

# TECHNICAL SESSIONS PROGRAM

## Monday – October 6

Opening Session, 8:00 - 9:40 am (*Commodore Hall*)

Sessions I – IV, 10:00 - 12:05 pm

- I. Validation of Core Analysis Tools for Fuel Management I (*Promenade 1*)
- II. Innovative Core Loading Strategies and Methods I (*Promenade 2*)
- III. Extended Fuel Cycles and Economic Analysis (*Promenade 3*)
- IV. Nodal and Lattice Physics Methods I (*Promenade 4*)

Sessions V – VIII, 4:00 - 6:55 pm

- V. Management, Design and Operation Issues of Advanced Reactor Fuels I (*Promenade 1*)
- VI. Reactor-Based Plutonium Disposition (*Promenade 2*)
- VII. Addressing Practical Design Constraints On Fuel Management (*Promenade 3*)
- VIII. Automated and Interactive Fuel Management Design and Optimization Tools I  
(This session starts with the 2003 Wigner Award Presentation by  
Honorary Chair, Dr. Paul J. Turinsky) (*Promenade 4*)

## Tuesday – October 7

Sessions IX – XII, 8:00 - 9:40 am

- IX. Generation-IV Design Concepts (*Promenade 1*)
- X. Advances In Reactor Stability (*Promenade 2*)
- XI. Nodal and Lattice Physics Methods II (*Promenade 3*)
- XII. PANEL – “World Perspective On Nuclear Fuel Management Needs” (*Promenade 4*)

Sessions XIII – XVI, 10:00 - 12:05 pm

- XIII. Automated and Interactive Fuel Management Design and Optimization Tools II  
(*Promenade 1*)
- XIV. Experiences and Advances In On-Line Core Monitoring I (*Promenade 2*)
- XV. Management, Design and Operation Issues of Advanced Reactor Fuels II (*Promenade 3*)
- XVI. MOX Utilization In Reactors (*Promenade 4*)

Sessions XVII – XX, 4:00 - 6:55 pm

- XVII. Fuel Temperature Feedback for Steady-State and Transients (*Promenade 1*)
- XVIII. Model Comparisons Against Measured Reactor Power Data (*Promenade 2*)
- XIX. Utilities Experience In Reload Design and Licensing (*Promenade 3*)
- XX. Innovative Core Loading Strategies and Methods II (*Promenade 4*)

## Wednesday – October 8

Sessions XXI – XXIV, 8:00 - 9:40 am

- XXI. Generation of Cross Section Libraries and Whole Core Transport Calculations  
(*Promenade 1*)
- XXII. Advanced Fuel Assembly and Burnable Absorber Designs (*Promenade 2*)
- XXIII. Experiences and Advances In On-Line Core Monitoring II (*Promenade 3*)
- XXIV. PANEL – “Adequacy of Methods for Nuclear Fuel Management”  
(Revisiting INPO SOER 96/02) (*Promenade 4*)

Sessions XXV – XXVIII, 10:00 - 12:30 pm

- XXV. Fuel and Core Design Based On Thorium Cycles (*Promenade 1*)
- XXVI. Automated and Interactive Fuel Management Design and Optimization Tools III  
(*Promenade 2*)
- XXVII. Validation of Core Analysis Tools for Fuel Management II (*Promenade 3*)

## TECHNICAL SESSIONS

### **OPENING SESSION. “MEETING TODAY’S NUCLEAR FUEL MANAGEMENT CHALLENGES”**

*Monday, 8:00 - 9:40 am (Commodore Hall)*

*Plenary Speakers: James Malone (Exelon), Jack Fuller (Global Nuclear Fuel), and Mike Saunders (Westinghouse).*

### **SESSION I. VALIDATION OF CORE ANALYSIS TOOLS FOR FUEL MANAGEMENT I**

*Monday, 10:00 - 12:05 pm (Promenade 1)*

*Session Organizer: Scott Palmtag*

*Co-Chairs: Scott Palmtag and Staffan Svard*

#### RELIABLE TOOLS TO MODEL ADVANCED SVEA FUEL DESIGNS

*Juan J. Casal (Westinghouse Atom AB), Jan Krouthén (Nordostschweizerische Kraftwerke AG), and Manuel Albendea (Iberdrola Generación S.A). 10:00 - 10:25 am*

#### MULTICYCLE THREE-DIMENSIONAL CORE SIMULATION SENSITIVITY ANALYSIS

*John .P. Rea and Vernon W. Mills (Global Nuclear Fuel). 10:25 - 10:50 am*

#### ON-LINE VERSUS OFF-LINE CORE TRACKING TRENDS AT LAGUNA VERDE

*G. Ivan Maldonado (University of Cincinnati), Gary N. Marrotte, Virginia Ruiz-Ugalde (Global Nuclear Fuel - Americas), Antonio Mendez-Mendez, and Carlos Torres (Comisión Federal de Electricidad). 10:50 - 11:15 am*

#### RECENT EXPERIENCE WITH ESTIMATED CRITICAL POSITION PREDICTIONS

*Erin M. Wehlage and Dave Knott (FirstEnergy Nuclear Operating Company). 11:15 - 11:40 am*

#### APPLICATION OF CMS FOR THE EVALUATION OF MODIFICATIONS IN THE ROD DROP DETECTION SYSTEM OF THE NPP BROHNDE BY TUEV HANOVER/ SACHSEN-ANHALT

*Marcel Hahn (Gemeinschaftskernkraftwerk Grohnde GmbH), and Wolfgang Kraus (TUEV Hanover/Sachsen-Anhalt e. V.). 11:40 - 12:05 pm*

## **SESSION II. INNOVATIVE CORE LOADING STRATEGIES AND METHODS I**

*Monday, 10:00 - 12:05 pm (Promenade 2)*

*Session Organizer: Juan Luis Francois*

*Co-Chairs: Juan Luis Francois and Charles Beard*

SNC'S USE OF ROSA TO FIND MORE ECONOMICAL LOADING PATTERNS FOR VOGTLE

*Robin D. Jones (Southern Nuclear Operating Company). 10:00 - 10:25 am*

LP-FUN APPLICATIONS TO RELOAD DESIGN

*H. Q. Lam (Westinghouse Electric Company), D. Sato (Mitsubishi Heavy Industries), D. C. Little and F. D. Popa (Westinghouse Electric Company). 10:25 - 10:50 am*

REDUCING REFUELING OUTAGE DURATION BY OPTIMIZING CORE DESIGN AND SHUFFLING SEQUENCE

*P. H. Wakker, F. C. M. Verhagen (NRG), J. T. van Bloois (N. V. EPZ), and W.R. Sutton, III (Southern Nuclear Operating Company). 10:50 - 11:15 am*

SIMULATION OF A DEMONSTRATION IRRADIATION OF SLIGHTLY-ENRICHED-URANIUM FUEL BUNDLES IN THE EMBALSE CANDU REACTOR

*Ricardo Mollerach, Ernesto Coutsiars, Carlos Moreno (Nucleoeléctrica Argentina S.A.), and Hank Chow (Atomic Energy of Canada Limited). 11:15 - 11:40 am*

AN AUTOMATED TOOL BASED ON GENETIC ALGORITHMS TO OPTIMISE THE DESIGN OF INDIVIDUAL FUEL ASSEMBLIES

*A. K. Ziver, J. N. Carter, C. C. Pain, C. R. E. de Oliveira, A. J. H. Goddard (Imperial College of Science), and R. S. Overton (British Energy Generation Ltd). 11:40 - 12:05 pm*

## **SESSION III. EXTENDED FUEL CYCLE AND ECONOMICS ANALYSIS**

*Monday, 10:00 - 12:05 pm (Promenade 3)*

*Session Organizer: Josef Belac and Mojmir Valach*

*Co-Chairs: Josef Belac and Mojmir Valach*

EFFECT OF HIGHLY ENRICHED / HIGHLY BURNT UO<sub>2</sub> FUELS ON NUCLEAR DESIGN PARAMETERS AND ECONOMICS

*Robert Gregg and Andrew Worrall (BNFL Plc). 10:00 - 10:25 am*

OPTIMUM DISCHARGE BURNUP AND CYCLE LENGTH FOR PWRs

*J. R. Secker, B. J. Johansen, D. L. Stucker (Westinghouse Electric Company), O. Ozer (EPRI), K. Ivanov, S. Yilmaz (Penn State University), and E. H. Young (Exelon Generation Company). 10:25 - 10:50 am*

NUCLEAR FUEL REPROCESSING COSTS

*M. Jonathan Haire (Oak Ridge National Laboratory). 10:50 - 11:15 am*

NFCSim: A DYNAMIC SIMULATION MODEL OF THE NUCLEAR ECONOMY  
*Charles G. Bathke, Scott DeMuth, Michael R. James, and Erich A. Schneider (Los Alamos National Laboratory). 11:15 - 11:40 am*

LACE: THE NFCSim CRITICALITY AND BURNUP ENGINE  
*Erich A. Schneider and Michael R. James (Los Alamos National Laboratory). 11:40 - 12:05 pm*

## **SESSION IV. NODAL AND LATTICE PHYSICS METHODS I**

*Monday, 10:00 - 12:05 pm (Promenade 4)*

*Session Organizer: Brian Moore*

*Co-Chairs: Brian Moore and Akio Yamamoto*

THREE-DIMENSIONAL ANALYTIC FUNCTION EXPANSION NODAL MODEL  
*Riku Mattila (Technical Research Centre of Finland). 10:00 - 10:25 am*

TOWARDS A THREE-DIMENSIONAL KINETICS METHODOLOGY BASED ON THE METHOD OF CHARACTERISTICS

*J Bryce Taylor, Anthony J Baratta (The Pennsylvania State University), and Dave Knott (FirstEnergy Nuclear Operating Company). 10:25 - 10:50 am*

CONTINUOUS AND DISCONTINUOUS NODAL HYBRID FINITE ELEMENT SCHEMES FOR THE X-Y DISCRETE ORDINATES TRANSPORT EQUATION

*Vicente Xolocostli, Edmundo del Valle (Instituto Politécnico Nacional), and Gustavo Alonso (Instituto Nacional de Investigaciones Nucleares). 10:50 - 11:15 am*

CORE MODEL PERFORMANCE FOR TRAINING SIMULATORS

*Jeffrey Borkowski and Lotfi Belblidia (Studsvik Scandpower). 11:15 - 11:40 am*

UNCERTAINTY ESTIMATES IN COLD CRITICAL EIGENVALUE PREDICTIONS

*Atul A. Karve, Brian R. Moore, Vernon W. Mills, and Gary N. Marrotte (Global Nuclear Fuel). 11:40 - 12:05 am*

## **SESSION V. MANAGEMENT, DESIGN AND OPERATION** **ISSUES OF ADVANCED REACTOR FUELS I**

*Monday, 4:00 - 6:55 pm (Promenade 1)*

*Session Organizer: Mujid Kazimi*

*Co-Chairs: Ed Pilat and Alfred Renard*

THE DEPARTMENT OF ENERGY ADVANCED FUEL CYCLE INITIATIVE

*James C. Bresee (U.S. Department of Energy). 4:00 - 4:25 pm*

ECONOMIC ASPECTS OF HIGH BURNUP FUEL OPTIONS IN PWRs

*Zhiwen Xu, Michael J. Driscoll, and Mujid S. Kazimi (Massachusetts Institute of Technology). 4:25 - 4:50 pm*

OPTIMIZATION OF PWR FUEL CYCLES

*D. Gale, W. Walters, H-D. Berger, A. Kocher, and R. Aigle (Framatome ANP). 4:50 - 5:15 pm*

#### UTILITY ATTITUDES TOWARD HIGH BURNUP

*Edward E. Pilat (Massachusetts Institute of Technology), and James P. Malone (Exelon Generation). 5:15 - 5:40 pm*

#### NUCLEAR FUEL MANAGEMENT IMPLICATIONS OF MINOR ACTINIDE INCINERATION

*Alfred Renard, Servais Pilate, Benoît Lance (BELGONUCLEAIRE), and Guy Vambenepe (Electricité de France). 5:40 - 6:05 pm*

#### ANNULAR FUEL FOR HIGH POWER DENSITY PWRs: NEUTRONIC AND THERMAL HYDRAULIC CONSIDERATIONS

*Pavel Hejzlar, Dangdong Feng, Yasuyuki Otsuka, Zhiwen Xu, Won Jae Lee, and Mujid Kazimi (Massachusetts Institute of Technology). 6:05 - 6:30 pm*

#### ADVANCES IN MOLECULAR LASER ISOTOPE SEPARATION

*Jeff W. Eerkens and William H. Miller (University of Missouri). 6:30 - 6:55 pm*

### **SESSION VI. REACTOR-BASED PLUTONIUM DISPOSITION**

***Monday, 4:00 - 6:05 pm (Promenade 2)***

***Session Organizer: Jim Hoerner***

***Co-Chairs: Jim Hoerner and Jim Kuijper***

#### PLUTONIUM RECYCLING IN LWRS AT FRAMATOME ANP - STATUS AND TRENDS

*Dieter Porsch, Walter Stach, Pascal Charmensat, and Michel Pasquet (Framatome ANP). 4:00 - 4:25 am*

#### BASIS FOR THE DESIGN OF REACTOR CORES CONTAINING WEAPONS GRADE MOX FUEL

*Steve Nesbit and Jim Eller (Duke Power). 4:25 - 4:50 pm*

#### REACTOR CORE MODEL BENCHMARK FOR PARTIAL MOX FUEL CYCLES

*Jim Eller (Duke Power Company). 4:50 - 5:15 pm*

#### FEASIBILITY OF BURNING FIRST AND SECOND GENERATION PLUTONIUM IN PEBBLE BED HTRS

*J. B. M. de Haas and J. C. Kuijper (NRG). 5:15 - 5:40 pm*

#### THE OPTIMUM PLUTONIUM FUEL FORM FOR REACTOR BASED PLUTONIUM DISPOSITION

*Michael Savelle and James S. Tulenko (University of Florida). 5:40 - 6:05 pm*

## **SESSION VII. ADDRESSING PRACTICAL DESIGN CONSTRAINTS ON FUEL MANAGEMENT**

*Monday, 4:00 - 6:55 pm (Promenade 3)*

*Session Organizer: Arthur DiGiovine*

*Co-Chairs: Arthur DiGiovine and Edward Pulver*

EXTENDED POWER UPRATES AND TWO YEAR CYCLES FOR BWRS -- WHERE DO WE GO FROM THERE?

*Craig Brown, Ken Hartley (Framatome ANP), and Jim Hulsman (Framatome ANP).*

*4:00 - 4:25 pm*

MERIT-FACTOR: A NEW CONCEPT FOR EVALUATION OF THE ECONOMIC EFFICIENCY OF CORE LOADING PATTERNS

*Masatoshi Yamasaki, Masaaki Yoshikuni (Nuclear Fuel Industries), and Akio Yamamoto (Nuclear Fuel Industries). 4:25 - 4:50 pm*

TAMING THE CRUD PROBLEM: THE EVOLUTION

*Yovan D. Lukic and Jeffrey S. Schmidt (Palo Verde Nuclear Power Station). 4:50 - 5:15 pm*

THE EFFECT OF CORROSION PRODUCT DEPOSITION ON FUEL MANAGEMENT

*M. Y. Young and J. R. Secker (Westinghouse Electric Company). 5:15 - 5:40 pm*

BROWNS FERRY UNIT 2 FUEL MANAGEMENT TO ACCOMMODATE A FUEL RELIABILITY EVENT

*Tom Beu, Jim Lemons, TA Keys, and Earl Riley (Tennessee Valley Authority). 5:40 - 6:05 pm*

EFFECTS OF CHANNEL BOW ON BWR PIN POWER DISTRIBUTION

*Dave Knott (FirstEnergy Nuclear Operating Company). 6:05 - 6:30 pm*

IMPACT OF PRESSURE TUBE AGING ON PHYSICS PARAMETERS OF A CANDU LATTICE CELL

*Germina Ilas, Farzad Rahnema (Nuclear and Radiological Engineering and Health Physics Program), Vladimir Khotylev, Dumitru Serghiuta (Canadian Nuclear Safety Commission), and Rudi J. J. Stamm'ler (Studsvik Scandpower AS). 6:30 - 6:55 pm*

## **SESSION VIII. AUTOMATED AND INTERACTIVE FUEL MANAGEMENT DESIGN AND OPTIMIZATION TOOLS I**

*Monday, 4:00 - 6:55 pm (Promenade 4)*

*Session Organizer: Paul Keller*

*Co-Chairs: Atul Karve and TBA*

EUGENE P. WIGNER REACTOR PHYSICIST AWARD PRESENTATION

*Honorary Chair: Dr. Paul J. Turinsky (North Carolina State University). 4:00 - 4:50 pm*

FORMOSA-P ADVANCED GA METHODOLOGY

*Paul M. Keller (North Carolina State University). 4:50 - 5:15 pm*

ENHANCEMENT OF SPATIAL TREATMENT IN OCEON-P OPTIMIZATION CODE

*Arvind K. Mathur and Paul J. Turinsky (North Carolina State University). 5:15 - 5:40 pm*

EQUILIBRIUM CYCLE ANALYSIS WITH XIMAGE/SIMAN

*John G. Stevens and Ken R. Rempe (Studsvik Scandpower). 5:40 - 6:05 pm*

INCLUSION OF INTERACTIVE GA IN THE AUTOMATIC CORE DESIGN OF A BWR

*Yoko Kobayashi (TEPCO Systems Corporation), and Eitaro Aiyoshi (Keio University).*

*6:05 - 6:30 pm*

CASTING THE FUEL SHUFFLE AS A TRAVELING SALESMAN PROBLEM

*James S. Burdo (University of Cincinnati), and Dave Knott (FirstEnergy Nuclear Operating Company). 6:30 - 6:55 pm*

## **SESSION IX. GENERATION-IV DESIGN CONCEPTS**

***Tuesday, 8:00 - 9:15 am (Promenade 1)***

***Session Organizer: Trent Primm***

***Co-Chairs: Jess Gehin and Hoon Song***

NUCLEAR DESIGN OF A NA COOLED KALIMER-600 CORE WITH NO BLANKET

*Hoon Song, Sang-Ji Kim (Korea Atomic Energy Research Institute), and Yeong-Il Kim (Korea Atomic Energy Research Institute). 8:00 - 8:25 am*

NEUTRONIC AND BURNUP CHARACTERISTICS OF KERNEL-FUEL IN VHTR

*G. S. Chang (Idaho National Engineering and Environmental Laboratory). 8:25 - 8:50 am*

AN INTEGRATED ONCE-THROUGH FUEL CYCLE WITH DEPLETED-URANIUM-DIOXIDE SNF MULTIFUNCTION CASKS

*Charles W. Forsberg and Les R. Dole (Oak Ridge National Laboratory). 8:50 - 9:15 am*

## **SESSION X. ADVANCES IN REACTOR STABILITY ANALYSIS**

***Tuesday, 8:00 - 9:40 am (Promenade 2)***

***Session Organizer: Ren-Tai Chiang***

***Co-Chairs: Ren-Tai Chiang and Jeff Borkowski***

IMPACTS OF FUEL DESIGN, CORE DESIGN AND REACTOR OPERATION ON BWR STABILITY BEHAVIOR

*R.-T. Chiang, A. K. Chung, C. L. Kunz, R. E. Stachowski, L. Trosman, and R. M. Fawcett (Global Nuclear Fuel). 8:00 - 8:25 am*

DEVELOPMENT OF A BWR PLANT TRANSIENT ANALYSIS CODE TRACG05 WITH FEW-GROUP ADVANCED NODAL METHOD

*Masatoshi Sugawara, Tatsuya Iwamoto, Masashi Tamitani (Global Nuclear Fuel - Japan), Jens G. Munthe Andersen, Charles L. Heck, and Brian R. Moore (Global Nuclear Fuel - Americas). 8:25 - 8:50 am*

BWR INSTABILITIES INDUCED BY COLD WATER TRANSIENTS

*Christian Jönsson (Studsvik Scandpower AB), Gustav Dominicus (Forsmark Kraftgrupp AB), and Marek Kosinski (Vattenfall Fuel AB). 8:50 - 9:15 am*

BENCHMARK OF SIMULATE-3K AGAINST THE FRIGG LOOP STABILITY EXPERIMENTS

*Gerardo M. Grandi and Jeffrey A. Borkowski (Studsvik Scandpower). 9:15 - 9:40 am*

**SESSION XI. NODAL AND LATTICE PHYSICS METHODS II**

*Tuesday, 8:00 - 9:40 am (Promenade 3)*

*Session Organizer: Brian Moore*

*Co-Chairs: Brian Moore and Riku Mattila*

DEVELOPMENT OF BWR LATTICE ANALYSIS CODE LANCER BASED ON AN IMPROVED CCCP METHOD

*Kazuo Azekura, Hiromi Maruyama, Tadashi Ikehara, Munenari Yamamoto (Global Nuclear Fuel - Japan), Vernon W. Mills, and Thomas F. Marcille (Global Nuclear Fuel – Americas).*

*8:00 - 8:25 am*

METHODS, BENCHMARKING AND APPLICATIONS OF BWR CORE SIMULATOR AETNA

*Tatsuya Iwamoto, Masashi Tamitani (Global Nuclear Fuel - Japan), and Brian R. Moore (Global Nuclear Fuel - Americas). 8:25 - 8:50 am*

EFFECT OF DANCOFF FACTOR IN CRITICALITY CALCULATION FOR CLUSTER FUEL BUNDLES

*Hyeong Heon Kim (Korea Power Engineering Company). 8:50 - 9:15 am*

INVESTIGATION OF THE ANISOTROPIC SCATTERING EFFECT IN THE HETEROGENEOUS SQUARE CELL OF LIGHT WATER REACTORS

*Tadashi Ushio, Masaaki Mori (Nuclear Engineering Limited (NEL)), and Toshikazu Takeda (Osaka University). 9:15 - 9:40 am*

**SESSION XII. PANEL - “WORLD PERSPECTIVE ON NUCLEAR FUEL MANAGEMENT NEEDS”**

*Tuesday, 8:00 - 9:40 am (Promenade 4)*

*Panel Organizer: Jeff Secker*

*Panel Moderator: Jeff Secker*

**SESSION XIII. AUTOMATED AND INTERACTIVE FUEL MANAGEMENT DESIGN AND OPTIMIZATION TOOLS II**

*Tuesday, 10:00 - 12:05 pm (Promenade 1)*

*Session Organizer: Paul Keller*

*Co-Chairs: Paul Keller and Kemal Ziver*

ARPEGE, THE EDF TOOL FOR CORE RELOAD DESIGN

*Xavier Mouney (Electricité de France Research and Development). 10:00 - 10:25 am*

ROSA, A FLEXIBLE LOADING PATTERN OPTIMIZATION TOOL FOR PWRS

*F. C. M. Verhagen and P. H. Wakker (NRG). 10:25 - 10:50 am*

TVA CORE DESIGN USING ROSA

*Scott T. Krepel and John E. Strange (Tennessee Valley Authority). 10:50 - 11:15 am*

AUTOMATING THE OPTIMIZATION OF BURNABLE POISONS IN PWRs

*Serkan Yilmaz, Kostadin Ivanov, Samuel Levine (Penn State University), and Moussa Mahgerefteh (Exelon Nuclear Company). 11:15 - 11:40 am*

OPTIMIZING THE PLACEMENT OF BURNABLE POISONS IN PWRs

*Serkan Yilmaz, Kostadin Ivanov, Samuel Levine (Penn State University), and Moussa Mahgerefteh (Exelon Nuclear Company). 11:40 - 12:05 pm*

**SESSION XIV. EXPERIENCES AND ADVANCES IN ON-LINE  
CORE MONITORING I**

*Tuesday, 10:00 - 11:40 am (Promenade 2)*

*Session Organizer: Angelo Chopelas and Mark Mneimneh*

*Co-Chairs: Angelo Chopelas and Steve Baker*

ADAPTIVE CORE SIMULATION: EFFICIENT SENSITIVITY ANALYSIS

*Hany Abdel-Khalik and Paul Turinsky (North Carolina State University). 10:00 - 10:25 am*

GNF BWR CORE SIMULATOR IMPROVED INSTRUMENT ADAPTIVE AND  
REJECTION METHOD FOR ON-LINE CORE MONITORING

*Hongbin Zhang (Global Nuclear Fuel - Americas). 10:25 - 10:50 am*

FAILED LPRM ASSESSMENT ON THERMAL MARGINS

*Mark J. Mneimneh, Angelo P. Chopelas, and Atul A. Karve (Global Nuclear Fuel).  
10:50 - 11:15 am*

IMPACT OF LPRM REJECTIONS ON THERMAL MARGINS

*Atul A. Karve, Mark J. Mneimneh, Brian R. Moore, and Angelo P. Chopelas (Global Nuclear  
Fuel). 11:15 - 11:40 am*

**SESSION XV. MANAGEMENT, DESIGN AND OPERATION  
ISSUES OF ADVANCED REACTOR FUELS II**

*Tuesday, 10:00 - 12:05 pm (Promenade 3)*

*Session Organizer: Mike Driscoll*

*Co-Chairs: Pavel Hejzlar and Hideyuki Funasaka*

PRESENT STATUS AND PROSPECTS IN FUEL CYCLE SYSTEM OF SODIUM-  
COOLED FAST REACTORS

*Hideyuki Funasaka, Takeshi Tsukada, Yoshihiro Nagaoki, Yasuo Nakajima, and Takashi Namba  
(Japan Nuclear Cycle Development Institute). 10:00 - 10:25 am*

MOLTEN SALT REACTORS (MSRS): COUPLING SPENT FUEL PROCESSING AND  
ACTINIDE BURNING

*Charles Forsberg (Oak Ridge National Laboratory), and Ehud Greenspan (University of  
California). 10:25 - 10:50 am*

TECHNOLOGY BASE FOR THE ADVANCED CANDU REACTOR (ACR) FUEL DESIGN  
*Peter G. Boczar, Jim D. Sullivan, Mukesh Tayal, Al M. Manzer, Ki-Seob Sim, Steve J. Palleck, and Krishnan Chakraborty (Atomic Energy of Canada Limited). 10:50 - 11:15 am*

NEW FUEL CYCLE AND FUEL MANAGEMENT OPTIONS IN HEAVY LIQUID METAL COOLED REACTORS

*Ehud Greenspan (University of California), Pavel Hejzlar (Massachusetts Institute of Technology), Hiroshi Sekimoto (Tokyo Institute of Technology), Georgy Toshinsky (Institute of Physics and Power Eng.), and David Wade (Argonne National Laboratory). 11:15 - 11:40 am*

FUEL DESIGN, MANAGEMENT AND CYCLES FOR GEN-IV GFRS

*J.C. Bosq, C. Poette, J. C. Garnier, J. Rouault (CEA/Cadarache), T. Taiwo, E. Hoffman, M. Fatone, and T. Y. C. Wei (Argonne National Laboratory). 11:40 - 12:05 pm*

## **SESSION XVI. MOX UTILIZATION IN REACTORS**

***Tuesday, 10:00 - 11:40 am (Promenade 4)***

***Session Organizer: Trent Primm***

***Co-Chairs: Jess Gehin and Dieter Porsch***

PHYSICS ANALYSIS OF BNFL'S FIRST COMMERCIAL MOX FUEL USING CMS  
*Andrew Worrall (British Nuclear Fuels Plc), and Christophe Ott (Nordostschweizerische Kraftwerke AG). 10:00 - 10:25 am*

VALIDATION OF STUDSVIK CMS FOR BEZNAU MOX CORES

*Tamer Bahadör (Studsvik Scandpower), and Raul Vielma (Nordostschweizerische Kraftwerke AG). 10:25 - 10:50 am*

TRITON: AN ADVANCED LATTICE CODE FOR MOX FUEL CALCULATIONS

*M. D. DeHart (Oak Ridge National Laboratory), Z. Zhong, and T. J. Downar (Purdue University) - (page II-74). 10:50 - 11:15 am*

PLUTONIUM RECYCLING AND ECONOMICS FOR A BWR FUEL CYCLE

*J. Ramon Ramirez, G. Alonso, and Javier C. Palacios (Instituto Nacional de Investigaciones Nucleares). 11:15 - 11:40 am*

## **SESSION XVII. FUEL TEMPERATURE FEEDBACK MODELING FOR STEADY STATE AND TRANSIENTS**

***Tuesday, 4:00 - 6:30 pm (Promenade 1)***

***Session Organizer: Bob St. Clair***

***Co-Chairs: Bob St. Clair and Andrew Worrall***

FUEL TEMPERATURE MODELING IN STUDSVIK SCANDPOWER'S CORE MANAGEMENT SYSTEM

*Arthur S. DiGiovine, Kord S. Smith, Dan Hagrman, and Scott Palmtag (Studsvik Scandpower). 4:00 - 4:25 pm*

ASPECTS OF FUEL ROD MODELING FOR RAPID TRANSIENTS

*Charles Beard, Peter Hilton, Serhat Lider, Daniel Risher, and Yixing Sung (Westinghouse Electric Company). 4:25 - 4:50 pm*

AN APPROACH FOR EVALUATING AND SELECTING FUEL TEMPERATURE DATA NEEDED FOR REACTOR PHYSICS NODAL CODES

*Geoffrey G. Pihl, Shawn K. Gibby, and P. M. Abraham (Duke Power Company). 4:50 - 5:15 pm*

IMPACT OF FUEL TEMPERATURE CORRELATIONS ON POWER REACTOR PHYSICS PREDICTIONS

*Robert J. Borland (FirstEnergy Nuclear Operating Company). 5:15 - 5:40 pm*

PIN-BY-PIN THERMAL-HYDRAULIC FEEDBACK MODELING IN THREE-DIMENSIONAL FINE-MESH CORE CALCULATIONS

*Akio Yamamoto and Tsutomu Ikeno (Nuclear Fuel Industries). 5:40 - 6:05 pm*

EFFECTIVENESS OF THE WHOLE CORE TRANSPORT CALCULATION WITH PIN-WISE THERMAL FEEDBACK

*Han Gyu Joo, Ha Yong Kim, Jin Young Cho, Chung Chan Lee, and Sung Quun Zee (Korea Atomic Energy Research Institute). 6:05 - 6:30 pm*

**SESSION XVIII. MODEL COMPARISONS AGAINST MEASURED POWER REACTOR DATA**

*Tuesday, 4:00 - 6:30 pm (Promenade 2)*

*Session Organizer: Robb Borland and Bob St. Clair*

*Co-Chairs: Scott Thomas and Kenneth Naugle*

CASMO-4 / SIMULATE-3 SETUP AND BENCHMARK RESULTS FOR OCONEE NUCLEAR STATION

*Andrew T. Godfrey and Robert R. St. Clair (Duke Power Company). 4:00 - 4:25 pm*

BENCHMARK OF SIMULATE-3 CORE MODEL PREDICTIONS

*Kenneth Naugle and Robert Borland (First Energy Nuclear Operating Company). 4:25 - 4:50 pm*

PANAC11 OFF-LINE PREDICTIONS OF MEASURED AXIAL TIP RESPONSES AT QUAD CITIES AND DRESDEN

*G. Ivan Maldonado (University of Cincinnati), Hongbin Zhang, Ronaldo Szilard (Global Nuclear Fuel - Americas), John Wheeler, and David Phegley (Exelon Nuclear). 4:50 - 5:15 pm*

DETECTOR COMPENSATION ERROR CORRECTION TECHNIQUES FOR WESTINGHOUSE DYNAMIC ROD WORTH MEASUREMENT

*Scott B. Thomas (Duke Power Company), and John E. Strange (Tennessee Valley Authority). 5:15 - 5:40 pm*

DETAILED OFF-LINE CORE TRACKING AND METHODS COMPARISONS

*John .P. Rea (Global Nuclear Fuel), and Michelle P. Hynes (Exelon Nuclear). 5:40 - 6:05 pm*

SIMPLEST SIMULATION MODEL FOR 3-DIMENSIONAL XENON OSCILLATION IN PWRS

*Yoichiro Shimazu (Hokkaidou University). 6:05 - 6:30 pm*

**SESSION XIX. UTILITIES EXPERIENCE IN RELOAD  
DESIGN AND LICENSING**

*Tuesday, 4:00 - 6:55 pm (Promenade 3)*

*Session Organizer: Jim Tusar*

*Co-Chairs: Jim Tusar and Hubert Druenne*

INCORE FUEL MANAGEMENT IN BELGIUM: LICENSING ASPECTS

*Ir. N. A. Hollasky (Association Vinçotte Nuclear). 4:00 - 4:25 pm*

BELGIAN EXPERIENCE IN ADVANCED INCORE FUEL MANAGEMENT

*Hubert L. Druenne (Tractebel Engineering). 4:25 - 4:50 pm*

CO-LOCATION - A PRESCRIPTION FOR BETTER LOADING PATTERN

*Robert Lee (Exelon Fuels), Jeffrey Guthridge (Westinghouse Core Technology), Robert Tsai, Brian Manges, and Peter Moravek (Exelon Fuels). 4:50 - 5:15 pm*

USING DAVMOS TO DESIGN A BWR/6 FUEL SHUFFLE

*Dave Knott, Elizebeth M. Maag and Erin M. Wehlage (FirstEnergy Nuclear Operating Company). 5:15 - 5:40 pm*

BWR BPWS RULES RE-ANALYZED FOR MODERN CORE DESIGNS

*Dianna M. Hahn, Erin M. Wehlage, and Dave Knott (FirstEnergy Nuclear Operating Company). 5:40 - 6:05 pm*

HIGH NOTCH WORTH EVENT FOR LIMERICK GENERATING STATION UNIT 2  
CYCLE 7 STARTUP

*Robert J. Wolfgang (Exelon Generation Company), and Brian R. Moore (Global Nuclear Fuel - Americas). 6:05 - 6:30 pm*

LIMERICK UNIT 1 CORE RE-DESIGN TO MITIGATE CHANNEL/CONTROL BLADE  
INTERFERENCE

*James J. Tusar (Exelon Nuclear). 6:30 - 6:55 pm*

**SESSION XX. INNOVATIVE CORE LOADING STRATEGIES  
AND METHODS II**

*Tuesday, 4:00 - 6:55 pm (Promenade 4)*

*Session Organizer: Juan Luis Francois*

*Co-Chairs: Juan Luis Francois and Steve Baker*

A TWO STEPS OPTIMIZATION PROCESS USING GENETIC ALGORITHMS AND  
TABU SEARCH METHODS FOR THE BWR AXIAL FUEL ASSEMBLY DESIGN

*C. Martín del Campo and J. L. François (Laboratorio de Análisis en Ingeniería de Reactores Nucleares). 4:00 - 4:25 pm*

AUTONOMOUS DISTRIBUTED APPROACH USING MULTI-AGENTS FOR  
AUTOMATIC CORE DESIGN OF A BWR

*Yoko Kobayashi (TEPCO Systems Corporation), and Eitaro Aiyoshi (Keio University).*

*4:25 - 4:50 pm*

MID-CYCLE SHUFFLE CONCEPT APPLIED TO QUAD CITIES 1

*Mehdi Asgari, David J. Kropaczek, Ronaldo H. Szilard, William E. Russell (Global Nuclear Fuel - Americas), David A. Phegley, and John K. Wheeler (Exelon Nuclear).* 4:50 - 5:15 pm

BWR MINIMAL SHUFFLE CORE DESIGN CONCEPT

*Elizabeth M. Maag and Dave Knott (FirstEnergy Nuclear Operating Company).* 5:15 - 5:40 pm

LOW-ENRICHMENT FRESH BUNDLES FOR FUEL FAILURE RISK REDUCTION

*Ming-Yuan Hsiao (Exelon Generation Company), and James Haun (Framatome ANP).*

*5:40 - 6:05 pm*

CORE DESIGN STUDY FOR NON-CR OPERATION USING ISOTOPE-ENRICHED  
GADOLINIUM ON UPGRATED A BWR

*Masahiko Kuroki, Hisaki Sato, Kouji Hiraiwa (Toshiba Corporation), and Fukushima Matsumoto (The Japan Atomic Power Company).* 6:05 - 6:30 pm

OPTIMIZATION OF BWR FUEL RELOADS USING COMBINATORIAL TECHNIQUES

*Luis B. Morales (Universidad Nacional Autónoma de México), Alejandro Castillo (Instituto Nacional de Investigaciones Nucleares), Edmundo del Valle (Instituto Politécnico Nacional), and Gustavo Alonso (Instituto Politécnico Nacional).* 6:30 - 6:55 pm

**SESSION XXI. GENERATION OF CROSS-SECTION  
LIBRARIES AND WHOLE CORE TRANSPORT  
CALCULATIONS**

*Wednesday, 8:00 - 9:15 am (Promenade 1)*

*Session Organizer: Tom Marcille, Webb Mills and Ali Haghghat*

*Co-Chairs: Tom Marcille and Jeff Borkowski*

AN AUTOMATED MULTIGROUP CROSS SECTION PROCESSING TECHNIQUE  
USING NJOY

*Thomas F. Marcille and Vernon W. Mills (Global Nuclear Fuel).* 8:00 - 8:25 am

ANALYSIS OF HOT AND COLD KRITZ CRITICALS WITH MCNP5<sup>TM</sup> AND  
TEMPERATURE-SPECIFIC NUCLEAR-DATA LIBRARIES

*Russell D. Mosteller, Robert E. MacFarlane, Robert C. Little, and Morgan C. White (Los Alamos National Laboratory).* 8:25 - 8:50 am

ACCURACY OF THE MONTE CARLO CRITICALITY CALCULATIONS DURING BR2  
OPERATION

*S. Kalcheva, E. Koonen, and B. Ponsard (Belgium Nuclear Research Centre).* 8:50 - 9:15 am

## **SESSION XXII. ADVANCED FUEL ASSEMBLY AND BURNABLE ABSORBER DESIGNS**

*Wednesday, 8:00 - 9:15 am (Promenade 2)*

*Session Organizer: Robb Borland*

*Co-Chairs: Robb Borland and Jeff Secker*

CORE MANAGEMENT IMPROVEMENTS AT ANGRA UNIT 1 AND KORI UNIT 2 USING AN ADVANCED 16X16 WESTINGHOUSE TYPE PWR FUEL ASSEMBLY  
*Edward F. Pulver, Steven J. King (Westinghouse Electric Company), Eduardo Faria, Luciano Sadde, Roberto Esteves (Industrias Nucleares do Brasil), Sang-Keun You, and Kyeong-Lak Jeon (KEPCO Nuclear Fuel Company). 8:00 - 8:25 am*

AN ADVANCED BURNABLE POISON FOR PRESSURIZED WATER REACTORS  
*Allen K., Tulenko J., Baney R., Butt D., and Kim J. (University of Florida). 8:25 - 8:50 am*

ANALYSIS OF BURNABLE ABSORBER OPTIONS FOR THE IRIS CORE DESIGN  
*Allan B. Wollaber, Ronald E. Pevey (The University of Tennessee), and Jess C. Gehin (Oak Ridge National Laboratory). 8:50 - 9:15 am*

## **SESSION XXIII. EXPERIENCES AND ADVANCES IN ON- LINE CORE MONITORING II**

*Wednesday, 8:00 - 9:40 am (Promenade 3)*

*Session Organizer: Angelo Chopelas and Mark Mneimneh*

*Co-Chairs: Mark Mneimneh and Chang Hyo Kim*

ADVANCED ON-LINE FLUX MONITORING FOR CANDU-PHWR WITH UNIFIED NODAL METHOD

*In Seob Hong and Chang Hyo Kim (Seoul National University). 8:00 - 8:25 am*

A NEW APPROACH TO ON-LINE CORE MONITORING

*Earl S Tomlinson III and Carlos Vidal (K Effective). 8:25 - 8:50 am*

GARDEL-PWR: STUDSVIK'S ONLINE MONITORING AND REACTIVITY MANAGEMENT SYSTEM

*Arthur S. DiGiovine (Studsvik Scandpower), and Alejandro Noël (Studsvik Scandpower Suisse, GmbH). 8:50 - 9:15 am*

GARDEL-BWR: ADVANCED BWR ONLINE CORE MONITORING

*Lorne J. Covington (Studsvik Scandpower), and Alejandro Noël (Studsvik Scandpower Suisse, GmbH). 9:15 - 9:40 am*

**PANEL XXIV: PANEL - (REVISITING INPO SOER 96/02)**  
**“ADEQUACY OF METHODS FOR NUCLEAR FUEL**  
**MANAGEMENT”**

*Wednesday, 8:00 - 9:40 am (Promenade 4)*

*Panel Organizer: Brian Moore*

*Panel Moderator: Brian Moore*

**SESSION XXV. FUEL AND CORE DESIGN BASED ON**  
**THORIUM CYCLES**

*Wednesday, 10:00 - 11:40 am (Promenade 1)*

*Session Organizer: Juan Luis Francois*

*Co-Chairs: Juan Luis Francois and Peter Boczar*

USE OF THORIUM IN LIGHT WATER REACTORS

*M. Todosow (Brookhaven National Laboratory), A. Galperin (Ben-Gurion University of the Negev), S. Herring (Idaho Engineering and Environmental Laboratory), M. Kazimi (Massachusetts Institute of Technology), T. Downar (Purdue University), and A. Morozov (Russian Research Center-Kurchatov Institute). 10:00 - 10:25 am*

CORE DESIGN OF A BOILING WATER REACTOR BASED ON AN INTEGRATED  
BLANKET-SEED THORIUM-URANIUM CONCEPT

*J.L. François and A. Núñez-Carrera (Universidad Nacional Autónoma de México).  
10:25 - 10:50 am*

ADVANCED FUEL CYCLES IN THE ACR

*G.R. Dyck and P.G. Boczar (Atomic Energy of Canada Limited). 10:50 - 11:15 am*

SCENARIO FOR U-233 PRODUCTION AND MA-INCINERATION BY USING TH-  
CYCLE

*Otohiko Aizawa (Musashi Institute of Technology). 11:15 - 11:40 am*

**SESSION XXVI. AUTOMATED AND INTERACTIVE FUEL**  
**MANAGEMENT DESIGN AND OPTIMIZATION TOOLS III**

*Wednesday, 10:00 - 12:30 pm (Promenade 2)*

*Session Organizer: Paul Keller*

*Co-Chairs: Paul Keller and Robb Borland*

METHOD FOR OPTIMIZATION OF BWR FUEL MANAGEMENT AND PLANT  
OPERATIONS

*David J. Kropaczek and William E. Russell (Global Nuclear Fuel - Americas).  
10:00 - 10:25 am*

THE GLOBAL NUCLEAR FUEL OPTIMIZATION SYSTEM FOR BWR FUEL CYCLE  
MANAGEMENT

*Christian C. Oyarzun, David J. Kropaczek, Steven B. Sutton, and William E. Russell (Global  
Nuclear Fuel - Americas). 10:25 - 10:50 am*

UTILIZATION OF MICROBURN-B2 FOR FUEL SHUFFLING OPERATIONAL AID  
*Dmitri Zialetsev, Hoju Moon, and Ralph Grummer (Framatome ANP). 10:50 - 11:15 am*

IMPLEMENTATION OF BWR CONTROL ROD PATTERN OPTIMIZATION IN  
MICROBURN-B2

*H. Moon, R. G. Grummer, and St. Misu (Framatome ANP). 11:15 - 11:40 am*

IMPROVED CONTROL ROD ADJUSTMENT MODEL IN THE LOADING PATTERN  
OPTIMIZATION CODE FINELOAD-3

*Suetsugu Jagawa (TEPCO Systems Corporation). 11:40 - 12:05 pm*

FUEL ROD OPTIMIZATION FOR COUPLED BWR FUEL BUNDLE AND CORE DESIGN

*Catherine A. Daubert, David J. Kropaczek, and William E. Russell (Global Nuclear Fuel - Americas). 12:05 - 12:30 pm*

## **SESSION XXVII. VALIDATION OF CORE ANALYSIS TOOLS FOR FUEL MANAGEMENT II**

***Wednesday, 10:00 - 12:30 pm (Promenade 3)***

***Session Organizer: Scott Palmtag***

***Co-Chairs: Scott Palmtag and Wolfgang Kraus***

VALIDATION OF ANMER PPR MODEL

*Mikio Tokashiki, Takuya Ito, and Yuzo Inaba (Nuclear Fuel Industries). 10:00 - 10:25 am*

REACTOR PHYSICS AND CRITICALITY BENCHMARK EVALUATIONS FOR  
ADVANCED NUCLEAR FUEL: EXPERIMENT ANALYSIS COMPARISON REPORT

*W.J. Anderson, M. Saglam (Framatome ANP), B.T. Rearden (Oak Ridge National Laboratory),  
and R. Smith (University of Florida). 10:25 - 10:50 am*

NON-DESTRUCTIVE EXPERIMENTAL DETERMINATION OF THE PIN-POWER  
DISTRIBUTION IN NUCLEAR FUEL

*Staffan Jacobsson Svärd, Ane Håkansson, Anders Bäcklin, Otasowie Osifo, Christofer Willman  
(Uppsala University), and Peter Jansson (Swedish Defense Research Agency).*

*10:50 - 11:15 am*

NEW METHOD FOR DETERMINATION OF ISOTOPIC CONTENT OF IRRADIATED  
NUCLEAR FUEL

*V. M. Piksaikin, V. A. Roshchenko, and L. E. Kazakov (State Scientific Center of Russian  
Federation). 11:15 - 11:40 am*

CASMO-4E FUEL STORAGE RACKS CALCULATIONS

*Joel D. Rhodes III, H. -N. Gheorghiu, and Malte Edenius (Studsvik Scandpower). 11:40 - 12:05  
pm*

OPTIMAL FUEL RELOADING STRATEGY FOR VVER-1000 CORE OF BUSHEHR  
NUCLEAR POWER PLANT

*Ali Pazirandeh (University of Tehran), Mohsen Ertejaee, and Majid Shahabfar (Azad  
University). 12:05 - 12:30 pm*