



**21st Symposium of AER on
VVER Reactor Physics and Reactor Safety
Dresden, September 19 - 23, 2011**

Agenda

Monday, September 19

8:30 Registration

9:30

- 0.1 Opening and Welcome,
S. Kliem, HZDR, Germany
- 0.2 Overview on the Institute of Safety Research within the Helmholtz-Zentrum
Dresden- Rossendorf,
S. Kliem, HZDR, Germany
- 0.3 Publication possibilities for AER scientific papers,
A. Aszodi, Budapest University of Technology and Economics, Hungary

10:40 Coffee break

11:10 Session 1 - Session chair: T. Simeonov

- 0.4 Safety assessment of the German NPPs after the Fukushima accident,
A. Pautz, GRS, Germany

Topic 2 Reactor physics experiments and code validation

- 2.1 "Full-Core" - VVER-440 core periphery power distribution benchmark
proposal,
V. Krýsl, P. Mikoláš, D. Sprinzl, J. Švarný, ŠKODA JS a.s., Czech Republic
- 2.2 Calculations of fission rate distribution in the core of VVER-1000 mock-up on
the LR-0 reactor using alternative methods and comparison with results of
measurements,
S. Zaritskiy, A. Kovalishin, T. Tsvetkov, NRC "Kurchatov Institute", Russia
- 2.3 Qualification of the APOLLO2 lattice physics code of the NURISP platform
for VVER hexagonal lattices,
*A. Keresztúri, G. Hegyi, Á. Tóta, KFKI Atomic Energy Research Institute,
Hungary*

12:45 Lunch

14:00 Session 2 - Session chair: A. Keresztúri

- 2.4 The simplified P3 approach on a trigonal geometry in the nodal reactor code DYN3D,
S. Duerigen, E. Fridman, HZDR, Germany
- 2.5 Solution of the "MIDICORE" VVER-1000 core periphery power distribution Benchmark by KARATE and MCNP,
E. Temesvári, G.Hordósy, G. Hegyi, Cs.Maráczy, KFKI Atomic Energy Research Institute, Hungary
- 2.6 Solutions for the task 1 and task 2 of the benchmark for core burnup calculations for a VVER-1000 reactor, T. Lötsch, V. Khalimonchuk, A. Kuchin,
TÜV SÜD Industrie Service GmbH, Germany
- 2.7 Overview of the validation of a new 3-D neutronics model in APROS,
J. Rintala, VTT, Finland

15:40 Coffee break

16:10 Session 3 - Session Chair: I. Ovdiienko

Topic 1 Spectral and core calculations

- 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, SKODA JS a.s., Czech Republic
- 1.2 HELIOS: Application for criticality limits assessment,
T. Simeonov, Studsvik Scandpower GmbH, Germany
- 1.3 A comparison of the FA's models with the detailed and simplified description of the design elements in calculations by MCU code,
A.S. Bikeev, S.V. Marin, E.A. Sukhino-Khomenko, NRC "Kurchatov Institute" Moscow, Russia
- 1.4 Development of multi-group spectral code TVS-M,
A.P. Lazarenko, A.V. Pryanichnikov, NRC "Kurchatov Institute" Moscow, Russia

Tuesday, September 20

9:00 **Session 4 - Session Chair: P. Mikoláš**

Topic 1 Spectral and core calculation

- 1.5 An analytical solution for the consideration of the effect of adjacent fuel elements; extension to hexagonal fuel elements,
B. Merk, U. Rohde, HZDR, Germany
- 1.6 The influence of the small radial FAs displacements on the power distribution in the VVER-cores,
E.A. Sukhino-Khomenko, NRC "Kurchatov Institute" Moscow, Russia
- 1.7 On solution to the problem of reactor kinetics with delayed neutrons,
J. Kyncl, Nuclear Research Institute Řez, Czech Republic
- 1.8 Influence of spectral history on full core calculation results,
Y. Bilodid, S. Mittag, HZDR, Germany

10:40 **Coffee break**

11:10 **Session 5 - Session Chair: A.P. Lazarenko**

- 1.9 Effect of burnup history by moderator density on neutron-physical characteristics of WWER-1000 core,
I. Ovdiienko, A. Kuchin, V. Khalimonchuk, M. Ieremenko, SSTC NRS Kiev, Ukraine
- 1.10 The development of the code package PERMAK-3D/SC-1,
P.A. Bolobov, D.A. Oleksyuk, NRC "Kurchatov Institute" Moscow, Russia

Topic 7 Engineering factors

- 7.1 Information about Group H meeting,
L.K. Shishkov, NRC "Kurchatov Institute" Moscow, Russia
- 7.2 Estimation procedure for engineering margin factors of VVER fuel cycles,
V.G. Dementiev, D.A. Oleksuk, L.K. Shishkov, NRC "Kurchatov Institute" Moscow, Russia

12:45 **Lunch**

14:00 **Session 6 - Session Chair: R. Zajac**

Topic 3 Core design, monitoring and fuel management

- 3.1 AER Working Group C activities in 2011 (oral presentation, only),
I. Nemes, Paks NPP, Hungary
- 3.2 In-core control system modernization experience on WWER-1000 units,
A. Bykov, SNIIP Atom Ltd. Moscow, Russia

- 3.3 Status and prospects of the core surveillance system SCORPIO-VVER in Czech Republic and Slovakia,
J. Molnar, R. Vocka, Nuclear Research Institute Řez, Czech Republic
- 3.4 Role of the team of scientific and technical commissioning support during Mochovce NPP Unit3&4 commissioning,
J. Hermanský, M. Prachár, M. Sedláček, VUJE Inc., Slovakia

15:40 Coffee break

16:10 Session 7 - Session Chair: J. Molnar

- 3.5 AER Working Group B activities in 2011,
P. Darilek, VUJE Inc., Slovakia
- 3.6 15m-cycle option for NPP Paks operation,
I. Nemes, Paks NPP, Hungary
- 3.7 Experience of TVSA fuel implementation at Kozloduy NPP,
K. Kamenov, Al. Kamenov, D. Hristov, Kozloduy NPP, Bulgaria
- 3.8 Implementation of 5-year fuel cycle strategy for control fuel assemblies at Dukovany NPP,
J. Bajgl, ČEZ, a.s., Dukovany NPP, Czech Republic

Wednesday, September 21

9:00 **Session 8 - Session Chair: I. Nemes**

Topic 3 Core design, monitoring and fuel management

- 3.9 New practice for the evaluation of rod efficiency measurement by rod drop at the NPP Paks,
I. Pócs, T. Parkó, Paks NPP, Hungary
- 3.10 VVER 440 fuel cycles optimization by the ATHENA code,
J. Prehradný, SKODA JS a.s., Czech Republic
- 3.11 Some remarks to the pin-wise power distribution behavior in L³P core designs,
M. Fiala, ČEZ, a.s., Dukovany NPP, Czech Republic

Topic 5 Spent fuel disposal, actinide transmutation

- 5.1 AER Working Group E activities in 2011,
V. Chrapciak, VUJE Inc., Slovakia

10:40 **Coffee break**

11:10 **Session 9 - Session Chair: J. Bajgl**

- 5.2 Criticality safety analysis of fresh and spent fuel storage and handling for NPP Mochovce using MCNP5,
G. Farkas, J. Haščík, J. Lüley, B. Vrban, M. Petriska, V. Slugeň, P. Urban, Slovak University of Technology in Bratislava, Slovakia
- 5.3 VVER-440 with viable direction to sustainability,
P. Darilek, C. Strmensky, R. Zajac, J. Majercik, VUJE Inc., Slovakia
- 5.4 Comparison of square and hexagonal fuel lattices for high conversion PWRs,
D. Kotlyar, E. Shwageraus, Ben-Gurion University of the Negev, Israel
- 5.5 ALLEGRO - Introduction to GFR,
P. Darilek, R. Zajac, VUJE Inc., Slovakia

Topic 7 Engineering factors

- 7.3 Account for uncertainties of control measurements in estimations of design margin factors,
V.G. Dementiev, V.D. Sidorenko, L.K. Shishkov, NRC "Kurchatov Institute" Moscow, Russia
- 7.4 Specific features of accounting for probable power excursions at periphery FAs, which are caused by FA gaps behaviour in the course of VVER-1000 operation,
E.F. Michailov, L.K. Shishkov, NRC "Kurchatov Institute" Moscow, Russia

13:15 **Lunch**

15:00 **Sightseeing tour Dresden (2-hour guided walk)**
Start at hotel reception

19:00 **Dinner**
Restaurant “Festungsmauern” Am Brühlschen Garten 4, Dresden

Thursday, September 22

9:00 Session 10 - Session Chair: U. Rohde

Topic 1 Spectral and core calculation

- 1.11 Steps ahead in the few-group cross-section library generation at the pin level,
N. Petrov, J-J. Herrero, INRNE Sofia, Bulgaria
- 1.12 Advanced calculation schemes and cross-section library generation in hexagonal geometry with APOLLO2,
G. Todorova, N. Petrov, N. Zheleva, N.P. Kolev, F. Damian, INRNE Sofia, Bulgaria

Topic 4 Reactor dynamics and safety analysis

- 4.1 AER Working Group D on VVER safety analysis – report of the 2011 meeting,
S. Kliem, HZDR, Germany
- 4.2 Preliminary results of the seventh three-dimensional AER dynamic benchmark problem calculation. Solution of problem with DYN3D- and RELAP5-3D-codes,
M. Bencik, J. Hádek, Nuclear Research Institute Řez, Czech Republic

10:40 Coffee break

11:10 Session 11 - Session Chair: A. Aszódi

- 4.3 Simulation of AER-7 benchmark with the coupled code DYN3D/ATHLET,
Y. Kozmenkov, S. Kliem, HZDR, Germany
- 4.4 COBAYA3/FLICA4 vs. DYN3D/FLOCAL Solutions of the VVER-1000 MSLB benchmark,
I. Spasov, T. Tzanov, N. Kolev, J. Hadek, INRNE Sofia, Bulgaria
- 4.5 Modeling the spatial distribution of the parameters of the coolant in the reactor volume,
S.P. Nikonov, NRC "Kurchatov Institute" Moscow, Russia
- 4.6 Comparisons with measured data of the simulated local core parameters by the coupled code ATHLET-BIPR-VVER applying a new enhanced model of the reactor pressure vessel,
S.P. Nikonov, I. Pasichnyk, K. Velkov, GRS, Germany

12:45 Lunch

14:00 Session 12 - Session Chair: S. Kliem

- 4.7 WVER safety analysis in case of simultaneous positive reactivity introduction by control rods withdrawal and pure condensate injection,
A. Kuchin, I. Ovdiienko, V. Khalimonchuk, SSTC NRS Kiev, Ukraine
- 4.8 Study on severe accidents and countermeasures for VVER-1000 reactors using the integral code ASTEC,

P. Tusheva, N. Reinke, F. Schäfer, E. Altstadt, S. Kliem, HZDR, Germany

- 4.9 Computational and design considerations for innovative Light Water Reactor with natural circulation ,

A. Soldatov, T. S. Palmer, Oregon State University, USA

- 4.10 Studies on boiling water reactor design with reduced moderation and analysis of reactivity accidents using the code DYN3D-MG,
U. Rohde, HZDR, Germany

15:40 Coffee break

16:10 Session 13 - Session Chair: T. Lahtinen

- 4.11 Application of DYN3D/ATHLET and DYN3D/RELAP5 coupled codes to simulation of RUTA-70 reactor with CERMET fuel,
Y. Kozmenkov, Y. Baranaev, A. Glebov, U. Rohde, HZDR, Germany

Topic 6 Nuclear applications of three dimensional thermal hydraulics

- 6.1 AER Working Group G activities in 2011,
A. Aszódi, Budapest University of Technology and Economics, Hungary
- 6.2 Investigation of coolant mixing in VVER-440/213 RPV with improved turbulence models,
B. Kiss, A. Aszódi, Budapest University of Technology and Economics, Hungary
- 6.3 New studies of the natural convection around the fuel rod model of the BME training reactor with PIV/LIF technique,
R. Szijártó, A. Aszódi, B. Yamaji, Budapest University of Technology and Economics, Hungary

Friday, September 23

9:00 **Session 14 - Session Chair: K. Velkov**

Topic 6 ***Nuclear applications of three dimensional thermal hydraulics***

- 6.4 Effect of spacer grid mixing vanes on coolant outlet temperature distribution,
T. Rämä, T. Lahtinen, Fortum Power and Heat Ltd., Finland
- 6.5 Analysis of coolant flow in central tube of VVER-440 fuel assemblies,
G. Zsíros, S. Tóth, A. Aszódi, Budapest University of Technology and Economics, Hungary
- 6.6 Analysis of C1 experiment on UPTF facility with an advanced ATHLET model,
I. Pasichnyk, K. Velkov, S.P. Nikonov, GRS, Germany
- 6.7 A proposal to continuation of VVER-440 fuel assembly head benchmark,
A. Aszódi, S. Tóth, Budapest University of Technology and Economics, Hungary

10:40 **Coffee break**

11:10 **Session 15 - Session Chair: K. Velkov**

Topic 5 ***Spent fuel disposal, actinide transmutation***

- 5.6 Summary of 13th session of the AER Working Group F- "Spent fuel transmutations" and 4th meeting of INPRO project RMI – "Meeting energy needs in the period of raw materials insufficiency during the 21st century",
V Lelek, Nuclear Research Institute Řez, Czech Republic
- 5.7 Strategies of the future technological development,
V. Lelek, Nuclear Research Institute Řez, Czech Republic

General discussion and closure of the Symposium

12:45 **Lunch**