Agenzia nazionale per le nuove tecnologie, l'energia
e lo sviluppo economico sostenibile

Ministero dello Sviluppo Economico

RICERCA DI SISTEMA ELETTRICO

Prosecuzione della Partecipazione a Comitati e Gruppi Internazionali

F. Mascari, G. Vella

RdS/2012/164

PROSECUZIONE DELLA PARTECIPAZIONE A COMITATI E GRUPPI INTERNAZIONALI

F. Mascari, G. Vella CIRTEN
Settembre 2012

Report Ricerca di Sistema Elettrico
Accordo di Programma Ministero dello Sviluppo Economico - ENEA
Area: Governo, Gestione e Sviluppo**,** del Sistema Elettrico Nazionale
Progetto: Nuovo Nucleare da Fissione: Collaborazioni Internazionali e sviluppo Competenze in Materia Nucleare
Responsabile del Progetto: Massimo Sepielli,ENEA

CIRTEN

CONSORZIO INTERUNIVERSITARIO
PER LA RICERCA TECNOLOGICA NUCLEARE

UNIVERSITA' DI PALERMO
DIPARTIMENTO dell' ENERGIA
Sezione INGEGNERIA NUCLEARE

Prosecuzione della Partecipazione a Comitati e Gruppi Internazionali

F. Mascari, G. Vella

CIRTEN-UNIPA RL- PAR 2011 1215/1250

Palermo, Agosto 2012

Lavoro svolto in esecuzione della linea progettuale LP1.C2 dell'AdP ENEA MSE, "Nuovo Nucleare da Fissione"

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SOMMARIO

Nell'ambito dell'attività relativa alla linea progettuale LP1.C2 "Prosecuzione della partecipazione a comitati e gruppi internazionali" dell'Adp ENEA MSE, di seguito è riportata una sintesi degli interventi, dei temi e dei contributi dal nostro gruppo di ricerca presentati al SPRING 2012 CAMP MEETING e alla conferenza internazionale ICONE20-POWER2012.

1 PARTECIPAZIONE AL PROGRAMMA DI RICERCA CAMP

Nell'anno 2012 nell'ambito delle attività promosse dal USNRC la sede di Palermo ha partecipato allo "SPRING 2012 CAMP MEETING".

Si sono recati a tale gruppo di lavoro il Prof. Giuseppe Vella e il Dr. Fulvio Mascari.

Il meeting si è tenuto dal 30 Maggio 2012 al 1 Giugno 2012 a Lubiana in Slovenia.

Il Code Applications and Maintenance Program (CAMP) è stato formato dalla USNRC e altri partner internazionali al fine di avere uno scambio di informazioni su problematiche termoidrauliche di sicurezza degli impianti nucleari. Il gruppo si incontra due volte l'anno. Il rappresentate CAMP per l'Italia è il Dr. Roberto Ranieri di ISPRA. Partecipando al CAMP si ha la possibilità di avere accesso ai codici di termoidraulica di sistema di tipo"Best Estimate" tipo TRACE, RELAP5 e di cinetica neutronica tridimensionale tipo PARCS necessari per le attività di ricerca da noi svolte.

L'agenda della riunione è riportata nella Appendice 1.

Gli argomenti di interesse trattati in questa riunione sono stati:

- Status of NRC Code Development
- Program and Code Status
- Member Country Reports
- Technical reports
- TPC Meeting

Di particolare interesse per le nostre attività di ricerca è il prossimo rilascio della patch 3 del codice TRACE.

Nella riunione sono stati da noi presentati tre *technical report:*

- Analyses of the OSU-MASLWR natural circulation phenomena by using TRACE code.
  Autori: Fulvio Mascari, Giuseppe Vella, Brian G. Woods, Kent Welter, Francesco D'Auria.

- Analyses of the SPES-3 accident condition by using TRACE code.
  Autori: Fulvio Mascari, Giuseppe Vella

- Analyses of the TRACE–PARCS coupling capability.
  Autori: Fulvio Mascari, Giuseppe Vella, Flavio Parozzi, Vincenzo Casamassima

Il primo technical report si basa sulla attività realizzata presso il Dipartimento dell'Energia in collaborazione con Oregon State University, NuScale e l'Università degli studi di Pisa, relativa all'impianto OSU-MASLWR in operazione presso Oregon State University (OSU).

L'impianto sperimentale OSU-MASLWR è stato progettato per investigare il comportamento termoidraulico del reattore nucleare MASLWR, prototipo di un reattore avanzato integrale a generatore di vapore elicoidali in cui il fluido primario, in circolazione naturale, asporta la potenza prodotta nel core in condizioni normali di funzionamento.
Una nodalizzazione TRACE dell'impianto OSU-MASLWR è stata sviluppata presso il Dipartimento dell'Energia dell'Università degli Studi di Palermo in collaborazione con Oregon State University. Una campagna sperimentale è stata condotta al fine di caratterizzare termoidraulicamente i fenomeni tipici del reattore MASLWR.
I transitori studiati sono il test 0SU-MASLWR-001, che consiste in un *"inadvertent actuation of 1 submerged ADS valve"* e ha lo scopo di riprodurre, sperimentalmente, la conseguente depressurizzazione del sistema primario e il conseguente comportamento del contenimento ad esso accoppiato, e il test OSU-MASLWR-002, *"natural circulation at core power up to 210 kW",* che colleziona sperimentalmente le portate volumetriche nel circuito primario e il grado di surriscaldamento all'uscita dei tubi elicoidali al variare della potenza fornita al core e della portata di FW.
I risultati presentati mostrano che i fenomeni che caratterizzano il test OSU-MASLWR-002 sono qualitativamente predetti dal codice nelle differenti condizioni di potenza del core e di portata secondaria. L'analisi del test OSU-MASLWR-001 mostra un generale accordo qualitativo con i dati sperimentali. Il codice TRACE è capace di predire i fenomeni tipici del transitorio quali lo svuotamento del circuito primario, la fase di "refill" del circuito primario e la fase di "long term cooling" tipica del MASLWR.

Il secondo technical report si basa sulla attività realizzata presso il Dipartimento dell'Energia in collaborazione con ENEA e SIET relativa all'impianto SPES-3. Tale impianto, è in fase di realizzazione presso la SIET, per caratterizzare i fenomeni termoidraulici che si destano, in transitori seguenti a postulati eventi incidentali nel reattore IRIS.
Una nodalizzazione TRACE dell'impianto SPES-3 è stata sviluppata presso il Dipartimento dell'Energia dell'Università degli studi di Palermo al fine di condurre analisi di eventuale supporto al progetto dell'impianto sperimentale SPES-3 e, dopo la costruzione dello stesso, calcoli di pre-test e calcoli di post-test.
In questo lavoro sono presentati i risultati di analisi di un caso di "low elevation SBLOCA" dovuto ad una rottura a ghigliottina della linea di iniezione diretta nel vessel. Tali analisi sono state paragonate con le analisi RELAP5 sviluppate dalla SIET.
Il paragone con i dati di simulazioni RELAP5, sviluppati dalla SIET, mostra un buon accordo in relazione ai più importanti parametri termoidraulici caratterizzanti il transitorio. In particolare l'uso del componente tridimensionale vessel, disponibile in TRACE, permette una più dettagliata analisi dei fenomeni attesi. Questo, ovviamente, implica un incremento del tempo di calcolo.

Il terzo technical report si basa sulla attività realizzata presso il Dipartimento dell'Energia in collaborazione con RSE relativa all'uso di codici termoidraulici di sistema e neutronici tridimensionali accoppiati.
Storicamente al fine di produrre analisi aventi in oggetto il progetto, l'ottimizzazione e la sicurezza di impianti nucleari, sono stati sviluppati software dedicati (codici di calcolo) miranti alla studio di particolari problematiche. Nell'ambito degli studi di analisi di sicurezza degli impianti nucleari hanno trovato largo impiego codici di simulazione termoidraulica e neutronica il cui utilizzo

permette un miglioramento nella sicurezza degli impianti di potenza già esistenti, una migliore utilizzazione del combustibile nucleare, un aumento della flessibilità operazionale. Con tali codici è inoltre possibile realizzare studi miranti all'estensione del funzionamento dei reattori, allo sviluppo di procedure di emergenza, allo studio di eventi operazionali ed infine alla realizzazione di simulatori per l'addestramento degli operatori. In questo contesto al fine di modellare le interazioni tra fenomeni di diversa natura, ma intimamente correlati, presenti in un reattore nucleare, sono state sviluppate tecniche di accoppiamento tra codici di calcolo aventi differenti campi di applicazione. Le analisi accoppiate hanno la potenzialità di produrre più accurati studi, ridurre le eventuali incertezze e dunque fornire una più realistica analisi dei fenomeni in oggetto che porta a una più completa e migliore comprensione delle sequenze dovute a postulati eventi incidentali.
Al fine di qualificare l'uso di procedure di accoppiamento di singoli codici "best estimate" e valutare le loro capacità, nell'ultimo decennio sono stati sponsorizzati dall'OECD/NEA tre benchmark internazionali:

- PWR Main Steam Line Break in TMI-1
- BWR Turbine Trip in Peach Bottom
- VVER1000 coolant transient.

Allo scopo di verificare le capacità dei codici accoppiati TRACE/PARCS viene presentato lo studio del transitorio di riferimento "PWR Main Steam Line Break" (MSLB) già proposto dal NEA, agenzia dell'OECD, e promosso dall'USNRC. Il benchmark è basato sui dati di progetto di un reale PWR della Babcock and Wilcox e sui dati operativi dell'impianto Three Miles Island 1.
Tra gli scopi principali di tale benchmark si ricordano quelli di verificare le capacità dei codici di analizzare transitori complessi con accoppiate interazioni neutroniche e termoidrauliche in condizioni tridimensionali e quelli di saggiare gli accoppiamenti di codici neutronici e termoidraulici.
I risultati delle analisi, ottenute simulando un "main steam line break" in un tipico PWR della Babcock and Wilcox, mostrano che analisi accoppiate hanno la capacità di riprodurre i fenomeni tipici di un reattore nucleare e la loro interazione. Le capacità grafiche di SNAP sono avanzate e utili per l'analisi e visualizzazione dei dati prodotti rendendo possibili visualizzazioni bidimensionali e tridimensionali.

2 PARTECIPAZIONE ALLA CONFERENZA INTERNAZIONALE ICONE20-POWER2012

La conferenza a cui si è partecipato è la "2012 20th International Conference on Nuclear Engineering and the ASME 2012 Power Conference (ICONE20-POWER2012).

Si è recato a tale conferenza il Dr. Fulvio Mascari.

La conferenza si è tenuta dal 30 Luglio 2012 al 3 Agosto 2012 ad Anaheim, California, USA.

ICONE20-POWER2012 è una Conferenza Internazionale organizzata da Nuclear and Power Divisions of the American Society of Mechanical Engineers (ASME), la Japan Society of Mechanical Engineers (JSME) e la Chinese Nuclear Society (CNS) in cooperazione con l' International Atomic Energy Agency (IAEA), la Canadian Nuclear Society (CNS), l'European Nuclear Society (ENS), la Society Nuclear Mexicana (SNM), la Nuclear Society of Slovenia (NSS), l'Atomic Energy Society of Japan (AESJ), l'Austrian Nuclear Society (ÖKTG) e la Canadian Standard Association (CSA). Lo scopo di questa conferenza è di mantenere i contatti tra gli esperti nelle aree dell'ingegneria nucleare, della termoidraulica e dell'energie rinnovabili mantenendoli aggiornati sugli ultimi sviluppi in questi settori.

Le varie *"technical track"* della conferenza con i vari contributi sono riportati nella appendice 2. Nella appendice 3 è riportato il programma del convegno. In particolare sono state presentati contributi su:

- Plant Operations, Maintenance, Engineering, Modifications, Life Cycle, and Balance of Plant;
- Component Reliability and Materials Issues;
- Plant Systems, Structures, and Components;
- Steam Generator Technology Applications and Innovations;
- Advanced Reactors and Near-Term Deployment;
- Safety and Security;
- Codes, Standards, Licensing, and Regulatory Issues;
- Fuel Cycle, Radioactive Waste Management and Decommissioning;
- Thermal-Hydraulics;
- Computational Fluid Dynamics (CFD) and Coupled Codes;
- Instrumentation and Controls;
- Next Generation Systems;
- Fusion Engineering;
- Reactor Physics, Neutronics, and Transport Theory;
- Nuclear Education, Human Resources, and Public Acceptance;
- Design Basis and Beyond Design Basis Events;
- Fuels and Combustion, Materials Handling, Emissions;
- Heat Exchangers and Cooling Systems;
- Turbines, Generators, and Auxiliaries;

- Advanced Energy Systems and Renewables (Wind, Solar, Geothermal);
- Performance Testing and Performance Test Codes;
- Simple and Combined Cycles.

Durante il convegno è stata organizzata anche una competizione tra studenti (Student Paper Competition).

Nella riunione è stato da noi presentato un articolo dal titolo:

"TRACE AND RELAP5 CODES FOR BEYOND DESIGN ACCIDENT CONDITION SIMULATION IN THE SPES3 FACILITY"

i cui autori sono in ordine, Roberta Ferri, Fulvio Mascari, Paride Meloni e Giuseppe Vella.
Tale articolo si basa sull'attività realizzata presso il Dipartimento dell'Energia in collaborazione con l'ENEA e la SIET relativa all'impianto SPES-3. Questo impianto è in fase di realizzazione presso la SIET, per caratterizzare i fenomeni termoidraulici che si destano, in transitori seguenti a postulati eventi incidentali nel reattore IRIS, indagando allo stesso tempo il comportamento dei sistemi passivi considerati in sede di progetto e le interazioni fra i vari componenti del contenimento e il primario. I dati sperimentali prodotti nell'impianto possono essere utilizzati anche per la validazioni di codici termoidraulici di sistema. I risultati di tale impianto potranno comunque essere di validità per i reattori nucleari integrati in generale.
Una nodalizzazione TRACE dell'impianto SPES-3 è stata sviluppata presso il Dipartimento dell'Energia dell'Università degli studi di Palermo al fine di condurre analisi di eventuale supporto al progetto dell'impianto sperimentale SPES-3 e, dopo la costruzione dello stesso, calcoli di pre-test, per contribuire al progetto termoidraulico dei test di interesse, e calcoli di post-test, con lo scopo di validare il codice TRACE.
In questo lavoro sono presentati i risultati delle analisi di un caso di "DVI line DEG break "in design and beyond design conditions dovuto ad una rottura a ghigliottina della linea di iniezione diretta nel vessel. Tali analisi sono state paragonate con le analisi RELAP5 sviluppate dalla SIET.
Il paragone con i dati delle simulazioni RELAP5, mostra un buon accordo in relazione ai più importanti parametri termoidraulici caratterizzanti il transitorio in design and beyond design condition. In particolare l'uso del componente tridimensionale vessel, disponibile in TRACE, nella modellazione della Reacor Cavity, del Pressure Suppression System, del Dry Well e del RWST permette una più dettagliata analisi dei fenomeni attesi senza ricorrere all'accoppiamento di codici di sistema e specifici codici di contenimento. Questo, ovviamente, implica un incremento del tempo di calcolo.

Il Dr. Fulvio Mascari ha anche partecipato ai lavori del "Nuclear Engineering Division Technical Committee Meetings on Themal Hydraulics".

APPENDICE 1

All Technical Sessions are at City Hotel conference center

Wednesday, May 30, 2012

8:15 AM	Registration	
8:30 AM	Opening and Welcome Leon Cizelj, Jožef Stefan Institute, Reactor Engineering Division, RED Head Franci Demšar, Slovene Research Agency, Director Stane Rožman, Nuclear Power Plant Krško, Director Andreja Peršič, Slovenian Nuclear Safety Administration, Nuclear Safety Division Borut Mavko and Andrej Prošek, Jožef Stefan Institute, Reactor Engineering Division	
8:50 AM	Chris Hoxie, USNRC, USA	Status of NRC Code Development (Chris L. Hoxie)
Program and Code Status		**Chair: Antony Calvo, USNRC**
9:20 AM	Antony Calvo, USNRC, USA	Review and Approval of the Fall 2011 Meeting Minutes
9:30 AM	Douglas Barber, ISL, USA	RELAP5 Status and User Problem Report (Douglas Barber, Dan Prelewicz)
10:00 AM	Break	
10:15 AM	Josh Whitman, USNRC, USA	TRACE Code Development Status (Joshua Whitman)
Member Country Reports		**Chair: Antony Calvo, USNRC**
10:45 AM	Chiung-Wen Tsai, National Tsing Hua University, Taiwan	Status of CAMP Activities in Taiwan (Jong-Rong Wang, Chiung-Wen Tsai , Hao-Tzu Lin, Chunkuan Shih)
11:15 AM	Jozsef Banati, Chalmers University of Technology, Sweden	Summary of Swedish CAMP Related Activities (Alexander Agung, József Bánáti, Ninos Garis, Weimin Ma)
11:45 AM	Ernest Staroń, National Atomic Energy Agency, Poland	The Polish Regulatory Body Activities (Ernest Staroń, Marcin Dąbrowski)
12:15 PM	Lunch	
1:15 PM	Miguel Sánchez Perea, Nuclear Safety Council, Spain	Status Report of CAMP Activities in Spain (Miguel Sánchez Perea)
1:45 PM	Omar Zerkak, Paul Scherrer Institut, Switzerland	Selected PSI activities using CAMP Agreement codes (C. Adamsson, J. Freixa, S. Canepa, T. Gudmundsson, D. Karanki, T-W. Kim, K. Nikitin, D. Papini, R. Szijarto)
2:15 PM	Seunghoon Ahn, Korea Institute of Nuclear Safety, Korea	Status of CAMP Activities in Korea (Seung-Hoon Ahn)
2:45 PM	Davor Grgić, University of Zagreb, Croatia	Status of CAMP Activities in Croatia (Vesna Benčik, Davor Grgić, Siniša Šadek)
3:15 PM	Break	

3:30 PM	Jinjun Feng, Nuclear and radiation Safety Center, China	CAMP Activities Status in China (Feng Jinjun, Chai Guohan)
4:00 PM	Aleksandar Delja, Canadian Nuclear Safety Commission, Canada	Canada CAMP (Code Applications and Maintenance Program) Updates (Aleksander Delja)
	Technical Reports	**Chair: Iztok Tiselj, JSI**
4:30 PM	Wadim Jaeger, Karlsruhe Institute of Technology, Germany	Uncertainty and Sensitivity Study with TRACE-DAKOTA and TRACE-SUSA: A comparison based on NUPEC BFBT experimental data (Wadim Jäger, Victor Sánchez, Francisco Montero, Cesar Queral)
5:00 PM	Ovidiu-Adrian Berar, Jožef Stefan Institute, Slovenia	IJS conversion procedure from RELAP5 to TRACE - example of Achilles test rig (Ovidiu-Adrian Berar, Andrej Prošek, Borut Mavko) Animation
5:30 PM	Adjourn	
7:30 PM	Welcome Reception, City hotel Ljubljana (sponsored by Nuclear Power Plant Krško)	

Thursday, May 31, 2012

8:00 AM	**Technical Reports (continued)**	**Chair: Josh Whitman, USNRC**
8:00 AM	Pavel Kral, Nuclear Research Institute Řež, Czech Republic	Application of RELAP5 and Uncertainty Methodology to Safety Analysis of VVER-1000 (Pavel Kral, Jelena Krhounkova, Frantisek Lahovsky, Jiri Macek, Radim Meca)
8:30 AM	Fulvio Mascari, Università degli Studi di Palermo, Italy	Analyses of the OSU-MASLWR natural circulation phenomena by using TRACE code (Fulvio Mascari, Giuseppe Vella, Brian G. Woods, Kent Welter, Francesco D'Auria)
9:00 AM	Hideo Konishi, JNES, Japan	Fukushima Daiichi Accident Analyses with RELAP5 (Hideo Konishi)
9:30 AM	Tong Soo Choi, KEPCO Nuclear Fuel, Korea	New Model and Correlation Package for RELAP5 Reflood Calculations (Tong Soo Choi)
10:00 AM	Break	
10:15 AM	Masahiro Furuya, Central Research Institute of Electric Power Industry, Japan	Code Validation for Flashing-Induced Density Wave Oscillations in SIRIUS-N Facility Which Simulates ESBWR (Masahiro Furuya, Yoshihisa Nishi, Nobuyuki Ueda)
10:45 AM	Filippo Fiori, GRNSPG, Italy	Status of the activity with RELAP5 and TRACE at GRNSPG (A. Petruzzi, M. Cherubini, W. Giannotti, N. Muellner, A. Kovtonyuk, F. Fiori, E. Coscarelli)
11:15 AM	Kiril Velkov, GRS, Germany	First Applications of PARCS and SNAP at GRS mbH (Kiril Velkov, Yann Perin, Carsten Köllein)
11:45 AM	Petr Heralecký, TES, Czech Republic	Post-Test Analysis of Hot Leg 2x25% Break at PSB VVER Facility Using RELAP5/MOD3.3 Code (Petr Heralecký)
12:15 PM	Lunch	
1:15 PM	Jose Felipe Villanueva, Universitat Politècnica de València, Spain	Spent Fuel Pool Analysis Using TRACE Code (Francisco Sánchez, Sofia Carlos, Jose Felipe Villanueva, Sebastián Martorell)
1:45 PM	Fulvio Mascari, Università degli Studi di Palermo, Italy	Analyses of the SPES-3 accident condition by using TRACE code (Fulvio Mascari, Giuseppe Vella)
2:15 PM	César Queral, Universidad Politecnica de Madrid, Spain	Analysis of LOCA sequences with TRACE code (César Queral, Juan Gonzalez-Cadelo, Javier Montero)
2:45 PM	Viktor Mukoid, State Scientific and Technical Center for Nuclear and Radiation Safety, Ukraine	Development of the TRACE Model for WWER-1000 Reactor Type (Yuriy Alekseev, Valeriy Shikhabutinov, Viktor Mukoid)
3:15 PM	Break	
3:30 PM	Benoit Arsenault, AMEC NSS, Canada	Benchmarking of a Generic CANDU Reactor with PARCS, MCNP and RFSP-IST (Benoit Arsenault, Omar Shaikh, David Luxat, Dan Jabaay, Yunlin Xu, Andrew Ward, Thomas

		Downar)
4:00 PM	Sergio Gallardo, Universidad Politecnica de Valencia, Spain	PKL/ROSA Counterpart Test. Post Test analysis with TRACE5 (S. Gallardo, A. Querol, G. Verdú)
4:30 PM	Gumersindo Verdú, Universitat Politècnica de València, Spain	IMPROVEMENTS IN THE DECAY HEAT MODEL IN THE THERMALHYDRAULIC CODE TRAC-BF1 (A. Soler, T. Barrachina, R. Miró, G. Verdú, A. Concejal, J. Melara)

5:30 PM Ljubljana Tour (1.5 hour)

8:00 PM Social dinner, City hotel Ljubljana (sponsored by GEN energija)

Friday, June 1, 2012

	Technical Reports (continued)	**Chair: Andrej Prošek, JSI**
8:00 AM	César Queral, Universidad Politecnica de Madrid, Spain	Simulation of CCW and SGTR sequences in a PWR-W (César Queral, Luisa Ibáñez, Gonzalo Jiménez-Varas)
8:30 AM	Fulvio Mascari, Università degli Studi di Palermo, Italy	Analyses of the TRACE–PARCS coupling capability (Fulvio Mascari, Giuseppe Vella, Flavio Parozzi, Vincenzo Casamassima) Animations
9:00 AM	Rafael Miró, Polytechnic University of Valencia, Spain	A COUPLING PROCEDURE BETWEEN TRAC-BF1 AND PARCS CODES FOR 3D TRANSIENT SIMULATIONS (A. Jambrina, T. Barrachina, R. Miró, G. Verdú, A. Concejal, J. Melara)
9:30 AM	Andrej Prošek, Jožef Stefan Institute, Slovenia	RELAP5, TRACE 1D and TRACE 3D comparison against Bethsy 9.1b test (Andrej Prošek, Ovidiu-Adrian Berar)
10:00 AM	Break	
10:15 AM	Suren Bznuni, Nuclear and Radiation Safety Centre, Armenia	Experience of PARCS-RELAP Implementation for WWER reactors modelling (S. Bznuni, T. Malakyan, A. Amirjanyan)

	TPC Meeting	**Chair: Antony Calvo, USNRC**
10:45 AM	Acceptance of Minutes from Fall 2011 TPC Meeting	
10:45 AM	NUREG/IA and CAMP Status (Antony Calvo)	
11:15 AM	Discussion of In-Kind Contributions	
11:45 PM	Final Discussion	
12:30 PM	End of Spring 2012 CAMP Meeting	

APPENDICE 2

- **Plant Operations, Maintenance, Engineering, Modifications, Life Cycle, and Balance of Plant**

ICONE20-POWER2012-54027
Improving Nuclear Power Plant's Operational Efficiences in the USA
Joseph S. Miller, Bob Stakenborghs, and Robert W. Tsai

ICONE20-POWER2012-54092
Developing the Initial Reliability Assurance Program (RAP) for Maintenance in New Nuclear Plants
J. K. August and Edward Dundon

ICONE20-POWER2012-54094
One Power Plant's Experience in Setting Up, Performing and Acting on a Pipe Hanger Surveillance Program
Lange Kimball and Kuda Mutama

ICONE20-POWER2012-54109
Development of a Manipulator-Supported Laser Decontamination System
Wolfgang Lippmann, Rene Littwin, and Antonio Hurtado

ICONE20-POWER2012-54158
Insights From Investigations of High Energy Arcing Fault "HEAF" Events in German Nuclear Power Plants
Marina Röwekamp, Steffen Katzer, Joachim Klindt, and Heinz-Peter Berg

ICONE20-POWER2012-54165
Effects of German Nuclear Power Plants Closure on Future Electricity Cost in Central Europe
Miroslav Vitek

ICONE20-POWER2012-54189
A Method for Incorporating Thermal Performance Characterization Tools With Real-Time and Historic Plant Data
Michael L. Morgan, Jr.

ICONE20-POWER2012-54276
Price Evaluation in Nuclear Power Industry: Modeling and Computation
Vasyl O. Kostiuk, Taras O. Kostyuk, and Volodymyr K. Dobrovolsky

ICONE20-POWER2012-54290
Evaluation of Reactor Recirculation Pump Adjustable Speed Drive Cell Bypass Recovery Scenarios for the Exelon Nuclear Plants
James W. Morgan, Hilary A. Neal, Eric R. Frantz, Mark Budelier, Hossein Youssefnia, and Thomas K. Lindqvist

ICONE20-POWER2012-54329
A Study for Heat-Loss Characteristics of Hot-Water Layer by the Increment of Reactor Power
Young-Chul Park, Kyoung-Woo Seo, Dae-Young Chi, Ju-Hyeon Yoon, and Hyun-Gi Yoon

ICONE20-POWER2012-54348
Optimizing Capacity of Nuclear Power Plants: Thermal Performance Assessment Using a Case Study
Komandur Sunder Raj

ICONE20-POWER2012-54352
Developing a Thermal Performance Monitoring System Specification for a Nuclear Power Plant: A Case Study
Komandur Sunder Raj

ICONE20-POWER2012-54406
Instrumentation Device and Surface Control Technology for Coolant Piping System of Nuclear Power Plants
Akihiko Nishimura, Takaya Terada, Yukihiro Shimada, Yukihiro Yonemoto, and Tomonori Yamada

ICONE20-POWER2012-54455
TRACE/PARCS Modelling of Feedwater Pump Trip Transients for Lungmen ABWR
Tsung-Sheng Feng, Jong-Rong Wang, Hao-Tzu Lin, and Chunkuan Shih

ICONE20-POWER2012-54475
Nuclear Power Plant Simulator for Concept Design and Performance Analysis
B. N. M. Mills, V. Badalassi, and R. I. Latchford

ICONE20-POWER2012-54493
Dust Generation and Transport Behavior in the Primary Circuit of HTTR
Shimpei Hamamoto, Yosuke Shimazaki, Takayuki Furusawa, Takahiro Nemoto, and Hiroyuki Inoi

ICONE20-POWER2012-54523
Exergy Analysis and Fuel Exergy Allocation in a HTGR Direct Combined Cycle
Atilio B. Lourenço, José Joaquim C. S. Santos, and João Luiz M. Donatelli

ICONE20-POWER2012-54578
Main Steam Isolation Valves of BWR: Requirements and Boundary Conditions Based on Operating Experience and New Technology
Otmar Promper and Egon Königstein

ICONE20-POWER2012-54656
Method for Establishing Risk Significance of Procedural Actions for Pre-Initiating Events for Operating Nuclear Power Plants
C. R. Grantom and Pamela Nelson

ICONE20-POWER2012-54681
Experiment and Numerical Simulation of Asymmetric Pipe Wall Thinning Behind an Orifice by Combined Effect of Swirling Flow and Orifice Bias
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Yaoli Zhang, Zhiwei Zhou, and Yanning Yang

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Tetsuaki Takeda, Akihiro Sato, and Shumpei Funatani

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Analytical Prediction of Turbulent Friction Factor in Circular Pipe Under Supercritical Conditions
Jinguang Zang, Xiao Yan, Shanfang Huang, Yanping Huang, and Zejun Xiao

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Effect of Void Fraction on Pressure Drop in Upward Vertical Two-Phase Gas-Liquid Pipe Flow
Clement C. Tang, Sanjib Tiwari, and Afshin J. Ghajar

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Performance Evaluation of a High Thermal Conductivity Fuel With Graphene Additives During the LBLOCA
Seung Won Lee, Hyoung Tae Kim, and In Cheol Bang

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Experimental Investigation on Heat Transfer for Two-Phase Flow Under Natural Convection
Milan Amižic, Estelle Guyez, and Jean-Marie Seiler

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Reactor Cavity Cooling System Facility Shakedown and RELAP5-3D Model Validation
R. Vaghetto, Saya Lee, and Y. A. Hassan

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- **Computational Fluid Dynamics (CFD) and Coupled Codes**

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Numerical Simulation of Three-Phase Flows With Rich Solid Particles by Coupling Multi-Fluid Model With Discrete Element Method
Liancheng Guo, Koji Morita, and Yoshiharu Tobita

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CFD Model Development and Validation for VHTR Air Ingress Scenarios
J. Baggemann, S. Kelm, H.-J. Allelein, and A. Hurtado

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Applications and Development of the PORFLO 3D Code in Nuclear Power Plant Thermal Hydraulics
Eveliina Takasuo, Ville Hovi, and Mikko Ilvonen

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CFD Modeling and Experiment Validation of Flow Characteristic in a Structured Pebble Bed
ZhongChun Li, Jian Li, XiaoMing Song, and JianChao Lu

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Computational Study on the Particle Sedimentation Performance of a Reactor Building Floor Weir by Means of Two-Dimensional Lattice Boltzmann Method
Jong Woon Park, Won Seok Kim, Keun Sung Lee, and Jinsu Kim

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Numerical Analysis of the Flow Blockage Accidents in Plate-Type Fuel Assembly
Lei Song, Yun Guo, and Heyi Zeng

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Numerical Simulation of Liquid Sodium Convection Flowing Through Wire-Wrapped Subassembly
Zheng Li, Heyi Zeng, and Yun Guo

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CFD Simulation of Direct Contact Condensation With ANSYS CFX Using Locally Defined Heat Transfer Coefficients
Sabin Cristian Ceuca and Rafael Macián-Juan

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Ding Lin and Zhang Li

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Numerical Methods for Compressible Multiphase Flow With Sodium-Water Chemical Reaction
Akihiro Uchibori and Hiroyuki Ohshima

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Numerical Analysis of Heat Transfer Phenomena When Mitigating Severe Accident With External Reactor Vessel Flooding
Tae Hyub Hong, Chan Kook Moon, and Hyeong Taek Kim

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Jinbiao Xiong, Xu Cheng, and Yanhua Yang

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Anisotropic Porosity Formulation of the Coarse-Grid-CFD (CGCFD)
Mathias Viellieber and Andreas G. Class

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3D Coupled Code SPARKLE-2 for PWR Non-LOCA Analysis
Hikaru Sakamoto, Manabu Miyata, Manabu Maruyama, and Junto Ogawa

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Application of a Second Order Shock Capturing Scheme to the Solution of the Water Faucet Problem With a 1D Two-Fluid Model
William D. Fullmer, Xiaoying Zhang, and Martin A. Lopez de Bertodano

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Three-Dimensional Numerical Study on Condensation-Conduction-Evaporation Coupled Heat Transfer
Chang Lei and Yanning Yang

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Assessment of Performance of Turbulence Models of CFX in Predicting Supercritical Water Heat Transfer in a Vertical Tube
Jie Li, Junchong Yu, Guangming Jiang, and Jiyang Yu

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Numerical Simulations of MISTRA 2009 Campaign for ITER Hydrogen Explosion Mitigation Studies
Jianjun Xiao and John R. Travis

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Investigations on Bubble-Induced Turbulence Modeling for Vertical Pipe Bubbly Flows
Yixiang Liao and Dirk Lucas

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Numerical Simulations of Shock-Induced Nozzle Flow Separation
Xiang Zhao, Sujun Dong, and Sijun Zhang

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Three-Dimensional Numerical Study of Natural Convection in Passive Residual Heat Removal Heat Exchanger
Mingyuan Wang, Ruojun Xue, and He Zhu

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CFD of the Upper Plenum and its Hot Legs for a PWR: Sensitivity to the Turbulence Model
Arièle Défossez, Sofiane Benhamadouche, and Serge Bellet

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Design of Passive Concrete Cooling System Using CFD
A. M. Vaidya, N. K. Maheshwari, and P. K. Vijayan

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Validation of a Pseudo-3D Modelling of Reactor Pressure Vessel With ATHLET System Code for Coupled Code Applications
Kiril Velkov, Sergey Nikonov, Georg Lerchl, and Ihor Pasichnyk

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Numerical Simulation of a Completely Passive Spent Fuel Pool: Lessons Learned
Elia Merzari and Yousry Gohar

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Extension and Application of the Coupled 1D-3D Thermal-Hydraulic Code ATHLET-ANSYS CFX for the Simulation of Liquid Metal Coolant Flows in Advanced Reactor Concepts
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Application of the Convolution Theorem to Predict Heated Wall Temperature Subject to Various Axial Power Distributions
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Multi-Scale Thermalhydraulic Analyses Performed in NURESIM and NURISP Projects
D. Bestion, D. Lucas, B. Niceno, H. Anglart, and L. Vyskocil

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Local Mesh Refinement in COM3D
Ke Ren, Alexei Kotchourko, and Alexander Lelyakin

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LES and URANS Predictions of Thermal Load in Piping Systems: T-Junction
Yacine Addad and Jeong Ik Lee

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A CFD-Based Integral Pump-Down Model for Computing Solids Transfer From a Mixing Vessel
Michael P. Kinzel, Leonard J. Peltier, Brigette Rosendall, Andri Rizhakov, and Kelly J. Knight

ICONE20-POWER2012-55214
CFD Simulations of a Heat Recovery Steam Generator for the Aid of Power Plant Personnel
Iván F. Galindo-Garcia, Ana K. Vázquez-Barragán, and Miguel Rossano-Román

- ## Instrumentation and Controls

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James A. Bickford, Michael Y. Feng, Mitchell Hansberry, Daniel Harjes, Eric Balles, Joe Estrada, Chris Hill, and Bill Kirkenir

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Defence-in-Depth and Diversity Analysis of FPGA-Based NPP I&C Systems: Conception, Technique and Tool
Vyacheslav S. Kharchenko, Volodymyr V. Sklyar, Olexandr A. Siora, and Andriy V. Volkoviy

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A Study on the Power and Power Control System of the Passive Core Cooling Integral Test
Fang Tian, Qing Clio Dai, and Zhen-feng Qi

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Diffusive Polarization of Electrodes in Molten-Salt Galvanic Circuit
Alexander L. Shimkevich

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The Role of FPGA-Based Architectures in the Control Room Modernization Process: Preliminary Results of a Case-Study
M. Cappelli, F. Memmi, L. Falconi, M. Palomba, R. Bove, and M. Sepielli

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Development of a New Oscillation Power Range Monitor Algorithm Based on Period Standard Deviation
Norio Sakai, Yutaka Takeuchi, Hiroyuki Takeuchi, and Kazuki Yano

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Application of Computer-Based Operating Procedure to the US-APWR Human-System Interface
Satoshi Hanada, Koji Ito, Kenji Mashio, Masashi Hirahatake, and Robert E. Hall

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Hydraulic Cylinders-Response in Fluid Power Control Systems
Tahany W. Sadak and Mahassen Rizk

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Nuclear Industry Applications of Si-Diode Based High Gamma Dose Rate Detectors
S. Yue, B. Sur, A. Das, G. Jonkmans, and L. Li

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Optimal H_∞ Loop Shaping Based Steam Generator Level PID Controller Tuning
Yuyan Liu and Shiliang Zhou

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A Simple Robust Gain Scheduled PID Control for Steam Generator Water Level
Shiliang Zhou and Yuyan Liu

ICONE20-POWER2012-55185
Safety Assessment of FPGA Based RPS System for Lungmen NPP
Jun-Jen Lu, Hwai-Pwu Chou, and Kin-Wah Wong

- ## Next Generation Systems

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Experimental Investigations and Analytical Improvements for HTR Pebble Bed Cores
H.-J. Allelein, B. Schloegl, J. Baggemann, S. Juehe, and S. Kasselmann

ICONE20-POWER2012-54074
Parametric and Uncertainty Study of a Counter Current LBE-Water Heat Exchanger With TRACE and SUSA
Wadim Jäger, Victor Sánchez, and Diego Castelliti

ICONE20-POWER2012-54095
Thermochemical Hydrogen Production IS process
Jin Iwatsuki, Shinji Kubo, Seiji Kasahara, Nobuyuki Tanaka, Hiroki Noguchi, Yoshiyuki I mai, and Kaoru Onuki

ICONE20-POWER2012-54184
High-Temperture Structural Analysis on a Small-Scale PHE Prototype Considering Mechanical Properties in the Heat-Affected Zone and in the Weld Zone
Kee Nam Song, Sung-Deok Hong, and Hong-Yoon Park

ICONE20-POWER2012-54351
Control Strategies for VHTR Gas-Turbine System With Dry Cooling
Hiroyuki Sato, Xing L. Yan, Hirofumi Ohashi, Yukio Tachibana, and Kazuhiko Kunitomi

ICONE20-POWER2012-54384
Numerical Analysis for a Molten Salt Reactor in the Presence of Fissile Lump
Yao Xiao, Dalin Zhang, Zhangpeng Guo, and Suizheng Qiu

ICONE20-POWER2012-54411
Preliminary Design of Hybrid Energy Reactor
Maosheng Li, Chan Gao, Xueming Shi, and Xianjue Peng

ICONE20-POWER2012-54429
Dynamic Behavior Analysis of a Supercritical Water Cooled System Using Modified ATHLET
Chong Zhou, Xu Cheng, and Yanhua Yang

ICONE20-POWER2012-54435
Simulation of the Natural Convection Test of Phenix Reactor Using Modified ATHLET
Chong Zhou, Klaus Huber, and Xu Cheng

ICONE20-POWER2012-54460
Investigation of a Heavy Liquid Metal Free Surface Target Experiment
Karsten Litfin, Frank Fellmoser, Abdalla Batta, Andreas G. Class, and Thomas Wetzel

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Development of a Core Management Tool for MYRRHA: Work in Progress
David Jaluvka, Gert Van den Eynde, and Stefan Vandewalle

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Dynamic Analysis of S-CO_2 Cycle Control With Coupled PDC-SAS4A/SASSYS-1 Codes
Anton Moisseytsev and James J. Sienicki

ICONE20-POWER2012-54548
Modeling of the SNL S-CO_2 Loop With ANL Plant Dynamics Code
Anton Moisseytsev and James J. Sienicki

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High-Speed Steam Turbine Systems for Small-Scale Power Generation Applications
Miroslav P. Petrov, Jens Fridh, Ake Göransson, and Torsten H. Fransson

ICONE20-POWER2012-54641
Reactor Kinetics in a Loss-of-Forced-Cooling (LOFC) Test of HTGRs
Kuniyoshi Takamatsu and Kazuhiro Sawa

ICONE20-POWER2012-54708
A Type of SCWR Core Design Study With 3-D Coupled Neutronics/Thermal-Hydraulics Analysis
Yong Zhang, Jue Yang, Dongsheng Li, Liangzhi Cao, Qianhua Su, Jianmin Zhang, Fei Wang, and Hongbo Li

ICONE20-POWER2012-54725
Improvement of the Fast Breeder Reactor Plant Dynamic Analysis Code ADYTUM
Isao Tatewaki, Hiroshi Endo, Yoshihisa Shindo, and Tomoko Ishizu

ICONE20-POWER2012-54733
LIFUS5/Mod2: The Experimental Facility for HLM/Water Interaction Investigation
Alessandro Del Nevo, Andrea Ciampichetti, Nicola Forgione, and Simone Mannori

ICONE20-POWER2012-54757
A Pre-Test CFD Analysis of HLM Fuel Pin Bundle
Ivan Di Piazza, Marco Scarpa, and Mariano Tarantino

ICONE20-POWER2012-54844
Investigation on the Characteristic of the Annular Fuel Based on Subchannel Analysis Under Supercritical Condition
Bo Zhang, Jue Yang, Yuanbin Zhu, Jianqiang Shan, and Junli Gou

ICONE20-POWER2012-54933
The Screening Methodologies and/or Achievement Evaluation in Japanese FR Cycle Development Program With the Changing Needs for Evaluation
Hiroki Shiotani, Kiyoshi Ono, Nariaki Uto, Takashi Namba, Koichi Kawaguchi, and Yoshihiko Shinoda

ICONE20-POWER2012-54952
Post Test Analysis of ICE Tests
Mariano Tarantino, Alessandro Del Nevo, Nicola Forgione, and Giacomino Bandini

ICONE20-POWER2012-54972
Integrated Multi-Modular Fast Reactor Concept Design
Vishal Patel and Pavel Tsvetkov

ICONE20-POWER2012-55042
Mechanical Aspects of the Canadian Generation IV Supercritical Water-Cooled Pressure Tube Reactor
M. Yetisir, M. Gaudet, and D. Martin

ICONE20-POWER2012-55152
A Design of Simulation Experiment System for the Helium Turbine
Liang Zhu and Zhengang Shi

- ## Fusion Engineering

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Thermal-Hydraulic Analysis of Design Basis Accidents for Chinese Helium-Cooled Solid Breeder TBM
Jie Wang, Guanghui Su, Wenxi Tian, and Suizheng Qiu

ICONE20-POWER2012-54209
Basic Experiment on Lithium Removal Technique
Tomohiro Furukawa and Yasushi Hirakawa

ICONE20-POWER2012-54445
Calculations of the Dual Functional Lithium Lead-Test Blanket Module for ITER With Three-Dimensional Deterministic Method
GuangChun Zhang, Hongchun Wu, Liangzhi Cao, and Youqi Zheng

ICONE20-POWER2012-54483
The Neutronic Calculation of Hybrid Energy Reactor
Chan Gao and Maosheng Li

ICONE20-POWER2012-54730
In Vessel Loss of Coolant Accident Analysis for the JET Tokomak in Support of the Safety Case Review
Joelle Vallory, Helen Boyer, Fabien Moreno, and Dominique Kadri

ICONE20-POWER2012-54789
Hydrocarbon Catalytic Nuclear Fusion by Using Quantum Spin Hall Effect
Abul Hasanat Muhammad Jahanur Rahman

ICONE20-POWER2012-55046
Scientific Bases of Corrosion Control for Water-Cooled Fusion Reactors Such as ITER
Genn Saji

- ## Reactor Physics, Neutronics, and Transport Theory

ICONE20-POWER2012-54214
Automatic Modeling of Complex Geometries for MCNP Simulation Using GEOMIT Code
Noha Shaaban, Wael El Gammal, Hesham Nasif, and Hidetsugu Morota

ICONE20-POWER2012-54229
Acceleration and Parallelization of Arbitrary Trajectory Based Three-Dimensional Method of Characteristics
Zhizhu Zhang, Kan Wang, and Qing Li

ICONE20-POWER2012-54369
Reactor Core Physics Simulation Method for HTR
Chunlin Wei, Zhe Sui, Jun Sun, and Wen-zhi Shan

ICONE20-POWER2012-54383
The Ultra-Fine-Group Panel Method for Neutron Slowing Down
Robert A. Joseph III, Ivan Maldonado, and Barry Ganapol

ICONE20-POWER2012-54428
Research on the Subgroup Method and 2D Arbitrary Geometry Resonance Calculation Code
Lei He, Hongchun Wu, Liangzhi Cao, Youqi Zheng, and Hongbo Zhang

ICONE20-POWER2012-54535
Performance Study of the MORET Monte Carlo Code for Local Power Density Calculations in a Full Size Reactor Core
Franck Bernard, Joachim Miss, and Gabriel Juhel

ICONE20-POWER2012-54544
The 2nd Generation Fuel of VVER-440 and the Validation of the Correspondent Calculation Route
György Hegyi, András Keresztúri, Csaba Maráczy, and Emese Temesvári

ICONE20-POWER2012-54554
Assessment of Reactor Core Simulations Using DONJON for a 2-Dimensional SCWR Benchmark Core
Xiaolin Wang and Jeremy Pencer

ICONE20-POWER2012-54586
Neutron Facility Based on High Intensity DT Neutron Generator
Vitaly Kovaltchouk, Ahmed Hosny, Rachid Machrafi, Muhammad Ali, and Nafisah Khan

ICONE20-POWER2012-54878
Xenon Correction in Homogenized Neutron Cross Sections
Davor Grgic, Radomir Jecmenica, and Dubravko Pevec

ICONE20-POWER2012-54939
The Investigation of Thermal Neutron Scattering Data of FLiBe
Longwei Mei, Xiangzhou Cai, Jingen Chen, Wei Qin, and Wei Guo

ICONE20-POWER2012-54948
Development of CAD-MCNP Interface Program “GEOMIT”
Hesham Nasif, Akihiro Masui, Hidetsugu Morota, Takashi Sato, and Hideo Kitagawa

ICONE20-POWER2012-54956
Development of a Nodal Kinetics Code System GalaxyCosmo-K for PWR Transient Analyses
Kazuya Yamaji, Kazuki Kirimura, and Hideki Matsumoto

ICONE20-POWER2012-55109
An Approximation for the Interference Term Applied to the Calculation of the Average Scattering Cross Section Using Fourier Series
Alessandro C. Gonçalves, Daniel A. P. Palma, and Aquilino S. Martinez

ICONE20-POWER2012-55280
Secondary Particles Produced by 1.5 GeV Proton Beams Incident on Lead-Bismuth Eutectic Target of C-ADS
Hongli Wu, Xiangqi Wang, Jingyu Tang, Yuanjie Bi, Weimin Li, and Lei Shang

- ## Nuclear Education, Human Resources, and Public Acceptance

ICONE20-POWER2012-54039
ASN and IRSN Contribution in European Union “Instrument for Nuclear Safety Cooperation” Projects: The Case of Egypt
Christophe Herer, Jean-Yves Ravachol, Jean-Christophe Gariel, Christophe Clement, Laurent Guimier, Vincent Rebour, David Baumont, and Pascal Bailly-du-Bois

ICONE20-POWER2012-54055
Challenge in the Public Acceptance and Cooperation on the Verge of Building the First Nuclear Power Plant in Indonesia
Susetyo Hario Putero, Haryono Budi Santosa, and Widya Rosita

ICONE20-POWER2012-54107
A Study on the Public Perception in Nuclear Area in Brazil
Renata A. Almeida, Maria de Lourdes Moreira, Patricia Wieland, and Antonio Cesar F. Guimarães

ICONE20-POWER2012-54389
Smart Energy Management and Comprehensive Utilization of Nuclear Energy
Shutang Zhu and Zhaoqi Zhu

ICONE20-POWER2012-54926
Fukushima: What Impact on Radiation Regulatory Conservatism?
Gary M. Sandquist, Jay F. Kunze, and Eric J. Wells

ICONE20-POWER2012-55055
Time-Series Visualization on Nuclear Power Plant Trouble Database
Yutaka Hongo, Koji Okamoto, and Shuhei Takahashi

ICONE20-POWER2012-55149
Research and Education in Nuclear Safety: Perspective of the Smallest Nuclear Country
Leon Cizelj and Iztok Tiselj

ICONE20-POWER2012-55205
Basic vs. Applied Doctoral Theses in Nuclear Engineering in Slovenia
Ivo Kljenak, Borut Mavko, Leon Cizelj, and Iztok Tiselj

ICONE20-POWER2012-55230
International Training Program in Support of Safety Analysis: 3D S.UN.COP—Scaling, Uncertainty and 3D Thermal-Hydraulics/Neutron-Kinetics COuPled Codes Seminar
A. Petruzzi, F. Fiori, A. Kovtonyuk, F. D'Auria, T. Bajs, and F. Reventos Puigjaner

ICONE20-POWER2012-55265
National Technical University of Ukraine "Kiev Politechnical Institute" and its Nuclear Education Programs
V. G. Razumovskiy, E. N. Pis'mennyi, M. Z. Zgurovskiy, and I. L. Pioro

- ## Student Paper Competition

ICONE20-POWER2012-54080
Experiments on Choking Flow of Subcooled Liquid Through a Simulated Steam Generator Tube Crack
Brian Wolf, Shripad T. Revankar, and Jovica R. Riznic

ICONE20-POWER2012-54103
Suitability of Eutectic Field's Metal for Use in an Electromagnetohydrodynamically-Enhanced Experimental Two-Phase Flow Loop
A. Lipchitz, Lilian Laurent, and G. D. Harvel

ICONE20-POWER2012-54154
Probability Analysis of the Fuel Microsphere Distribution of Dispersion-Type Nuclear Fuel Plates
Lijun Gao, Hua Pang, Bingde Chen, Shengyao Jiang, Jiyang Yu, and Zhong Xiao

ICONE20-POWER2012-54188
Post Test Calculations of a Severe Accident Experiment for VVER-440 Reactors by the ATHLET Code
Hunor György and István Trosztel

ICONE20-POWER2012-54199
Accounting Nuclear Fuel Burnup for Criticality Safety Justification of Spent Nuclear Fuel Storages
Vladislav Solovyov and Vitaliy Galchenko

ICONE20-POWER2012-54221
Code Simulation of Quenching of a High Temperature Debris Bed: Model Improvement and Validation With Experimental Results
A. Bachrata, F. Fichot, G. Repetto, M. Quintard, and J. Fleurot

ICONE20-POWER2012-54239
Study of Aerosol Scavenging by Rain in Case of a Radioactive Contamination of the Atmosphere
Arnaud Quérel, Pascal Lemaitre, Marie Monier, Emmanuel Porcheron, and Flossmann Andrea

ICONE20-POWER2012-54245
Triboengineering Problems of Lead and Lead-Bismuth Coolants in Innovative Fast Reactors
Artem Shumilkov, A. V. Lvov, A. V. Beznosov, T. A. Bokova, and Kirill Makhov

ICONE20-POWER2012-54251
Nuclear Fuel Burn-Up Depth in WWER Reactors With Various Burnable Absorbers
Vasyl Zaiets

ICONE20-POWER2012-54266
On the Use of Support Vector Regression Technique for the Analysis of Rod Ejection Accidents
Botao Jiang, Yang Liu, and Fuyu Zhao

ICONE20-POWER2012-54288
Experimental Investigation of Cavitation in the Circulation Pumps With Lead and Lead-Bismuth Coolants
A. V. Lvov, A. I. Shumilkov, P. A. Bokov, A. V. Beznosov, and O. O. Novozhilova

ICONE20-POWER2012-54315
The Perspective of Creating a Closed Fuel Cycle Based on the Fast Reactors in Ukraine
I. A. Tereshchenko and S. O. Ustimenko

ICONE20-POWER2012-54327
Research on Enhancement of Natural Circulation Capability in Lead-Bismuth Alloy Cooled Reactor by Using Gas-Lift Pump
Juanli Zuo, Wenxi Tian, Suizheng Qiu, and Guanghui Su

ICONE20-POWER2012-54361
Theoretical Study on the Flow Instability of Supercritical Water in the Parallel Channels
Yali Su, Jian Feng, Wenxi Tian, Suizheng Qiu, and Guanghui Su

ICONE20-POWER2012-54381
Application of Fine Depletion Calculation for LLFPs In-Core Transmutation Evaluation in PWRs
Kun Liu, Hongchun Wu, Liangzhi Cao, Youqi Zheng, and Changhui Wang

ICONE20-POWER2012-54396
Visualization on Inert Gas Jets Impinging to a Glass Tube Submerged in Liquid Sodium
Hideyuki Kudoh, Ken-ichiro Sugiyama, Tadashi Narabayashi, Hiroyuki Ohshima, and Akikazu Kurihara

ICONE20-POWER2012-54397
Thermal Hydraulics Behavior Around a Single Heated Rod With Adhesion Products of Sodium-Water Reaction
Junki Ohta, Ken-ichiro Sugiyama, and Hideyuki Kudoh

ICONE20-POWER2012-54399
Estimation of Fragmentation on Jet Breakup in Coolant
Taihei Kuroda, Yutaka Abe, Akiko Kaneko, Iwasawa Yuzuru, Hideki Nariai, Hiroshi Sak aba, Kazuya Koyama, and Eiji Matsuo

ICONE20-POWER2012-54402
Study on Mixing Process of Two Component Gases in a Vertical Fluid Layer: Effectiveness on One-Dimensional Natural Circulation
Hiroki Mizuno, Tetsuaki Takeda, and Shumpei Funatani

ICONE20-POWER2012-54412
Jet Breakup Behavior With Surface Solidification
Yuzuru Iwasawa, Yutaka Abe, Akiko Kaneko, Taihei Kuroda, Eiji Matsuo, Hideki Nariai, Hiroshi Sakaba, Kazuya Koyama, and Kazuhiro Itoh

ICONE20-POWER2012-54454
Surface Tension of Liquid Sodium With Suspended Nanoparticles
Takuro Ogawa and Ken-ichiro Sugiyama

ICONE20-POWER2012-54467
Measurements of RF-Induced SOL Modifications in Tore Supra Tokamak
Martin Kubic, James P. Gunn, Laurent Colas, Stéphane Heuraux, and Eric Faudot

ICONE20-POWER2012-54490
Study on Control Method of Natural Circulation by Injection of Helium Gas
Masashi Nomura, Tetsuaki Takeda, Shumpei Funatani, and Takuya Shimura

ICONE20-POWER2012-54508
Numerical Flow Analysis of Electromagnetic Fluid Using GSMAC Finite-Element Method
Kun Yang, Yoshitaka Saitoh, Hideki Kawai, Nobuyoshi Tsuzuki, Hiroshige Kikura, and Gaku Hashimoto

ICONE20-POWER2012-54516
Development of a Heat Transfer Correlation for Supercritical CO_2 Based on Multiple Data Sets
Tiberiu Preda, Eugene Saltanov, Igor Pioro, and Kamiel S. Gabriel

ICONE20-POWER2012-54519
Analysis of the MSFR Core Neutronics Adopting Different Neutron Transport Models
Carlo Fiorina, Manuele Aufiero, Antonio Cammi, Claudia Guerrieri, Jiri Krepel, Lelio Luz zi, Konstantin Mikityuk, and Marco Enrico Ricotti

ICONE20-POWER2012-54521
A Preliminary Study of the MSFR Dynamics
Claudia Guerrieri, Manuele Aufiero, Antonio Cammi, Carlo Fiorina, and Lelio Luzzi

ICONE20-POWER2012-54524
A Study of Air-Coupled Ultrasonic Flowmeter
Keisuke Tsukada, Tomonori Ihara, and Hiroshige Kikura

ICONE20-POWER2012-54527
Preliminary Study on Features of Key Components for HTGR Helium Turbine System
Haoran Hao, Xiaoyong Yang, and Jie Wang

ICONE20-POWER2012-54530
Sensitivity Analysis of Fuel Centerline Temperature in SCWRs
Ayman Abdalla, Wargha Peiman, Igor Pioro, and Kamiel Gabriel

ICONE20-POWER2012-54531
Experimental Study of Heat Transfer in a 7-Element Bundle Cooled With Supercritical Freon-12
G. Richards, J. Samuel, A. S. Shelegov, P. L. Kirillov, I. L. Pioro, and G. Harvel

ICONE20-POWER2012-54546
Assessment of Different Turbulence Models in Helically Coiled Pipes Through Comparison With Experimental Data
Marco Colombo, Antonio Cammi, and Marco E. Ricotti

ICONE20-POWER2012-54558
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Anastasiia Zvorykina, Sahil Gupta, Wargha Peiman, Igor Pioro, and Natalia Fialko

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Experiments and Simulations on the Steady-State and Transient Behavior of Gas/Liquid Interfaces in Impulse Pipes for Hydrostatic Level Measurements
Stephan Schulz and Rainer Hampel

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W. Peiman, Eu. Saltanov, L. Grande, I. Pioro, B. Rouben, and K. Gabriel

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Sahil Gupta, Prabu Surendran, Igor Pioro, Donald McGillivray, and Liliana Trevani

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An Addendum: Probabilistic Failure Analysis of a Residual Heat Removal Heat Exchanger During Postulated Loss of Coolant Accident
Matt Solom, Christopher Pannier, Christopher Chance, Robert Seager, Paola Alicea, Ta m Duong, Alan Lee, and Jordan Green

ICONE20-POWER2012-54640
Experimental Investigation of Nucleate Boiling on Capillary Tubes Under PWR Specific Subcooling and Flow Parameters
C. Schneider, R. Hampel, A. Hurtado, A. Traichel, S. Meissner, and E. Koch

ICONE20-POWER2012-54660
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A. V. Taranovski

ICONE20-POWER2012-54665
Comparison of Transient Responses for SCWRs With Different Flow Path Designs Under Loss of Flow Accident
Dahuan Zhu, Wenxi Tian, Suizheng Qiu, and Guanghui Su

ICONE20-POWER2012-54669
Numerical Simulation of Graphite Oxidation in HTGR
Yao Wang, Peng Wang, and Suyuan Yu

ICONE20-POWER2012-54670
Research on the Loading Pattern of Reactor Core With MOX Fuel in the First Cycle
Tianqi Zhang, Shihe Yu, and Xinrong Cao

ICONE20-POWER2012-54676
Response Functions of a Boron-Loaded Plastic Scintillator to Neutron and Gamma Radiation
Nafisah Khan, Muhammad Ali, Ahmed Hosny, and Rachid Machrafi

ICONE20-POWER2012-54683
Neutronics Performance of a Fusion-Fission Hybrid Reactor With Pressure Tube Assemblies
Tiejun Zu, Hongchun Wu, Youqi Zheng, and Liangzhi Cao

ICONE20-POWER2012-54686
Supercritical-Water Experimental Setup for In-Pile Operation
M. Miletic, I. Pioro, M. Ružicková, R. Fukac, and W. Peiman

ICONE20-POWER2012-54693
Best Estimate Analysis of PHEBUS FPT1 Test Using RELAP/SCDAPSIM Code
Tadas Kaliatka, Eugenijus Ušpuras, and Virginijus Vileiniškis

ICONE20-POWER2012-54777
Molecular Dynamics Simulations to Evaluate the Effect of Applied Strain on Interstitial Cluster Formation and Orientation Under Collision Cascade Damage
Satoshi Miyashiro, Satoshi Fujita, Mitsuhiro Itakura, and Taira Okita

ICONE20-POWER2012-54782
Sensitivity Analysis of CFD Code FLUENT-12 for Supercritical Water Heat Transfer in Vertical Bare Tubes
Amjad Farah, Patrick Haines, Glenn Harvel, and Igor Pioro

ICONE20-POWER2012-54834
A Probabilistic Assessment of Flow-Accelerated Corrosion Rate in Pipe Bends With Unknown Initial Thickness
D. Lu, M. D. Pandey, and Jovica Riznic

ICONE20-POWER2012-54840
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ICONE20-POWER2012-54841
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Takeshi Eda, Achyut Sapkota, and Masahiro Takei

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Muhamad Zuhairi Sulaiman, Masahiro Takamura, Kazuki Nakahashi, and Tomio Okawa

ICONE20-POWER2012-54857
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Chun-Yen Li, Rong-Jiun Sheu, Jinn-Jer Peir, Der-Sheng Chao, and Jenq-Horng Liang

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R. S. Glushenkov

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Neutron Generation Based Method for Monte Carlo Three-Dimensional Reactor Time-Dependent Simulation
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Reza Arghandeh and Robert Broadwater

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Generation and Mechanical Analysis of Repeatable Random Rough Surfaces
Hector E. Medina and Brian Hinderliter

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Jong-Pil Park, Kyung Sik Choi, Ji Hwan Jeong, and Jae Jun Jeong

ICONE20-POWER2012-55025
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Yoshitaro Fujiyama and Hiroyasu Ohtake

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Kohei Nago, Yasuo Koizumi, Akihiro Uchibori, and Hiroyuki Ohshima

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Taeseung Lee, Jong Hyuk Lee, and Yong Hoon Jeong

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Alexey Dragunov, Eugene Saltanov, Sergey Bedenko, and Igor Pioro

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Parametric Study of MISTRA M5 Test Using Lumped Parameter COCOSYS Code
Mantas Povilaitis, Egidijus Urbonavicius, and Sigitas Rimkevicius

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Sensitivity Study of the South Texas Project Power Plant Steady-State Simulations Using RELAP5-3D Coupled With DAKOTA
O. A. Rodriguez, R. Vaghetto, and Y. A. Hassan

ICONE20-POWER2012-55237
Modeling and Experimental Study of Inorganic Crystal Response Function for Gamma Spectroscopy and Dosimetry
Muhammad Ali, Nafisah Khan, Ahmed Hosny, and Rachid Machrafi

ICONE20-POWER2012-55245
On the Inflow Phenomenon in Near Field of Buoyant Jet at Low Froude Number
Atsushi Maeda, Nobuyuki Fujisawa, and Takayuki Yamagata

- ## Design Basis and Beyond Design Basis Events

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Brian S. Allison, Chris M. Allison, Judith K. Hohorst, Uwe Luettringhaus, and Fred Torri

ICONE20-POWER2012-54142
EC6 Instrumentation, Control, and Electrical Design for Station Blackouts
Philip Foster, John Harber, Steven Ford, Boris Lekakh, and Chunlei Nie

ICONE20-POWER2012-54241
Beyond Design Basis Seismic Analysis for Atucha II Nuclear Plant
Tao Zhang, Frederick W. Brust, Gery Wilkowski, Heqin Xu, Alfredo Betervide, and Oscar Mazzantini

ICONE20-POWER2012-54253
Extreme Events: The New Social Design Basis
Romney B. Duffey

ICONE20-POWER2012-54278
TRACE and RELAP5 Codes for Beyond Design Accident Condition Simulation in the SPES3 Facility
Fulvio Mascari, Roberta Ferri, Paride Meloni, and Giuseppe Vella

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Single Bubble Growth at Different Gravity and the Effects of Microgravity on Marangoni Convection
Yan Yang, Liang-ming Pan, and Long-Chang Xue

ICONE20-POWER2012-54301
Importance of Reactor Heat Transport System Overpressure Protection System Under Severe Accident Conditions With Special Reference to CANDU Reactors
Sunil Nijhawan

ICONE20-POWER2012-54382
Self-Propelling Cooling Systems: Back-Fitting Passive Cooling Functions to Existing Nuclear Power Plants
Dominik von Lavante, Dietmar Kuhn, and Ernst von Lavante

ICONE20-POWER2012-54387
Improved Regulatory Oversight and Immediate Retrofits for Operating Pressurized Heavy Water Reactors for Beyond Design Basis Accidents
Sunil Nijhawan

ICONE20-POWER2012-54528
Evaluation of a Method for Remote Detection of Fuel Relocation Outside the Original Core Volumes of Fukushima Reactor Units 1-3
Douglas W. Akers and Edwin A. Harvego

ICONE20-POWER2012-54541
CANDU 6 Severe Accident Prevention and Mitigation Features
Steven Ford, Boris Lekakh, Ed Choy, Kamal Verma, and Sorin Ghelbereu

ICONE20-POWER2012-54564
Identification of Non-Safety Systems to Withstand Beyond Design Basis Events
James Nygaard, Ping Wan, Desmond Chan, and Sara Barrientos

ICONE20-POWER2012-54582
Probability of the Loss of Offsite Power and Damage to Road Network due to a Rare Event
Chase Gilmore, Bilal Khan, Jack Cavaluzzi, and Minh Hong Tran

ICONE20-POWER2012-54604
The Benefits of Using a Risk-Informed Approach to Resolving GSI-191
Timothy D. Sande, Gilbert L. Zigler, Ernie J. Kee, Bruce C. Letellier, C. Rick Grantom, and Zahra Mohaghegh

ICONE20-POWER2012-54674
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Salomon Levy

ICONE20-POWER2012-54684
Numerical Simulation of the Self-Leveling Phenomenon by Modified SIMMER-III
Bin Zhang, Tatsuya Matsumoto, Koji Morita, Hidemasa Yamano, Hirotaka Tagami, Tohr u Suzuki, and Yoshiharu Tobita

ICONE20-POWER2012-54729
Preliminary Evaluation of the Reliability of Gen II or III Reactors in BDBE Conditions
Rosa Lo Frano and Giuseppe Forasassi

ICONE20-POWER2012-54856
Seismic Fragility Analysis of a Condensate Storage Tank With Multiple Uncertain Degradation Scenarios
Jinsuo R. Nie, Joseph I. Braverman, Charles H. Hofmayer, Young-Sun Choun, Min Kyu Kim, and In-Kil Choi

ICONE20-POWER2012-54868
Operating Condition of Steam Injector as a Passive Cooling System at Severe Accident of Nuclear Power Plant
Yutaka Abe, Shunsuke Shibayama, Akiko Kaneko, Chikako Iwaki, Tadashi Narabayashi , and Michitsugu Mori

ICONE20-POWER2012-54925
Analysis of Fuel-Coolant Interaction Potential in Sodium Cooled Fast Reactor Safety Experiments
John C. Petrykowski

ICONE20-POWER2012-55002
Integration of Direct/Indirect Influences of Severe Accidents for Improvements of Nuclear Safety
Kampanart Silva, Yuki Ishiwatari, and Shogo Takahara

ICONE20-POWER2012-55114
A Concept of Classification Criteria of External Hazards for PRA of Nuclear Power Plants
Yoshiyuki Narumiya and Takahiro Kuramoto

ICONE20-POWER2012-55129
Flow Characterization and Heat Transfer of Core-Catcher in Passive Safety System
Tomohisa Kurita, Mika Tahara, Toshimi Tobimatsu, Masato Yamada, and Yoshihiro Kojima

ICONE20-POWER2012-55131
Severe Accident Analysis for BWR With Containment Outer Pool
Koki Yoshimura and Kohei Hisamochi

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Masanori Naitoh, Hiroaki Suzuki, and Hidetoshi Okada

ICONE20-POWER2012-55255
Analysis for Low Pressure Cooling Injection System Suction Hydrodynamics for a Boiling Water Reactor
Basar Ozar, Rodney Harvill, Christopher E. Henry, and Deborah A. Norton

- ## Fuels and Combustion, Materials Handling, Emissions

ICONE20-POWER2012-54089
Hydrogen Addition Effects on High Intensity Distributed Combustion
Ahmed E. E. Khalil and Ashwani K. Gupta

ICONE20-POWER2012-54123
Methanol Fuel as Low Cost Alternative for Emission Reduction in Gas Turbines and Utility Boilers
B. Chudnovsky, Y. Hain, A. Kunin, N. Rappoport, M. Reshef, M. Shternshus, S. Baitel, and A. Talanker

ICONE20-POWER2012-54273
A Study of the Effect of Gas Turbine Emissions on the Economics of Natural Gas Pipeline Transportation
A. Nasir, P. Pilidis, S. Ogaji, and W. Mohamed

ICONE20-POWER2012-54486
Temperature and Pressure Characteristics of Ultra-Low Concentration Coal Bed Methane Combustion in a Fluidized Bed
Zhongqing Yang, Li Zhang, and Shiwei Zheng

ICONE20-POWER2012-54638
Comparative Research on the Economy and Emissions of Nuclear Powered Ship and Diesel Ship
Yoshiaki Fumino and Kenji Ishida

ICONE20-POWER2012-54696
Fuel Oil Emulsion Operations in Boilers at El Cafe Plant, Guayaquil, Ecuador
T. Houlihan, P. Grimes, B. Owen, B. Plata, J. Waldron, R. Astudillo, R. Espinel, and R. Maspons

ICONE20-POWER2012-54766
Long-Term Demonstration of a Lean, Premixed, Prevaporized (LPP) System for Gas Turbines
Leo D. Eskin, Maclain M. Holton, Brent A. Turner, Richard G. Joklik, Michael S. Klassen , and Richard J. Roby

ICONE20-POWER2012-55135
The Structure and Performance of a New Type of Industrial Circulating Fluidized Bed Boiler With a Circulating Ash Heat Exchanger
Honghao He, Xiaofeng Lu, Xuanyu Ji, and Quanhai Wang

ICONE20-POWER2012-55215
Increasing Boiler Efficiency Through Intelligent Combustion Optimization
Sudha Thavamani, Matthias Behmann, and Till Spaeth

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Hybrid Power Generation Plant for CO_2 Capture
Shimin Deng, Rory Hynes, and Brian Drover

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Development of Wasteless Combined Aggregate–Coal-Fired Steam-Generator/Melting-Converter
Igor Pioro and Leonard Pioro

- ## Heat Exchangers and Cooling Systems

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Transient Analysis of a Passive Residual Heat Removal System Following a Station Blackout Accident
Dongqing Wang, Baosheng Wang, Taihong Qiu, Jin Jiang, and Jianmin Zhang

ICONE20-POWER2012-54037
Recommended Practices for the Development of an Effective Steam Surface Condenser Maintenance Regime; Including Suggested Maintenance Solutions and Design Modifications That Can Improve Condenser Performance and Reliability
Darren M. Nightingale

ICONE20-POWER2012-54116
The Variation in Effectiveness of Low-Finned Tubes Within a Shell-and-Tube Heat Exchanger for Supercritical CO_2
Patrick M. Fourspring and Joseph P. Nehrbauer

ICONE20-POWER2012-54175
Experimental Study on Condensate Inundation for Condensation of Horizontally Flowing Steam in a Large Condenser Tube Bundle
Issaku Fujita, Koichi Inoue, Satoshi Hiraoka, Manabu Ishihara, and Kotaro Machii

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Dynamic Heat-Exchanger Model for Any Combination of Water and Steam States
Eunkyeong Kim, Takuya Yoshida, and Tatsurou Yashiki

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Improving Air-Cooled Condenser Performance and Availability Through Innovative Cleaning, Inspection and In-Situ Sleeving
Gary Fischer and Craig Ripley

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Performance Experienced From Switching Copper Condenser Tubing to a High Performance Stainless
Summer Goebel and Colin R. Criminger

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Design and Control of Bypass Condensers
Ranga Nadig and Michael Phipps

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High Pressure Feedwater Heater Hemi Head Manway Hoist
Frank L. Michell, David Adkins, Curt Winiger, and Tim Selby

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How Vertical Project Team Integration Between End User, End User's Engineer, Nuclear QA, and Equipment Vendor Provided for Minimized Cost and Installation Expense
Jordan Tyman, Joe Bruno, and Perry Holzman

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Condenser Refurbishment (Retube / Rebundle): Lost Opportunity
Mark Tagliamonte

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Tube Pullout Testing Experience
Kim M. Massey and Merwin W. Jones

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Thermal Analysis Technique for Coolers Operating in Off and Low Load Conditions
Thomas J. Muldoon

- ## Turbines, Generators, and Auxiliaries

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Yifeng Hu, Gang Chen, and Ming Kang

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Missile Safety Analysis of Nuclear Steam Turbine
Rong Chen, Feng Liang, Wen Xiang Hua, Pu Ning Jiang, and Xiao Zhong He

ICONE20-POWER2012-54555
Operation and Maintenance Solutions for Generator Water Cooling
Matthias Svoboda and Robert Svoboda

ICONE20-POWER2012-54584
Failure of Modern Generators
Clyde V. Maughan

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The Advantages of Using Hydraulic Coupling Bolts Over Standard Fitted Bolts in Steam Turbine Flange Couplings
Tom Kennedy

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Lifetime Assessments of an Old Westinghouse-Design Steam Chest
Sazzadur Rahman, Waheed Abbasi, and Thomas W. Joyce

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A Compressible Three-Dimensional Inverse Design Method Based on the Streamline Curvature Approach and Clebsch Formulation for Radial and Mixed Flow Turbomachines
Xiao Pei Tian and Peng Shan

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Steady and Unsteady Flow Measurements Under Low Load Conditions in a Low Pressure Model Steam Turbine
Kiyoshi Segawa, Shigeki Senoo, Hisashi Hamatake, Takeshi Kudo, Tateki Nakamura, and Naoaki Shibashita

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Steam Turbine Overspeed Protection Failures, Causes and Strategies to Avoid Them
Wallace F. Ebner

ICONE20-POWER2012-55029
Subsynchronous Resonance and Torsional Effects on a Steam Turbine Generator in Transmission Systems With Series Capacitor Compensation
K. R. Mutama, D. H. Baker, R. D'Aquila, B. Fitzgerald, C. Wegner, R. M. Staulters, and J. Seeliger

ICONE20-POWER2012-55093
The Effects of Cycling on Generator Rotors
Bill Moore

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A Resurgence of Torsional Vibration Concerns for Nuclear and Fossil Steam Turbine Generator Retrofits
Stephen R. Reid and James B. Lewis

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Proven Methods to Repair and Extend the Life of Low Pressure Turbine Rotors
Stephen R. Reid and James B. Lewis

ICONE20-POWER2012-55208
Main Generator Life Cycle Management
Arun Puri and John DiBiase

ICONE20-POWER2012-55223
Steam Turbine, Boiler, and Valve Optimization Strategies to Recover Parasitic Load and Provide Life Extension
Michael W. Smiarowski

- **Advanced Energy Systems and Renewables (Wind, Solar, Geothermal)**

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Basic Characteristics of a Compact PV/T Simulator
Elkata Yandri, Naoto Hagino, Kazutaka Itako, and Hiro Yoshida

ICONE20-POWER2012-54424
Thermodynamic and Economic Analysis of Reheat Transcritical Organic Rankine Power Cycle Using a Low Temperature Geothermal Heat Source
Hanfei Tuo

ICONE20-POWER2012-54532
Evaluation of Distributed Generation Technologies in a University Context
Marco Gambini and Michela Vellini

ICONE20-POWER2012-54576
A CO_2 Compression and Dehydration System Utilizing Absorption Chillers and Heat Recovery Concepts
David Hasler, David Stopek, Roger Smith, and John Klumpyan

ICONE20-POWER2012-54799
Process Simulation for Enhanced Energy Recovery in a 10 MW(e) Base-Load Solar Thermal Power Plant
Sadaf Siddiq, Zafar Ullah Koreshi, and Shahab Khushnood

ICONE20-POWER2012-54811
Parameter Analysis of Low Grade Thermal Energy Sources Use With Organic Rankine Cycle
Gang Zhao, Jie Wang, and Qian Shi

ICONE20-POWER2012-55115
A Highly Efficient Cogeneration System Using APT Coupled With Biomass Gasification
Y. Tsujikawa

ICONE20-POWER2012-55120
Rooftop Solar Electric Generator Project
Jack Robinson, Jr. and Robert J. Durscher

ICONE20-POWER2012-55151
Economical Impact of Using Wind/PV Hybrid Systems on Energy Sector in Jordan
Mohammad AL Zubi, Trilochan Singh, and Hesham AL Salem

ICONE20-POWER2012-55224
A Design of a Hydrofoil Family for Current-Driven Marine-Hydrokinetic Turbines
Henry Shiu, C. P. "Case" van Dam, Matthew Barone, Erick Johnson, Ryan Phillips, Willi am Straka, Arnold Fontaine, and Michael Jonson

- ## Performance Testing and Performance Test Codes

ICONE20-POWER2012-54136
Experimental Investigations of Control Rod Drive Mechanism
Wenyuan Xiang, Yonghong Lv, Wenyou Huang, Gguangyao Lu, and Jianming Zhou

ICONE20-POWER2012-54551
Combined Cycle Phased Testing Philosophy: Revisited
Jagadish Nanjappa and Mike Gross

ICONE20-POWER2012-54609
Practical Considerations for Power Plant Thermal Performance Test Accuracy
Evan E. Daigle, Thomas P. Schmitt, and Christopher R. Banares

ICONE20-POWER2012-54971
Efficiency Based on Free-Energy Instead of Isentropic Conditions
William Ernest Schenewerk

ICONE20-POWER2012-55039
Total Solar Field Direct Normal Insolation Measurement Method Under Investigation for ASME PTC 52
Dave W. Price, Keith Kirkpatrick, Wayne D. Ferguson, and Dudley Benton

ICONE20-POWER2012-55102
Performance Testing of a Multi-Stage Centrifugal Compressor With Sidestream Extraction
A. I. C. Hunter, R. G. Nyquist, M. F. Andrews, J. Smith, and H. Boice

ICONE20-POWER2012-55212
A Study of Venturi Tubes
Richard L. Wakeland

- ## Simple and Combined Cycles

ICONE20-POWER2012-54711
How the Use of Limited Plant Data Can Support Limited Improvements in Combined Cycle Operation
James M. Perez and Tina L. Toburen

ICONE20-POWER2012-54719
Current Technology for Power Plant Makeup Water Treatment and Wastewater Recovery
Brad Buecker

ICONE20-POWER2012-54822
Performance Evaluation of Evaporative Compressor Inlet Air Cooling System in a Gas Turbine-Based Cogeneration Plant
Farshid Zabihian, Alan S. Fung, and Fabio Schuler

ICONE20-POWER2012-54902
The Convergence of Squeeze: With Respectable Speed, a New Gas Turbine Power Plant Rises at an Arizona Mine
John Baker and Marshall Ralph

ICONE20-POWER2012-55111
Smart Lube Systems for Gas Turbine Engines
Thomas B. Kenney

ICONE20-POWER2012-55192

Numerical Study on Flow Separation Control for High-Lift Low-Pressure Turbine Split Blade

Jianhui Chen, Yonghui Xie, Di Zhang, and Zhongyang Shen

APPENDICE 3

ICONE20 POWER2012 PROGRAM

	Room Size	Tower	Monday, July 30th		Tuesday, July 31st					Wednesday, August 1st						Thursday, August 2nd						Friday, August 3rd		
TIMES	POWER	ICONE	8:00am - 12:00pm	8:00am - 5:00pm	8:00am - 10:00am	10:30am - 12:00pm	12:15am - 1:15pm	1:30pm - 3:15pm	3:45pm - 5:30pm	8:00am - 9:45am	10:15am - 12:00pm	12:15am - 1:15pm	1:30pm - 3:15pm	3:45pm - 5:30pm	6:30pm - 8:30pm	8:00am - 9:45am	10:15am - 12:00pm	12:15am - 1:15pm	1:30pm - 3:15pm	3:45pm - 5:30pm	5:40am - 6:40pm	8:00am - 9:45am	10:15am - 12:00pm	1:00pm - 4:00pm
Exhibit Hall B	60 ppl	Lower					Lunch	21-2	21-9		21-1	Lunch	21-4	21-3			21-8	Lunch	21-7	21-6		21-5		
Exhibit Hall C	60 ppl	Lower						1-15	1-14	1-3	1-4		1-5	1-6		9-18	9-19		9-33	9-21		7-8		
Exhibit Hall D	60 ppl	Lower						12-1	12-2	12-3	12-4		12-5	11-3		9-24	9-34		9-25	9-35		8-2	8-6	
Exhibit Hall E	60 ppl	Lower						4-9	4-10	2-8	5-1		5-2	10-10		1-7	1-12		10-7	10-8		17-5	17-6	
Exhibit Hall G	60 ppl	Lower						20-1	20-8	5-3	20-3		20-4	20-2		2-15	20-5		20-8	9-28				
Exhibit Hall H	60 ppl	Lower						2-1	2-2	2-13	2-6		2-17	2-14		2-16	2-5		18-14	18-5		2-4	2-7	
Exhibit Hall I	60 ppl	Lower						19-1	11-1	11-2	4-11		19-3	19-4		7-6	19-5					19-9		
Exhibit Hall J	60 ppl	Lower						7-1	7-2	7-3	7-4		17-1	7-5		17-2	17-3		17-4	7-7		6-15	6-16	
North Ballroom A/B	200 ppl	Lower			FOOD	FOOD		FOOD	FOOD	FOOD	FOOD		FOOD	FOOD	ICONE AWARDS Reception	FOOD	FOOD		FOOD	FOOD	ICONE Students AWARDS Reception	FOOD	FOOD	Steering Committee Exit Meeting
Center Ballroom	720 ppl	Lower			Opening Keynote I	Keynote II		ICONE Plenary I		Power Plenary I						Power Plenary II	ICONE Plenary II		ICONE Plenary III	18-18				
South Ballroom A	200 ppl	Lower					Lunch		Comm Mtg		18-11	Lunch	18-13	18-17						18-16				
South Ballroom B	200 ppl	Lower							Comm Mtg		18-15		18-6	18-12					18-10					
Magic Kingdom 1	250 ppl	Upper	Workshop or Tutorial					9-1	9-26	9-27	9-3		9-4											
Magic Kingdom 2	300 ppl	Upper	Workshop or Tutorial					9-6	9-29	9-30	9-31		9-11											
Magic Kingdom 3	300 ppl	Upper	Workshop or Tutorial					9-8	9-9	9-10	9-16		9-32											
Magic Kingdom 4	250 ppl	Upper	Workshop or Tutorial					10-1	10-2	10-3	10-4		10-5											
A Ticket	25 ppl	Upper	Practice																					
B Ticket	100 ppl	Upper						22-1	4-12															
Sleeping Beauty	200 ppl	Upper	Comm Mtg	ICONE Steering Committee Initial Meeting 12:00 1:30 PM	Comm Mtg	Comm Mtg	NED TC # 1 Meeting	Comm Mtg	Comm Mtg	Comm Mtg	Comm Mtg	NED TC # 2 Meeting	Power Awards	Power Awards										
Monorail A	49 ppl	L Lower					Lunch	24-2	24-3	15-1	15-2	Lunch	24-1	24-7		15-3	1-1	Lunch	6-11	6-14				
Monorail B	49 ppl	L Lower	Workshop or Tutorial					6-2	6-4	6-5	22-2		22-3	22-4		17-7				15-4				
Monorail C	49 ppl	L Lower	Workshop or Tutorial					3-2	3-3	3-1	3-4		6-6	6-7		6-10	3-5		3-6	3-7				
Castle A	49 ppl	L Lower	ASME	ASME	ASME	ASME		ASME	ASME	ASME	ASME		ASME	ASME		ASME	ASME		ASME	ASME	ASME	ASME	ASME	ASME
Castle B	49 ppl	L Lower	Workshop or Tutorial					13-1	13-2	8-3	23-1		23-2	23-3			23-4							
Castle C	49 ppl	L Lower	Workshop or Tutorial					14-1	14-2	14-3						14-4			8-1	8-5				
Congo	30 ppl	Adventure					NED TC # 5 Meeting					NED TC # 7 Meeting						NED TC # 6 Meeting			NED TC # 3 Meeting			
Zambezi	18 ppl	Adventure	NED EC Daily Meetings																					
Mark Twain	100 ppl	Frontier							18-9															
Mississippi	42 ppl	Frontier					Lunch	16-1	Poster	16-5	Poster	Lunch	16-9	Poster		16-13	Poster							
Columbia	44 ppl	Frontier						16-2	Poster	16-6	Poster		16-10	Poster			Poster							
Wilderness	60 ppl	Frontier						16-3	Poster	16-7	Poster		16-11	Poster		Comm Meeting	Comm Meeting	NED TC # 4 Meeting	Comm Meeting	Comm Meeting	Comm Meeting			
Western	60 ppl	Frontier						16-4	Poster	16-8	Poster		16-12	Poster		Comm Meeting	Comm Meeting							

UPDATED 7/19/2012

APPENDICE 4

Breve curriculum scientifico del gruppo di lavoro impegnato nell'attività

Il prof. Giuseppe Vella , Ordinario del Settore Scientifico Disciplinare ING-IND/19 Impianti Nucleari, è Responsabile del reattore nucleare di ricerca AGN 201 - COSTANZA dell'Università di Palermo. Ha coordinato diversi programmi di ricerca finanziati dal Ministero della Ricerca Scientifica e Tecnologica. E' stato Coordinatore nazionale di un progetto di ricerca di interesse nazionale PRIN-2007 finanziato dal MIUR. E' autore o coautore di più di 140 articoli pubblicati su riviste scientifiche nazionali ed internazionali e/o presentati a conferenze, congressi o simposi. E' anche coautore di diversi rapporti nell'ambito dei PAR trascorsi. L'attività scientifica del prof. Vella ha riguardato principalmente le seguenti tematiche: tubi di calore al sodio, problemi di ribagnamento di superfici ad elevata temperatura, efflussi critici bifase, analisi termoidrauliche relative alla sicurezza dei reattori nucleari a fissione, analisi neutroniche, termoidrauliche e termomeccaniche del mantello e di componenti ad alto flusso termico di un tipico reattore a fusione di tipo TOKAMAK. E' stato referee per la rivista "Fusion Engineering and Design" e "Nuclear Engineering and Design".

Fulvio Mascari, assegnista di ricerca del S.S.D. ING-IND/19, da circa 6 anni svolge attività di ricerca su problematiche termoidrauliche e nucleari connesse allo sviluppo dei reattori a fissione. Partecipa alle attività di validazione dei codici termoidraulici di sistema TRACE e RELAP5, collaborando con il Department of "Nuclear Engineering & Radiation Health Physics" della Oregon State University, NuScale, l'Università degli Studi di Pisa e ENEA. Recentemente ha preso parte alle attività di un International Collaborative Standard Problem (ICSP) on "Integral PWR Design Natural Circulation Flow Stability and Thermo-Hydraulic Coupling of Containment and Primary System during Accidents" promosso dall'IAEA.

I risultati delle sue attività di ricerca sono stati pubblicati su una ventina di memorie in riviste internazionali, capitoli di libro, in atti di congresso nazionali e internazionali e rapporti. E' anche coautore di diversi rapporti nell'ambito dei PAR trascorsi. E' stato referee per le riviste "Nuclear Engineering and Design" e "Science and Technology of Nuclear Installations".