International Topical Meeting on Advances in Thermal Hydraulics 2018 (ATH' 18)

Orlando, Florida, USA
11 - 15 November 2018

Volume 1 of 2

ISBN: 978-1-5108-7545-6

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571

Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2018) by American Nuclear Society
All rights reserved.

Printed by Curran Associates, Inc. (2019)

For permission requests, please contact American Nuclear Society
at the address below.

American Nuclear Society
555 North Kensington Avenue
La Grange Park, Illinois 60526
USA

Phone: (800) 323-3044
(708) 352-6611
Fax: (708) 352-0499

www.ans.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

KEYNOTE - I

Advanced Liquid-Metal Thermal Hydraulics Research for MYRRHA 1
K. Van Tichelen, G. Kennedy, F. Mirelli, A. Marino, A. Toti, D. Rozzia, E. Cascioli, S. Keijers, Ph. Planquart

COMPUTATIONAL THERMAL HYDRAULICS - I

A Parallel Implicit Finite-Volume Algorithm for Predicting Compressible Thermal-Hydraulic Flows 17
Lucian Ivan, Scott Northrup, Nusret Aydemir
Numerical Method for Modeling Iodine Sorption in Charcoal Filters 27
Mark S. Lanza, Donald R. Todd
CFD Research of AP1000 Hot-Leg Suction Effect and Temperature Heterogeneity 33
Lianfa Wang, Mingjun Wang, Suizheng Qiu, Guanghui Su, Wenxi Tian
A Theoretical Method to Predict DNB-Type Critical Heat Flux in Rod Bundle under Motion Conditions 44
Siyang Huang, Qiqi Yan, Wenxi Tian, G. H. Su, Suizheng Qiu

TWO-PHASE FLOW AND HEAT TRANSFER FUNDAMENTALS - I

Bubbly Flow Synthesis and Labeling Using the Bubble Generative Adversarial Networks 57
Yucheng Fu, Yang Liu
Measurement of Steam-Water Flow in a Vertical Annulus 68
Vineet Kumar, Zhiee Jhia Ooi, Caleb S. Brooks
Interfacial Structures in Bubbly to Slug Transition Flows in a Duct 77
Guanyi Wang, Qingzi Zhu, Mamoru Ishii
Measurement of Two-Phase Natural Circulation in a Vertical Annulus 88
Zhiee Jhia Ooi, Vineet Kumar, Caleb S. Brooks
Development of a New Two-Phase Flow Mass Quality Correlation for Reflood Transients 98
Yue Jin, Faith R. Beek, Fan-Bill Cheung, Stephen M. Bajorek, Kirk Tien, Chris L. Hoxie

LEAD AND LBE COOLED REACTOR THERMAL HYDRAULICS

CFD Assessment of Pool Thermal Hydraulics for HLM Reactors 109
F. Roelofs, D. Dovizio, D. Visser, K. Zwijsen, A. Shams
Study on Reactor Vessel Air Cooling for Westinghouse Lead Fast Reactor 117
Jun Liao, Danial Utley
Experimental and Numerical Characterization of the Flow Field at the Core Entrance of a Water Model of a HLM-Cooled Reactor 131
Philippe Planquart, Chiara Spaccapaniccia, Giacomo Alessi, Sophia Buckingham , Katrien Van Tichelen
Development of Mechanistic Source Term Analysis Tool SAS4A-Fate for Lead- and Sodium-Cooled Fast Reactors 143
T. Q. Hua, A. Moisseytsev, A. Karahan, A. M. Tentner, T. Sofu, S. J. Lee, C. Y. Paik, J. Liao, P. Ferroni

OPERATING LWRS THERMAL HYDRAULICS AND SAFETY

Flow Behavior Observation of Single-Phase Air Jet Simulating a Nozzle of Terry Turbine Using PIV 160
N. Tsuzuki, M. Chaki, D. T. Nguyen, Y. A. Hassan, K. Vierow Kirkland
Terry Turbine Expanded Operating Band: Initial Experimental Efforts 170
M. Solom, D. Osborn, K. Ross, Karen Vierow Kirkland, A. Patil, N. Tsuzuki
Terry Turbine Expanded Operating Band: Sandia National Laboratories Analytical Efforts 183
J. Cardoni, K. Ross, B. Beeny, D. Osborn
Development of Reactor Core Isolation Cooling System Model for SAMPSON 201
Chiaki Kino, Yoshihiro Morita, Masao Chaki
Analysis of Transient Flow Change Aided by a Support Vector Machine Method 212
Dongjune Chang, Maolong Liu, Youho Lee

NEXT GENERATION LWR THERMAL HYDRAULICS

Improved Prediction of Heat Transfer to Supercritical Water in Circular Tubes 227
X. Cheng, M. Zhao, X. J. Liu
High Resolution Gamma-Ray Tomography Imaging for Detailed Void Fraction Measurements in High-Pressure Flow Loops 241
Julio Diaz, Robert Adams, Victor Petrov, Annalisa Manera

X-Ray Radiography and High-Speed Videography Measurement on Void Fraction in Helical Coil 250
Nailiang Zhuang, Kui Zhang, Annalisa Manera, Victor Petrov
Simulation of Boiling Two-Phase Flow in a Helical Coil Steam Generator Using the Spectral Element Code NEK-2P 263
D. R. Shaver, A. Tomboulides, A. Tentner. P. Vegendla, E. Merzari, N. Salpeter, W. D. Pointer
Investigation on Steady and Transient States of Thermal-Hydraulic Characteristics for a Helical- Coiled- Type Once Through Steam Generator 277
Xueyou Ding, Qinglong Wen, Cheng Cheng, Hongyang Wang, Shenhui Ruan, Zhiqiang Chen

MOLTEN-SALT REACTOR THERMAL HYDRAULICS

Thermal-Hydraulics Phenomena Important in Modeling and Simulation of Liquid-Fuel Molten Salt Reactors 291
Stephen Bajorek, David J. Diamond, Nicholas R. Brown, Richard Denning
Neutronics Phenomena Important in Modeling and Simulation of Liquid-Fuel Molten Salt Reactors 304
David J. Diamond, Nicholas R. Brown, Richard Denning, Stephen Bajorek
Design and Optimization of a Fluted Tube, Counter Flow Intermediate Heat Exchanger for a Molten Salt Fast Reactor Using a Chloride Salt as the Coolant 317
M. W. Patterson, Kevin Terrill, Stephen Hancock, Joseph Warner
Heat Transfer Distribution of Randomly Packed Pebble-Bed Fuels for Fluoride Salt-Cooled High Temperature Reactor (FHR) 331
Seong Gu Kim, Maolong Liu, Youho Lee, Jeong Ik Lee
Preliminary Experiments of Wireless Advanced Instrumentation Toward Packed Pebble Heat Transfer 343
Dongjune Chang, Youho Lee

THERMAL HYDRAULICS IN ACCIDENT MANAGEMENT

Hydrogen Generation Crossflow Due To Hardened Containment Venting 355
Dong Zheng, Julie M. Jarvis, Serena Allison-Ptak, Gregory Brauer, Michael Hopman
MAAP5-VVER Validation and IAEA-SPE-3 Modelling 365
Tom Elicson, Hugh Luo, David Luxat, Lajos Tarczal, Tom Kindred
Verification of Diverse Alternative Shutdown Severe Accident Management Guideline (SSAMG) Entry Conditions for CPR1000 379
Zhi'ao Huang, Huifang Miao, Huai-En Hsieh, Yifen Chen, Ning Li, Chao Guo
Development of Severe Accident Management Training Simulator for AP1000 Nuclear Power Plant 388
Gang Jiang, Gang Chen, Weikun Ding, Yanghua Yang
A Semi-Mechanistic Model to Predict Spatial Variation of Critical Heat Flux on an Inclined Surface Facing Downward 399
Uiju Jeong, Sung Joong Kim

BOILING AND CONDENSATION PHENOMENA

Using Inverse Heat Transfer in the Analysis of Two-Phase Flow Post-CHF Experiments 406
Juliana Pacheco Duarte, HangJin Jo, Michael L. Corradini
Comparison of Steady-State and Transient Condition Flow Boiling Critical Heat Flux (CHF) of FeCrAl Alloy, Zircaloy-4 and Inconel600 414
Soon K. Lee, Maolong Liu, Edward D. Blandford, Youho Lee, Nicholas R. Brown, Hang Ban, Colby B. Jensen, Kurt A. Terrani
Surface Wettability Measurements and Pool Boiling CHF Prediction of Ion Irradiated Coated Zircaloy 428
Amir Ali, Edward Blandford, Youho Lee, Khalid Hattar, Hyun-Gil Kim, Dong Jun Park
Boiling and Critical Heat Flux on Surfaces of Modified Wettability and Roughness 440
Joseph L. Bottini, Sabrina Hammouti, David Ruzic, Caleb S. Brooks
Comparative Analyses of CHF Prediction Performance Between Deep Learning and Physics Approaches to Pool Boiling Enhanced by Microstructures 449
Mingfu He, Youho Lee
Numerical Simulation on Flow Boiling Heat Transfer in Single Rod Channel Near Critical Heat Flux 460
Haidong Liu, Deqi Chen, Xiang Zhang

SIMULATION AND EXPERIMENTS OF WIRE-WRAPPED FUEL ASSEMBLIES

Validation of Wire-Wrapped Fuel Assembly CFD Simulations 474
F. Roelofs, D. Dovizio, H. Uitslag- Doolaard, B. Mikuž, A. Shams
CFD Investigation on Conjugate Heat and Mass Transfer in the Wire-Wrapped Fuel Assembly 482
Su-Jong Yoon, Gilles J. Youinou
On the Fluid Structure Interactions of a Wire-Wrapped Pin Bundle 493
C. A. Nixon, W. R. Marcum, A. W. Weiss, K. M. Steer, R. B. Jackson, M. G. Martin
Thermal-Hydraulic Experimental Testing of the Myrrha Wire-Wrapped Fuel Assembly 505
G. Kennedy, K. Van Tichelen, J. Pacio, I. Di Piazza, H. Uitslag-Doolaard

Local Blockages in a Rod Bundle with Wire Spacers: Heat Transfer in LBE for the Safety Assessment of MYRRHA 520
J. Pacio, M. Daubner, T. Wetzel
Flow Visualization on SFR Wire-Wrapped 19 Pin Bundle and Comparison with CFD Analysis 531
Min Seop Song, Eung Soo Kim, Jae Ho Jeong

KEYNOTE - II

Interface Resolved Simulation of Reactor Flows 547
Igor A. Bolotnov

THERMAL HYDRAULICS OF WASTE MANAGEMENT, TEST REACTORS AND ADVANCED FUELS

Effect of Glass Viscosity on Foaming Behavior and Heat Transfer in a Laboratory-Scale Waste Glass Melter 557
Alexander W. Abboud, Donna P. Guillen, Richard Pokorny
Thermal Safety Analysis of SRS Spent Nuclear Fuel Storage Facility 572
Si Y. Lee, Dennis W. Vinson
On Scaling Theory of Vortex Shedding of Tandem Plates 586
Trevor Howard, Wade Marcum
Development of Superior Thermal Shock Tolerant Material for Nuclear Components by Engineering Surface Heat Transfer Modes 600
Divya Jyoti Prakash, Youho Lee
Effect of Thermal Expansion on Fluid-Structure Interaction of Curved Plate Deflection Measurement 612
Gary L. Solbrekken, Gerhard H. Schnieders, Jerome Rivers, Adrian Tentner, Cezary Bojanowski, Erik Wilson

HIGH PERFORMANCE COMPUTING APPLICATIONS IN NUCLEAR ENGINEERING

High Performance Computing for Nuclear Reactor Design and Safety Applications 625
Afaque Shams, Dante De Santis, Adam Padee, Tobiasz Jarosiewicz, Piotr Wasiuk, Tomasz Kwiatkowski, Slawomir Potempski
Wall-Resolved Large Eddy Simulation of the Flow Through a PWR Guide Card at R_{eh}=10,000 636
S. Benhamadouche, M.-C. Gauffre, Y. Fournier
Direct Numerical Simulation of the Turbulent Flow Inside a Differentially Heated Cavity 644
Javier Martinez, Elia Merzari, Michael Acton, Emilio Baglietto

VOLUME 2

Numerical Simulation of Isothermal Flow Across Slant Five-Tube Bundle with Spectral Element Method Code Nek5000 659
Mustafa Alper Yildiz, Yassin Hassan, Haomin Yuan, Elia Merzari

ADVANCED REACTOR THERMAL HYDRAULICS - I

Plenum-to-Plenum Natural Circulation Heat Transfer in a Prismatic Very High-Temperature Reactor for Different Coolants 670
Salman M. Alshehri, Ibrahim A. Said, Muthanna H. Al-Dahhan, Shoaib Usman
Experimental Investigation on Heat Transfer in a Prismatic Modular Reactor under Cosine Heat Flux 682
Salman M. Alshehri, Ibrahim A. Said, Muthanna H. Al-Dahhan, Shoaib Usman
Sustaining Turbulence in a Very Long Pipe Towards Studying Heat Driven Turbulent Gas Relaminarization 694
Apoorva Rudra, Masahiro Kawaji, Aleksandr V. Obabko, Saumil Patel
Temperature and Flow Characteristics of the High Temperature Test Facility during Depressurized Conduction Cooldown Testing 701
Kyle E. Brumback, Seth R. Cadell, Brian G. Woods
Evaluation of Organic Rankine Cycles in an Air-Brayton Combined Cycle for Microreactor Applications 714
Joseph Litrel, Donna Post. Guillen, Michael McKellar

ROD BUNDLE THERMAL HYDRAULICS

Thermal Hydraulics Calculations Plus Uncertainty Analysis of VVER-1000 Fuel Assembly 729
Alp Tezbasaran, Maria N. Avramova, Kostadin N. Ivanov, Osman S. Celikten
A Study of Liquid Entrainment in Oscillatory Flows 739
Faith R. Beck, Yue Jin, Fan-Bill Cheung, Stephen M. Bajorek, Kirk Tien, Chris L. Hoxie
Experimental Investigation of Axial Flow in the Narrow Gap Regions of a 7-Rod Bundle Using PIV 751
Robert C. Bowden, Casey Tompkins, Sun-Kyu Yang
Wall-Modelled Large Eddy Simulation of the Flow Through PWR Fuel Assemblies at Reh=66,000—Validation on CALIFS Experimental Setup 765
S. Benhamadouche, M.-C. Gauffre, P. Badel

Single Rod and 5x5 Rod Bundle Blowdown Experiments on the Dispersion of Surrogate Fuel 777
G. D. Latimer, W. R. Marcum, W. F. Jones

YOUNG PROFESSIONAL THERMAL HYDRAULIC RESEARCH COMPETITION - I

Liquid Metal Experimental System for Thermal Stratification or Mixing 789
Brendan Ward, Hitesh Bindra
Experimental Studies on Metallic Fuel Relocation in a Pin Bundle Core Structure of a Sodium-Cooled Fast Reactor 792
Taeil Kim, Dzmitry Harbaruk, Craig Gerardi, Mitchell Farmer, Christopher Grandy, Yoon Il Chang
Accelerating Introduction of Innovative Claddings Through Microscale Phenomenological Understanding of Thermal Hydraulics 796
Arunkumar Seshadri, Koroush Shirvan
Neutron Imaging of Percolating Hydraulic Flow Through a Simulated Debris Bed 800
Molly Ross, Adam van Bergeijk, Alan Cebula, Steve Eckels, Hitesh Bindra

GENERAL THERMAL HYDRAILICS - I

On Improving Suction Factor: Effect of Bulk Flow, Steam Concentration and Wall Orientation 804
Dhongik S. Yoon, HangJin Jo, Michael L. Corradini
Machine Learning: A Key Tool in Future Thermal Hydraulics Research and Development 808
Ling Zou, Hongbin Zhang
Development of Analytical Models for RCIC Terry Turbine and Pump 812
Hongbin Zhang, Ling Zou
Towards the Development of a Deposition Model for CFD Application 816
Giulia Agostinelli, Emilio Baglietto
Two-Phase Natural Circulation and Flow Boiling Characteristics with Artificial Seawater 820
Daniel Franken, Zayed Ahmed, Seth Eckels, Steven Eckels, Hitesh Bindra

ADVANCED REACTOR THERMAL HYDRAILICS - II

Overview of the SaS4A Code Metallic Fuel Models and Extended Analysis of a Postulated Severe Accident in the Prototype Gen-IV Sodium-Cooled Fast Reactor 823
A. M. Tentner, A. Karahan, S. H. Kang
The Importance of Turbulent Heat Transfer Modelling in Low-Prandtl Fluids 836
Afaque Shams
Mixed Convection with Liquid Metals: Review of Experiments and Model Development 846
Wadim Jaeger, Wolfgang Hering
Design Optimization Study on the Single Tank Packed Bed Thermal Energy Storage System 860
Junsoo Yoo, Su-Jong Yoon, Thomas E. O'Brien, Konor L. Frick, James E. O'Brien, Piyush Sabharwall, Carl M. Stoots
Feasibility Analysis of Passive Heat Removal System Coupled with Dry Air Cooling System for the Atom System 871
Min Wook Na, Doyoung Shin, Sung Joong Kim, Gwang Hyeok Seo, Jeong Ik Lee

EXPERIMENTAL METHODS AND INSTRUMENTATION

Velocity and Scalar Fields of a Turbulent Buoyant Jet in the Self-Similar Region 878
S. Qin, B. Krohn, V. Petrov, A. Manera
Design and CFD Modelling of Helium 3 Negative Reactivity Insertion Device for the TREAT Reactor 892
G. Mignot, S. Balderama, N. Woolstenhulme, W. Marcum
A Brief Investigation of the Repeatability and Reproducibility of PIV Measurements for CFD-Grade Databases 904
Daniel Nunez, Benedikt Krohn, Victor Petrov, Annalisa Manera
Pressure Sensitive Paint Measurement Technique on the Surface of a Rod for Steam Generator Applications 919
Garland Porter, Marilyn Delgado, Yassin Hassan
A Review of Nuclear Power Plant Thermal Hydraulic Test Facilities in China 926
Li Gao, Yusheng Liu, Jiqiang Su
Three-Layers Wire-Mesh System for Air Bubble Measurement in a Rectangular Channel 937
Shimo Yu, Xiao Yan, Dawei, Zhao, Suijun Gong, Aiwei Xu, Yuanfeng Zan

YOUNG PROFESSIONAL THERMAL HYDRAULIC RESEARCH COMPETITION - II

Machine Learning-Based Critical Heat Flux Predictors in Subcooled and Low-Quality Flow Boiling 945
Xingang Zhao, Robert K. Salko, Koroush Shirvan
Measurement of Droplet Parameters Using a Single Optical Fiber Probe Sensor in a Horizontal Pipe 949
Byeonggeon Bae, Taeho Kim, Byongjo Yun
Pool Boiling Experiments for Evaluations of Critical Heat Flux with a Flat-Type Upward Heater Using Fe_3O_4, SiO_2 Nanoparticles 953
Min Suk Lee, Dong Hoon Kim, Yoon Hoon Jeong

Basic Study on Hydrogen Behavior in a Small-Scale Cylindrical Container with Catalysts by Experiment and Numerical Simulation 957
Gaku Takase, Yoshihisa Hiraki, Kazuyuki Takase, Isamu Kudo, Keisuke Tanizawa, Shogo Taira
Evaluation of Sink and Source Terms in Interfacial Area Transport Equation for Bubbly Flow 961
Hang Liu, Liang-ming Pan, Wen-xiong Zhou, Quan-yao Ren
Assessment and Simulation on the Thermal Mixing Phenomenon with CFD Method in a 45° Horizontal T-Junction 965
Mingjun Wang, Tangtao Feng, Ping Song, Wenxi Tian, G. H. Su, Suizheng Qiu

GENERAL THERMAL HYDRAULICS - II

Analytical Correction for Interfacial Area Measurement with Four-Point Optical Probes 977
Casey Tompkins, Robert Bowden, Sun-Kyu Yang
Validation of S-RELAP5 for Framatome's Realistic Non-LOCA Methodology 981
C. K. Nithianandan, Kent Able, Chris Molseed, Moses Yeung, Thomas George, Nicole Allen, Keith Higar
New Discoveries in Post-Accident Passive Decontamination of Advanced Reactors 985
Rohan Biwalkar, Sola Talabi
Sensitivity of Aerosol Removal Mechanisms to Varying Thermal-Hydraulic Parameters in Integrated Small Modular Reactors 989
Rohan Biwalkar, Sola Talabi

ADVANCED CODE DEVELOPMENT WITH VERIFICATION AND VALIDATION

Adding Confidence to Solution Verification: Using MMS-Informed MEA to Better Understand Discretization Error 1003
Aaron M. Krueger, Vincent A. Mousseau, Yassin A. Hassan
Effect of ATF Clad Coating During a Short-Term Station Black Out with MELCOR 1.8.6 YU 1015
Jun Wang, Michael L. Corradini, Hangjin Jo
Comparison of Experimental and Simulated Low-Pressure CHF Tests Using CTF and RELAP5-3D 1022
Jacob P. Gorton, Nicolas R. Brown, Soon Kyu Lee, Yonho Lee
Inverse Uncertainty Quantification of Turbulence Modeling in Multiphase-CFD Solver Using High- Resolution Data from Particle Image Velocimetry 1028
Yang Liu, Shanbin Shi, Yalan Qian, Xiaodong Sun, Nam Dinh
Development and Verification of Post-CHF Heat Transfer Model Based on 10CFR50 Appendix K in COSINE 1041
Kong Xiaoning, Chen Jun, Liu Dongqi, Li Jian, Sun Qionghua

KEYNOTE - III

Direct Numerical Simulation and Wall-Resolved Large Eddy Simulation in Nuclear Thermal Hydraulics 1050
Iztok Tiselj, Cedric Flageul, Jure Oder

COMPUTATIONAL FLUID DYNAMICS

Optimization of Thermal-Hydraulic Performance of a Zigzag Channel Printed Circuit Heat Exchanger Employed as IHX IN HTGR Systems 1066
Raciel de la Torre Valdés, Juan Luis François, Pedro Morales, Lázaro García
Hydrodynamic Numerical Simulations of a Prototypical Oxide-Metal Corium Melt Representative of Fukushima 1-F1 Severe Accident Conditions 1080
A. Boulin, J. F. Haquet, P. Piluso, S. Semenov, M. Antoni, T. Washiya, A. Nakayoshi, T. Kitagaki
Effects of Amplitude of Roughness on Heat Transfer 1091
Muhammad Yousaf, Shoaib Usman
Subcooled Boiling Natural Convective Two-Phase CFD Simulation and Application 1100
Songwei Li, Riccardo Puragliesi Carl Adamsson
The Application of Dual-Mesh Coupled Heat Transfer Porous Model on the Numerical Simulation of Shell-Tube Heat Exchanger 1112
Guangdong, Song, Qingchuan Yang, Binbin Qiu, Hongyi Yang, Huajin Yu, Mengmeng Liu

TWO-PHASE FLOW AND HEAT TRANSFER FUNDAMENTALS - II

Modeling of Bathtub Vortexi in Consideration of Realistic Axial Velocity Distribution 1120
Kei Ito, Daisuke Ito, Yasushi Saito, Toshiki Ezure, Masaaki Tanaka
Experimental Investigation on Influencing Factors of Nanofluids Flow Boiling CHF 1133
Wenxi Tian, Kuanghan Deng, Yun Wang, G. H. Su
Entrainment Model Evaluation Based on Full-Scale Test Facility 1142
P. Zhang, H. J. Chang

Test Facilities for Passive Safety Pressurized Water Reactors of AP600, AP1000 and CAP1400 1155
Huajian Chang, Yuquan Li, Bin Gao, Cheng Li, Yanfang Xue, Nang Wang

GENERAL THERMAL HYDRAULICS - III

Modeling and Simulations of 1/16th Full Scale VHTR Upper Plenum 1169
Prasad Vegendla, Rui Hu, Aleksandr Obabko, Haomin Yuan, Richard Schultz, Yassin Hassan
SAS4A Simulations of Selected CABRI-1 Oxide Fuel Experiments 1181
A. Karahan, K. Kawada, A. Tentner
Thermal Stratification and Mixing in SFR Plena Using a One-Dimensional Scalar Transport Model 1185
Graham Wilson, Hitesh Bindra

COMPUTATIONAL THERMAL HYDRAULICS - II

Investigation of Flow Through a 2X2 PWR Rod Bundle: Effect of Twisted Tapes 1189
Salman Alzahrani, Shoaib Usman
Effect of Heaving Motion on a 200MW OFNP Transient Thermal Behaviors under SBO Accidents 1202
Qiqi Yan, Siyang Huang, Yapei Zhang, Guanghui Su, Suizheng Qiu
Numerical Simulation on the Saturated Downward Facing Hemispherical Pool Boiling 1215
Xiang Zhang, Daogui Tian, Yanfang Xue, Lian Chen, Yuquan Li

NEUTRONICS/THERMAL-HYDRAULICS COUPLING

ARTEMIS/S-RELAP5 Transient Benchmarks to Support ARITA Non-LOCA Methodology 1234
Kevin Segard, Richard Brock, Keith Higar, Sebastian Kuch
Advanced Liquid Fuel Molten Salt Reactor Core Simulation Using Gen-Foam 1248
Muhammad Altahhan, Sandesh Bhaskar, Paolo Balestra, Jason Hou, Maria Avramova, Nicholas Smith
Development of Preliminary VERA-CS Crud-Induced Localized Corrosion Modeling Capability 1257
R. Salko, S. Slattery, T. Lange, M. Delchini, B. Collins, W. Gurecky, E. Tatli, A. Manera
Advanced Platform for Execution of Coupled Multi-Physics Simulations 1271
Nicolae Bobolea, Randy Ellison, Joshua Parker

GENERAL THERMAL HYDRAULICS - IV

Vapor Dynamic Behavior on the Hemispherical Downward Facing Heating Surface 1285
Xiang Zhang, Daogui Tian, Lian Chen, Yuquan Li, Huajian Chang
Advancement of Numerical Analysis Method for Tube Failure Propagation 1289
Akihiro Uchibori, Tatashi Takata, Hideki Yanagisawa, Jiazhi Li, Sunghyon Jang
Verification of COSINE Containment Code Based on Single Room Case 1295
Jian Li, Aijing Shen, Jun Chen
Effectiveness of Secondary and Primary B&F Strategies to Mitigate SAI-SGTR Consequence 1306
Zhi'ao Huang, Huifang Miao, Huai-En Hsieh, Ning Li
Implication of Transient CHF Model on ATR Fueled Experiments Safety Margin 1310
Yu-Jou Wang, Xingang Zhao, Akshay J. Dave, Koroush Shirvan, Lin-Wen Hu, Joseph Nielsen, Paul Murray, Ryan Marlow
Author Index