

16th Symposium of AER on VVER Reactor Physics and Reactor Safety

Bratislava, Slovakia
25-29 September 2006

Organised by VUJE, Inc., Trnava
and FEEI SUT, Bratislava

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PROGRAM

MONDAY, 25 September

10:00 Opening of the Symposium

- 0.1 Welcome address, *Marta Žiaková, Slovak Regulatory Authority*
- 0.2 Welcome address, *Vladimír Nečas, Faculty of Electrical Engineering and Information Technology, Slovak University of Technology*
- 0.3 Welcome address, *Vladimír Slugeň, Slovak Nuclear Society*
- 0.4 Welcome address, *Peter Líška, VUJE, Inc.*
- 0.5 Present Status of Modernization of NPP V2 Bohunice, *Pavol Ševera, VUJE, Inc.*
- 0.6 Safety Issues to be Solved in Mochovce NPP Units 3&4 Design Revision, *Ivan Čillík, Štefan Rohár, VUJE, Inc.*

Coffee break

Topic 1 *Spectral and Core Calculations*

11:30 Session 1 (chair: **P. Mikoláš, Czech Republic**)

- 1.1 Information about AER WG A On Improvement, Extension and Validation of Parametrized Few-Group Libraries for VVER 440 and VVER 1000, *P. Mikoláš, ŠKODA JS a.s., Czech Republic*
- 1.2 Inclusion of Historical Dependences of Fuel Burn-up into MOBY-DICK Code, *V. Krýsl, P. Mikoláš, ŠKODA JS a.s., Czech Republic*

12:30 Lunch

13:30 Session 1 continues

- 1.3 Quantitative and Quality Test of Cross Section Library ENDF/B-b2, *R. Zajac, VUJE, Inc., V. Nečas, FEEI SUT, Slovakia*
- 1.4 BIPR7 Library Preparation by HELIOS, *P. Dařílek, VUJE, Inc., Slovakia*

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- 1.5 Calculation of Isotope Burn-up and Change in Efficiency of Absorbing Elements of VVER-1000 Control and Protection System during Burn-up, *O.A. Timofeeva, K.Yu. Kurakin, FSUE OKB „GIDROPRESS“, Russia*

Coffee break

Topic 2 Core Operation, Experiments and Code Validation

15:00 Session 2 (chair: K. Kurakin, Russia)

- 2.1 Determination of Reactor Parameters During Start Up Test at the TIANWAN NPP, Unit 1, *S. Astakhov, A. Kravchenko, Yu. Kraynov, A.Nasedkin, S. Tsyganov, RRC “Kurchatov Institute”, Russia*
- 2.2 Code Package SAPPHIRE _95&RC_ VVER. Verification on Operational Data of VVER-440 Units, *Yu. A. Ananiev, K. Yu. Kurakin, FSUE OKB “GIDROPRESS”, Russia, V.G. Artyomov, FSUE NITI, Russia*
- 2.3 The Power's Maneuvering Regime Simulation on 2nd Unit of Khmel'nitsky HNPP, *Y. Ovdiyenko, V. Khalimonchuk, A. Kuchin, State Scientific and Technical Centre on Nuclear and Radiation Safety, Ukraine*
- 2.4 Tests in “Kurchatov Institute” on Research of Coolant Mixing in Fuel Exit Channel of VVER-440 Reactor, *L. Kobzar, D. Oleksuk, RRC “Kurchatov Institute”, Russia*
- 2.5 On the Method of Moving of Incomplete Coolant Mixing Correction in the Top Nozzle of VVER-440 Assembly. Correction of Power Assemblies Using Thermocouples Readings, *A. Brik, D. Oleksiuk, RRC “Kurchatov Institute”, Russia*
- 2.6 Power Release Estimation Inside of Fuel Pins Neighbouring Fuel Pin with Gadolinium in a WWER-1000 Type Core, *J. Mikus, NRI Řez plc, Czech Republic*

18:30 Dinner

TUESDAY, 26 September

Breakfast

Topic 3 Fuel Management

08:30 Session 3A (chair: J. Bajgl, Czech Republic)

- 3.1 AER Working Group "B" Activities in 2006, *P. Dařílek, VUJE, Inc., Slovakia*
- 3.2 Comparison of Optimizing Loading Patterns on the Basis of SA and PMA Algorithms, *B. Beliczai, Paks NPP Ltd, Hungary*
- 3.3 Gd-2 Fuel Cycle Benchmark - Final Definition, *J. Bajgl, CEZ Inc., Dukovany NPP, Czech Republic*
- 3.4 Utilisation of Gd-2 Fuel Assemblies at NPP Bohunice Unit 3 and 4, *M. Kačmar et al, Bohunice NPP, Slovakia*
- 3.5 Preliminary Comparison of Theoretical and Real Data of Cycles with Gd-II FA, *P. Urban, NPP Mochovce, Slovakia*

Coffee break

10:50 Session 3B (chair: Y. Kukushkin, Russia)

- 3.6 Four Years Re-Use of Low Burned Fuel Assemblies from Units 1&2 in Core Loadings of Units 3&4 WWER-440 at Kozloduy NPP, *I. Stoyanova, A. Antov, V. Spasova, Kozloduy NPP Plc., Bulgaria*
- 3.7 Results of Research and Optimization for the Third-Generation Fuel Assemblies PK-3 VVER-440, *A. Gagarinsky, A. Lazarenko, M. Lizorkin, B. Saprykin, RRC "Kurchatov Institute", Russia*
- 3.8 ²³⁶U Compensation in Recycled Uranium Fuel for the VVER Reactors, *V.Yu. Plyashkevich, V.N. Proselkov, RRC "Kurchatov Institute", Russia*
- 3.9 Stationary TVSA Fuel Cycles at Kozloduy NPP WWER-1000 Reactors, *K. Kamenov, Kozloduy NPP Plc., Bulgaria*

12:30 Lunch

Topic 4 Core Surveillance and Monitoring

13:30 Session 4A (chair: S. Kliem, Germany)

- 4.1 AER Working Group C Activity in 2006, *I. Nemes, Paks NPP Ltd., Hungary*

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- 4.2 Modernization of In-Core Instrumentation System (ICIS) on Reactor VVER-1000, *V. Mitin, RRC "Kurchatov Institute", Russia*
- 4.3 SPND Detectors Response at the Control Rod Drop in VVER-1000. Measurement and Modeling Results, *V. Mitin, N. Milto, M. Kuzmichev, L. Shishkov, S. Tsyganov, RRC "Kurchatov Institute", Russia*
- 4.4 Application of New Methodology of Form-Functions Calculations in SCORPIO-VVER System, *J. Šústek, ŠKODA JS a.s., Czech Republic*
- 4.5 An Advanced Tool of Nuclear Reactor Core Analysis for Reactor Physicist: VERONA-Expert System, *I. Pócs, Z. Kálay, G. Farkas, Paks NPP Ltd., Hungary*

Coffee break

15:45 Sight-seeing tour

19:30 Dinner

WEDNESDAY, 27 September

Breakfast

08:30 Session 4B (chair: A. Gagarinskiy, Russia)

- 4.6 A new Type of In-Core Sensor Validation Outline, *S. Fignedy, VUJE, Inc., Slovakia*
- 4.7 Modelling of the WWER-440 Reactor for Determination of the Spatial Weight Function of Ex-Core Detectors Using MCNP-4C2 Code, *G. Farkaš, SUT, Faculty of Electrical Engineering and Information Technology, Department of nuclear physics and technology, Slovakia*
- 4.8 The Evaluation of Control Assembly Withdrawal by Dynamic Method - Practice Utilization, *C. Strmensky, M. Minarcin, V. Petenyi, VUJE, Inc., Slovakia*
- 4.9 Measurement and Evaluation Systems for NPP Commissioning, *M. Elko, VUJE, Inc., Slovakia*
- 4.10 Influence of Sampling Interval Inaccuracy on Calculated Reactivity Error, *M. Sedlacek, M. Elko, VUJE, Inc., Slovakia*

Coffee break

Topic 5 Reactor Dynamics, Thermal Hydraulics and Safety Analysis

10:50 Session 5A (chair: P. Siltanen, Finland)

- 5.1 "AER Working Group D on VVER Safety Analysis", Report of the meeting in Pisa, Italy, 26-27 April 2006, *P. Siltanen, Fortum Nuclear Services Ltd, Finland*
- 5.2 Results of Modeling Benchmark Problem V1000CT2 for Exercise 1 of the Phase 2 with the System Code ATHLET-BIPR8KN, *S. Nikonov, M. Lizorkin, A. Kotsarev, RRC "Kurchatov Institute", Russia, K. Velkov, S. Langenbuch, GRS mbH, Germany*
- 5.3 State of the Art Regarding the Safety Analysis of Boron Dilution Events in Germany, *S. Kliem, U. Rohde, Forschungszentrum Rossendorf, Germany*
- 5.4 Uncertainty Analysis for Hot Channel, *I. Panka, A. Keresztúri, KFKI Atomic Energy Research Institute, Hungary*

12:30 Lunch

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13:30 Session 5A continues

- 5.5 Evaluation of Fuel Rod Cladding Failure, *B. Hatala, VUJE, Inc., Slovakia*
- 5.6 Assessment of the Thermo-Mechanical Behavior of Fuel Pins During Power's Maneuvering Regime on 2nd Unit of KHNPP", *M. Jeremenko, Y.Ovdiyenko, V.Khalimonchuk, Scientific and Technical Centre on Nuclear and Radiation Safety, Ukraine*

14:20 Session 5B (chair: A. Aszódi, Hungary)

- 5.7 Detailed Analysis of Coolant Flow in VVER-440 Fuel Rod Bundle, *S. Tóth, A. Aszódi, Institute of Nuclear Techniques, Budapest University of Technology and Economics, Institute of Nuclear Techniques, Hungary*
- 5.8 CFD Analysis of Coolant Mixing in VVER-1000 Pressure Vessel, *B. Yamaji, A. Aszódi, Budapest University of Technology and Economics, Institute of Nuclear Techniques, Hungary*
- 5.9 The CFD Modeling of Coolant Flow in Fuel Assembly - Current Results and Their Application, *K. Klučárová, J. Remiš, VUJE, Inc., Slovakia*
- 5.10 Spectral Element Code Development for Incompressible Flow Simulations In the Subchannel of a Fuel Rod Bundle, *P. Kávrán, KFKI Atomic Energy Research Institute, Hungary*

Coffee break

Topic 6 *Physical Problems of Spent Fuel Decommissioning and Radwaste*

16:15 Session 6A (chair: T. Lötsch, Germany)

- 6.1 Summary of Working Group „E“, *V. Chrapčiak, VUJE, Inc., Slovakia*
- 6.2 The Analyses of Measured Nuclide Concentration in Project ISTC 2670, *V. Chrapčiak, VUJE, Inc., Slovakia*
- 6.3 Composition Calculations by the KARATE Code System for the Spent-Fuel Samples from the Novovoronezh Reactor, *G. Hordósy, KFKI Atomic Energy Research Institute, Hungary*
- 6.4 Validation of SCALE Depletion Calculations Against VVER Experimental Data, *M. Manolova, N. Mihaylov, M. Peeva, INRNE, Bulgaria (paper only)*
- 6.5 Calculation of Isotope Composition of WWER- 440 Spent Fuel Assembly by the NESSEL-NUKO Code System on the Basis of the ISTS Burn-Up Credit Project Data, *R. Prodanova, INRNE, Bulgaria (paper only)*
- 6.6 Methodology for Burnup Credit Application for VVER-440 Reactors in Slovakia, *V. Chrapčiak, VUJE, Inc., Slovakia*

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18:30 Dinner

THURSDAY, 28 September

Breakfast

09:00 Session 6B (chair: I. Stoyanova, Bulgaria)

- 6.7 Bounding Approach in BUC Implementation in Pool at VVER-440, *F. Havlůj, NRI Řež plc, Czech Republic*
- 6.8 Nuclear Safety Analysis for Transport Cask TK-6 (for VVER-440) and Cover for Fresh Assemblies (for VVER-1000) in Implementation of new Fuel Types at Ukrainian NPP, *Y. Bilodid, State Scientific and Technical Centre on Nuclear and Radiation Safety, Ukraine*
- 6.9 Leak Testing of WVER-440 Fuel Assemblies in Slovak Wet Interim Spent Fuel Storage Facility, *M. Mikloš, V. Kršjak, V. Slugeň, SUT, Faculty of Electrical Engineering and Information Technology, Department of nuclear physics and technology, Slovakia*

Coffee break

Topic 7 Actinide Transmutation and Spent Fuel Disposal

10:25 Session 7A (chair: V. Lelek, Czech Republic)

- 7.1 Information about Activities AER Working Group "F" – Spent Fuel Transmutations, *V. Lelek, NRI Řež plc., Czech Republic*
- 7.2 Sustainable Fuel Cycle Alternatives for Slovakia - Evaluation Methods, *P. Dařílek, VUJE, Inc., Slovakia*
- 7.3 PWR and VVER Thorium Cycle Calculation, *J. Breza, VUJE, Inc., Slovakia*
- 7.4 Fuel Research in Halden, *J. Breza, VUJE, Inc., Slovakia*
- 7.5 Impact of the Alternative Fuel Cycles on the Long Term Safety of Deep Geological Repository, *J. Přítrský, F. Ondra, DECONTA, Slovakia*

12:30 Lunch

13:30 Technical excursion

19:30 Official dinner

FRIDAY, 29 September

Breakfast

9:00 Session 7B (chair: G. Hordósy, Hungary)

- 7.6 Meeting of Energy Needs During the Period of Raw Materials Insufficiency in the 21st Century (Bulgaria, Czech Republic, Poland, Russia and Slovakia cooperation – draft of project), *V. Lelek, T. Apostolov, B. Petrov, S. Chwaszczewski, K. Andrzejewski, S. Subbotin, V. Tsibulskij, P. Darilek, R. Zajac, J. Breza*
- 7.7 Uranium as Raw Material for Nuclear Energy, *V. Lelek, NRI Řež plc., Czech Republic*
- 7.8 Application of KARATE to Supercritical Water Reactors, *Gy. Hegyi, Cs. Maráczy, KFKI Atomic Energy Research Institute, Hungary*

Coffee break

10:30 Session 8 Discussion and Symposium Closure

12:30 Lunch

9:00÷12.30 Poster session

- P1 Radiotoxicity of Thorium fuel cycle, *J. Bajan*
- P2 Infinite Multiplication Factor and Temperature Coefficient of MSR Calculated by HELIOS, *Z. Németh*
- P3 Electrodeposition of Lanthanum from Fluoride Melts, *M. Ambrová, V. Danielik, J. Jurišová*
- P4 Phase Diagrams of the Systems MF – La₂O₃ and M₃AlF₆ - La₂O₃ where M = Li, Na, K, *M. Ambrová, V. Danielik, J. Jurišová*
- P5 Dose Rate Calculation on the Surface of the C30 Container, *B. Ecker, P. Lipták*