



- IGORR 9 Proceedings

**9th Meeting of the International Group on Research Reactors**  
**24-28 March 2003, SYDNEY, AUSTRALIA**

### Opening Session

#### Opening address

Klaus Boening  
 New Research Reactor FRM-II,  
 Technische Universitaet Muenchen  
 - Germany

### Opening Technical Presentation

#### Activities on Safety for the Cross Cutting Issue of Research Reactors in the IAEA

J.A.Perrotta, H.J.Boado Magan  
 IAEA - Austria

### Technical Session 1: Safety, Licensing & Decommissioning 1

#### Safety System Upgrades to a Research Reactor: A Regulatory Perspective

G.B. Lamarre, W.G. Martin  
 Canadian Nuclear Safety  
 Commission - Canada

#### Flow Characteristics of the HANARO Reactor Pool

Heonil Kim, Gee Yang Han  
 KAERI - Korea

#### Research Reactor Decommissioning Planning - It is Never Too Early to Start

R. S. Eby - CH2M HILL - USA  
 Dr. N. Hertel - Georgia Institute of  
 Technology - Georgia

#### Plan for Moata Reactor Decommissioning, ANSTO

Sungjoong (Shane) KIM  
 ANSTO - Australia

### Technical Session 2: New Facilities & Upgrades 1

#### Australia's new high performance research reactor

Ross Miller - ANSTO - Australia  
 Pablo M. Abbate - INVAP SE -  
 Argentina

#### Advanced Neutron Instrumentation at FRM-II

Winfried Petry  
 ZWE FRM-II, Technische Universität  
 München - Germany

#### Options for the Delft Advanced Neutron Source

H.P.M. Gibcus  
 Delft University of Technology,  
 Interfaculty Reactor Institute - The  
 Netherlands

#### The Jules Horowitz Reactor (JHR), a European Material Testing Reactor (MTR), with extended experimental capabilities

A. Ballagny, Y. Bergamaschi, Y.  
 Bouilloux, X. Bravo, B. Guigon, M.  
 Rommens  
 CEA - France

**Neutronic Characteristics of the RRRE**

Eduardo A. Villarino, Daniel Hergenreder  
INVAP SE - Argentina

**Reactor refurbishment from 1991 to 1994**

H. Guyon  
Institut Laue-Langevin - France

**Technical Session 3: Optimisation of Operation & Utilisation 1**

**Ageing Management Program for Reactor Components in HANARO**

Yeong-Garp Cho, Sang-Ik Wu, Jung-Hee Lee, Jeong-Soo Ryu, Yong-Chul Park,  
Jong-Sup Wu, Byung Jin Jun  
HANARO Center, KAERI - Korea

**Introducing an ILS methodology into research reactors**

Néstor De Lorenzo - Centro Atómico Bariloche - Argentina  
Roberto Cervieri Borsani - INVAP SE - Argentina

**Time changes of vertical profile of neutron fluence rate in LVR-15 reactor**

L. Viererbl, J. Stehno, O. Erben, Z. Lahodova, M. Marek  
Nuclear Research Institute - Czech Rep.

**Experimental Utilization of the IPEN/MB-01 Reactor**

Ulysses d´Utra BITELLI, Adimir dos SANTOS, Rogério JEREZ, Ricardo DINIZ, Leda C.C.B.FANARO, Alfredo Y.ABE\*\*, João M.L. MOREIRA\*\*, Nelson FÉR \*\*, Marino R.GIADA\*\* and Rinaldo FUGA\*\*  
IPEN/CNEN-SP- Instituto de Pesquisas Energéticas e Nucleares - Brazil  
\*\* CTMSP- Centro Tecnológico da Marinha em São Paulo - Brazil

**Technical Session 4: Secondary Neutron Sources**

**Performance of the Advanced Cold Neutron Source and Optics Upgrades at the NIST Research Reactor**

Robert E. Williams, Paul Kopetka, Jeremy C. Cook, and J. Michael Rowe  
NIST Center for Neutron Research - USA

**Transient analysis of the new Cold Source at the FRM-II**

E. Gutmiedl - Technical University of Munich, ZWE FRM-II, Munich, Germany  
H. Posselt - Linde AG, Munich - Germany  
A. Scheuer - TUEV Rheinland/Berlin-Brandenburg e.V, Cologne - Germany

**Cold neutron source with self-regulation**

Takeshi KAWAI  
TAKTECH Inc. - Japan  
Takeshi Kawai - TAKTECH Inc. - Japan

**Design concepts for construction of cold neutron source**

Erwin Gutmiedl - FRM-II, Technical University Munich - Germany  
Anton Scheuer - TUV - Germany

## **Development of the RRR Cold Neutron Source Facility**

N.Masriera, O.Lovotti, C.Lecot and D.Hergenreder (1)  
A.Serebrov, V.Mityukhlyaev and A.Zakharov (2)  
(1) INVAP - Argentina  
(2) Petersburg Nuclear Physics Institute - Russia

## **Technical Session 5: Safety, Licensing & Decommissioning 2**

### **Risk-Informed regulation**

Donald R. Hoffman  
EXCEL SERVICES CORPORATION - USA (?)

### **The HIFAR Level 1+ PSA: Its Update and Extension**

Andy Willers  
ANSTO - Australia

### **Licensing of ANSTO's Replacement Research Reactor**

M W Summerfield - ANSTO - Australia  
V Garea - INVAP SE - Argentina

### **COGEMA-ANSTO management of the acceptance process of HIFAR spent fuel**

J. THOMASSON - COGEMA - France  
T. IRWIN - ANSTO - Australia

## **Technical Session 6: Safety, Licensing & Decommissioning 3**

### **Main technical options of the Jules Horowitz Reactor project to achieve high flux performances and high safety level**

A. Ballagny, Y. Bergamaschi, Y. Bouilloux , X. Bravo, B. Guigon, M. Rommens  
CEA - France

### **Major Changes of Core Components in OSIRIS and ORPHEE for Maintaining High Safety Level**

D. Moulin, A. Ballagny, F. Morel , J. Estrade  
CEA - France

### **Numerical Benchmarks For MTR Fuel Assemblies With Burnable Poison**

Eduardo A. Villarino - INVAP SE - Argentina  
Francisco Leszczynski - CNEA - Argentina

### **Cold Neutron Source at CMRR**

Hu Chunming Shen Wende, Dai Junlong, Liu Xiankun (1)  
Vadim Kouzminov, Victor Mityukhlyaev, Anatoli Serebrov, Arcady Zakharov (2)  
(1) Institute of Nuclear Physics and Chemistry of China Academy of Engineering Physics, - P. R. China  
(3) Petersburg Nuclear Physics Institute - Russia

### **Flow and heat transfer characteristics through narrow vertical rectangular channels**

S. Soliman\*, R. N. Abdel-Messih\*\*, R. M. Messiha\*\*, H. F. Elbakhshawangy\*  
\* A.E.A, Cairo, Egypt  
\*\* Ain-Shams University, Faculty of Engineering, Cairo, Egypt

## **Technical Session 7: New Facilities & Upgrades 2**

### **New Possibilities of the utilization of the Budapest Research Reactor**

István Vidovszky  
KFKI Atomic Energy Research Institute - Hungary

**BNCT Facility Development in HANARO**

Byung Chul Lee, Sang Jun Park,  
Myong Seop Kim and Byung Jin Jun  
HANARO Center, KAERI - Korea

**Reactor PIK construction**

Kir Konoplev  
Petersburg Nuclear Physics  
Institute, Russia

**The CABRI Facility: Implementation of a Pressurized  
Water Loop and Related Safety Review**

JC. CABRILLAT, M. MAEGEY, D.  
BOURGUIGNON, G. MIACHON, F.  
FORESTIER, JP. COULON - CEA -  
France  
M. FAURY - IRSN - France

**New cooling system of the FRG-1, Two Barrier System  
of the Primary Coolant Cycle**

W. Knop, P. Schreiner  
GKSS-Forschungszentrum  
Geesthacht GmbH - Germany

**Technical Session 8: Neutron Scattering**

**Neutron Guides and Scientific Neutron Equipment at  
CILAS/GMI**

P. GAUTIER-PICARD  
CILAS - France

**Neutron Beam Facilities at the Replacement Research  
Reactor, ANSTO**

Sungjoong (Shane) KIM  
ANSTO - Australia

**Neutron Beam Applications using Low Power Research  
Reactor Malaysia - Perspectives**

Abdul Aziz Mohamed, Azali  
Muhammad, Faridah Idris, Adnan  
Bokhari and Muhd Noor Yunus  
REACTOR INTEREST GROUP -  
Malaysian Institute for Nuclear  
Technology Research (MINT) -  
Malaysia

**Technical Session 9: Optimisation of Operation & Utilisation 2**

**Wear Inspection for Fuel Channels in HANARO**

Sang-Ik WU, Yeong-Garp CHO  
HANARO Applications Research,  
KAERI - Korea

**Reactor Operations At Safari-1**

JWH Vlok  
SAFARI-1 Research Reactor NECSA  
- South Africa

**Some Aspects Related to the Management of  
Maintenance for a TRIGA Research Reactor in Romania**

Gheorghe Vieru  
Reliability and Testing Laboratory  
Institute for Nuclear Research -  
Romania

**Reactor Protection Systems for the Replacement  
Research Reactor, ANSTO**

Charles R Morris  
ANSTO - Australia

**Technical Session 10: Safety, Licensing & Decommissioning 4**

**Shipments of Irradiated DIDO Fuel from Risoe National  
Laboratory to the Savannah River Site - Challenges and  
Achievements**

Catherine Anne, John Patterson  
NAC International - USA

**Present Status on the Mechanical Characterization of  
Aluminum Alloys 5754-Net-O And 6061-T6 Irradiated  
at High Fluences**

B. Kapusta, C. Sainte-Catherine, X.  
Averty, M. Scibetta(\*), G.M.  
Decroix, M. Rommens  
CEA - France  
(\* ) SCK-Mol - Belgium

## **Highlights on the PSA Analyses Performed for the RRR**

### **Local Prediction of Subcooled Boiling Flow in an Annular Channel with the Influence of Bubble Coalescence and Break-Up Mechanisms**

J. Barón, J. Núñez McLeod, S. Rivera and S. Bastin (\*)

CEDIAC Institute - Argentina  
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G. H. Yeoh (1), J. Y. Tu (2) and Y. Z. Li (3)

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(2) RMIT University, School of Aerospace, Mechanical and Manufacturing

Engineering - Australia

(3) School of Energy and Power Engineering, Xi'an Jiaotong University - P. R. China

## **Technical Session 11: Optimisation of Operation & Utilisation 3**

### **Instrumentation corrective maintenance in ETRR-2**

Yasser M. K. M. Khedr  
ETRR-2 - A.E.A.-Egypt

### **MYRRHA, A Multipurpose Accelerator Driven System for Research & Development**

H. AÏT ABDERRAHIM ET AL.  
Reactor Physics & MYRRHA Dept.  
SCK•CEN - Belgium

### **Maintenance and Inspection Plan for ETRR-2**

A.S. Kamoon, O.E. El Nokity, Y.E. Tawfik  
Atomic Energy Authority of Egypt,  
ETRR-2 - Egypt

### **Utilisation of Computational Fluid Dynamics Techniques for Design of Molybdenum Target Specification**

G. H. Yeoh and D. Wassink  
ANSTO - Australia