



Canadian Nuclear
Laboratories

Laboratoires Nucléaires
Canadiens

**3rd International Technical Meeting
on Small Reactors**
Ottawa, Ontario CANADA
2014 November 5-7
Organized by the CNS
and CNL



Program

Registration and Cocktails

Tuesday, November 4

Ottawa Marriott Hotel, 100 Kent St., Ottawa, Ontario

Time	Description
18:00 – 19:00	Registration and Welcome Cocktails, SPIN Restaurant, Ottawa Marriott Hotel

Day 1 Opening Session, Cartier Salon III

Wednesday, November 5

Time	Description	Speaker/Author(s)
Plenary Session (B. Sur, CNL)		
08:15 – 08:30	Welcome	M. Yetisir (CNL)
08:30 – 09:00	Opening Address	R. Walker (CNL)
09:00 – 09:30	The Australian Experience with a New Multi-Purpose Research Reactor for Scientific Research, Isotope Production and Silicon Irradiation	R. Robinson (OPAL Reactor, Australia)
09:30 – 10:00	Maintaining Critical Mass: Why Academic and Industry Research Partnerships in Small Modular and Research Reactors are Essential	K. Higley (Oregon State University, USA)
10:00 – 10:20	Break, Cartier Salon I	
10:20 – 10:50	The Sylvia Fedoruk Canadian Centre for Nuclear Innovation and the Nuclear Innovation Agenda	N. Alexander (Fedoruk Centre, Saskatchewan)
10:50 – 11:20	IAEA Activities in Support of Research Reactor Applications and Utilization	F. Marshall (IAEA, Vienna)
11:20 – 11:50	SMR Supply Chain Issues	R. Oberth (OCI)
11:50 – 12:00	Group Photo – Hotel Lobby	
12:00 – 13:30	Conference Lunch Buffet, Cartier Salon I; Guest Speaker R. Duffey (DSM Associates): “A Few Questions”	

Day 1 Parallel Session A - Research Reactors

Wednesday, November 5

Session #1A: Material Testing and Neutron Beams, Cartier Salon III

Session Chairs: J. Root and I. Burgess

13:30 – 13:50	Neutron Reflectometry of Soft Films Supported on Electrified Surfaces	I. Burgess and A. Quirk (USASK)
13:50 – 14:10	Use of Neutron Diffraction for the Development of Metal Hydrides for Hydrogen Storage	J. Lang and J..Huot (UQTR)
14:10 – 14:30	Neutron Scattering Determination of Hydrogen Solubility in Zirconium Alloys	M. Gharghoury, J. Root and R. Fong (CNBC)
14:30 – 14:50	Materials Research With Neutron Beams from a Research Reactor	J. Root and D. Banks (CNBC)

14:50 – 15:10	Nuclear Materials Testing in the Loops of the NRU Research Reactor Using Material Test Bundles	T. Leung and L. Walters (CNL)
15:10 – 15:30	AECL's Experimental Fuel and Materials Test Loops in NRU	N. Harrison (CNL)
15:30 – 15:50	Break, Cartier Salon I	
Session #2A: Application of Thermal and Cold Neutrons, Cartier Salon III		
Session Chairs: J. Katsaras		
15:50 – 16:20	Biophysics at the Intersection of Health Science and Nuclear Technology	D. Marquardt, R. J. Alsop, M. C. Rheinstadter and T. A. Harroun (Brock University)
16:20 – 16:50	The Application of Neutron Beams for Non-Destructive Nuclear Forensics of Radioactive Samples	R.B. Rogge (CNBC), G. Bentoumi (CNL), R. Flacau, G. Li, L. Li, F. Dimayuga and B. Sur (CNL)
16:50 – 17:20	The Biomembranes Program at ORNL: Resolving the Structure of Biomembranes using Neutrons, High Performance Computing and Molecular Labeling	J. Katsaras (ORNL)
Day 1 Parallel Session B - Small Reactors		Wednesday, November 5
Session #1B: Small Reactors for Off-Grid Applications, Cartier Salon II		
Session Chairs: J. Wallenius and P. Lang		
13:30 – 13:50	Adapting the CANDU Reactor Design for Northern Service	D. Meneley and G. Harvel (UOIT)
13:50 – 14:10	The Consultation Challenge in Small Remote Northern Communities	D. Malcolm (Malcolm and Associates)
14:10 – 14:30	Design considerations for Micro Nuclear Reactors to Supply Power to Off-Grid Mines	B. Gihm, G. Cooper, P. De Koning, M. Carreau, D. Morettin and J. Sarvinis (Hatch Associates)
14:30 – 14:50	Cyber Security, Safety and Autonomous Operation of Remote Small Reactors	D. Trask and M. MacDonald (CNL)
14:50 – 15:10	Small Modular Reactors (SMRs) – The Way Forward for the Nuclear Industry in Canada?	H. Sam-Aggrey (CNL)
15:10 – 15:30	The 25MW Super Near Boiling Nuclear Reactor (SNB25) for Supplying Co-Generation Energy to an Arctic Canadian Forces Base	H. W. Bonin, S. Paquette and Peter J. Boucher (RMCC)
15:30 – 15:50	Break, Cartier Salon I	
Session #2B: Design I: LWR and Gas-Cooled Reactors, Cartier Salon II		
Session Chair: D. LeBlanc		
15:50 – 16:10	Methodology of On-Line Prediction and Fuel Management of the Modular Pebble-Bed High-Temperature Reactors	B. Xia, F. Li, Y. Zheng, F. Chen, J. Zhang and J. Guo (INET)
16:10 – 16:30	The Feasibility of Using the 25MW Super Near Boiling Nuclear Reactor (SNB25) to Provide Thermal and Electrical Energy for a Large Canadian Forces Base in the Canadian Arctic	S. Paquette, H. W. Bonin, Z. Switzer, M. Baskin and K. Bowen (RMCC)
16:30 – 16:50	Thermal Utilization Opportunities with a Small-to-Medium Sized BWR	D. Konkin, C. Simonson, A. Dalai, K. Tanino, K. Nishida, T. Mochida, T. Ikegawa and K. Kito (USASK)
18:00 – 21:00	Conference Banquet Summit Room Cocktails - 6:00 pm, Dinner Buffet - 6:30 pm Guest Speaker J. Hilborn (AECL Retired): “Small Reactors at War: Laurence, Heisenberg and Fermi”	

Day 2 Parallel Session C - Research Reactors**Thursday, November 6**

Time	Description	Speaker/Author(s)
Session #1C: Research Reactors, Cartier Salon III Session Chairs: D. Cox and G. Kohse		
08:30 – 08:50	The NRU Reactor: Implementation of Industry Best Practice in a Journey to Excellence	D. Cox (CNL)
08:50 – 09:10	The In-Core Experimental Program at the MIT Research Reactor	G. Kohse and Lin-wen Hu (MIT)
09:10 – 09:30	Impact on Safety of the Conversion of the NIST Research Reactor	D. Diamond, J. Baek, A. Hanson, L. Cheng, A. Cuadra and N. Brown (BNL)
09:30 – 09:50	Nuclear Powered Innovation at McMaster University	C. Heysel (McMaster University)
09:50 – 10:10	Ageing/Obsolescence Management at the ZED-2 Research Reactor	D. Mon and C. Trudeau (CNL)
10:10 – 10:30	The NRU REACTOR: Past, Present & Future	M. Floyd (CNL), D. Banks (CNBC), J. Carver, T. Leung, W. TerMarsch, F. Van Hoof, L. Walters and N. Wang (CNL)
10:30 – 10:45	Break, Cartier Salon I	
Session #2C: Slowpoke Reactors, Cartier Salon III Session Chairs: S. Livingstone and J. Hilborn		
10:45 – 11:05	Enhancements to the SLOWPOKE-2 Nuclear Research Reactor at the Royal Military College of Canada	P. Hungler (RMCC)
11:05 – 11:25	Implementing an Integrated Management System (IMS) for JM-1 SLOWPOKE-2 Research Reactor in Jamaica	T. Warner (ICENS)
11:25 – 11:45	A Gamma Irradiator Using a Radioactive Source Produced by a Small Research Reactor	C. Chilian (EP)
11:45 – 12:05	Fabrication of Low-Enriched Uranium Dioxide Fuel Pellets in Support of a SLOWPOKE-2 Research Reactor Highly-Enriched Uranium Core Conversion	A. Bergeron (CNL)
12:05 – 13:20	Conference Lunch Buffet, Cartier Salon I	
Session #3C: Reactor Physics, Cartier Salon III Session Chairs: D. Meneley and Z. Karriem		
13:25 – 13:45	Verification of a Reactor Physics Calculation Scheme for the CROCUS Reactor	D. Siefman, G. Girardin, A. Rais, M. Hursin and A. Pautz (EPFL)
13:45 – 14:05	Modeling Burnup at NRU Loop Sites using MCNP	I. Zwiers (CNL)
14:05 – 14:25	Measurement of Prompt Neutron Lifetime in ZED-2	M. Zeller, J. Atfield (CNL), J. Koclas (EP) and B. Wilkin (AECL Retired)
14:25 – 14:45	Thermal Neutron Scattering Cross Section Measurements of Heavy Water	G. Li, G. Bentoumi (CNL), Z. Tun (CNBC), L. Li and B. Sur (CNL)
14:45 – 15:05	Neutron Flux Perturber Experiments in the ZED-2 Reactor	L. Li, N. Lee, B. van der Ende and B. Sur (CNL)

15:05 – 15:25	Break, Cartier Salon I	
Session #4C: Isotopes and Medical Applications, Cartier Salon III Session Chairs: H. Bonin and T. A. Harroun		
15:25 – 15:45	Homogeneous SLOWPOKE Reactors for Replacing SLOWPOKE-2 Research Reactors and the Production of Radioisotopes	H.W. Bonin (RMCC), J. W. Hilborn (AECL Retired), G.E. Carlin, R. Gagnon and P. Busatta (RMCC)
15:45 – 16:05	Homogeneous SLOWPOKE Reactors for Mo-99/Tc-99m Production in North America	J. Hilborn (AECL Retired) and H. Bonin (RMCC)
15:55 – 16:25	Evaluation of the OSCAR-4/MCNP Calculation Methodology for Radioisotope Production in the SAFARI-1 Reactor	Zainuddin Karriem and Oscar Zamonsky (NECSA)
16:25 – 16:45	Use of the NRU Thermal Neutron Beams to Investigate the Relationship Between Linear Energy Transfer (LET) and Cell Death Ratios	L. Paterson, J. Atanackovic, N. Kucerka, C. Boyer, R. Richardson and D. Boreham (CNL)
16:45 – 17:00	Closing Remarks, Cartier Salon III	
Day 2 Parallel Session D - Small Reactors		Thursday, November 6
Time	Description	Speaker/Author(s)
Session #1D: Advanced Components, Cartier Salon II Session Chairs: M. Sapra and M. Edwards		
08:30 – 08:50	Role of Passive Valves & Devices in Poison Injection System of Advanced Heavy Water Reactor	M. Sapra, S. Kundu, P. Vijayan, K. Vaze and R. Sinha (BARC)
08:50 – 09:10	Feasibility of Heat Pipe Technology for Passive Heat Removal in Nuclear Power Plants	A. Sartipi, M. Gaudet, R. Rui and Z. Haque (CNL)
09:10 – 09:30	Compact Feedwater Heaters	M. Edwards (CNL)
09:30 – 09:50	Preliminary Numerical Modelling of No-Core-Melt in the Generation IV Canadian SCWR	G. Schmidt, J. Goldak T. Kaya (Carleton University) and M. Yetisir (CNL)
10:30 – 10:45	Break, Cartier Salon I	
Session #2D: Design II: Molten Salt and Liquid Metal Reactors, Cartier Salon II Session Chair: M. de Vos		
10:45 – 11:05	The Integral Molten Salt Reactor	D. LeBlanc (Terrestrial Energy)
11:05 – 11:25	GEM*STAR: Accelerator-Driven Subcritical-System for Improved Safety, Waste Management, and Plutonium Disposition	R. Johnson and C. Bowman (Muons, Inc. and Muplus, Inc.)
11:25 – 11:45	SEALER: A Small Lead Cooled Fast Reactor for Commercial Energy Production in Off-Grid Communities	J. Wallenius (LeadCold Reactors) and S. Bortot (PSI)
11:45 – 12:05	LEADIR-PS: The Path to a Safe and Economic SMR	R. S. Hart (Northern Nuclear Industries Incorporated)
12:05 – 13:20	Conference Lunch Buffet, Cartier Salon I	
Session #3D: Safety and Licensing of SMR's, Cartier Salon II Session Chairs: R. Humphries and K. Lee		
13:25 – 13:45	CNSC Update On Readiness to Regulate Projects Proposing the Use of Small Modular Reactors (SMR)	M. de Vos and K. Lee (CNSC)
13:45 – 14:05	The Intelligent Customer: Considerations Around Build-Own-Operate Business and Licensing Models for Small Modular Reactors in Canada	K. Jones (CNSC)
14:05 – 14:25	Safety and Licensing of CNNC-ACP100	F. Zhong (NPIC)

14:25 – 14:45	The Emissions-Free Energy (EFE) Working Group	R. Humphries (AMEC)
14:45 – 15:05	Systems Engineering and the Licensing of Small Modular Reactors	T. Kulesa, K. Soderholm and P. Fechtelkötter (IBM)
15:05 – 15:25	Break, Cartier Salon I	
Day 2 Parallel Session E - Research Reactors Thursday, November 6		
Session #4E: Novel Applications of Research Reactors, Cartier Salon III Session Chairs: G. Jonkmans and C. Heysel		
15:25 – 15:45	Use of a SLOWPOKE-2 Reactor for Nuclear Forensics Applications	M. Andrews, T. Beames-Canivet, R. Elliot, D. Kelly and E. Corcoran (RMCC)
15:45 – 16:05	One-Sided Muon Tomography - A Novel Approach to Imaging Critical Facilities with a Portable Muon Detector	K. Boniface, G. Jonkmans, V. Anghel, A. Erlandson, M. Thompson and S. Livingstone (CNL)
15:55 – 16:25	Direct Conversion of Fission Energy into Electricity in Liquid Gallium Contact Potential Cell	T. Soh (USASK)
16:25 – 16:45	Cadmium-Emitter Self-Powered Thermal Neutron Detector Performance Characterization & Reactor Power Tracking Capability Experiments Performed in ZED-2	M. LaFontaine (LaFontaine Consulting), M. Zeller (CNL) and K. Nielson (RMCC)
16:45 – 17:00	Closing Remarks, Cartier Salon III	

Day 3 (Tour – Optional) Chalk River Labs, Ontario Friday, November 7	
Time	Description
07:30	Depart for Chalk River Laboratories (bus pick-up at front door of Marriott Hotel)
10:00	Arrival at Chalk River Laboratories Outer Gate for Security Check. Proceed to main building.
10:30 – 12:00	Facility Tours
12:00 – 13:00	Lunch
13:00 – 15:00	Facility Tours
15:00	Regroup in B500 Rm 136, Closing Address
15:15	Depart Chalk River Laboratories
17:30	Return to Ottawa Hotel

- Available only to those who pre-registered to attend the tour
- Account for slight delays on return time to Ottawa hotel
- Wear flat-soled, closed-toe shoes and long pants
- Advise of severe allergies, pregnancy or medical conditions / devices
- All cameras must be left at Security, including cell phones / BlackBerrys / PDAs if camera-equipped