

*Fourteenth International Symposium on*  
**REACTOR DOSIMETRY**

May 22-27, 2011

Mt. Washington Resort  
Bretton Woods, NH, USA

Program  
and  
Book of Abstracts





## *Welcome*

Welcome to the Fourteenth International Symposium on Reactor Dosimetry. This Symposium is held approximately every three years and is jointly sponsored by ASTM International and the European Working Group on Reactor Dosimetry. Since the first joint Symposium on Reactor Dosimetry was held at the Petten Research Centre in The Netherlands, the intent has been to provide a forum for high quality presentations in the field of Reactor Dosimetry for the sharing of ideas and results. This Symposium is expected to follow this trend with a total of 88 oral and poster papers from 18 countries, along with seven workshops on timely subjects.

In addition to the very full technical program schedule, there are several social events scheduled. These events present a good opportunity to develop contacts with other people working in the field of dosimetry from around the world.

We also would like to take a moment to recognize our Japanese colleagues. Due to the devastating earthquake and tsunami that recently occurred in Japan, many of the Japanese facilities near the coast have sustained considerable damage. Our thoughts are with our colleagues in Japan, several of whom have had to cancel their plans to attend this Symposium.

We look forward to a very informative and exciting Symposium, and the opportunity to renew past associations and make new ones.

David Vehar, Symposium Co-Chair, ASTM

Pierre D'hondt, Symposium Co-Chair, EWGRD

Douglas Selby, Symposium Program Chair, ASTM

Mary Helen Sparks, Symposium Scientific Secretary, ASTM

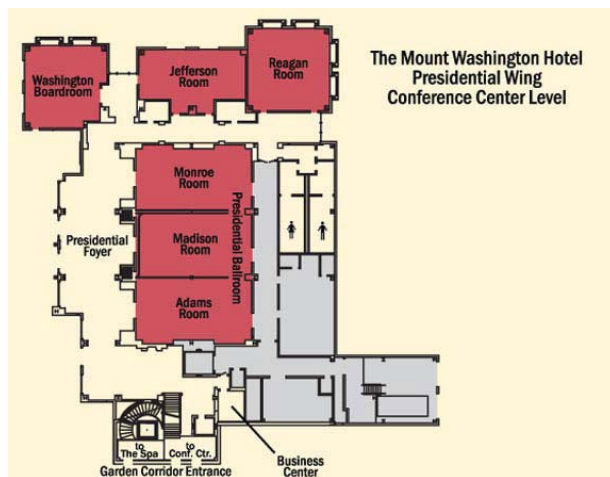
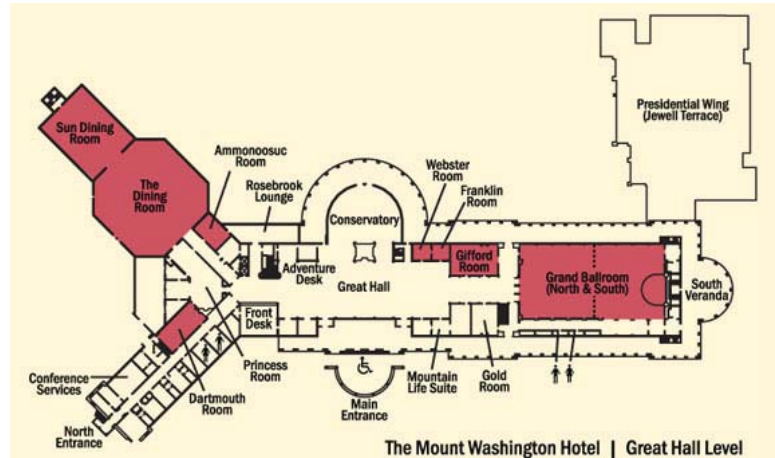
Jan Wagemans, Symposium Programme Secretary, EWGRD

# Meeting Rooms

**Oral sessions** will be held in the Grand Ballroom, located on the main level.

**Symposium Registration** on Sunday will take place in the Great Hall, outside of the Webster and Franklin Rooms.

The **Reception** will be held on the Jewel Terrace, atop the Presidential Wing

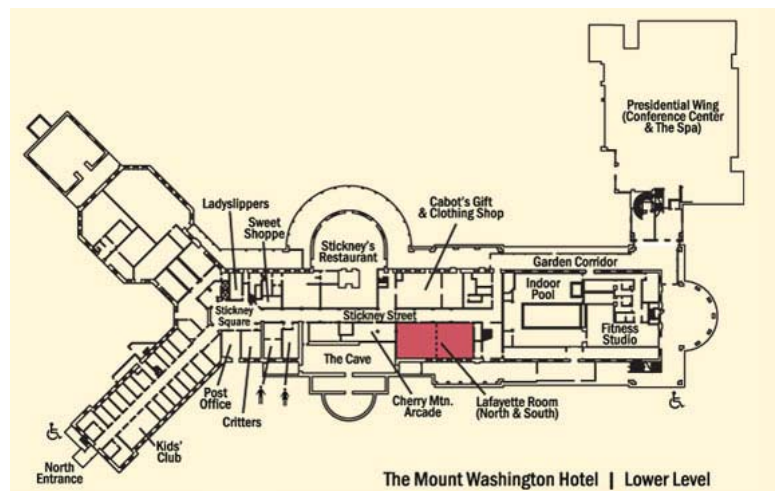


**Poster sessions** will be held in the Presidential Ballroom.

**Workshops** will be held in the Washington Boardroom and the Jefferson and Reagan Rooms.

The **Symposium Office** will be located in the Lafayette Room on the lower level.

A **Preview Station**, where authors can ensure that their presentations display properly on Symposium computers, will be located in one section of the Lafayette Room.



# 14th ISRD - Preliminary Schedule

	Sun	Mon	Tue	Wed	Thu	Fri
7:15			Breakfast	Breakfast	Breakfast	
8:00		Breakfast	Oral Session 4	Oral Session 6		Breakfast
9:00		Opening and Keynote			Oral Session 7	WS Summary and Closing
10:00		Break	Break	Break		
11:00		Oral Session 1	Poster Session 1	Workshop Session 2	Poster Session 2	
12:00		Lunch	Lunch		Lunch	
13:00		Oral Session 2	Workshop Session 1	ISRD Games-II	Workshop Session 3	
14:00						Break
15:00		Oral Session 3	Oral Session 5		Joint ASTM/EWGRD Committee Meeting	
16:00	Registration		ASTM and EWGRD Committee Meetings			
17:00						
18:00	Wine and Dessert Reception			BBQ	Banquet	
19:00						
20:00						



## ASTM and Committee E10

The ASTM Committee E10 on was founded in 1951. Originally the Radioisotopes and Radiation Effects Committee, it is now Committee E10 on Nuclear Technology and Applications. E10 meets twice a year, usually in January and June, with about 50 members attending three days of technical meetings. The Committee has a current membership of approximately 225, including representatives from over 20 countries. E10 has jurisdiction of over 105 standards, published in the Annual Book of ASTM Standards, Vol. 12.02. Committee E10 has 7 technical subcommittees that maintain jurisdiction over these standards. Information on this subcommittee structure and E10's portfolio of approved standards and work items under construction are available on the ASTM website. These standards have and continue to play a preeminent role in all aspects important to the nuclear industry, including radiation dosimetry, nuclear structural materials, and decontamination & decommissioning. Committee E10 sponsors scientific and technical symposia such as ISRD-14 and generates publications within the scope of the committee. The ASTM Organizing and Program Committee members who have worked to make ISRD-14 a reality are:

<u>Name</u>	<u>Affiliation</u>
• David Vehar (Symposium Chairman)	Sandia National Laboratory
• Douglas Selby (Program Chairman)	Oak Ridge National Laboratory
• Mary Helen Sparks (Scientific Secretary)	White Sands Missile Range
• John Williams (Workshop Chairman)	University of Arizona
• Jim Adams	Corvus Integration, Inc.
• Arzu Alpan	Westinghouse
• Alan Carlson	National Institute of Standards and Technology
• Russell DePriest	Sandia National Laboratory
• Arnie Fero	Westinghouse
• Mike Flanders	White Sands Missile Range
• Larry Greenwood	Pacific Northwest National Laboratory
• David Gilliam	National Institute of Standards and Technology
• Pat Griffin	Sandia National Laboratory
• Alireza Haghighat	University of Florida
• Ayman Hawari	North Carolina State
• Craig Heimbach	National Institute of Standards and Technology
• Norman Holden	Brookhaven National Laboratory
• Tetsuo Iguchi	Nagoya University
• Parvin Lippincott	(Retired)
• Bojan Petrovic	Georgia Tech University
• Gianluca Longoni	Westinghouse
• Ben Parks	Nuclear Regulatory Commission
• Tom Quirk	Sandia National Laboratory
• Igor Remec	Oak Ridge National Laboratory
• Frank Ruddy	Westinghouse
• Roger Stoller	Oak Ridge National Laboratory
• Jim Stubbins	University of Illinois
• Pavel Tsvetkov	Texas A&M University
• Jehudah Wagschal	The Hebrew University of Jerusalem
• Choon Sung Yoo	Korean Atomic Energy Research Institute



## The European Working Group on Reactor Dosimetry

The European Working Group on Reactor Dosimetry (EWGRD) started around 1960, under the sponsorship of EURATOM, with members designated by the governments from each European Union (EU) laboratories working in the field of reactor physics and technology. The goal was to exchange directly experience and know-how in reactor dosimetry and connected programmes. The fields covered were the measurements of thermal and epithermal fluences and fluence rate, the measurement of fast neutron spectra and fluences of thermal and fast reactors, and later the measurement of fusion and spallation neutron spectra.

The major applications of neutron dosimetry in fission reactors was and still is the monitoring of irradiation experiments. The knowledge of the neutron and gamma-ray fields and fluences as well as the temperature during irradiation, is necessary to understand and to assess the embrittlement of the structural materials and mainly the pressure vessel steel due to the neutron exposure.

The state of the art in all reactor dosimetry aspects such as techniques, calculations and adjustment methods, damage correlation, neutron data, etc., are fully reported in the proceedings of the international symposia on Reactor Dosimetry organised alternatively in EUROPE and in the USA by the EWGRD and ASTM committee E10. The EWGRD also initiates collaborative research and training efforts in order to safeguard knowledge preservation, and surveys the readiness of the European institutes to meet the current and future reactor dosimetry requirements.

## Members of the EWGRD Programme Committee

<b>Name</b>	<b>Country</b>	<b>Institute</b>
Pierre D'hondt (Chairman)	Belgium	SCK-CEN, Mol
Jan Wagemans (Secretary)	Belgium	SCK-CEN, Mol
Alain Alberman	France	CEA, Saclay
Antonio Ballesteros	The Netherlands	JRC, Petten
Daniel Beretz	France	CEA, St Paul lez Durance
Luigi Debarberis	The Netherlands	JRC, Petten
Oleksandr Grytsenko	Ukraine	KINR, Kiev
Krassimira Ilieva	Bulgaria	INRNE, Sofia
Joerg Konheiser	Germany	FZR, Rossendorf
Milan Marek	Czech Republic	NRI, Rez
Ravi Mutnuru	The Netherlands	NRG, Petten
Michaël Plaschy	Switzerland	ALPIQ, Lausanne
Vladimir Smutny	Czech Republic	Skoda, Plzen
Tom Serén	Finland	VTT, Espoo
Dean Thornton	United Kingdom	Serco, Gloucester
Sergey Zaritsky	Russia	RRC KI, Moscow
Eva Zsolnay	Hungary	BUTE, Budapest

## Symposium Sponsors

The Symposium Committee for the 14<sup>th</sup> International Symposium on Reactor Dosimetry gratefully acknowledges the support of its sponsors. Without their help the organization of this Symposium would be very difficult. Please take the time to thank representatives attending the symposium from these organizations.



**Westinghouse Electric Company**



**Sandia National Laboratories**



**Thermo Fisher Scientific**



**Bruker Biospin**



**National Institute of Standards and Technology**



**U. S. Department of Energy**

## Nontechnical Events

**Sunday Welcome Reception:** The Symposium Welcome Reception will be held at the Jewel Terrace on Sunday evening. This is located outdoors atop the Presidential Wing. Desserts and cheese will be provided from 7:00 – 8:00 p.m. The desserts will be traditional regional fare. During registration, two tickets will be distributed to all adults for wine or beer. A cash bar will also be available on the terrace from 7:00 - 9:00 p.m. Come and mingle with old friends and new.

**Companion Program:** The Symposium is pleased to offer companions of the Symposium attendees an opportunity to renew contacts and become acquainted with new people during the week. Companions will be included for breakfast through the week. The Dartmouth Room has been reserved Monday for your convenience. ‘Rest and Rejuvenation’ is the theme for the Companion Program. The Mt. Washington hotel was originally built as a summer escape from the city and we want you to explore the possibilities. All activities are described in detail on the website by clicking on the ‘Companions’ tab of the home page. The planned activities for the week will have one fee of \$50.00 US. The activities include:

- Wagon Ride ending with Spa Introductory Treatment,
- Mount Washington Historical Tour
- Informative Nature Walk - Appalachian Mountain Club Guide
- “Moose Hunt”
- Afternoon Tea

All companions are invited and encouraged to attend the Friday farewell breakfast.

**Wednesday Social:** Wednesday afternoon is traditionally a time for social events away from the confines of the meeting rooms. This year we will have the ISRD Games. Teams consisting of Symposium attendees and companions will organize and participate in competitions held on the ski mountain that faces the Mt. Washington Resort, away from the main hotel. We will begin at 2:00 p.m. so that you have time for lunch on your own and to change into sport clothes. Hotel shuttle buses will take you to the base lodge where you will find neutral judges ready to guide everyone through the events. There will be plenty of room on the mountain for those wanting to watch without competing or who would like to enjoy alternate activities. Dinner on the mountain will follow the games. Activities should conclude around 7:30 p.m. for return to the hotel via the shuttles.

The competitions will include the Williwaw (racing section of the Canopy Tour), badminton, mountain croquet, volleyball, a multipart extreme course challenge and disc (Frisbee) golf. A tug-of-war will be used to determine the winning team in case of a tie. Additional activities on the mountain may include bocce, board games, mountain hikes, etc.

There are other activities on the ski mountain if you don’t wish to participate in the Games. If you wish to rent digglers (heavy-duty scooters with a wide platform for feet, knobby tires, and hand brakes) or take a Canopy Tour you will be able to find information and pay at the Mt. Washington Concierge Desk or at the Ski Mountain Base Lodge. **Note: Advance reservations for alternate activities are highly recommended.**



# ISRD-14 SYMPOSIUM PROGRAM SCHEDULE

## Sunday May 22<sup>nd</sup>

5:00 - 9:00 pm: Registration (Great Hall just outside the Webster and Franklin rooms)

7:00 – 9:00 pm: Wine and Dessert Reception (Jewel Terrace, atop the Presidential Wing)

## Monday Morning May 23<sup>rd</sup>

**8:00 - 8:30 Breakfast (Grand Ballroom – North area)**

**8:30 – 10:00 Welcome and Keynote Presentations (Grand Ballroom – South)**

Chairmen: David Vehar (Sandia National Laboratories) and Pierre D'hondt (SCK-CEN)

8:30: Welcome and Announcements

8:40: **The Energy Future – The Have's and the Have Not's (What can Jared Diamond tell us about the future of our wonderful little discovery?)**

**Andrew Cook** – AREVA (USA)

9:20: **Structural Materials for Innovative Nuclear Systems**

**Pascal Yvon** – CEA (France)

**10:00 – 10:20 Break**

**10:20 – 12:00 Oral Session 1 – Reactor Surveillance and Plant Life (Grand Ballroom – South)**

Chairmen: Choon Sung Yoo (Korean Atomic Energy Research Institute) and Tom Serén (VTT)

10:20 **Reactor Dosimetry and RPV Life Management**

**Mladen Mitev** – Institute for Nuclear Research and Nuclear Energy of the Bulgarian Academy of Sciences (INRNE-BAS) (Bulgaria)

10:40 **Korean Standard Nuclear Plant Ex-Vessel Neutron Dosimetry Program –Ulchin 4**

**Jose Duo** – Westinghouse (USA)

11:00 **Dosimetry Assessments for the RPV and Core Barrel in UK PWR Plant**

**Dean Thornton** – Serco (United Kingdom)

11:20 **Comparison of Attenuation Coefficients for VVER-440 and VVER- 1000 Pressure Vessels**

**Milan Marek** – Nuclear Institute Rez (Czech Republic)

11:40 **RINGHALS Unit 3 and 4 – Fluence Determination in a Historic and Future Perspective**

**Eva-Lena Green** – VATTENFALL (Sweden)

**12:20 – 1:30 Lunch (Sun Dining Room)**

## Monday Afternoon May 23<sup>rd</sup>

### **1:30 – 3:30 Oral Session 2 – Nuclear Data and Uncertainties (Grand Ballroom – South)**

Chairmen: Jehudah Wagschal (Racah Institute of Physics, Hebrew University of Jerusalem) and Gilles Grégoire (CEA)

- 1:30 **2010 Review of Neutron and Non-Neutron Nuclear Data**  
**Norman Holden** – Brookhaven National Laboratory (USA)
- 1:50 **Path Forward for Dosimetry Cross Sections**  
**Patrick Griffin** – Sandia National Laboratories (USA)
- 2:10 **A Standard Procedure for Dosimetry Reaction Cross-section Evaluation**  
**Serguei Badikov** – Energy & Industry Analytica (Russia)
- 2:30 **New Work on Updating and Extending the Neutron Data Standards**  
**Allan Carlson** – National Institute of Standards and Technology (USA)
- 2:50 **Uncertainties of Responses Calculated with a “tuned” Library – Geometrical and Algebraic Insights**  
**Reuven Perel** – Racah Institute of Physics (Israel)
- 3:10 **A New Formulation of UMC and an Application to Evaluation of the Mn-55 (n,  $\gamma$ ) Dosimetry Reaction Cross Section (a.k.a. “Toy Story 4”)**  
**Roberto Capote** – NAPC - Nuclear Data Section IAEA (Austria)

### **3:30 – 3:50 Break**

### **3:50 – 5:30 Oral Session 3 – Reactor Surveillance and Retrospective Dosimetry (Grand Ballroom – South)**

Chairmen: Larry Greenwood (Pacific Northwest National Laboratory) and Milan Marek (Nuclear Institute Rez)

- 3:50 **Radiation Exposure Monitoring of VVER-1000 Vessel at Ukrainian NPPs**  
**Vladyslav Diemokhin** – Institute for Nuclear Research of National Academy of Sciences of Ukraine (Ukraine)
- 4:10 **Application of Different Nuclides in the Retrospective Dosimetry**  
**Joerg Konheiser** – FZD (Germany)
- 4:30 **Retrospective Dosimetry Analyses of Reactor Vessel Cladding Samples**  
**Larry Greenwood** – Pacific Northwest National Laboratory (USA)
- 4:50 **Neutron Flux Reduction Programs for Reactor Pressure Vessel**  
**Choon Sung Yoo** – Korean Atomic Energy Research Institute (Korea)
- 5:10 **A 3-Dimensional Methodology for the Assessment of Neutron Damage and Nuclear Energy Deposition in Graphite Components of Advanced Gas Cooled Reactors**  
**Dean Thornton** – Serco (United Kingdom)

## Tuesday Morning May 24<sup>th</sup>

**7:15 – 8:00 Breakfast (Grand Ballroom – North area)**

**8:00 – 10:00 Oral Session 4 – Benchmarks and Intercomparisons (Grand Ballroom – South)**

Chairmen: Patrick Griffin (Sandia National Laboratories) and Joerg Konheiser (FZD)

- 8:00 **Shielding Integral Benchmark Archive and Data Base (SINBAD)**  
**Bernadette Kirk** – Oak Ridge National Laboratory (USA)
- 8:20 **VENUS-F: A Fast Lead Critical Core for Benchmarking**  
**Jan Wagemans** – SCK-CEN (Belgium)
- 8:40 **Benchmarking of Heavy Ion Transport Codes**  
**Igor Remec** – Oak Ridge National Laboratory (USA)
- 9:00 **Neutron and Gamma Fields Investigations in the VVER-1000 Mock-up Concrete Shielding on the Reactor LR-0**  
**Sergey Zaritskiy** – RRC Kurchatov Institute (Russia)
- 9:20 **New Measurements and Calculations to Characterize the Caliban Pulsed Reactor Cavity Neutron Spectrum by the Foil Activation Method**  
**Pierre Casoli** – CEA (France)
- 9:40 **Los Alamos National Laboratory Fission Basis**  
**August Keksis** – Los Alamos National Laboratory (USA)

**10:00 – 10:20 Break**

**10:20 – 12:20 Poster Session 1 (Presidential Ballroom)** (Benchmarking/calibrations and standards, Data evaluation, Reactor surveillance and plant life management, Dosimetry for assessment of reactor structural materials, Dosimetry for core characterisation and reactor physics, Dosimetry for Reactor and accelerator neutron sources, Nuclear data for dosimetry, and Retrospective dosimetry and decommissioning)

Chairmen: Mike Luker (Sandia National Laboratories) and Mladen Mitev – Institute for Nuclear Research and Nuclear Energy of the Bulgarian Academy of Sciences (INRNE-BAS)

- P1-1 **Jules Horowitz Reactor, A New Irradiation Facility: Improving Dosimetry for the Future of Nuclear Experimentation**  
**Gilles Grégoire** – CEA (France)
- P1-2 **Measurements of Actinide Fission Product Yields in Caliban and Prospero Metallic Core Reactor Fission Neutrons Fields**  
**Pierre Casoli** – CEA (France)
- P1-3 **Decommissioning of High Flux Beam Reactor at Brookhaven Laboratory**  
**Richard Reciniello** – Brookhaven National Laboratory (USA)
- P1-4 **Assessment of Threshold Reactions Integral Cross Sections on 235U Fission Spectrum in the CALIBAN Reactor Central Cavity**  
**Daniel Beretz** – CEA (France)
- P1-5 **Reactor Pulse Repeatability Studies at the Annular Core Research Reactor**  
**Russell DePriest** – Sandia National Laboratories (USA)

## Continuation of Tuesday Morning Poster Session

- P1-6 **Sensitivity Studies Associated with Dosimetry Experiments Interpretation**  
**Stephane Bourganel** – CEA (France)
- P1-7 **Real-time In-core Neutron Detector Evaluations at the Advanced Test Reactor Critical Facility**  
**Troy Unruh** – Idaho National Laboratory (USA)
- P1-8 **Neutron Flux Measurements in the Side-Core Region of Hunterston B AGR**  
**Dennis Allen** – Serco (United Kingdom)
- P1-9 **Thermal Cross Sections and Resonance Integrals for  $\text{Ag}^{109}(\text{n},\gamma)\text{Ag}^{110\text{m}}$  and Several Other Reactions**  
**John Williams** – University of Arizona (USA)
- P1-10 **Cross section Calculations for Neutron Capture and (n,xy) Reactions Using Closed-form Methods for  $\gamma$ -Decay Description**  
**Vira Bondar** - Nuclear Physics Department of the Taras Shevchenko National University of Kiev (Ukraine)
- P1-11 **Evaluation of the Regulatory Guide 1.99 Fluence Attenuation Method**  
**Ken Watkins** - TransWare Enterprises Inc. (USA)
- P1-12 **Core Characterization of the New CABRI Water Loop Facility**  
**Guillaume Ritter** – CEA (France)
- P1-13 **Dosimetry Analyses of the Ringhals 3 & 4 Reactor Pressure Vessels**  
**Arnold Fero** – Westinghouse (USA)
- P1-14 **Updating and Extending the IRDF-2002**  
**Roberto Capote** - NAPC - Nuclear Data Section IAEA (Austria)
- P1-15 **Shielding Analyses and Procedures for SNS**  
**Irina Popova** – Oak Ridge National Laboratory (USA)
- P1-16 **Modernization of Existing VVER-1000 Surveillance Programs**  
**Dmitry Erak** - RRC "Kurchatov Institute" (Russia)
- P1-17 **Uncertainty-Accounted Computational-Experimental Approach for Improved Conservative Evaluations of VVER RPV Radiation Loading Parameters**  
**Gennady Borodkin** - Scientific and Engineering Centre for Nuclear and Radiation Safety (SEC NRS) (Russia)
- P1-18 **Initial Validation of HELIOS™, ATTILA, and NEWT for Advanced Test Reactor Applications**  
**James Parry** – Idaho National Laboratory (USA)
- P1-19 **The Power Distribution Effect on Neutron Fluence in the VVER-1000 Mock-Up at the LR-0 Research Reactor**  
**Vojtech Rypar** - Research Centre Rez, ltd (Czech Republic)
- P1-20 **A Feasibility Study to Determine Cooling Time and Burnup of ATR Fuel Using a Non-destructive Technique**  
**Jorge Navarro** – Idaho National Laboratory (USA)

### Continuation of Tuesday Morning Poster Session

- P1-21 **TENDL-2010: Comprehensive Nuclear Data Library for Dosimetry Applications**  
**Dimitri Rochman** - Nuclear Research and Consultancy Group (NRG) (The Netherlands)
- P1-22 **Development of INSPCT-S for Inspection of Spent Fuel Pool**  
**Alireza Haghghat** – University of Florida (USA)
- P1-23 **The Neutron Standard Fields at the BR1 Reactor at SCK·CEN**  
**Jan Wagemans** - SCK·CEN (Belgium)
- P1-24 **Towards a New Evaluation of the Neutron Cross Section of Tungsten Isotopes**  
**Federica Emiliani** - EC-JRC-Institute for Reference Material and Measurements (Belgium)
- P1-25 **Nuclide Guide and International Chart of Nuclides – 2010**  
**Tengiz Golashvili** - Joint Stock Company "Energy & Industry Analytica" (Russia)
- P1-26 **Long Term Operation of Units 5 and 6 of Kozloduy NPP**  
**Desislava Kirilova** - Kozloduy NPP (Bulgaria)

**12:20 – 1:30 Lunch (Sun Dining Room)**

### Tuesday Afternoon May 24<sup>th</sup>

**1:30 – 3:30 Workshop Session 1 (Jefferson and Reagan Rooms)**

**WS-1A: Surveillance Dosimetry** – Chairmen: Arnie Fero (Westinghouse) and Dean Thornton Serco)

**WS-1B: Cross Sections and Nuclear Data** – Chairmen: Allan Carlson (National Institute of Standards and Technology) and Roberto Capote (NAPC - Nuclear Data Section IAEA)

**3:30 – 3:50 Break**

**3:50 – 5:10 Oral Session 5 – Research/Test Reactor and Accelerator Dosimetry (Grand Ballroom – South)**

Chairmen: Douglas Selby (Oak Ridge National Laboratory) and Jan Wagemans (SCK·CEN)

3:50 **Modeling, Simulation and V&V Upgrade for the Advanced Test Reactor**  
**David Nigg** – Idaho National Laboratory (USA)

4:10 **Development and Experimental Validation of a Calculation Scheme for Nuclear Heating Evaluation in the Core of the OSIRIS Material Testing Reactor**  
**Fadhel Malouch** – CEA Alternative Energies and Atomic Energy Commission (France)

4:30 **Development and Implementation of Materials Irradiation Experiment at the Research Reactor IR-8**  
**Dmitry Erak** - RRC "Kurchatov Institute" (Russia)

4:50 **Analysis of Gamma-Ray Dosimetry Experiments in the Zero Power MINERVE Facility**  
**Hicham Amharrak** – CEA Alternative Energies and Atomic Energy Commission (France)

**5:30 – 6:30 ASTM and EWGRD Committee Meetings**

**Wednesday May 25<sup>th</sup>**

**7:15 – 8:00 Breakfast (Grand Ballroom – North area)**

**8:00 – 10:00 Oral Session 6 – Neutron and Gamma-Ray Transport Calculations and Modelling (Grand Ballroom – South)**

Chairmen: Igor Remec (Oak Ridge National Laboratory) and Sergey Zaritsky (RRC Kurchatov Institute)

8:00 **Ex-Vessel Neutron Dosimetry Analysis for Westinghouse 4-Loop XL Pressurized Water Reactor Plant using the RadTrack™ Tool with the 3D Parallel Discrete Ordinates Code RAPTOR-M3G**

**Jianwei Chen** – Westinghouse (USA)

8:20 **Design Analyses and Shielding of HFIR Cold Neutron Scattering Instruments**

**Douglas Selby** – Oak Ridge National Laboratory (USA)

8:40 **A Broad-Group Cross-Section Library Based on ENDF/B-VII.0 for Fast Neutron Dosimetry Applications**

**Arzu Alpan** – Westinghouse (USA)

9:00 **Development and Testing of the VITAMIN-B7/BUGLE-B7 Coupled Neutron-Gamma Multigroup Cross-Section Libraries**

**Joel Risner** – Oak Ridge National Laboratory (USA)

9:20 **RAMA Surveillance Capsule and Component Activation Analyses**

**Ken Watkins** – TransWare Enterprises Inc. (USA)

9:40 **Application of Ex-vessel Neutron Dosimetry Combined with In-core measurements for Correction of Neutron Source Used for RPV Fluence Calculations**

**Pavel Borodkin** - Scientific and Engineering Centre for Nuclear and Radiation Safety (SEC NRS) (Russia)

**10:00 – 10:20 Break**

**10:20 – 12:20 Workshop Session 2 (Jefferson and Reagan Rooms)**

**WS-2A : Test and Research Reactors** – Chairmen: David Nigg (Idaho National Laboratory) and Daniel Beretz (CEA)

**WS-2B : Benchmarks and Intercomparisons** – Chairmen: David Gilliam (NIST) and Milan Marek (Nuclear Institute Rez)

**12:20 – 1:45 Lunch (on your own)**

**2:00 – 7:00 ISRD Games II**

**7:00 – 8:30 BBQ Dinner**

**Thursday Morning, May 26<sup>th</sup>**

**7:15 – 8:00 Breakfast (Grand Ballroom – North area)**

**8:20 – 10:00 Oral Session 7 – Experimental Techniques, New Developments, and Optical Methods (Grand Ballroom – South)**

Chairmen: Mike Flanders (White Sands Missile Range) and Jan Wagemans (SCK-CEN)

- 8:20 **EPR/PTFE Dosimetry for Test Reactor Environments**  
**David Vohar** – Sandia National Laboratories (USA)
- 8:40 **CALMOS: Innovative Device for the Measurement of Nuclear Heating in Material Testing Reactors**  
**Hubert Carcreff** – CEA Alternative Energies and Atomic Energy Commission (France)
- 9:00 **Simplified Method for Deducing High Energy Neutron Spectra Between 1 and 100 MeV Using Foil-Activation Data**  
**Yoshimi Kasugai** – Japan Atomic Energy Agency (Japan)
- 9:20 **Thermoluminescence Detectors for Reactor Dosimetry**  
**M. T. Jose** – Department of Atomic Energy (India)
- 9:40 **An Imaging Neutron Spectrometer**  
**James Ryan** – University of New Hampshire (USA)

**10:00 – 10:20 Break**

**10:20 – 12:20 Poster Session 2 (Presidential Ballroom)** (Characterization of neutron and gamma-ray environments, Damage correlation and exposure parameters, Experimental techniques, Fusion and high energy neutrons, Irradiation processing and testing of electronics, Monitoring of irradiation experiments, Neutron and gamma-ray transport calculations, New developments, and Uncertainty analyses and adjustment methods)

Chairmen: Arzu Alpan (Westinghouse) and Ravi Mutnuru (Nuclear Research and Consultancy Group)

- P2-1 **Design and Testing of a Boron Carbide Capsule for Spectral-Tailoring in Mixed Spectrum Reactors**  
**Lawrence Greenwood** – Pacific Northwest National Laboratory (USA)
- P2-2 **Photon Spectrum Behind Biological Shielding of the LVR-15 Research Reactor**  
**Milan Marek** – Nuclear Institute Rez (Czech Republic)
- P2-3 **Analysis of Dosimetry from the H. B. Robinson Unit 2 Pressure Vessel Benchmark using RAPTOR-M3G and ALPAN**  
**Greg Fischer** – Westinghouse (USA)
- P2-4 **The Fast Neutron Fluence and the Activation Detector Activity Calculations Using the Effective Source Method and the Adjoint Function**  
**Vladimír Smutný** - ŠKODA JS a.s. (Czech Republic)
- P2-5 **Equilibrator Thickness Effects on CaF<sub>2</sub>:Mn TLD Response in <sup>60</sup>Co and Research Reactor Fields**  
**Russell DePriest** – Sandia National Laboratories (USA)
- P2-6 **Exposure Conditions of Reactor internals of Rovno VVER-440 NPP Units 1 and 2**  
**Oleksandr Grytsenko** – Institute for Nuclear Research (Ukraine)

### Continuation of Thursday Morning Poster Session

- P2-7 **An Alternative Calibration Method for Counting P-32 Reactor Monitors**  
**Thomas Quirk** – Sandia National Laboratories (USA)
- P2-8 **Sensitivity of Adjustment to Parameter Correlations and to Response-Parameter Correlations**  
**Jehudah Wagschal** - Racah Institute of Physics, Hebrew University of Jerusalem (Israel)
- P2-9 **VVER-440 and VVER-1000 Reactor Dosimetry Benchmark - BUGLE-96 vs ALPAN VII.0**  
**Jose Duo** – Westinghouse (USA)
- P2-10 **Dosimetry Calculation of Burnt LWR Fuel in the PROTEUS Reactor Upgrade**  
**Kelly Jordan** - Paul Scherrer Institute (Switzerland)
- P2-11 **A New Experiment Proposal for 235U PFNS to Answer Fifty Year Old Question**  
**Nikolay Kornilov** – Department of Physics and Astronomy, Ohio University (USA)
- P2-12 **A Comparison Between MCNPX and ATTILA Calculations for Spent LWR Fuel in the PROTEUS Research Reactor**  
**Werner Stratmann** – Nuclear Technologies (Germany)
- P2-13 **Least-Squares Data Adjustment with Rank-Deficient Data Covariance Matrices**  
**John Williams** – University of Arizona (USA)
- P2-14 **Gamma Spectrometric Technique to Identify Activation Products in FBTR**  
**M. T. Jose** - Department of Atomic Energy (India)
- P2-15 **Development of Neutron Measurement in High Gamma Field Using New Nuclear Emulsion**  
**Jun Kawarabayashi** – Nagoya University (Japan)
- P2-16 **Development of a GaAs Calorimeter for Dosimetry Applications in Water-Moderated and Fast Burst Reactors**  
**Donald King** – Sandia National Laboratories (USA)
- P2-17 **Coarse-Group Iron Displacement Cross-section Generation Methods for Displacement Rate Calculations**  
**Ren-Tai Chiang** – Areva NP Inc. (USA)
- P2-18 **Characterization of Neutron and Gamma Dose in the Irradiation Cell of Texas A&M University Research Reactor**  
**Latha Vasudevan** – Nuclear Science Center, Texas A&M University (USA)
- P2-19 **Characterization of a Late-Time Radiation Environment From a Reactor Pulse Using a Differential Signal Fission Chamber**  
**Mike Luker** – Sandia National Laboratories (USA)
- P2-20 **A Database-Informed Approach to New Plant Shielding Design**  
**Timothy Loyd** – Westinghouse (USA)
- P2-21 **Differential Neutron Energy Spectrum Measurement at the Horizontal Channel No. 4 of the Dalat Reactor**  
**Nguyen Canh Hai** – Nuclear Research Institute (Vietnam)



### Continuation of Thursday Morning Poster Session

P2-22 **Dosimetry and Radiation Damage Parameters for Analysis of VHTR Reactors**  
**Bojan Petrovic** - Nuclear and Radiological Engineering, Georgia Institute of Technology (USA)

P2-23 **A Hybrid Methodology Based on Ray-tracing and SN Algorithm with Fictitious Quadrature for Calculation of Dose Due to Radiation Streaming**  
**Alireza Haghghat** – University of Florida (USA)

**12:20 – 1:30 Lunch (Sun Dining Room)**

### Thursday Afternoon, May 26<sup>th</sup>

**1:30 – 3:30 Workshop Session 3 (Jefferson Room, Reagan Room, and Washington Boardroom)**

**WS-3A: Transport Calculations** – Chairmen: Russell DePriest (Sandia National Laboratories) and Vladimir Smutny (ŠKODA JS a.s.)

**WS-3B: Adjustment Methods and Uncertainties** – Chairmen: John Williams (University of Arizona) and Ravi Mutnuru (Nuclear Research and Consultancy Group)

**WS-3C: Retrospective Dosimetry** – Chairmen: Larry Greenwood (Pacific Northwest National Laboratory) and Tom Serén (VTT)

**3:30 – 3:50 Break**

**3:50 – 4:50 Joint ASTM/EWGRD Committee Meeting (Reagan Room)**

**6:00 – 9:00 Banquet**

### Friday May 27<sup>th</sup>

**8:00 - 8:30 Breakfast (Grand Ballroom South)**

**8:30 – 11:00 Work Shop Summary and Closing (Grand Ballroom South)**

**11:00 Adjournment**