



Croatian Nuclear Society

in cooperation with



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DRŽAVNI ZAVOD ZA RADIOLOŠKU I NUKLEARNU SIGURNOST

11th International Conference of the

**C R O A T I A N
N U C L E A R S O C I E T Y**

**Former "Nuclear Option in Countries
with Small and Medium Electricity Grids"**

June 5-8, 2016, Zadar, Croatia

Conference Programme

UNDER THE AUSPICES OF



EUROPEAN NUCLEAR SOCIETY



IAEA

International Atomic Energy Agency



FER

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**MINISTARSTVO GOSPODARSTVA,
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DRŽAVNI ZAVOD ZA RADIOLOŠKU I NUKLEARNU SIGURNOST

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CONFERENCE LOCATION

The conference will take place in the **Hotel Kolovare** in Zadar.

CONFERENCE PROCEEDINGS

All papers, presented orally or as posters, accepted upon peer review are included into the proceedings on memory stick. Book of Abstracts and Conference Proceedings can be found in conference package.

INFORMATION

For further information and possible questions please refer to the Conference registration desk in the Hotel Kolovare.

SOCIAL EVENTS

WELCOME RECEPTION

The welcome reception will take place on **Sunday, June 5th 2016, at 20:00 h** in the **Hotel Kolovare, Wine Boutique area**. You are welcome to attend.

CONFERENCE DINNER

The conference dinner will take place on **Tuesday, June 7th 2016**, in the **Foša Seafood Restaurant** at **20:00 h** in Zadar. The restaurant is within walking distance from the conference venue.

MUSEUM VISIT

The visit to the Museum of Ancient Glass, situated in the Old Town of Zadar, will take place on **Tuesday, June 7th 2016, at 18:00 h**.

CONFERENCE OVERVIEW

ORAL PRESENTATIONS

From Monday, June 6th, till Wednesday, June 8th, following 8 sessions with oral presentations are foreseen:

- Session 1. Energy Planning and Nuclear Option*
- Session 2. Regulatory Practice and Emergency Preparedness*
- Session 3. Operation and Maintenance Experience*
- Session 4. Power Reactors and Technology*
- Session 5. Nuclear Safety Analyses*
- Session 6. Reactor Physics and Nuclear Fuel Cycle*
- Session 7. Radioactive Waste Management and Decommissioning*
- Session 8. Environment, Public Relations and Safety Culture*

The program also includes the following eight **invitel lectures (IL)**:

- IL-1 Arif Nesimi Kilic: **NPP-Grid Interface as a Part of IAEA Milestone Approach**
- IL-2 Andrii Gritsevskiy: **Outlook for Global Nuclear Power: Energy, Electricity and Nuclear Power Estimates for the Period up to 2050**
- IL-3 Jozef Mišak: **Essential Role of Nuclear Power for Implementation of Conclusions of Climate Conference 2015**
- IL-4 Ana Stanič: **Lessons from Fukushima: Actions Taken at EU and International Level**
- IL-5 Milovan Perić: **Computational Fluid Dynamics and Heat Transfer: State-of-the-Art and Future Trends**
- IL-6 Peter Breitenstein: **Sustainable Used Fuel Management – The Benefits of Treatment and Recycling of Used Nuclear Fuel**
- IL-7 Malcolm Grimston: **Public Attitudes to Nuclear Power – it's Not (just) About the Science**
- IL-8 Ivica Prlić: **Why is the NORM Waste Included in to the Croatian RadWaste Strategy**

POSTER PRESENTATIONS

Poster session will take place on Tuesday, **June 7th 2016, from 12:00 h to 13:00 h.**

YOUNG AUTHORS AWARD CEREMONY

The Young Authors Award Ceremony will take place on Wednesday, **June 8th 2016**, during the Conference Closing session.

CONFERENCE

	Sunday, June 5 th	Monday, June 6 th
8:00		Registration
9:00		Welcome Addresses
9:30		Invited Lectures 1 & 2
10:00		
10:30		Session EPNO
11:00		Coffee Break
11:30		Session RPEP
12:00		
12:30		
13:00		Lunch Time
13:30		
14:00		Invited Lecture 3
14:30		Session OME1
15:00		
15:30		
16:00		Coffee Break
16:30		Invited Lecture 4
17:00		Session OME2
17:30		
18:00		
18:30	Conference Registration	
19:00		
19:30		
20:00	Welcome Reception	
21:00		

Sessions:

EPNO	Energy Planning and Nuclear Option
RPEP	Regulatory Practice and Emergency Preparedness
OME	Operation and Maintenance Experience

PROGRAMME

Tuesday, June 7 th	Wednesday, June 8 th	
		8:30
Invited Lecture 5	Invited Lecture 7	9:00
Session PRT	Session RPNFC	9:30
		10:00
		10:30
Coffee Break	Coffee Break	11:00
Invited Lecture 6	Session EPRSC	11:30
Poster Session		12:00
	Invited Lecture 8	12:30
Lunch Break	Lunch Break	13:00
		13:30
Session NSA1	Session RWMD	14:00
		14:30
		15:00
	Coffee Break	15:30
Coffee Break	Conference Closing	16:00
Session NSA2		16:30
		17:00
17:30		
18:00		
Museum Visit		18:30
		19:00
		19:30
Conference Dinner		20:00
		20:30

Sessions:

- PRT** Power Reactors and Technology
- NSA** Nuclear Safety Analyses
- RPNFC** Reactor Physics and Nuclear Fuel Cycle
- EPRSC** Environment, Public Relations and Safety Culture
- RWMD** Radioactive Waste Management and Decommissioning

CONFERENCE SCHEDULE

MONDAY, June 6th

8:00-9:00	Registration of participants
9:00-10:30	<p style="text-align: center;">OPENING SESSION</p> <p style="text-align: center;">Chairs: D. Grgić, Z. Šimić, Ž. Tomšić (Croatian Nuclear Society)</p> <p style="text-align: center;">Welcome Addresses</p> <p style="text-align: center;">Invited Lectures</p>
	<p>IL-1 Arif Nesimi Kilic NPP-Grid Interface as a Part of IAEA Milestone Approach</p> <p>IL-2 Andrii Gritsevskiy Outlook for Global Nuclear Power: Energy, Electricity and Nuclear Power Estimates for the Period up to 2050</p>
10:30-11:00	<p style="text-align: center;">Energy Planning and Nuclear Option</p> <p style="text-align: center;">Chairs: A. Gritsevskiy (IAEA, Austria), Ž. Tomšić (FER, Croatia)</p>
	<p>S1-11 András Cserhádi The Role of Nuclear Power in Hungary, a Regional Comparison</p> <p>S1-87 Vladimir Knapp, Dinka Lale, Mario Matijević, Dubravko Pevec Carbon Emission Impact for Energy Strategy in which All Non-CCS Coal Power Plants Are Replaced by Nuclear Power Plants</p>
11:00-11:30	Coffee Break
11:30-13:00	<p style="text-align: center;">Regulatory Practice and Emergency Preparedness</p> <p style="text-align: center;">Chairs: S. Medaković (SORNS, Croatia), G.L. Vayssier (NSC, The Netherlands)</p>
	<p>S2-9 Nevenka Novosel Recommendations and Suggestions of the IRRS Mission in Croatia</p> <p>S2-133 George Vayssier Accident Management under Extreme Events</p> <p>S2-36 Robert Prior Enhancements to PWR SAMG Since Fukushima</p> <p>S2-38 Hrvoje Grganić Overview of the Electromagnetic Compatibility Requirements for the Nuclear Power Plants</p>

	<p>S4-79 Zohreh Gholamzadeh, Atyeh Joze Vaziri, Seyed Mohammad Mirvakili</p> <p>Neutronic Investigation of a Modeled Subcritical NaBeF-Th-U Molten Salt Reactor Driven by 30 MeV Protons</p>
13:00-14:00	Lunch Break
14:00-14:30	Invited Lecture
	<p>IL-3 Jozef Mišak</p> <p>Essential Role of Nuclear Power for Implementation of Conclusions of Climate Conference 2015</p>
14:30-16:00	Operation and Maintenance Experience Part I Chairs: P. Širola, Z. Heruc (NPP Krško, Slovenia)
	<p>S3-109 Arif Nesimi Kilic</p> <p>Increasing Needs and Solutions for Non-Baseload Operation of NPPs</p> <p>S3-3 Mario Gluhak</p> <p>Equipment Reliability Process in Krško NPP</p> <p>S3-90 Zdenko Šimić, Miguel Peinador Veira</p> <p>Lessons Learned from Missing Flooding Barriers Operating Experience</p> <p>S3-45 Marko Pirc</p> <p>Cable Aging Management Program Implementation in Krško NPP</p> <p>S3-83 Dragoslav Djaković</p> <p>Quality Control Activities Related to Mechanical Maintenance of Safety Related Components at Krško NPP</p> <p>S3-85 Davorin Marić</p> <p>Experience with Tin Whisker Phenomena at NPP Krško</p>
11:00-11:30	Coffee Break
16:30-17:00	Invited Lecture
	<p>IL-4 Ana Stanič</p> <p>Lessons from Fukushima: Actions Taken at EU and International Level</p>
17:00-18:00	Operation and Maintenance Experience Part II Chairs: A.N. Kilic (IAEA, Austria), M. Budimir (INETEC, Croatia)
	<p>S3-13 Boyka Nenkova, Bogomil Manchev, Emil Tomov</p> <p>An Approach for Measurement of Company Business Effectiveness</p>

S3-25	Petar Mateljak, Marko Budimir, Mario Koštan, Abbas Mohimi High-Temperature Ultrasound NDE Systems for Continuous Monitoring of Critical Points in NPPs Structures
S3-88	Krunoslav Markulin, Leonardo Trupinić, Matija Vavrouš Improvement of the Maintenance of NPP Primary Circuit Components Through use of Qualified In-Service Inspection Methods
S3-89	Ivan Rep, Tomislav Tomašić, Darko Barilar Sludge Deposit Mapping for Steam Generators

IL – Invited lecture

TUESDAY, June 7th

8:30-9:00	Registration of participants
9:00-9:30	Invited Lecture
	IL-5 Milovan Perić Computational Fluid Dynamics and Heat Transfer: State-of-the-Art and Future Trends
9:30-11:00	Power Reactors and Technology Chairs: J. Misak (UJV Rez a.s., Czech Republic), B. Petrović (Georgia Institute of Technology, USA)
	S4-1 Zsolt Sóti, Joseph Magill, Raymond Dreher Karlsruhe Nuclide Chart 9 th Edition
	S4-14 Ihn Namgung, Khaled Atya Ahmed Abdallah Design Optimization of APR-1400 Steam Generator Tube-sheet
	S4-75 JaeSik Kwak, HeeReyoung Kim Optimization of Design Variables of ALIP for the Circulation of Sodium Coolant in the PGSR
	S4-135 Slawomir Michael Modro, Tomislav Bajš Consideration of Design Extension Conditions in the Recently Revised IAEA Standard on Design Safety
	S1-142 Giovanni Maronati, Bojan Petrović, Nikola Čavlina I ² S-LWR Top-Down Differential Economics Evaluation Approach
	S4-23 Luka Alujević Possible Future Role of Small and Medium Sized Reactors (SMRs) in Countries with Small and Medium Electricity Grids
11:00-11:30	Coffee Break
11:30-12:00	Invited Lecture
	IL-6 Peter Breitenstein Sustainable Used Fuel Management – The Benefits of Treatment and Recycling of Used Nuclear Fuel
12:00-13:00	Poster Session Chair: K. Trontl (FER, Croatia)
	S8-136 Patricia Pla, Jorge Tanarro, Luca Ammirabile, Miodrag Stručić, Franck Wastin Long-Term Preservation of Knowledge in the Area of Nuclear Thermal-Hydraulics – The New STRESA Database
	S6-29 Marti Chambers, Bojan Kurinčić Fuel Design Change

- S1-100 **Vladimir Knapp, Mario Matijević, Dubravko Pevec, Boris Crnobrnja, Dinka Lale**
Long Term Fuel Sustainable Fission Energy Perspective Relevant for Combating Climate Change
- S5-41 **Tadeja Polach, Dejan Slovinc, Jure Jazbinšek, Ivica Bašić, Luka Štrubelj**
Analysis of Manual Reactor Trip of NEK NPP in APROS Computer Code
- S2-113 **Michel Cindro, Matjaž Stepišnik, Damir Pinezić, Davor Šinka, Dejan Škanata**
Physical and Radiological Characterisation of Measuring Sites Within The Croatian Gamma Dose Rate Early Warning Network
- S5-86 **Igor Vuković, Rudolf Prosen**
Evaluation of Impact of NEK Safety Upgrade Program Implementation on the Reduction of Total Core Damage Frequency
- S3-84 **Josip Vuković, Adem Beširević, Zdenko Boljat**
Reactor Coolant Pump Motor Maintenance Experience In Krško NPP
- S3-81 **Igor Horvat, Boštjan Bohorč**
Revitalization of the Cooling Tower at Krško Nuclear Power Plant
- S6-72 **Radomir Ječmenica, Davor Grgić, Mario Matijević, Bojan Petrović**
Nuclear and Thermal Hydraulic Calculation of a Representative I²S-LWR First Core
- S3-78 **Violeta Čalić**
The Efficiency of Nuclear Ion Exchange Resins Applied in the Primary Circuit Demineralizers of NPP Krško
- S5-71 **Matea Filipović, Davor Grgić, Željko Tomšić**
Preparation of Radioactive Inventory Data for Severe Accident and Consequence Calculation Codes
- S1-67 **Željko Tomšić, Ivan Rajšl, Matea Filipović**
Possible Role of NPP in Long Term Low Carbon Development Strategy – Case Study Croatia
- S6-65 **Mario Matijević, Davor Grgić, Radomir Ječmenica**
Spent Fuel Pool Dose Rate Calculations Using Point Kernel and Hybrid Deterministic-Stochastic Shielding Methods
- S3-63 **Hrvoje Lukačević, Damir Kopinč, Marin Ivanjko**
Overview of Mobile Equipment Used in Case of Beyond Design Basis Accident at NPP Krško
- S5-61 **Tomislav Fancev, Davor Grgić, Siniša Šadek**
Verification of GOTHIC Multivolume Containment Model during NPP Krško DBA LOCA

	<p>S5-58 Siniša Šadek, Davor Grgić, Vesna Benčik NPP Krško Station Blackout Analysis after Safety Upgrade Using MELCOR Code</p> <p>S6-56 Sooyoung Choi, Minyong Park, Youqi Zheng, Chidong Kong, Jiwon Choe, Hanjoo Kim, Kiho Kim, Ho Cheol Shin, Deokjung Lee Development Status of Reactor Physics Code Suite in UNIST</p> <p>S5-40 Janez Kokalj, Mitja Uršič, Matjaž Leskovar Analysis of Debris Bed Coolability in Bottom Reflooding Conditions</p> <p>S3-34 Petar Matelj, Haitao Zheng, Eleni Cheilakou, Alvaro Garcia, Vasilis Papadimitriou Non-Destructive Testing Technique for NPP Containment Concrete Structure Inspection</p> <p>S3-31 Darko Cicvarić Human Factors Engineering in Nuclear Power Plants</p> <p>S6-18 Marjan Kromar, Bojan Kurinčič Validation of the CORD-2 System for the Nuclear Design Calculations of the NPP Krško Core</p> <p>S3-12 Josip Čević, Matko Širola Medium and Low Voltage Cable Measurements – TD, PD, LIRA</p> <p>S3-8 Vania Stoilova Yordanova, Bogomil Manchev Flexible Software Solution for Information System of Maintenance and Repair in Armenian NPP Medzamor</p>
13:00-14:00	Lunch Break
14:00-16:00	<p>Nuclear Safety Analyses Part I Chairs: F. D'Auria (University of Pisa, Italy), Andrej Prošek (Jožef Stefan Institute, Slovenia)</p> <p>S5-70 George Vayssier Severe Accident Management Guidance: Lessons Still to be Learned after Fukushima</p> <p>S2-49 Sok Chul Kim, Jong-Seuk Park, Dong-Ju Chang, Do-Hyoung Kim, Seung-Woo lee, Yong-Jin Lee, Hyo-Won Kim Development of an Evaluation Methodology for Loss of Large Area Induced from Extreme Events with Malicious Origin</p> <p>S5-7 Andrej Prošek RELAP5/MOD3.3 Analyses of Core Heatup Prevention Strategy During Extended Station Blackout in PWR</p> <p>S5-62 Štefica Vlahović, Davor Grgić, Vesna Benčik NPP Krško Post-UFC Transient Response During MS LB</p>

	<p>S5-68 Mario Mihalina, Srđan Špalj, Bruno Glaser External Reactor Vessel Cooling Evaluation for Severe Accident Mitigation in NPP Krško</p> <p>S5-17 Francine Menzel, Gaianê Sabundjian, Francesco D’Auria, Alzira Madeira Application of Best Estimate Plus Uncertainty Methodology in a Final Safety Analysis Report of a Generic Plant</p> <p>S5-19 Igor Kozlov, Volodymir Skalozubov, Victor Kolykhanov Evolution of the Severe Accident Management for Nuclear Reactor with Pressure Vessel and the Fukushima Accident Lessons</p> <p>S5-27 Algirdas Kaliatka, Tadas Kaliatka, Eugenijus Uspuras, Hiroyasu Mochizuki Modelling of Critical Heat Flux Phenomenon in the Boiling Water Reactors</p>
16:00-16:30	Coffee Break
16:30-17:15	<p>Nuclear Safety Analyses Part II Chairs: I. Vrbanić (APoSS d.o.o., Croatia), P. Pla (EC JRC, The Netherlands)</p> <p>SL Mitja Uršič NUGENIA - Association Activities, Projects and Challenges</p> <p>S5-69 Ivica Bašić, Ivan Vrbanić International Context Regarding Application of Single Failure Criterion For New Reactors</p> <p>S5-35 Miodrag Stručić Possible Accident Scenarios Related to the Spent Fuel Pool Operating Events</p>
18:00-20:00	Museum Visit
20:00	Conference Dinner

IL – Invited lecture

SL – Special lecture

WEDNESDAY, June 8th

9:00-9:30	<p style="text-align: center;">Invited Lecture</p> <p>IL-7 Malcolm Grimston Public Attitudes to Nuclear Power – it's Not (just) About the Science</p>
9:30-11:00	<p style="text-align: center;">Reactor Physics and Nuclear Fuel Cycle Chairs: F. Rahnema (Georgia Institute of Technology, USA), M. Kromar (Jožef Stefan Institute, Slovenia)</p> <p>S6-28 Grigory Leonidovitch Ponomarenko Peculiarities of Neutronics Characteristics of Integral Reactor WWER of Small Capacity</p> <p>S6-32 Ján Haščik, Štefan Čerba, Jalub Lüley, Branislav Vrbán Study of the Allegro Core Performance</p> <p>S6-51 Paulina Dučkić, Mario Matijević, Davor Grgić Neutron Buildup Factors Calculation for Support Vector Regression Application in Shielding Analysis</p> <p>S6-55 Ho Seung Yoo, Dae Hee Hwang, Ser Gi Hong, Won Jae Lee, Francesco Venneri A Neutronics Exploration of LWR Fuel Assembly using FCM Fuels for SMR Application</p> <p>S6-64 Mario Matijević, Dubravko Pevcec, Radomir Ječmenica I²S-LWR Activation Analysis of Heat Exchangers Using Hybrid Shielding Methodology with SCALE6.1</p> <p>S6-126 Dingkang Zhang, Farzad Rahnema Application of the Response Function Generation Optimization Technique to the C5G7 Benchmark Problems</p>
11:00-11:30	<p style="text-align: center;">Coffee Break</p>
11:30-12:30	<p style="text-align: center;">Environment, Public Relations and Safety Culture Chairs: Z. Šimić (EC JRC, The Netherlands), K. Trontl (FER, Croatia)</p> <p>S8-37 Raquel Heredia, Federico Puente Espel Preliminary Study Intended for the Application of the INPRO Methodology in the area of Infrastructure (Public Acceptance) for the Case of Mexico</p> <p>S8-59 Krešimir Trontl, Dubravko Pevcec, Mario Matijević, Radomir Ječmenica, Paulina Dučkić, Josip Lebegner Public Opinion Survey – Energy, The Present and the Future, 2015</p>

	<p>S8-91 Zdenko Šimić Nuclear Energy Literature Review</p> <p>S8-33 Irena Jakić Benchmarking Nuclear Power Plants</p>
12:30-13:00	Invited Lecture
	<p>IL-8 Ivica Prlić Why is the NORM Waste Included in to the Croatian RadWaste Strategy</p>
13:00-14:00	Lunch Break
14:00-15:30	Radioactive Waste Management and Decommissioning Chairs: Ž. Veinović (RGN, Croatia), P. Breitenstein (AREVA, France)
	<p>S7-39 Vanessa Vo Van, Peter Breitenstein Possible Used Fuel Management Options for a Single Reactor Utility</p> <p>S7-74 Ukjae Lee, Hee Reyoung Kim Concept of On-site Two Point Beta Detection System by Using Scintillating Fiber</p> <p>S7-73 Jun Woo Bae, Hee Reyoung Kim Fundamental Approach to the Design of an In-situ Beta Ray Detection System for the Nuclear D&D Site</p> <p>S7-110 Želimir Veinović, Zdenko Vrankić, Andrea Rapić Site Characterization for LILW Long-Term Storage Facility and Repository</p> <p>S7-43 Alemka Knapp, Ivica Levanat, Diana Šaponja-Milutinović Prospects for the NPP Krško Radioactive Waste Management</p> <p>S7-44 Ivica Prlić, Saša Medaković, Mladen Novaković Monitoring the Sanation Works in the Building Used as a Temporary Radioactive Material Storage at the Ruđer Bošković Institute in Zagreb</p>
15:30-16:00	Coffee Break
16:00-16:30	Conference Closing Chairs: D. Grgić, Z. Šimić, Ž. Tomšić (Croatian Nuclear Society)

IL – Invited lecture

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