ARCHER@TV: A Telecast on Nuclear Power and Heat Cogeneration in the Making – in Edutainment Style
Norbert Frischauf, Michael A. Fütterer (Joint Research Centre, Institute for Energy and Transport), Walter Scheuermann (University of Stuttgart, IKE), Gert Baldauf, Julius Kratky (Austrian Broadcast Corporation (ORF))

4:00 pm

14319 Analytical and Experimental Study on the Effective Thermal Conductivity of VHTR Fuel Block Geometry with Multiple Cylindrical Holes
Dong-Ho Shin (Seoul National University), Su-Jong Yoon (Idaho National Laboratory), Hong-Sik Lim (Korea Atomic Energy Research Institute), Goon-Cherl Park (KEPCO International Nuclear Graduate School), Hyoung-Kyu Cho (Seoul National University)

3.02 FAST NEUTRON REACTORS: PROGRAMS AND INFRASTRUCTURE

Session Chairs: Didier De Bruyn (SCK•CEN), Christian Latge (CEA)

Providence Ballroom III

3:00 pm

14059 A New IAEA Coordinated Research Project on Sodium Properties and Safe Operation of Experimental Facilities in Support of the Development and Deployment of Sodium-Cooled Fast Reactors
Stefano Monti (IAEA), Christian Latge (CEA), Bin Long (CIAE), Osvaldo E. Azpitarte (CNEA), Perumal Chellapandi (IGCAR), Robert Stieglitz (KIT), Sven Eckert (HZDR), Hiroaki Ohira (JAEA), Jewhan Lee (KAERI), Ferry Roelofs (NRG), Evgenii Marinenko (IPPE), Christopher Grandy (ANL)

Monday Technical Sessions

3:20 pm

14060 Experimental Platforms in Support of the ASTRID Program: Existing and Planned Facilities
Olivier Gastaldi, Gilles Rodriguez, Laurent Ayrault, Bruno Collard, Jérôme Dumesnil, Francois Dujet, Tkatschenko Isabelle, Emmanuel Sanseigne, Guy Willermoz, Frédéric Serre (CEA Cadarache -CEA/DEN/CAD/DTN)

3:40 pm

14131 Preparation of KASOLA Scientific Work Programme Using TRACE
Wadim Jaeger, Christoph Homann, Wolfgang Hering, Victor Jammot (Karlsruhe Institute of Technology)

5.03-II POST-FUKUSHIMA ISSUES AND ANALYSES-II

Session Chair: Judith Hohorst (Innovative Systems Software)

Tryon

3:00 pm

14156 Remaining Issues in Pool Scrubbing: Major Drivers for Experimentation within the EU-PASSAM Project
L.E. Herranz, R.D. Tardáguila (CIEMAT), B. Torsten, T. Lind (PSI), S. Morandi (RSE)

3:20 pm

14209 MAAP Enhancements for Ascertaining and Analyzing Reactor Core Status in Fukushima-Daiichi NPPs
Yoshihiro Kojima, Hiromasa Yanagisawa, Naoki Shinji, Hideki Horie, Norio Sakai (Toshiba Corporation), Richard Wachowiak (Electric Power Research Institute), Chan Paik, Martin Plys (Fauske and Associates, LLC)

3:40 pm

14376 Numerical Simulation of Dispersion and Deposition of Radionuclides over Ocean Sectors from Fukushima Dai-ichi Accidental Releases
C.V. Srinivas, P.T. Rakesh, K.B.R.R. Hari Prasad, R. Venkatesan, B. Ramakrishnan, B. Venkatraman, S.A.V. Satya Murty (Indira Gandhi Center For Atomic Research)

4:00 pm

14388 Evaluation of ABWR for Safety Post-Fukushima
Jim Powers (Toshiba America Nuclear Energy), Kenji Arai, Masatomo Kuroda (Toshiba Corporation Power Systems Company), Steve Thomas, Bill Mookhoek (Nuclear Innovation North America)

7.04-II THERMAL HYDRAULICS TESTING-II

Session Chair: Nam Dinh (North Carolina State University)

Providence Ballroom I

3:00 pm

14043 Experiment Study on Flow Characteristics of Free Falling Wafer Film on Steel Plate
Po Hu (Shanghai Jiao Tong University)

3:20 pm

14229 Measurement of the Minimum Film Boiling Temperature for Low Pressure and Low-Flow Rate Flow Boiling
Byoung Jae Kim (Korea Atomic Energy Research Institute), Jun Seok Park (Kyung Hee University), Jong Kuk Park, Sang Ki Moon, Kyung Doo Kim (Korea Atomic Energy Research Institute), Hyung Dae Kim (Kyung Hee University), Jae Seok Heo (Korea Atomic Energy Research Institute)

3:40 pm

14257 Advanced Calibration and Validation of a Mechanistic Model of Subcooled Boiling Two-Phase Flow
Anh Bui (Idaho National Laboratory), Brian Williams (Los Alamos National Laboratory), Nam Dinh (North Carolina State University)

4:00 pm

14395 Off-normal Characteristic Two-Phase Flow Behavior in the Water-cooled MHTGR-RCCS with Decay Heat Variation
Olumuyiwa Omotowa (University of Idaho), Darius Lisowski (Argonne National Laboratory), Mark Anderson (University of Wisconsin-Madison), Akira Tokuhiko (University of Idaho), Michael Corradini (University of Wisconsin-Madison)

7.11-II SINGLE PHASE CFD-II

Session Chair: Kazuyuki Takase (Japan Atomic Energy Agency)

Providence Ballroom II

3:00 pm

14075 RANS-Based CFD Analyses of Turbulent Flow in a Solid Core, Small Modular Reactor
Timothy M. Schriener, Mohamed S. El-Genk (University of New Mexico)

3:20 pm

14192 Numerical Flow Simulation of Bare Square Array Subchannel with Partially Closed Gaps
Hyung Min Son (Korea Atomic Energy Research Institute), Kune Yull Suh (Seoul National University; PHILOSOPHIA, Inc.)

3:40 pm

14263 Large Eddy Simulations of Flow inside a Cubical Differentially Heated Cavity under Realistic Conditions
A. Dehbi, F. Han, J. Kalilainen (*Paul Scherrer Institut*)

8.03 FUEL CYCLE ECONOMICS

Session Chair: Charles Forsberg (*Massachusetts Institute of Technology*)

Sharon

3:00 pm

14058 OECD/NEA Study on the Economics of the Back-end of Nuclear Fuel Cycle
Maria Elena Urso, Alexey Likhov, Ron Cameron (*OECD Nuclear Energy Agency*)

3:20 pm

14167 Modeling Non-Destructive Assay Based Signatures for Application to Safeguarding Pyroprocessing
Philip L. Lafreniere (*University of New Mexico*), Devin Rappleye (*University of Utah*), Robert Hoover (*University of New Mexico*), Michael Simpson (*University of Utah*), Edward Blandford (*University of New Mexico*)

3:40 pm

14299 Sustainability and Economy of Energy Supply with HTGR Fueled by Uranium from Seawater
Yuji Fukaya, Minoru Goto, Hirofumi Ohashi, Yukio Tachibana, Kazuhiko Kunitomi (*Japan Atomic Energy Agency*)

4:00 pm

14394 Economics Analysis of Complex Nuclear Fuel Cycles with NE-COST
Francesco Ganda (*Argonne National Laboratory*), Brent Dixon (*Idaho National Laboratory*), Edward Hoffman, Taek K. Kim, Temitope Taiwo (*Argonne National Laboratory*), Roald Wigeland (*Idaho National Laboratory*)

9.05 MECHANICAL BEHAVIOR UNDER INCIDENTAL/ ACCIDENTAL CONDITIONS

Session Chair: Marion Le Flem (CEA)

Independence

3:00 pm

14019 Debris-induced Fretting Failure Analysis
Mansu Kim (*Korea Hydro and Nuclear Power*), Changdoo Kee (*Chon Nam National University*), SeungJin Baek (*Korea Hydro and Nuclear Power*), Yongwhan Kim (*Korea Nuclear Fuel Co.*)

3:20 pm

14064 Fuel Grid Vane Failure Caused from Higher Hoist Speed
Mansu Kim (*Korea Hydro and Nuclear Power*), Changdoo Kee (*Chonnam National University*), Sangil Ahn (*Korea Hydro and Nuclear Power*), SangGyun Chang (*KEPCO E&C*), Kiyoun Kim (*Korea Hydro and Nuclear Power*), Kisung Choi (*KEPCO NF*)

3:40 pm

14114 Core Mechanical Dynamics Experiment in the Phenix Reactor
P. Barret, D. Broc, J. Cardolaccia, L. Martin, J.-L. Portier (*French Alternative Energies and Atomic Energy Commission*)

4:00 pm

14213 Numerical Study of Violent Sloshing during Earthquake Excitation Using Coupled CFD/FEA and SPH/FEA Approaches
Radu Mihail Bilegan, Stefan Nicolici, Alexandru Gheorghita (*Subsidiary of Technology and Engineering for Nuclear Projects (CITON)*)

MONDAY, APRIL 7, 2014 · 4:20 PM - 6:00 PM

PLENARY 2: BEATING THE ECONOMIC AND BUSINESS CHALLENGES IN NUCLEAR POWER

Session Co-Chairs: Neil M. Wilmshurst (*Electric Power Research Institute*), Mujid Kazimi (*Massachusetts Institute of Technology*)

Grand Ballroom C

Economics and business issues are the key drivers for choices made in electricity generation options. Even though relatively free global trade tends to equalize the costs of various generation choices, there are still substantial differences in different regions of the world. Case studies showing different economic evaluation methodologies and assumptions will show how and why different countries and/or utilities make varying business choices.

Speakers:

- Marvin Fertel (*President & CEO, Nuclear Energy Institute*)
- Mikko Kosonen (*Senior VP, Production Chairman of Plant Meeting, TVO Nuclear Services Ltd.*)
- Osamu Maekawa (*Executive VP, Power System Company of Toshiba Corporation*)
- Amir Shahkarami (*CEO Exelon Nuclear Partners, Senior Vice President Exelon Generation*)
- Antonio Muller (*President of ABDAN (Brazilian Association for Development of Nuclear Activities)*)

Tuesday Technical Sessions

TUESDAY, APRIL 8, 2014 • 8:00 AM - 9:45 AM

PLENARY 3: SUSTAINABILITY OF THE NUCLEAR FUEL CYCLE

Session Co-Chairs: Andrew Sowder (EPRI), Ausaf Hussain (UAE)

Grand Ballroom C

The long term viability of nuclear energy depends on selecting a nuclear fuel cycle that can be sustained from both the affordable fuel resources and minimum environmental impact standpoints. Efforts have been made in recent years to define the best options for the fuel cycle that balance these criteria, and others. This session will bring a broad perspective on the topics affecting selection of the best fuel cycle, including uranium resource availability, the potential for unconventional breeding reactors, such that those not requiring reprocessing of fuel, or those using coolants other than liquid metals. International and national investigations of fuel cycle optimization will be discussed.

Speakers:

- Erich Schneider (Professor, University of Texas at Austin)
- Roald Wigeland (National Technical Director, Fuel Cycle Options Campaign, Idaho National Laboratory)
- Luc Van Den Dурpel (Vice President, Strategic Analysis and Technology R&D, AREVA)
- John Gilleland (CEO, TerraPower)
- Harukuni Tanaka (Senior Managing Executive Officer, Japan Nuclear Fuel Limited)

TUESDAY, APRIL 8, 2014 • 10:20 AM - 12:00 PM

1.02 ADVANCES IN INTEGRAL LWRS

Session Chair: MD Alamgir (GE-Hitachi Nuclear Energy)

Trade

10:20 am

14311 Integral Inherently Safe LWR (I2S-LWR) Concept: Extending SMR Safety Features to Larger Power Output
Bojan Petrovic (Georgia Institute of Technology)

10:40 am

14313 Integral Inherently Safe LWR (I2S-LWR) Concept: Integral Vessel Layout
Matthew Memmott (Westinghouse Electric Company), Matthew Marcese, Bojan Petrovic (Georgia Institute of Technology)

11:00 am

14193 The Use of a Flashing Drum to Generate Steam in the Integral, Inherently Safe (I2S) Light Water Reactor
Matthew J. Memmott (Westinghouse Electric Company), Annalisa Manera (University of Michigan)

11:20 am

14280 Instrumentation and Controls for an Integral Inherently Safe Light Water Reactor
Belle R. Upadhyaya, Matthew R. Lish, J. Wesley Hines (University of Tennessee)

3.06 ADVANCED MODELING AND SIMULATION (INVITED)

Session Chair: Emily R. Shemon (Argonne National Laboratory)

Providence Ballroom III

10:20 am

14377 NEAMS SFR System Module: Overview and Development Status
Rui Hu, Thomas H. Fanning (Argonne National Laboratory)

10:40 am

14379 NEAMS Neutronics: Development and Validation Status
E.R. Shemon, C.H. Lee, M.A. Smith, A. Marin-Lafleche (Argonne National Laboratory)

11:00 am

14384 NEAMS MeshKit: Nuclear Reactor Mesh Generation Solutions
Rajeev Jain, Timothy J. Tautges (Argonne National Laboratory)

11:20 am

14389 SHARP Coupled Multiphysics Toolkit for Reactor Analysis
Vijay Mahadevan, Elia Merzari, Rajeev Jain, Timothy Tautges, Michael Smith, Aleks Obabko, Paul Fischer (Argonne National Laboratory), Robert Ferencz (Lawrence Livermore Laboratory)

11:40 am

14393 NEAMS Structural Mechanics: Development Status with Core and Seismic Soil-Structure Interaction Examples
R.M. Ferencz, J.M. Solberg, R.A. Whitesides, N.E. Hodge (Lawrence Livermore National Laboratory)

4.01 OPERATION, RISK BASED MAINTENANCE AND GOOD PRACTICE

Session Chair: Heather Szews (Duke Energy)

Harris

10:20 am

14112 A New Methodology for Improving Nuclear Instrument System Intermediate Range Reliability When Elevating Reactor Power after an Unplanned Reactor Shutdown
Sang-il Ahn, Man-su Kim (Korea Hydro & Nuclear Power Co., Ltd)

10:40 am

14198 Human Factors Engineering Program Implementation Recommended Practices for Nuclear Power Plant Licensing Applicants
Daniel Casas, Luis Rejas, Fernando Ortega (*Tecnatom S.A.*)

11:00 am

14294 Human Performance Enhancement Methods from Analyzing Employee's Survey in Nuclear Power Plants
Jeongjin Park, Chanho Sung, Younggab Kim (*KHNP Central Reserch Institute*)

11:20 am

14327 Enhancing Nuclear Safety Based on Good Practices of Tokai-No.2 Survived the Tsunami and Earthquake
Kazuo Ishiguma, Koji Okamoto (*The Japan Atomic Power Company*)

11:40 am

14342 Component Qualification - An Essential Element for Safe Operation of Nuclear Power Plants
Darryl Gordon, Holger Schmidt (*AREVA*)

5.04-I SEVERE ACCIDENT CORE MELT MANAGEMENT STRATEGY-I

Session Chair: Mirco Grosse (*Karlsruhe Institute of Technology*)

Tryon

10:20 am

14029 Development and Validation of a New Direct Containment Heating (DCH) Model for the Integral Code ASTEC
J. Eckel, C. Spengler (*Gesellschaft für Anlagen- und Reaktorsicherheit (GRS)mbH*)

10:40 am

14133 Design of Containment Filtered Venting System for Depressurization in Containment under Severe Accidents
Young Su Na, Kwang Soon Ha, Rae-Joon Park, Jong-Hwa Park (*Korea Atomic Energy Research Institute*), Song-Won Cho (*Nuclear Safety Evaluation*)

11:00 am

14091 The Timing of Reactor Vessel Failure during the Severe Accident Progression
Thi Huong Vo (*Korea Atomic Energy Research Institute; University of Science and Technology*), Jin Ho Song, Tae Woon Kim, Dong Ha Kim (*Korea Atomic Energy Research Institute*)

11:20 am

14108 Estimation Analysis of Pressure Loading in a Typical Chinese Pressurized Water Reactor Cavity During Ex-Vessel Steam Explosion
Yuan Zhou, Meng Lin, Mingjun Zhong (*Shanghai Jiaotong University*)

11:40 am

14248 PLINIUS-2 : A Versatile Platform for Severe Accident Mitigation Device and Simulation Assessments
Guy Willermoz, Christophe Journeau, Christophe Suteau, Jean-Francois Haquet, Nathalie Cassiaut-Louis, Eric Pluyette, Frédéric Serre (*CEA*)

7.01 CONTAINMENT/SYSTEMS ANALYSIS

Session Chair: David Pialla (*CEA*)

Providence Ballroom I

10:20 am

14238 Interaction Experiments of Molten Corium with Structures in a Severe Accident
Sang Mo An, Kwang Soon Ha, Seong Ho Hong, Hwan Yeol Kim (*Korea Atomic Energy Research Institute*), Yoseb Cha (*Doosan Heavy Industries & Construction*)

10:40 am

14239 Coolability of an Ex-vessel Core Catcher Induced by Natural Circulation Flow
Kwang Soon Ha, Bo Wook Rhee, Rae Joon Park (*Korea Atomic Energy Research Institute*)

11:00 am

14314 An Evaluation of the Scaling Analysis Model of the EU-APR1400 Core Catcher Cooling System Test Facility Based on Test Results
B.W. Rhee, K.S. Ha, R.J. Park, J.H. Song (*Korea Atomic Energy Research Institute*)

11:20 am

14322 OECD/NEA HYMERES Project: For the Analysis and Mitigation of a Severe Accident Leading to Hydrogen Release into a Nuclear Plant Containment
Domenico Paladino, Guillaume Mignot, Ralf Kapulla, Sidharth Paranjape, Michele Andreani (*Paul Scherrer Institut*), Etienne Studer (*CEA/DEN/DANS/DM2S/STMF/LIEFT*), Jerome Brinster, Frederic Dabbene (*CEA/DEN/DANS/DM2S/STMF/LATF*)

7.09-I ADVANCED FRAMEWORK/UQ-I

Session Chair: Igor Bolotnov (*North Carolina State University*)

Providence Ballroom II

10:20 am

14038 Developing Fully Coupled Dynamical Reactor Core Isolation System Models in RELAP-7 for Extended Station Black-Out Analysis
Haihua Zhao, Ling Zou, Hongbin Zhang, David Andrs, Richard Martineau (*Idaho National Laboratory*)

Tuesday Technical Sessions

10:40 am

14045 Characteristics of Parallel Simulation of Two-Phase Thermal-Hydraulics code, CUPID
Jae Ryong Lee, Han Young Yoon (*Korea Atomic Energy Research Institute*)

11:00 am

14062 Application of FFTBM for Sensitivity Study
Andrej Prošek, Matjaž Leskovar, Ovidiu-Adrian Berar (*Jožef Stefan Institute*)

11:20 am

14130 Application of Fast Fourier Transformation Methods in the Frame of Uncertainty and Sensitivity Studies for Reflood Experiments
Wadim Jaeger, Victor Hugo Sánchez Espinoza, Florentin Llombart Monfort (*Karlsruhe Institute of Technology*)

10.01 INNOVATIVE HYBRID NUCLEAR ENERGY SYSTEMS

Session Chair: Luc Van den Durpel (*AREVA*)

Sharon

10:20 am

14011 Nuclear-Renewable Hybrid System Economic Basis for Electricity, Fuel, and Hydrogen
Charles Forsberg (*Massachusetts Institute of Technology*), Steven Aumeier (*Idaho National Laboratory*)

10:40 am

14057 A Demonstration Project Coupling a Small Modular Reactor with a Hybrid Nuclear Renewable Oil Shale System
Daniel Curtis, Charles Forsberg (*Massachusetts Institute of Technology*), Michael McKellar, Earl Mattson (*Idaho National Laboratory*)

11:00 am

14072 Hybrid-Nuclear Advanced Reactor Technology
Michael F. Keller (*Hybrid Power Technologies LLC*)

11:20 am

14337 NuScale Energy Supply for Oil Recovery and Refining Applications
D.T. Ingersoll, C. Colbert (*NuScale Power, LLC*), R. Bromm (*Fluor Corporation*), Z. Houghton (*NuScale Power, LLC*)

TUESDAY, APRIL 8, 2014 • 1:00 PM - 2:40 PM

2.02 HIGH TEMPERATURE GAS-COOLED REACTORS: SIMULATION

Session Chair: Gerhard Strydom (*INL*)

Harris

1:00 pm

14272 Comparison of the PHISICS/RELAP5-3D Ring and Block Model Results for Phase I of the OECD MHTGR-350 Benchmark
Gerhard Strydom (*Idaho National Laboratory*)

1:20 pm

14292 Comparison of Homogeneous and Heterogeneous CFD Fuel Models for Phase I of the IAEA CRP on HTR Uncertainties Benchmark
Su-Jong Yoon, Gerhard Strydom (*Idaho National Laboratory*)

1:40 pm

14310 Linear Versus Nonlinear Irradiation Creep Model for Finite Element Based Stress Analysis of High Temperature Gas Cooled Reactor Core Graphite Component
Subhasish Mohanty, Saurin Majumdar (*Argonne National Laboratory*)

3.03-I FAST NEUTRON REACTORS: SAFETY AND ACCIDENT ANALYSIS-I

Session Chair: Stefano Monti (*IAEA*)

Providence Ballroom III

1:00 pm

14048 Analysis of the CABRI-1 Single Fuel Pin LOF Experiment BI1 with SAS-SFR Code including Two-phase Sodium Behaviour
Sara Perez-Martin, Werner Pfrang, Maxime Haselbauer (*Karlsruhe Institute of Technology, Institute for Neutron Physics and Reactor Technology*)

1:20 pm

14068 In-Containment Nucleation in Severe Accidents in SFR: Assessment of Thermal Hydraulic Boundary Conditions
Monica Garcia, Luis E. Herranz (*CIEMAT*), Martin Kissane (*IRSN*)

1:40 pm

14106 Performance Evaluation on Secondary Sodium Fire Measures in JSFR
Yoshitaka Chikazawa, Atsushi Katoh, Tomohiko Yamamoto, Shigenobu Kubo (*Japan Atomic Energy Agency*), Mikinori Iwasaki, Hiroyuki Hara, Yoshio Shimakawa (*Mitsubishi FBR Systems Inc.*), Hiroshi Sakaba (*Mitsubishi Heavy Industries, Ltd.*)

2:00 pm

14139 Innovative Control Strategy Approach for the Fast Runback Transient of a Sodium-Cooled Small Modular Reactor
Roberto Ponciroli (*Politecnico di Milano*), Stefano Passerini (*Argonne National Laboratory*), Antonio Cammi, Lelio Luzzi (*Politecnico di Milano*), Richard Vilim (*Argonne National Laboratory*)

2:20 pm

14246 An Experimental Study on the Ignition Temperature of Sodium-CO₂ Reaction with an Implication of Safety of a SFR with S-CO₂ Brayton Cycle

Hwa-Young Jung (*Korea Advanced Institute of Science and Technology; Korea Atomic Energy Research Institute*), Yong Hwan Yoo (*Korea Atomic Energy Research Institute*), Jeong Ik Lee (*Korea Advanced Institute of Science and Technology*), Myung-Hwan Wi, Jae-Hyuk Eoh (*Korea Atomic Energy Research Institute*)

5.04-II SEVERE ACCIDENT CORE MELT MANAGEMENT STRATEGY-II

Session Chair: Mirco Grosse (*Karlsruhe Institute of Technology*)

Tryon

1:00 pm

14033 Robust and Resilient Severe Accident Mitigation
Jin Ho Song (*Korea Atomic Energy Research Institute*)

1:20 pm

14080 Improvement of the Debris Spreading Model in SAMPSON Code and Evaluation for the Spreading on Primary Containment Vessel Floor

Masataka Hidaka, Tadashi Fujii, Takeshi Sakai (*Hitachi-GE Nuclear Energy, Ltd.*), Kazuo Nakashima (*Hitachi, Ltd.*)

1:40 pm

14078 Development of Calculation Method for Heat Flux from Molten Debris during In-Vessel Retention

Kazuyoshi Aoki (*Power and Industrial Systems Research and Development Center, Toshiba Corporation*), Hisaki Sato (*Isogo Nuclear Engineering Center, Toshiba Corporation*), Koji Mizuguchi (*Power and Industrial Systems Research and Development Center, Toshiba Corporation*), Kazunari Okonogi (*Isogo Nuclear Engineering Center, Toshiba Corporation*), Hiroaki Nishi (*The Kansai Electric Power Co., Inc.*)

2:00 pm

14142 Experimental Study on the Coolability of Stratified Debris Beds

Sachin Thakre, Weimin Ma (*Royal Institute of Technology (KTH)*)

2:20 pm

14352 Benchmark of MCCI Model in MAAP5.02 against OECD CCI Experiment Series

Quan Zhou, Chan Y. Paik, Paul McMinn (*Fauske & Associates, LLC*)

6.04-I NEW FUELS, NEW FUEL MANAGEMENT, NEW REACTOR CORES CHARACTERIZATION OF SPENT FUELS-I

Session Chair: Markus T. Schlenker (*Karlsruhe Institute of Technology*)

Sharon

1:00 pm

14124 Analysis of the Behavior of BWR Core and Fuel with SiC Cladding and Channel Box

Koji Kitano, Yuichiro Ban, Shungo Sakurai, Fumiaki Inoue, Masayuki Uchihashi, Masaru Ukai (*Toshiba*)

1:20 pm

14137 Study on Intra-Fuel Assembly Reshuffling Options in PWR In-core Fuel Management

Aung Tharn Daing, Myung Hyun Kim (*Kyung Hee University*)

1:40 pm

14145 Increasing the Fuel Utilization in Gen-II BWR with Reduced-Moderation Square Lattice Fuel Assemblies

Markus T. Schlenker, Victor H. Sanchez-Espinoza (*Karlsruhe Institute of Technology*)

7.05-I REACTOR THERMAL HYDRAULICS-I

Session Chair: Zeses Karoutas (*Westinghouse Electric Company*)

Providence Ballroom I

1:00 pm

14149 Numerical Study of Three-Dimensional Steam-Water Flows in Circulation Loops of VVER-type Reactors with Best Estimate Thermal Hydraulic Code BAGIRA

V.E. Kroshilin (*Moscow State University*), A.E. Kroshilin, V.N. Pryakhin, A.V. Smirnov (*All-Russian Research Institute for NPP Operations*)

1:20 pm

14227 Implementation and Validation of COBRA-TF Subcooled/Nucleate Boiling Models

Liping Cao, Yixing Sung, Vefa Kucukboyaci (*Westinghouse Electrical Company*)

1:40 pm

14334 On Post-dryout Heat Transfer in Channels with Flow Obstacles

H. Anglart, I.G. Anghel (*Royal Institute of Technology*)

2:00 pm

14354 Assessment of Subchannel Code ASSERT-PV for Prediction of Critical Heat Flux in CANDU Bundles

Y.F. Rao, Z. Cheng, G.M. Waddington (*Atomic Energy of Canada Limited*)

Tuesday Technical Sessions

2:20 pm

14351 Assessment of Subchannel Code ASSERT-PV for Prediction of Post-Dryout Heat Transfer in CANDU Bundles
Z. Cheng, Y.F. Rao, G.M. Waddington (*Atomic Energy of Canada Limited*)

7.06-I MULTIPHASE GENERAL-I

Session Chair: Olivier Marfaing (*CEA Saclay*)

Providence Ballroom II

1:00 pm

14027 Unsteady Bulk Boiling in a Tall and Slender Water Pool
Eckart Laurien, Josip Kutnjak (*University of Stuttgart*)

1:20 pm

14103 Development of Accurate and Stable Two-Phase Two-Fluid Model Solver

Rabie A. Abu Saleem, Tomasz Kozłowski (*University of Illinois at Urbana-Champaign*)

1:40 pm

14141 Dissolution of a Steam Air Stratification by Natural Convection

Eike Wolfgang Schmidt, Sanjeev Gupta, Martin Freitag, Gerhard Poss (*Becker Technologies GmbH*)

2:00 pm

14154 Assessment of RELAP5/TRACE against VEFITA Thermal-Hydraulic Level Swell Tests

Jun Yang, Detlef Suckow, Horst-Michael Prasser, Furrer Furrer, Terttaliisa Lind (*Paul Scherrer Institut*)

2:20 pm

14155 Scale Resolving Simulation of Dispersed Bubbly Flows
Hassan Badreddine, Yohei Sato, Bojan Niceno (*Paul Scherrer Institute*)

2:40 pm

14115 Numerical Analysis of Molten Droplet Pre-conditioning under High Pressure Pulse

Mingjun Zhong, Meng Lin, Jinbiao Xiong, Yanhua Yang (*Shanghai Jiao Tong University*)

8.02 PERFORMANCE AND SPECIFIC ISSUES ON FUEL CYCLE OPTIONS

Session Chair: Yoshihiko Horikawa (*Nuclear Engineering, Ltd.*)

Trade

1:00 pm

14040 Development and Testing of an Americium/Lanthanide Separation Flowsheet Using Sodium Bismuthate

Jack Law, Bruce Mincher, Troy Garn, Mitchell Greenhalgh, Nicholas Schmitt, Veronica Rutledge (*Idaho National Laboratory*)

1:20 pm

14153 Phenomenological and Experimental Study of the Tritium Distribution in the Effluents Resulting from the Sodium Hydrolysis

Aurelien Chassery (*CEA, DEN, Cadarache, DTN; Université de Toulouse; CNRS*), Helene Lorcet, Joel Godlewski, Karine Liger, Pierre Trabuc, Christian Latge (*CEA, DEN, Cadarache, DTN*), Xavier Joulia (*Université de Toulouse; CNRS*)

1:40 pm

14136 TRU Burning Fast Reactor Cycle Using Uranium-free Metallic Fuel

Kazuo Arie, Mitsuaki Yamaoka, Yasuyuki Moriki (*Toshiba Corporation*), Masatoshi Kawashima (*Toshiba Nuclear Engineering Services Corporation*), Takashi Oomori, Kyoko Ishii, Yasushi Tsuboi (*Toshiba Corporation*)

2:00 pm

14270 Impact of SiC Cladding on Plutonium Burning in a Thorium Fueled PWR

N. Andrews, E. Pilat, K. Shirvan, M.S. Kazimi (*Massachusetts Institute of Technology*)

9.03 CORROSION/CRUD ISSUES

Session Chair: Céline Cabet (*CEA*)

Independence

1:00 pm

14211 High Temperature Steam Oxidation Performance of MAX Phase (Ti₂AlC) coated ZIRLO

Michael Pantano (*Massachusetts Institute of Technology*), Valentina Avincola (*Karlsruhe Institute of Technology*), Pierre Arnauld de Sèze (*INSTN*), Thomas McKrell, Mujid S. Kazimi (*Massachusetts Institute of Technology*)

1:20 pm

14268 Fuel CRUD Redeposition Following On-Line NobleChem™ Application

Carola A. Gregorich (*Formerly with AREVA Inc.*), Mike Pop, Larry S. Lamanna (*AREVA Inc.*)

1:40 pm

14339 Nuclear Fuel Rod Corrosion Model Optimization

Andrew J. Petrarca, Henk C. Schutte, Zeses E. Karoutas

(*Westinghouse Electric Company*)

2:00 pm

14391 Development of SCC Mitigation Method in BWR by TiO₂ Technique

Junichi Takagi, Koji Negishi, Osamu Shibasaki, Masato Okamura, Seiji Yamamoto (*Toshiba Corporation*)

2:20 pm

14300 Influence of Water Chemistry on the Corrosion Behaviour of the CANDU Steam Generator Tubing Material
Dumitra Lucan, Lucian Velciu (*Institute for Nuclear Research*),
Georgiana Lucan (*The Bucharest University of Economic Studies*)

TUESDAY, APRIL 8, 2014 • 3:00 PM - 4:20 PM

2.05 HIGH TEMPERATURE MOLTEN SALT-COOLED REACTORS: EXPERIMENTAL

Session Chair: Ondrej Chvala (*University of Tennessee at Knoxville*)

Harris

3:00 pm

14119 Preventing Fuel Failure for a Beyond Design Basis Accident in a Fluoride Salt Cooled High Temperature Reactor
M.J. Minck, C.W. Forsberg (*Massachusetts Institute of Technology*)

3:20 pm

14190 Experimental Validation of Numerical Methods in a LEBENC Code for Single Phase Natural Circulation Modified for a Fluoride Salt-Cooled High-Temperature Reactor (FHR)
Amy Nicole Drumm, Joel Thomas Hughes, Edward Blandford (*University of New Mexico*)

3:40 pm

14204 A Preliminary Experimental Design Study on the Friction Coefficient of an Ordered Pebble Bed Core of the TMSR-SF1 Reactor
Shixiang Qu, Zhaozhong He, Kun Chen (*Chinese Academy of Sciences*), Xiaojing Liu (*Shanghai Jiaotong University*)

4:00 pm

14285 Fluoride Salt High Temperature Reactor Materials Irradiation Test at the MIT Research Reactor
David M. Carpenter, Michael Ames, Gordon Kohse, Yakov Ostrovsky, Lin-wen Hu (*Massachusetts Institute of Technology*)

3.03-II FAST NEUTRON REACTORS: SAFETY AND ACCIDENT ANALYSIS-II

Session Chair: David Pialla (*CEA*)

Providence Ballroom III

3:00 pm

14034 Evaluation of the Primary Phase of an Unprotected Loss of Flow in a Heterogeneous Sodium-cooled Fast Reactor Core with SIMMER-III
S. Pomerouly (*EDF R&D*), R. Buseine (*EDF R&D/Ecole des Mines de Paris*), D. Lemasson (*EDF R&D*), W. Pfrang (*KIT-INR*)

3:20 pm

14036 Simulation with SAS-SFR of a ULOF Transient on ASTRID-like Core and Analysis of Molten Clad Relocation Dynamics in Heterogeneous Subassemblies with SAS-SFR
David Lemasson (*Electricite de France*), Frederic Bertrand (*CEA, DEN, DER*)

3:40 pm

14050 Study of Power and Cooling Criteria for Selecting SA Groups in the Simulation of Accidental Transients in Sodium Fast Reactors with SAS-SFR Code
Sara Perez-Martin, Alexander Ponomarev, Regina Kruessmann, Werner Pfrang (*Karlsruhe Institute of Technology, Institute for Neutron Physics and Reactor Technology*)

4:00 pm

14205 Preliminary Results from PSA Studies to Support the ASTRID Design Process
F. Curnier, P. Gauthé, P. Quellien, F. Bertrand, M. Marquès (*CEA, DEN, DER, SESI*), H. Gentner, A. Charrier, L. Vinçon, S. Jouve (*AREVA-NP*), M. Balmain, V. Rychkov (*EDF R&D*), Y. Banchieri (*EDF SEPTEN*)

4.03 INSTRUMENTATION, SENSORS AND HUMAN-SYSTEM INTERFACE MAJOR COMPONENT RELIABILITY, REPAIR AND REPLACEMENT

Session Chair: Sama Bilbao y Leon (*Virginia Commonwealth University*)

Trade

3:00 pm

14170 Improvements in the Testing of Instrumentation and Control Systems
Akira Fukumoto, Takeshi Hasegawa (*Toshiba Corporation Power Systems Company Nuclear Systems and Services Division*), Naoto Odagawa, Kenji Komine, Tamotsu Takeda (*Toshiba Corporation Power Systems Company Fuchu Operations*), Pietro G. Porco, Roger A Costantino (*Westinghouse Electric Company LLC*)

3:20 pm

14177 Traversing In-core Probe (TIP) Replacement in BWR Plant
Tadashi Miyazaki, Teruji Tarumi (*Toshiba Corporation Power Systems Company Fuchu Operations*), Hidehiko Yasuta (*Toshiba Corporation Power Systems Company Keihin Product Operations*), Shawn P. Kelly (*Westinghouse*)

3:40 pm

14369 The Improvement and Validation of Setpoint Methodology for Diverse Protection System

Chang Jae Lee (*KEPCO Engineering & Construction Company, Inc.; Chungnam National University*), Min Soo Park, Gyu Cheon Lee (*KEPCO Engineering & Construction Company, Inc.*), Yang Gyun Oh (*KEPCO Engineering & Construction Company, Inc.; Chungnam National University*), Seung Han, Jae Hee Yun, Seung Min Baek (*KEPCO Engineering & Construction Company, Inc.*), Sang Jeong Lee (*Chungnam National University*)

4:00 pm

14373 Advancing On-Line Monitoring Capabilities for Sensor Validation

R.B. Vilim, A. Heifetz (*ANL*)

5.04-III SEVERE ACCIDENT CORE MELT MANAGEMENT STRATEGY-III

Session Chair: Glenn Carlson (*Babcock & Wilcox Company*)

Tryon

3:00 pm

14150 Results of the QUENCH-DEBRIS Test

J. Stuckert, M. Große (*Karlsruhe Institute of Technology*), Y. Onel (*Bundesanstalt für Materialforschung und -prüfung, Mikro-Zfp – Computertomographie*), C. Rössger, M. Steinbrück (*Karlsruhe Institute of Technology*)

3:20 pm

14179 Evaluation Plan for Passive Debris Cooling System and Refractory Layer

Tomohisa Kurita (*Power and Industrial Systems Research and Development Center, Toshiba Corporation*), Isao Sasaki (*Isogo Nuclear Engineering Center, Toshiba Corporation*), Fumiyo Sasaki, Yuya Takahashi (*Power and Industrial Systems Research and Development Center, Toshiba Corporation*), Tadashi Fujii (*Hitachi-GE Nuclear Energy, Ltd.*), Yoshihiro Satou (*Chubu Electric Power Company Co., Inc*)

3:40 pm

14286 Kaiga Atomic Power Station Containment Behaviors during Postulated Severe Accident along With SAG

Sanjeev Kr. Sharma, D.K. Bhartia, Nalini Mohan, P.K. Malhotra (*Nuclear Power Corporation of India Limited*)

4:00 pm

14366 Development of Surrogate Model for Prediction of Corium Debris Agglomeration

Pavel Kudinov (*Royal Institute of Technology (KTH)*), Mikhail Davydov (*Electrogorsk Research and Engineering Center on Nuclear Power Plants Safety (EREC)*)

6.04-II NEW FUELS, NEW FUEL MANAGEMENT, NEW REACTOR CORES CHARACTERIZATION OF SPENT FUELS-II

Session Chair: Mohamed S. El-Genk (*University of New Mexico*)

Sharon

3:00 pm

14308 Non-invasive Imaging of a Reactor Using Cosmic-ray Muons

Naoto Kume, Haruo Miyadera, Yuichiro Ban, Yoshiji Karino (*Toshiba Corporation*), Kohichi Nakayama, Yuji Sano, Tsukasa Sugita, Kenichi Yoshioka (*Toshiba Corporation*), Christopher L. Morris, Jeffery D. Bacon, Konstantin N. Borozdin (*Los Alamos National Laboratory*), John O. Perry, Shinya Mizokami, Yasuyuki Otsuka, Daichi Yamada (*Tokyo Electric Power Company*)

3:20 pm

14232 SLIMM - Neutronics Analysis and Lifetime Estimates

Mohamed S. El-Genk, Luis M. Palomino (*University of New Mexico*)

3:40 pm

14255 Comparison of the Reactivity Evolutions of Heterogeneous and Classical ASTRID Cores during Severe Accidents

Geraud Prulhiere, Frederic Bertrand (*CEA*), Bernard Maliverney (*EDF R&D*)

7.05-II REACTOR THERMAL HYDRAULICS-II

Session Chair: Koroush Shirvan (*Massachusetts Institute of Technology*)

Providence Ballroom I

3:00 pm

14347 Development of Sub-channel Spacer Model and Evaluation of Existing Spacer Models in Single and Two Phase Flow

Fatih Aydogan, Jennifer Cannon (*Center of Advanced Energy Studies, University of Idaho*)

3:20 pm

14157 Two-loop PWR RELAP5 to TRACE Model Conversion and Three Dimensional Vessel Model Development for Coolant Mixing Analysis

Ovidiu-Adrian Berar, Andrej Prošek, Matjaž Leskovar, Borut Mavko (*Jožef Stefan Institute*)

3:40 pm

14357 Prediction of Subchannel Mixing Downstream of Spacer Grids
Z.E. Karoutas, J. Yan, P.F. Joffre, P. Yuan (*Westinghouse Electric Company*)

4:00 pm

14363 TRACG Analysis of the OECD/NEA Oskarshamn-2 BWR Stability Benchmark Based on February 25, 1999 Feedwater Transient Event
H.M. Cowen, S.L. Pfeffer, J. Vedovi, L. Ibarra, D.G. Vreeland, D.C. Miranda (*GE Hitachi Nuclear Energy*)

7.06-II MULTIPHASE GENERAL-II

Session Chair: Eckart Laurien (*University of Stuttgart*)

Providence Ballroom II

3:00 pm

14195 Implementation Methodology of Heat Transfer Enhancement with Forced Convection
Chan Hee Jung (*Seoul National University*), Kune Yull Suh (*Seoul National University; PHILOSOPHIA, Inc*)

3:20 pm

14230 Analysis and Applications of a Generalized Multi-Field Two-Fluid Approach for Treatment of Multi-Scale Interfacial Structures in High Void-Fraction Regimes
Gustavo Adolfo Montoya Zabala (*Helmholtz-Zentrum Dresden-Rossendorf; Massachusetts Institute of Technology*), Dirk Lucas, Eckhard Krepper, Susann Hänsch (*Helmholtz-Zentrum Dresden-Rossendorf*), Emilio Baglietto (*Massachusetts Institute of Technology*)

3:40 pm

14333 Fine-Scale Modelling of Sodium-water Reaction
Olivier Marfaing, Alberto Beccantini (*CEA-Saclay, DEN, DANS, DM2S, STMF, LATF*), Stéphane Gounand (*CEA-Saclay, DEN, DANS, DM2S, STMF, LMSF*), Arnault Monavon (*Institut Jean le Rond d'Alembert, Université Pierre et Marie Curie*), Etienne Studer (*CEA-Saclay, DEN, DANS, DM2S, STMF, LATF*)

4:00 pm

14383 Development and Application of a UTSG Thermal-hydraulic Analysis Code
Tenglong Cong, Wenxi Tian, Guanghui Su, Suizheng Qiu (*Xi'an Jiaotong University*)

TUESDAY, APRIL 8, 2014 • 4:20 PM - 6:00 PM

PLENARY 4: ACCELERATING NUCLEAR TECHNOLOGY TRANSFER FROM CONCEPT TO PRACTICE

Session Co-Chairs: Andrew Kadak (Consultant), Goon-Cherl Park (*KEPCO International Nuclear Graduate School (KINGS)*)

Grand Ballroom C

The pace of advances in technology has quickened in the past few decades, but nuclear power plants seem to remain wedded to technology perfected in the last half of the last century. Advances in materials, in instrumentation, in digital information processing are examples of fields that been slower in being adopted in the nuclear energy field than in other industries. This session will explore ways by which the pace of advanced technology implementation in power plants can be accelerated, to enhance safety and economics of nuclear energy. Discussion will include steps to improve the regulatory framework and certainty and risk of financing of new technology by first movers.

Speakers:

- Richard Lester (*Head, Department of Nucl. Sci. Eng., Massachusetts Institute of Technology*)
- Finis Southworth (*Chief Technology Officer, AREVA*)
- George Apostolakis (*Member, U.S. NRC*)
- Bernard Salha (*Executive VP for R&D, EDF*)



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Wednesday Technical Sessions

WEDNESDAY, APRIL 9, 2014 • 8:00 AM - 9:30 AM

PLENARY 5: OPERATING PLANT ISSUES IN A POST-FUKUSHIMA WORLD

Session Co-Chairs: Steve Nesbit (*Duke Energy Corporation*), Atam Rao (*Consultant*)

Grand Ballroom C

With over 400 operating plants, there is a huge investment by the global community in this electricity generation source. The future maintenance and enhancement of these major resources will depend on lessons learned, experiences shared and anticipated problems avoided. Operators and industry leaders from around the world will share their visions on what the past 50 years have taught us to best handle the next 50 years.

Speakers:

- JK Park (*Director Nuclear Power, IAEA*)
- M Dominguez (*Spanish Industrial Forum/EMPRESARIOS AGRUPADOS*)
- Chang-Ho Yang (*Vice President, KHNP*)
- Donald Hoffman (*President, ANS and CEO, EXCEL SERVICES CORPORATION*)

WEDNESDAY, APRIL 9, 2014 • 10:00 AM - 12:00 PM

1.03 ADVANCES IN BOILING WATER REACTORS

Session Chair: MD Alamgir (*GE-Hitachi Nuclear Energy*)

Trade

10:00 am

14148 Technical Lessons Learned from the Fukushima Accident and Water-Cooled Reactor Technologies to Cope with Fukushima-type Accidents

Katsumi Yamada, Mark J. Harper (*International Atomic Energy Agency*)

10:20 am

14403 Analysis of HUSTLE Test Data and ESBWR Application

Wayne Marquino (*GEH*), Hideo Soneda (*HGNE*), MD Alamgir, Antonio Barrett, Jake Yang, Jose Caro, Michael Naramore, Levon Keusseyan (*GEH*), Mikolaj Podgorski (*Wroclaw University of Technology*)

10:40 am

14101 Soil Structure Interaction Analysis of a Boiling Water Reactor Building

B.J. Ratnagar (*All State Technical Services, A KBR Company*), B. Torkian (*Southern Company*), P. Chandran (*All State Technical Services, A KBR Company*), S. Lu (*Simpson Gumpertz and Heger*)

11:00 am

14404 ESBWR – Robust Design for Power Maneuvering and Load Following Effectiveness

MD Alamgir, Wayne Marquino, Ira Poppel, Jake Yang, Ken Karcher (*GE-Hitachi Nuclear Energy*)

11:20 am

14259 Multidimensional Mechanistic Modeling of Fluid Flow and Heat around Spacer Grids

B.M. Waite, D.R. Shaver, M.Z. Podowski (*Rensselaer Polytechnic Institute*)

11:40 am

14044 Transient Analysis of an Autarkic Heat Removal System

J. Venker (*RWE Technology GmbH; University of Stuttgart, Institute for Nuclear Technology and Energy Systems (IKE)*), D. von Lavante (*TÜV Rheinland*), M. Buck (*University of Stuttgart, Institute for Nuclear Technology and Energy Systems (IKE)*), D. Gitzel (*RWE Technology GmbH*), J. Starflinger (*University of Stuttgart, Institute for Nuclear Technology and Energy Systems (IKE)*)

2.06 HIGH TEMPERATURE MOLTEN SALT-COOLED REACTORS: SIMULATION

Session Chairs: Brian Mays (*AREVA*), David Carpenter (*Massachusetts Institute of Technology*)

Harris

10:00 am

14166 Neutronic Design Features of a Transportable Fluoride-salt Cooled High Temperature Reactor

Kaichao Sun, Lin-wen Hu (*Massachusetts Institute of Technology*)

10:20 am

14187 MSR Lattice Optimization for Economic Salts with LEU Fuel

Ondrej Chvala (*University of Tennessee*)

10:40 am

14212 Core Design Evolution of a Fluoride Salt Cooled High Temperature Test Reactor

Joshua Richard, Benoit Forget, Charles Forsberg (*Massachusetts Institute of Technology*)

11:00 am

14231 Design of the Mark-I Pebble-Bed, Fluoride-Salt-Cooled, High-Temperature Reactor Commercial Power Plant

David L. Krumwiede, Charalampos Andreades, Jae Keun Choi, Anselmo T. Cisneros, Lakshana R. Huddar, Kathryn D. Huff, Michael R. Laufer, Madicken Munk, Raluca O. Scarlat, Jeffrey Seifried, Nicolas Zweibaum, Ehud Greenspan, Per F. Peterson (*University of California, Berkeley*)

11:20 am

14290 CFD Analysis for Asymmetric Power Generation in a Prismatic Fuel Block of Fluoride-salt-cooled High-temperature Test Reactor

Wen-chi Cheng (*Massachusetts Institute of Technology; National Tsing Hua University*), Kaichao Sun, Lin-wen Hu (*Massachusetts Institute of Technology*), Ching-Chang Chieng (*National Tsing Hua University; City University of Hong Kong*)

11:40 am

14396 Preliminary Evaluation of the Fuel Assembly At-Power Removal Transient of the Advanced High Temperature Reactor

Pietro Avigni, Bojan Petrovic (*Georgia Institute of Technology*)

3.07 DECISION ANALYSIS TO SUPPORT DEPLOYMENT OF ADVANCED NUCLEAR TECHNOLOGIES (INVITED)

Session Chair: Andrew Sowder (EPRI)

Providence Ballroom III

10:00 am

14282 A Decision Analysis Tool to Support Planning and Decision-Making for Sustainable, Deployment-Oriented Research, Development and Demonstration (RD&D) of Advanced Nuclear Energy Technologies

Steven Krahn, Timothy Ault, Andrea Resch Gardiner, Allen Croff, James Clarke (*Vanderbilt University*), Albert Machiels, Andrew Sowder (*Electric Power Research Institute*)

10:20 am

14303 Nuclear Fuel Cycle Options Evaluation to Inform R&D Planning

Roald Wigeland (*Idaho National Laboratory*), Temitope Taiwo (*Argonne National Laboratory*), Michael Todosow, Hans Ludewig (*Brookhaven National Laboratory*), William Halsey (*Lawrence Livermore National Laboratory (ret.)*), Jess Gehin, Robert Jubin (*Oak Ridge National Laboratory*), James Buelt (*Pacific Northwest National Laboratory (ret.)*), Siegfried Stockinger (*U.S. Department of Energy, Office of Nuclear Energy (NE-53)*), Karen Jenni (*Insight Decisions LLC*), Brian Oakley (*Scully Capital*)

10:40 am

14361 Moving Beyond Just R&D for U.S. Fast Reactor Deployment While Nuclear Still Matters: An Industry Perspective

Andrew Sowder (*Electric Power Research Institute*), Everett Redmond (*Nuclear Energy Institute*), Paul Murray (*AREVA Federal Services*), Michael Anness (*Westinghouse Electric Company*), Stephen Atherton (*GE Hitachi Nuclear Energy*), Steve Nesbit (*Duke Energy*), Brian Gustems (*PSEG Nuclear, LLC*)

11:00 am

14370 Progress and Plans for DOE's Office of Fuel Cycle Research and Development

Andrew Richard Griffith (*U.S. DOE*)

11:20 am

14382 Generic Feasibility Assessment: A Methodology for Assessing Nuclear Energy Technologies

Gregg Butler, Grace McGlynn (*University of Manchester*), Kevin Hesketh (*UK National Nuclear Laboratory*)

11:40 am

14399 The Nuclear Fuel Cycle Options Catalog

Laura Price (*Sandia National Laboratory*)

5.02 RADIOLOGICAL CONSEQUENCES

Session Chair: Kevin Knebel (JRC - ITE)

Tryon

10:00 am

14113 Atmospheric Stability Classification of Dispersion Factor for Radiological Analysis at YONGGWANG Site in KOREA

Seung Chan Lee, Duk Joo Yoon, Dong Soo Song (*Korea Hydro Nuclear Power Co., Central Research Institute*)

10:20 am

14152 A Novel Guided Ultrasonic Wave Sensor for Quantitative Gas Accumulation Sensing in Nuclear Coolant Pipes

Zhenhua Tian, Lingyu Yu (*University of South Carolina*)

10:40 am

14202 Experimental Studies on the Revaporisation Behaviour and Aerosol Formation of Caesium under Severe Accident Conditions

K. Knebel (*European Commission - Joint Research Centre - Institute for Transuranium Elements; University of Eastern Finland*), P.D.W. Bottomley, V.V. Rondinella (*European Commission - Joint Research Centre - Institute for Transuranium Elements*), A. Auvinen (*Technical Research Centre of Finland*), J. Jokiniemi (*Technical Research Centre of Finland; University of Eastern Finland*)

11:00 am

14329 Sensitivity and Uncertainty Analysis for Prediction of Particulate Debris Bed Self-leveling in Prototypic SA Conditions

Simone Basso, Alexander Konovalenko, Pavel Kudinov (*Royal Institute of Technology (KTH)*)

Wednesday Technical Sessions

11:20 am

14330 Development of Scalable Empirical Closures for Self-leveling of Particulate Debris Bed
S. Basso, A. Konovalenko, P. Kudinov (*Royal Institute of Technology (KTH)*)

7.07 LOCA

Session Chair: Stephan Leyer (*Deggendorf Institute of Technology*)

Providence Ballroom II

10:00 am

14015 Passive Integral LOCA Accident Testing at Karlstein Test Facility
Robert Drescher, Thomas Wagner (*AREVA GmbH*), Horst-Michael Prasser (*ETH (Swiss Federal Institute of Technology) & Paul Scherrer Institute*), Stephan Leyer (*THD University of Applied Sciences*)

10:20 am

14022 Large Break LOCA Analysis for KAPP-3&4 Using Computer Code RELAP/MOD.3.2
Kumar P. Krishna, S. Hajela, H.P. Rammohan, P.K. Malhotra (*Nuclear Power Corporation of India Ltd*)

10:40 am

14088 Analysis on the Safety Verification Tests of the ECCS Driven by the Electrically 4 Trains during LBLOCA
Yusun Park, Hyun-sik Park, Kyoung-ho Kang, Nam-hyun Choi, Kyoung-ho Min, Ki-yong Choi (*Korea Atomic Energy Research Institute*)

11:00 am

14109 ATLAS MSLB Accident Analysis Using the SPACE Code
Bum-Soo Youn (*KHNP Central Research Institute*)

11:20 am

14140 An SBLOCA Test of Safety Injection Line Break with the SMART-ITL Facility and its MARS-KS Code Simulation
Hwang Bae, Dong Eok Kim, Sung Uk Ryu, Yong-Cheol Shin, Yung-Joo Ko, Sung-Jae Yi, Hyun-Sik Park (*Korea Atomic Energy Research Institute*), Yeon-Sik Cho, Jae-Seung Suh (*System Engineering and Technology*)

7.08-I ADVANCED CONCEPTS-I

Session Chair: Brett Rampal (*Westinghouse Electric Company*)

Providence Ballroom I

10:00 am

14074 Safety Analysis of Solid Core-Sector Compact Reactor (SC-SCoRe)
Timothy M. Schriener, Mohamed S. El-Genk (*University of New Mexico*)

10:20 am

14082 Conjugate Heat Transfer Study of a Wire Spacer SFR Fuel Assembly with the thermal code SYRTHES and the CFD code Code_Saturne
C. Peniguel, I. Rupp (*EDF*), D. Hermouet (*BERTIN*)

10:40 am

14125 Measurement of Critical Heat Flux for SiC-coated Stainless Steel Plate and α -SiC Tube with Short Heated Length under Atmospheric Condition
Dong Hoon Kam (*Korea Advanced Institute of Science and Technology*), Jong Hyuk Lee (*KAERI*), Taeseung Lee, Yong Hoon Jeong (*Korea Advanced Institute of Science and Technology*)

11:00 am

14165 Multidimensional CFD Modeling of a Liquid Salt Pebble Bed Heat Transfer Loop
R.B. Cunningham, A.E. Ruggles (*University of Tennessee*), G.L. Yoder (*Oak Ridge National Laboratory*)

11:20 am

14316 Preliminary Thermal-hydraulic Feasibility Evaluation of the Integral Inherently Safe LWR (I2S-LWR) High Power Density Core
Paolo Ferroni (*Westinghouse Electric Company*), Bojan Petrovic, Glenn Sjoden, Michael Chin (*Georgia Institute of Technology*)

11:40 am

14332 Examination of Liquid Fluoride Salt Heat Transfer
Graydon Lee Yoder (*Oak Ridge National Laboratory*)

9.02 ADVANCED REACTOR MATERIALS

Session Chair: Juri Stuckert (*Karlsruhe Institute of Technology*)

Independence

10:00 am

14007 Development, Characterization and Testing of Materials of Relevance to Nuclear Energy Sector Using Neutron Beams – A Progress Report of the IAEA Coordinated Research Project
M. Grosse (*Karlsruhe Institute of Technology*), A. Balagurov (*Joint Institute for Nuclear Research*), V. Inozemtsev (*IAEA*), E. Lehmann (*Paul Scherrer Institut*), P. Mikula (*Nuclear Physics Institute ASCR*), D. Ridikas (*IAEA*), G. Török (*Central Research Institute for Physics*)

10:20 am

14111 Creep Rupture Behaviour of Cr-Mo Ferritic Steels under Multiaxial State of Stress
K. Laha, Sunil Goyal, M.D. Mathew, T. Jayakumar (*Indira Gandhi Centre for Atomic Research*)

10:40 am

14117 Status of the French R&D on ASTRID Core Materials
Marion Le Flem, Pierre Gavoille, Arnaud Courcelle, Patrick Olier (*CEA*), Martine Blat-Yrieix (*EDF*), Pascal Diano (*AREVA NP*)

11:00 am

14245 Some Recent Results on Stainless Steel 316L(N) for a 60 Years Design Life as ASTRID Structural Material
Celine Cabet, France Dalle, Maxime Sauzay, Yiting Cui (*CEA, DEN/DANS*), Laurent Forest (*CEA, DEN/DANS/DM2S/SEMT*), Jean-Louis Courouau (*CEA, DEN/DANS/DCEA*), Sophie Dubiez-Le Goff, Thorsten Marlaud (*AREVA NP*), Martine Blat-Yrieix (*EDF R&D MMC*)

11:20 am

14289 Influence of Milling Duration and Aluminum Pollution on the Microstructure of Oxide Dispersion Strengthened
M. Loyer-Prost (*CEA-DEN, Service de Recherches de Métallurgie Physique*), C. Hatzoglou (*Université et INSA de Rouen*), B. Radiguet (*Université et INSA de Rouen*), G. Vaux (*CEA-DEN, Service de Métallurgiques Appliquées*), D. Nunes, D. Sornin, N. Lochet, P.F. Giroux, F. Frossard, Y. Le Bouar (*Laboratoire d'Etudes des Microstructures*), S. Poissonnet, P. Bonnallie (*CEA-DEN, Service de Recherches de Métallurgie Physique*), P. Pareige (*Université et INSA de Rouen*), L. Chaffron (*CEA-DEN, Service de Métallurgiques Appliquées*), F. Legendre (*CEA-DEN, Service de Recherches de Métallurgie Physique*)

10.02 ADVANCED NUCLEAR REACTOR CONCEPTS IN A POST-FUKUSHIMA WORLD

Session Chair: Richard Vilim (*ANL*)

Sharon

10:00 am

14065 Small Modular Nuclear Reactor (SMR) Research and Development (R&D) and Deployment in China
Danrong Song, Biao Quan (*Nuclear Power Institute of China*)

10:20 am

14070 Assessing Synergistic Transition Scenarios to Sustainable Nuclear Energy System
Galina Fesenko, Vladimir Kuznetsov (*International Atomic Energy Agency*), Vladimir Kagramanian, Vladimir Usanov (*Institute of Physics and Power Engineering*)

10:40 am

14331 Flexblue®: A Subsea and Transportable Small Modular Power Plant
Geoffrey Haratyk, Catherine Lecomte, François-Xavier Briffod (*DCNS*)

11:00 am

14349 Model-Driven Development Safety-Critical Project in Nuclear Energy
Paul LeRoy Fechtelkötter, Ben Amaba (*Energy and Infrastructure Systems, IBM*)

11:20 am

14381 Nuclear Power as a Basis for Future Electrical-Energy Generation in the World
Igor Pioro (*University of Ontario Institute of Technology*)

11:40 am

14397 Nuclear Energy in Emerging Nuclear States
V. Nkong-Njock, A. Gritsevskiy (*IAEA*)

WEDNESDAY, APRIL 9, 2014 • 1:00 PM - 2:40 PM

1.04-I ADVANCES IN PRESSURIZED WATER REACTORS-I

Session Chair: John Sulley (*Rolls-Royce*)

Trade

1:00 pm

14053 Mitigating Grid-induced Transients in an Existing Nuclear Power Plant: A Case Study
Mikko Lemmetty, Ismo Sandback (*Teollisuuden Voima Oyj*)

1:20 pm

14097 Neutronics Analysis of Improved Accident Tolerance LWR Fuel by Modifying Zircaloy Cladding of Fuel Pins
Xu Wu, Tomasz Kozłowski, Brent J. Heuser (*University of Illinois Urbana-Champaign*)

1:40 pm

14102 Structural Model Comparison for Pressurized Water Reactor Containment Building
P. Chandran (*All State Technical Services, KBR Company*), B. Torkian (*Southern Company*), C. Morrow (*E-Group*), B. Ratnagar (*All State Technical Services, KBR Company*), S. Lu (*Simpson Gumpertz and Heger*)

2:00 pm

14206 Development of a Nuclear Power Plant Simulator for Design and Verification of Instrumentation and Control Systems
YanKai Li, Meng Lin, YanHua Yang (*Shanghai Jiao Tong University*)

Wednesday Technical Sessions

3.04-I FAST NEUTRON REACTORS: BALANCE OF PLANT AND AUXILIARY SYSTEMS-I

Session Chairs: Hideaki Heki (*Toshiba Corporation*), Didier De Bruyn (*SCK•CEN*)

Providence Ballroom III

1:00 pm

14069 Sodium Purification Systems: Requirements, Tools and Qualification Strategies

Christian Latge, Thierry Gilardi, Nayiri Khatcherssian (*CEA Nuclear Energy Division, Cadarache*), Xavier Joulia, Xuan Meyer (*ENSIACET INP Toulouse*), Jean-Michel Jean-Romain, Faegheh Haj-Bolouri (*ALSTOM-Power Brown Boveri Strasse*)

1:20 pm

14093 Conceptual Designs of Complementary Safety Devices for ASTRID: From Selection Method to Selected Options

I. Guénot-Delahaie, D. Lorenzo, X. Jeanningros, M.-S. Chenaud, J.-C. Garnier, B. Valentin, J.-M. Esclaine, G. Avakian (*French Alternative Energies and Atomic Energy Commission (CEA)*)

1:40 pm

14128 Reliability Improvement of JSFR Emergency Power Supply System

Kunihiko Nabeshima, Kosuke Aizawa, Yoshitaka Chikazawa (*Japan Atomic Energy Agency*), Daisuke Satoh, Risako Ikari (*Mitsubishi FBR Systems, Inc*)

2:00 pm

14129 Progress of Design Study on Fuel Handling and Storage System in JSFR against Design Extension Conditions

Masahiko Ohtaka, Atsushi Katoh, Yoshitaka Chikazawa (*Japan Atomic Energy Agency*), Masayuki Uzawa, Akihiro Ide, Fumiaki Kaneko, Hiroyuki Hara (*Mitsubishi FBR Systems Inc.*)

5.01-I TRANSIENT AND ACCIDENT PERFORMANCE-I

Session Chair: Shih-Ping Kao (*Zachry Nuclear Engineering*)

Tryon

1:00 pm

14008 Parameters Influencing the Hydrogen Concentration and Distribution in Cladding Tubes after LOCA: Results of Bundle-Scale Experiments and Modeling

M. Grosse, J. Stuckert, M. Steinbrueck (*Karlsruhe Institute of Technology*)

1:20 pm

14018 Classification of Loss of Coolant Accident for Advanced Boiling Water Reactor

Bo-Han Lee, Hwai-Pwu Chou (*Institute of Nuclear Engineering and Science, National Tsing Hua University*)

1:40 pm

14021 Preliminary Evaluation of Re-Criticality Potential for ESFR Core and Conditions for Its Elimination

Franco Polidoro (*Ricerca sul Sistema Energetico*), Michael Flad, Werner Maschek (*Karlsruhe Institute of Technology*)

2:00 pm

14105 Particle Based Modeling of Fuel Plate Melting under Coolant Channel Flow Blockage

Hiraku Nakamura (*University of Tennessee*)

2:20 pm

14158 Verification of Core Exit Temperature for Adequate SAMG Entry Condition of OPR1000

Seungwon Seo, Seongnyeon Lee (*Hanyang University*), Hwan-Yeol Kim, Kwang Soon Ha (*Korea Atomic Energy Research Institute*), Gyooodong Jeun, Sung Joong Kim (*Hanyang University*)

6.02 CORE CALCULATION

Session Chair: Han Gyu Joo (*Seoul National University*)

Sharon

1:00 pm

14025 Generation and Application of Interface Discontinuity Factors in the Reactor Simulator DYN3D

Miriam Daeubler, Javier Jimenez, Victor Sanchez (*Karlsruhe Institute of Technology*)

1:20 pm

14186 Improvement and Assessment of Stiffness Confinement Method with Pseudo Absorption

Beom Woo Park, Han Gyu Joo (*Seoul National University*)

1:40 pm

14188 Control Rod Decussing Treatment based on Local 3-D CMFD Calculation for Direct Whole Core Transport Solvers

Yeon Sang Jung, Young Suk Ban, Han Gyu Joo (*Seoul National University*)

2:00 pm

14288 Sensitivity and Uncertainty Analysis of UO₂ and MOX Fueled PWR Cells by Taking Account of Resonance Self-Shielding Effect

Toshikazu Takeda (*University of Fukui*), Basma Foad (*University of Fukui; Egypt Nuclear and Radiological Regulatory Authority*)

2:20 pm

14344 Fuel Performance Assessment when Modeling Gamma-Ray Heating During Steady-State and Transient Scenarios

Ian E. Porter, Travis W. Knight (*University of South Carolina*)

2:40 pm

14055 Latest Development of Core Simulator in COSINE Code Package
Yixue Chen, Xiaoyu Hu, Su Wang, Guoping Quan, Changhui Wang, Zhanquan Liu, Hui Yu (*State Nuclear Power Software Development Center*)

7.08-II ADVANCED CONCEPTS-II

Session Chair: Brett Rampal (*Westinghouse Electric Company*)

Providence Ballroom I

1:00 pm

14214 Implementation of Liquid Salt Working Fluids into TRACE
Joshua Richard (*Massachusetts Institute of Technology*), Dean Wang, Graydon Yoder, Juan Carbajo, David Williams (*Oak Ridge National Laboratory*), Benoit Forget, Charles Forsberg (*Massachusetts Institute of Technology*)

1:20 pm

14250 RELAP5 Assessment on CIRCE Decay Heat Removal Experiments
Giacomino Bandini, Massimiliano Polidori, Paride Meloni, Mariano Tarantino, Ivan Di Piazza (*ENEA*)

1:40 pm

14273 Thermal Analysis of UO₂-BeO Fuel during LOCA using FRAPTRAN and RELAP5
Shripad T. Revankar (*Purdue University; POSTECH*), Deepthi Chandramouli (*Purdue University*)

2:00 pm

14323 Development of TAPINS-M Code for Thermal-Hydrodynamics of Maine Reactor under Rolling Motion
Jin-Seok Hwang, Hyoung-Kyu Cho, Goon Cheri Park (*Seoul National University*)

2:20 pm

14378 Coupled System and CFD Code Simulation of Thermal Stratification in SFR Protected Loss-Of-Flow Transients
R. Hu, J.W. Thomas, E. Munkhzul, T.H. Fanning (*Argonne National Laboratory*)

7.09-II ADVANCED FRAMEWORK/UQ-II

Session Chair: Haihua Zhao (*Idaho National Laboratory*)

Providence Ballroom II

1:00 pm

14189 Validation of 1-D Code Developed to Analyze Passive Decay Heat Removal System Using Thermosyphon for Low Temperature and Low Pressure Pool-type LWR
Jangsik Moon, Byung-Hyun You, Yong Hun Jung, Yong Hoon Jeong (*Korea Advanced Institute of Science and Technology*)

1:20 pm

14237 Estimation of Physical Model Uncertainties Using Surrogate for Thermal Hydraulic System
Jaeseok Heo, Seung-Wook Lee, Kyung Doo Kim (*Korea Atomic Energy Research Institute*)

1:40 pm

14291 In-Situ Processing and Visualization for Direct Numerical Simulation of Coolant Flow through Mixing Vanes
Hong Yi (*Renaissance Computing Institute*), Michel Rasquin (*Argonne National Laboratory; University of Colorado at Boulder*), Anand Mishra, Jun Fang, Igor A. Bolotnov (*North Carolina State University*)

8.01 GENERAL FUEL CYCLE ANALYSIS

Session Chair: T. K. Kim (*ANL*)

Harris

1:00 pm

14010 Spent Nuclear Fuel Management for Salt-Cooled Reactors: Storage, Safeguards, and Repository Disposal
Charles Forsberg (*Massachusetts Institute of Technology*), Per Peterson (*University of California*)

1:20 pm

14094 Nuclear Fuel Cycle Technology Readiness Metrics Level Determination: The Results of a Focused Expert Review
Steven Krahn (*Vanderbilt University*), Andrew Sowder (*Electric Power Research Institute*), Albert Machiels, Robert Jubin (*Oak Ridge National Laboratory*), Allen Croff, Timothy Ault (*Vanderbilt University*)

1:40 pm

14104 The Environmental Health and Safety Risks of the Transition from the Present U.S. Once-through to a Modified Open Nuclear Fuel Cycle
Bethany L. Smith, Steven L. Krahn, James H. Clarke, Kevin G. Brown (*Vanderbilt University*), Albert Machiels, Andrew Sowder (*Electric Power Research Institute*)

2:00 pm

14120 Highlights and Summary Observations from the Global 2013 Thorium Fuel Cycle Track
Steven Lee Krahn, Allen Croff, Timothy Ault (*Vanderbilt University*), Fausto Franceschini (*Westinghouse Electric Corporation*)

Wednesday Technical Sessions

9.07 MECHANICAL BEHAVIOR FUEL/CLAD, EXPERIMENT AND MODELING

Session Chair: Xinyu Huang (*University of South Carolina*)

Independence

1:00 pm

14298 Assessment of BISON Fuel Performance Code and Its Application to Advanced Fuels
Koroush Shirvan (*Massachusetts Institute of Technology*)

1:20 pm

14343 Model of U3Si2 Fuel System Using BISON Fuel Code
K.E. Metzger, T.W. Knight (*University of South Carolina*), R.L. Williamson (*Idaho National Laboratory*)

1:40 pm

14348 Mechanical Behavior of SiCf/SiC CMC Tubes Relative to Nuclear Fuel Cladding
S.C. Johnson (*Westinghouse Electric Company LLC*), H. Patts (*Westmoreland Mechanical Testing & Research, Inc.*), D.E. Schuler (*Iowa State University*)

2:00 pm

14358 Key Structural Challenges of SiC as Fuel Cladding for LWRs
Youho Lee, Thomas J. McKrell, Mujid S. Kazimi (*Massachusetts Institute of Technology*)

2:20 pm

14374 AE Crack Initiation and Propagation Detection in High Pressure Burst Testing of SiCf-SiCm Composite Nuclear Fuel Cladding
Luis H. Alva-Solari, Xinyu Huang, Xiaoming Chen, Colt Everatt (*University of South Carolina*), George M. Jacobsen, Christina A. Back (*General Atomics*)

WEDNESDAY, APRIL 9, 2014 • 3:00 PM - 4:20 PM

1.04-II ADVANCES IN PRESSURIZED WATER REACTORS-II

Session Chair: John Sulley (*Rolls-Royce*)

Trade

3:00 pm

14256 Simulation of In-Vessel Retention Device Heat Removal Capability of AP1000 Severe Core Melt Accident
Fei Jan Tsai, Min Lee (*National Tsing Hua University*), Hsiang Chun Liu (*Taiwan Power Company*)

3:20 pm

14241 The Effects of SiC Cladding Thickness on Advanced PWR Fuel Rod Performance
Yanin Sukjai, Koroush Shirvan, Edward Pilat, Mujid S. Kazimi (*Massachusetts Institute of Technology*)

3:40 pm

14287 A Decay Heat Removal System for a PWR Based on Air Cooling
Hiroyasu Mochizuki (*University of Fukui*)

4:00 pm

14385 Design AES-2006 - Concept Solutions
Andrey Anokhin, Ivan Doshchuk (*Saint Petersburg Research and Design Institute ATOMENERGOPROEKT (SPbAEP), Branch of JSC Leading Institute VNIPIET*)

3.04-II FAST NEUTRON REACTORS: BALANCE OF PLANT AND AUXILIARY SYSTEMS-II

Session Chairs: Hideaki Heki (*Toshiba Corporation*), Sandra Pomerouly (*EDF*)

Providence Ballroom III

3:00 pm

14132 Design Approach for Decay Heat Removal Systems Based on the Safety Design Criteria for Gen-IV Sodium-cooled Fast Reactor
Atsushi Katoh, Shigenobu Kubo, Yoshitaka Chikazawa, Hiroki Hayafune (*Japan Atomic Energy Agency*), Shinobu Yokoi, Shuhei Nakata, Akihiro Tani, Yoshio Shimakawa (*Mitsubishi FBR Systems, Inc.*)

3:20 pm

14134 Performance Confirmation of Monju Failed Fuel Detection and Location System
Yuko Morohashi, Satoshi Suzuki (*Japan Atomic Energy Agency*)

3:40 pm

14185 The Assembly Reactivity Control (ARC) System
Staffan Qvist (*Uppsala University; University of California Berkeley*), Ehud Greenspan (*University of California Berkeley*)

4:00 pm

14340 Structural Assessment of Intermediate Printed Circuit Heat Exchanger for Supercritical-CO2 Cycle attached to Sodium Fast Reactor
Youho Lee, Jeong Ik Lee (*Korea Advanced Institute of Science and Technology (KAIST)*)

4.02 SIMULATION, COMPUTATIONAL METHODS, PERFORMANCE AND RELIABILITY IMPROVEMENTS

Session Chair: Hiroaki Ohira (*Japan Atomic Energy Agency*)

Sharon

3:00 pm

14217 Turbine Bypass Piping Supports Failure and Root Cause Analyses Using CFD and Non-linear FEM

Stefan Nicolici, Radu Mihail Bilegan, Alexandru Gheorghita (*Subsidiary of Technology and Engineering for Nuclear Projects (CITON)*)

3:20 pm

14218 Simulation for New Builds. A Challenging but Essential Tool. Application to Atucha II NPP

Pablo Rey (*Tecnatom*)

3:40 pm

14243 Interactive Simulation and Visualization of Under-Sodium Viewing

Young Soo Park, Zachary T. Gima, Pawel Dworzanski, Xiaorui Zhao, Leighton Roberts, Richard B. Vilim (*Argonne National Laboratory*)

4:00 pm

14359 Flow Characteristics Analysis of Control Valve for Turbine System

Palash K. Bhowmik, Jubair A. Shamim (*Seoul National University*), Kune Y. Suh (*Seoul National University; PHILOSOPHIA*)

5.01-II TRANSIENT AND ACCIDENT PERFORMANCE-II

Session Chair: Shih-Ping Kao (*Zachry Nuclear Engineering*)

Tryon

3:00 pm

14016 Simulation of Sodium Aerosol Behaviour with CONTAIN-LMR Code

S. Gordeev, W. Hering, M. Schikorr, R. Stieglitz (*Karlsruhe Institute of Technology*)

3:20 pm

14035 Simulation of PWR's Passive Containment Cooling with an Advanced Water Film Model

Xi Huang, Xu Cheng (*Karlsruhe Institute of Technology*)

3:40 pm

14197 US-ABWR Design Capability During Extended Loss of AC Power Events

Kenji Arai (*Toshiba Corporation Power Systems Company*), Steven Thomas, Bill Mookhoek (*Nuclear Innovation North America*), Jim

Powers (*Toshiba America Nuclear Energy Corporation*), Warren Alford (*Westinghouse Electric Company*)

4:00 pm

14265 A Probabilistic Safety Assessment of Ultimate Response Guidelines of Chinshan Nuclear Power Plant

Hong-En Lai, Min Lee (*National Tsing Hua University*), Chun-Chang Chao (*Institute of Nuclear Energy Research, Atomic Energy Council*)

7.02-I CFD FOR LARGE SYSTEMS-I

Session Chair: Rui Hu (*Argonne National Laboratory*)

Harris

3:00 pm

14032 A Coupled RELAP5-3D/STAR-CCM+ Simulation for the Calculation of Friction Factor in Pipes

Antonello Palazzi, Michael J. Bluck (*Imperial College London*), Simon Lo (*CD-adapco*)

3:20 pm

14046 Numerical Simulation of Flow with Volume Condensation in Presence of Non-condensable Gases within a PWR Containment

Jing Zhang, Eckart Laurien (*University of Stuttgart, Institute of Nuclear Technology and Energy Systems (IKE)*)

3:40 pm

14051 CFD Analysis on the Natural Circulation Cooling of a Spent Fuel Pool

Stephan Kelm, Wilfried Jahn (*Forschungszentrum Juelich GmbH*), Hans-Josef Allelein (*Forschungszentrum Juelich GmbH / RWTH Aachen University*)

4:00 pm

14168 CFD Simulations of Thermal Stratification in a Large Enclosure

Lane B. Carasik (*Texas A&M University*), Arthur E. Ruggles (*University of Tennessee*), Stuart A. Walker (*Altair Engineering*)

7.03 TWO-PHASE CFD

Session Chairs: Emilio Baglietto (*Massachusetts Institute of Technology*), Zeses Karoutas (*Westinghouse Electric Company*)

Providence Ballroom I

3:00 pm

14023 A GEN-II Subcooled Boiling Model for CASL VERA Multiphase Simulations

Lindsey Gilman, Emilio Baglietto (*Massachusetts Institute of Technology*)

Wednesday Technical Sessions

3:20 pm

14081 The Hydrodynamics of Two-Phase Flow in a Tube Bundle and a Bare Channel

T. Betschart, D. Suckow, V. Brankov, H.-M. Prasser (*Paul Scherrer Institute; Eidgenössische Technische Hochschule (ETH)*)

3:40 pm

14087 Three-Dimensional Simulation of Natural Circulation in a Passive Condensate Cooling Tank of a Passive Feedwater Auxiliary System using the CUPID Code

Seung-Jun Lee (*KAERI*), Hyoung-Kyu Cho (*Seoul National University*), Ik Kyu Park, Han-Young Yoon (*KAERI*)

4:00 pm

14159 LES VOF Simulations of Annular Flow in a Double Subchannel with Swirl Type Spacer

Abhishek Saxena, Horst-Michael Prasser (*Laboratory of Nuclear Energy Systems, ETH Zurich*)

4:20 pm

14295 Multiphase and Turbulence Models' Sensitivity Study in Pressurized Thermal Shock Simulations of the TOPFLOW Experiment

S.S. Deshpande (*Paul Scherrer Institut*), B. Niceno (*Paul Scherrer Institut; Swiss Federal Institute of Technology*), A. Mutz, J. Klügel (*Kernkraftwerk Goesgen*)

7.10 SMR THERMAL HYDRAULICS

Session Chair: Koroush Shirvan (*Massachusetts Institute of Technology*)

Providence Ballroom II

3:00 pm

14041 Post-Test Simulation Results on the Integral Effect Tests using the VISTA-ITL for the SMART Design

Hyun-Sik Park, Youn-Gyu Jung (*Korea Atomic Energy Research Institute*), Doo-Hyuk Kang (*System Engineering & Technology Co., Ltd*), Hwang Bae, Sung-Jae Yi (*Korea Atomic Energy Research Institute*), Jae-Seung Suh (*System Engineering & Technology Co., Ltd*)

3:20 pm

14067 Comparison of Thermal Hydraulic Performances of Rod-type Fuel to Plate-type Fuel for Small Modular Reactor Application

Min-Gil Kim, Youho Lee, Jeong Ik Lee (*Korea Advanced Institute of Science and Technology*)

3:40 pm

14077 A v2-f Model Assessment for Mixed Convection in Water-cooled SMR Configuration

Anhika Feri Wibisono (*Korea Advanced Institute of Science and*

Technology), Yacine Addad (*Khalifa University of Science, Technology & Research (KUSTAR)*), Jeong Ik Lee (*Korea Advanced Institute of Science and Technology*)

4:00 pm

14306 Fuel Assembly Hydraulic Testing for Westinghouse Small Modular Reactor

M.E. Conner, R.L. Wang (*Westinghouse Electric Company*)

9.06 NUCLEAR NDE AND HEALTH MONITORING

Session Chair: Lingyu Yu (*University of South Carolina*)

Independence

3:00 pm

14304 Nuclear Environmental Effects on Piezoelectric Wafer Active Sensors Based Acousto-ultrasonic Sensing System

Bin Lin, Matthieu Gresil, Victor Giurgiutiu, Travis Knight (*University of South Carolina*), Adrian Mendez-Torres (*Savannah River National Laboratory*), Lingyu Yu (*University of South Carolina*)

3:20 pm

14307 Analytical Study Guideline for Structural Health Monitoring of Steel Canister in Dry Cask Storage System by using Multimodal Ultrasonic Lamb Waves

Ayman Kamal, Victor Giurgiutiu (*University of South Carolina*)

3:40 pm

14350 High Temperature (> 1000 °C) Piezoelectric Sensors for Nuclear Applications

Kyungrim Kim, Joseph Johnson, Xiaoning Jiang (*North Carolina State University*)

4:00 pm

14353 Nondestructive Evaluation of Concrete in Nuclear Power Plants Using Suitable Concrete Specimens

Dwight Alan Clayton, Cyrus Smith (*Oak Ridge National Laboratory*), Lev Khazanovich, Kyle Hoegh (*University of Minnesota*), Christopher Ferraro (*University of Florida*), Jordan Nelson (*Lynch and Ferraro Engineering, Inc.*), John Popovics, Hajin Choi, Suyun Ham (*University of Illinois – Urbana-Champaign*), Satish Chintakunta (*Engineering & Software Consultants, Inc.*)

4:20 pm

14367 Assessment of Alkali-Silica-Reaction Using Acoustic Emission

Mohamed ElBatanouny, Matthew Jones, Paul Ziehl (*University of South Carolina*)

WEDNESDAY, APRIL 9, 2014 • 4:20 PM - 5:40 PM

3.05 OTHER ADVANCED REACTOR CONCEPTS

Session Chair: Stefano Passerini (Argonne National Laboratory)

Providence Ballroom III

4:20 pm

14012 The MYRRHA ADS Project in Belgium Enters the Front End Engineering Phase
Didier De Bruyn, Hamid Ait Abderrahim, Peter Baeten, Rafaël Fernandez, Jeroen Engelen, Gert Van den Eynde (*Belgian Nuclear Research Centre (SCK•CEN)*)

4:40 pm

14162 Designing for Inherent Control in Liquid Metal Advanced SMRs
S. Passerini, R.B. Vilim (*Argonne National Laboratory*)

5:00 pm

14372 Enhanced Operability in the ASMR for Improved Response to Active System Faults and Grid Upset Events
R.B. Vilim, S. Passerini, R.R. Ponciroli (*Argonne National Laboratory*)

7.02-II CFD FOR LARGE SYSTEMS-II

Session Chair: Rui Hu (Argonne National Laboratory)

Harris

4:20 pm

14191 A Study on Thermal Mixing Behavior in IRWST Using Three-Dimensional CFD Analysis
Jeong Hee Ha, Doo Yong Lee, Soon Joon Hong (*FNC Technology Co., Ltd.*), Jae Sik Jeong, Man Heung Park, Young Tae Moon (*KEPCO E&C Co.*)

4:40 pm

14326 CFD Simulations of Temperature Distribution in the Cavity Pool of an Ex-vessel Cooling System
Akshay Dave, Kerstin Cramer, Victor Petrov, Annalisa Manera (*University of Michigan*)

5:00 pm

14356 CFD Simulations of the Effects of Thermal Stratification on the Start of Natural Circulation during SFR Transients
Enerel Munkhzul (*Virginia Commonwealth University*), Justin Thomas (*Argonne National Laboratory*)

5:20 pm

14401 Analysis of Thermohydraulic Characteristics of AP1000 Passive Residual Heat Removal Heat Exchanger
Xu Xie (*Nuclear Power Institute of China*), Wenxi Tian, Pei Yu (*Xi'an Jiaotong University*), Changhua Nie, Li Zhan, Pengzhou Li (*Nuclear Institute of China*)



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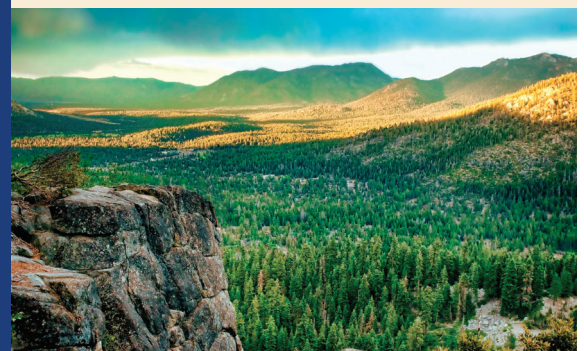
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