Issue 2
September 2020

NEWSLETTER

CNS UPDATE

MESSAGE FROM THE PRESIDENT

NEWSLETTER CONTENTS

This is Issue 2 of the CNS UPDATES NEWSLETTER. It introduces your 2020-2021 CNS Divisions, Branches and Committees and their Chairs, as approved by the CNS Council. It covers also the CNS Post-Covid-19 Recovery Task Force initiative update, and some upcoming CNS events in 2020. These events include the 2020 Symposium on AI, ML and Innovating Technologies, the G4SR Virtual Summit and Webinars, as well as courses on CANDU Technology, and Nuclear Chemistry. Note also that the CNS has provided input to the Canadian Action Plan on SMRs, indicating activities through which CNS will actively support the Plan and its implementation. And the CNS is endorsing the request for enhanced government funding by the Canadian scientific organizations: Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC).

CNS needs your continued support to fulfill its vision and mandate

The CNS is implementing a new Conference Management System with Kendall Erlandson as the Project Lead. The following modules are included: Event Registration, Membership Registration, Exhibitor Registration Module, Submission & Speaker Management Module, Membership & Multi-Event App. The Membership Module implementation is in progress, with the remaining modules expected to be implemented by October.

With the implementation of the Membership Module, CNS will move to a rotating membership approach, whereby when one signs up as member on a particular date that becomes the member's anniversary date for membership renewal. I urge you to renew your CNS membership, or join again if your membership has lapsed. You can do this by visiting the CNS website (www.cns-snc.ca), which also contains more information about CNS activities and available vacancies and opportunities for members to become actively involved in CNS.

2020-2021 CNS DIVISIONS & CHAIRS

Division	Chair
Environment, Waste Management & Decommissioning	Parva Alavi
Nuclear Operations and Maintenance (NOM)	Nathan Bruns, BWXT; Andrew Brooks, BP, Moe Fadaee, Kinectrics
Fuel Technologies	Masoud Shams, SNC Lavalin
Fusion Energy and Accelerator Science and Technology	Blair Bromley, CNL
Generation IV and Small Reactors	Wilson Lam, Ontario Ministry of Energy
Materials, Chemistry and Fitness for Service	Mohammadreza Baghbanan, OPG
Nuclear Science & Engineering	Wei Shen, COG
Science and Technology of Radioisotopes	Chary Rangacharyulu, University of Saskatchewan

2020-2021 CNS BRANCHES & CHAIRS

Branch	Chair(s)
BRUCE	John Krane
CHALK RIVER	Andrew Morreale
DURHAM	Nicholas Preston
GOLDEN HORSESHOE	Michael Tucker
MANITOBA	Jason Martino
NEW BRUNSWICK	Derek Mullin
ONTARIO TECH	Mohamad Saleh
OTTAWA	Ken Kirkhope
QUEBEC (Dormant)	last Chair was Michel Saint-Denis
SHERIDAN PARK	Raj Jain
TORONTO	Moe Fadaee
WESTERN	Arthur Situm & Jason Donev

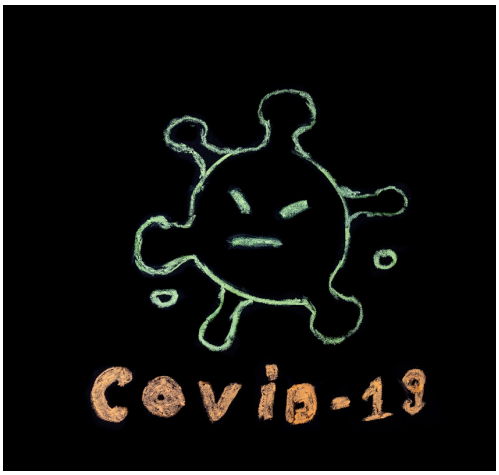
2020-2021 CNS Committees

COMMITTEE	CO-CHAIRS/VICE CHAIRS	MEMBERS
Branch Affairs	Keith Stratton	Syed Zaidi (assistant to Chair)
Education and Communications	Peter Ottensmeyer, Doddy Kastanya	
Finance	Daniel Gammage	Mohinder Grover, Keith Stratton, Adriaan Buijs and Mohamed Younis
Honours and Awards	Ruxandra Dranga	John Gorman (CNA President), Aman Usmani (CNS President), Jennifer Chapin, Daniel Gammage, Mohinder Grover, William (Bill) Kupferschmidt, Derek Mullin, Ovidiu Nainer, Peter Ozemoyah, Benjamin Rouben, Keith Stratton, Kamal Verma, Robert Walker, Jeremy Whitlock
Business Support	Vacant	William (Bill) Smith, Kendall Boniface, Jacques Plourde, Keith Stratton
Inter-Society Relations	Peter Ozemoyah	Mohinder Grover, Ruxandra Dranga, Kamal Verma
Membership	Guy Hotte	Including editorial board with members Guy Hotte, Doddy Kastanya and Cheryl Tasker-Shaw
Publications	Vacant	
Scholarships	Mohamed Younis	Jad Popovic, Kendall Boniface, Doddy Kastanya, Wei Shen, Mohinder Grover, Adriaan Buijs
Strategic Planning	Jacques Plourde	Aman Usmani, President (sponsor), Kamal Verma 1st VP, Keith Stratton, past president, Council members Daniel Gammage, Jerry Hopwood, David Malcolm, Chary Rangacharyulu
International Liaison Committee	Peter Ozemoyah	Benjamin Rouben
CNS Contribution Agreement Chair	Paul Jones	

CNS POST-COVID-19 TASK FORCE

As reported in Newsletter 1, the CNS has formed a Task Force (led by CNS President Aman Usmani) to develop a plan for alternative ways to hold CNS events to generate revenue and to keep membership and stakeholders engaged and interested.

The update on the tasks undertaken is as follows:



Preparation of specification and selection of virtual platforms for the CNS

The specification has been prepared and the review of suitable platforms is ongoing. For the AI and ML symposium on October 6-7 2020, the Vfair platform was selected, and for the G4SR-2 Virtual Summit on November 18, 19, 2020, the Webex platform will be used.

CNS Executives have approved a Cisco Webex subscription for all upcoming virtual events for the next one year

Survey of membership and stakeholders to seek feedback

The survey has been completed and; 167 responses have been analyzed. The results are being used to plan the virtual CNS events. The survey results are posted on the CNS website.

Facilitation of Branch event delivery using virtual platform

This task is currently under way, and the Branch chairs are encouraged to reach out to Branch chair Keith Stratton for any help.

Development of new and enhancement of existing CNS courses, potentially in collaboration with Universities and UNENE

In the short term in 2020, three CNS courses are planned to be delivered: 1) Nuclear for Everyone 2) CANDU Nuclear Technology and 3) Nuclear Chemistry.

CNS ACTIVELY SUPPORTS CANADA'S ACTION PLAN FOR SMRS

CNS has committed to being part of SMR Team Canada. This is achieved through participation along with CNA and COG. CNS has demonstrated keen interest in being part of SMR Team Canada to support the SMR road map action plan and its implementation to combat global warming and achieve carbon-free energy in Canada.

In alignment with the latest advanced SMR development trends in Canada, the G4SRT Division of CNS fulfils CNS learned-society objectives by providing a medium to share with others practising in related fields:

- The development and implementation of the latest Generation IV nuclear design concepts, including Small Modular Reactors (SMRs)
- The framework for analysis and assessment of transition scenarios (roadmap) to sustainable nuclear energy systems employing Generation IV and Small Reactor designs
- The use of advanced materials, safety analysis methodologies, simulation tools, etc., in solving design problems for these advanced reactor design concepts
- Encourage technical exchange among: International nuclear agencies, IAEA, NEA, government officials, etc., in sharing public-domain technical resources; these include the framework for nuclear policy analysis, nuclear advanced materials, safety analysis methodologies, and simulation tools for Gen IV nuclear design and SMR research and development (via G4SRT Webinars)
- Co-operate with various societies (e.g. American Nuclear Society, UK Nuclear Institute, European Nuclear Society, etc.) to co-sponsor and support their efforts with regards to Gen IV Nuclear Design and SMR development (via an Intersociety Committee)
- Inform CNS members of up-to-date news, stories and information about Gen IV Nuclear Design and SMR technology research and development, both in Canada, and in other nations, including upcoming domestic and international conferences, meetings, workshops, and training courses (via CNS Newsletter, Bulletin, etc.)

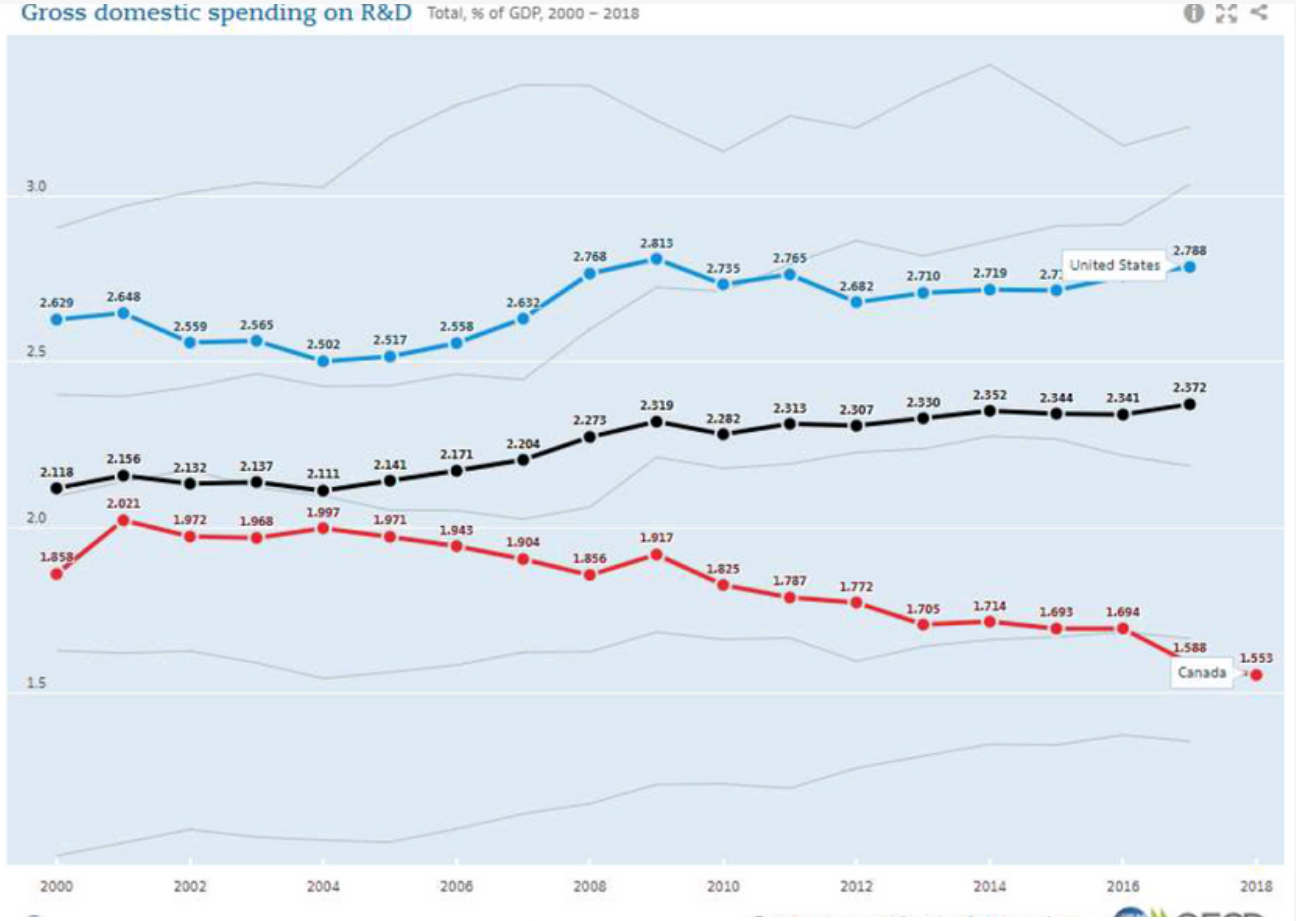
CNS is delighted to hear that Alberta is joining the Nuclear Group. This is great news for the Nuclear Industry and Canada. The Sun Media report excerpt is given below.

Alberta to Join Three Other Provinces in exploring small-scale nuclear technology

Premier Jason Kenney has signaled the intent to join into a memorandum of understanding with Ontario, Saskatchewan and New Brunswick to support the development of small modular reactors (SMRs), the government said in a news release. In a pre-taped video statement with Energy Minister Sonya Savage, Kenney said that technology has the potential to generate reliable and affordable energy while reducing emissions and diversifying the energy sector.

CNS ENDORSES REQUEST FOR ENHANCED GOVERNMENT FUNDING FOR CANADIAN SCIENTIFIC AND APPLIED RESEARCH

Robust investments in the Canadian Institutes of Health Research (CIHR), the NaturalSciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC) are essential for improving health, investigating scientific frontiers, contributing to economic restart and recovery in Canada.



OECD Data on Gross Domestic spending on Research and Development - Canada compared to other countries of the G7. Dark black line is OECD average.

OECD (2019), Gross domestic spending on R&D (indicator). doi: 10.1787/d8b068b4-en (Accessed on 11 October 2019) https://data.oecd.org/chart/5HLk

This data shows Canada ranks second to last of the G7 countries in terms of Gross Domestic spending on Research & Development, spending only 1.5% of its GDP on R&D. This low investment level also places Canada well below the average of OECD countries, at 2.4%, and well below the US, which invest 2.8% of its GDP in R&D. While increases in research investment have been made in Canada, they have not kept up with the inflation rates.

Neutrons at the Core: Energy for Millennia: A new monograph on nuclear energy from the point of view of neutrons by Peter Ottensmeyer

During the continuing COVID isolation Peter Ottensmeyer, one of our CNS Councillors, decided to write down what he learned in giving lectures, talks, seminars, and having conversations after entering the nuclear field some 15 years ago, after his retirement from research on the physics and engineering side of cancer research. It resulted in a book, still in draft form, up to 200 pages by now with 20 Chapters, leading from the fundamentals of the nucleus to the intricacies of neutron interactions inside a reactor core. If that sounds difficult, it isn't; at least not in this book. The range covered is from the creation of the Earth to the potential imminent acquisition of fast-spectrum small modular reactors in Canada, with non-carbon fuel for a thousand years or more. For a text on nuclear energy here are some unexpected comments from readers of individual Chapters of the draft version: very easy to read, intriguing, captivating; an enjoyable experience; I can really feel his personality as an educator; it was a pleasure; in his writings I sense his passion to help future generations; I dread the future of my ten grandchildren if we don't act now.

Dr. Ottensmeyer, an engineering physicist, is Professor Emeritus at the University of Toronto and Fellow of the Royal Society of Canada. He is on the Council of the Canadian Nuclear Society and currently Co-Chair of the CNS Education and Communication Committee. Approach him about it. For details you may contact Peter using the following link: peter.ottensmeyer@utoronto.ca.

CNS UPCOMING EVENTS IN 2020

GENERATION IV & SMALL REACTOR TECHNOLOGY (G4SRT) DIVISION (WILSON LAM, DIVISION CHAIR)

Nov. 18, 2020 (Wed): Canada : Government Support and SMR Actions

Free Morning Session: Government Support for SMR Action Plan
REGISTRATION REQUIRED.

- NRCan Minister O'Regan's Launch of Canadian SMR Actions Plan
- Speech from Indigenous Leader
- Speech from nuclear young entrepreneur
- Provincial Ministers Panel -SMR Feasibility Study and Business Case for Interprovincial Collaboration Memorandum of Understanding (MOU) on SMR, in preparation for inter-provincial strategic plan for SMR deployment implementations.

Paid Registration to watch all sessions live or on demand

Nov. 18 Afternoon: Plenary Session 1: SMR Actionable Principle #1 Support the development and deployment of SMRs in Canada, with first units in operation by the late 2020s
Theme : Advancing SMR Deployment in Canada
Session #1 - Advancing SMR Demonstration, Deployment and Research Innovation in Canada
Session #2: Strategies to minimize and potentially recycle nuclear waste - Advanced SMRs in New Brunswick.

Nov. 19, 2020 Morning: Working with International Partners As Early Movers Enablers in SMR Deployment

Theme: - SMR Actionable Principle #3 : work together to engage with international partners to seize export opportunities and influence international standards

Three Keynote Addresses on Working with International Partners on SMR Deployment. Invited Keynote Plenary Speakers include prominent nuclear energy leaders from EU, UK and US.

Nov. 19 Afternoon Plenary Session 3: Enabling Advanced Nuclear Technology Deployment in the United States

The US track is focused on initiatives and activities built on the enabling side of US Advanced Reactors Development.

Plenary Speakers include:

- Advanced Reactor Demonstration, National Reactor Innovation Center (NRIC), Idaho National Lab
- Versatile Test Reactor, Idaho National Lab
- DOE HALEU Program

Nov. 19 Afternoon Plenary Session 4: Microreactors as Clean Energy Option for Canada

Nov. 19 Afternoon Plenary Session 5 : SMR Hybrid Energy System and Hydrogen

Plenary Speakers include:

- HTGR Hydrogen & Heat Generation in Japan;
- Reactor for Process Heat and Electricity in EU
- Emerging Clean Energy Transition - Innovation in Nuclear Hydrogen Production
- Integrated Nuclear-Renewable Energy Systems

Nov. 19 Afternoon Plenary Session 6: Indigenous Engagement Practice for Nuclear Projects in Canada.

Today, successful projects must include proactive and meaningful Indigenous engagement and participation. It is important that proponents and suppliers have a strong understanding of the variety of issues that must be considered when developing an effective Indigenous engagement strategy.Attendees will hear from five experienced nuclear industry leaders who will share their practical insights on Indigenous engagement, including:

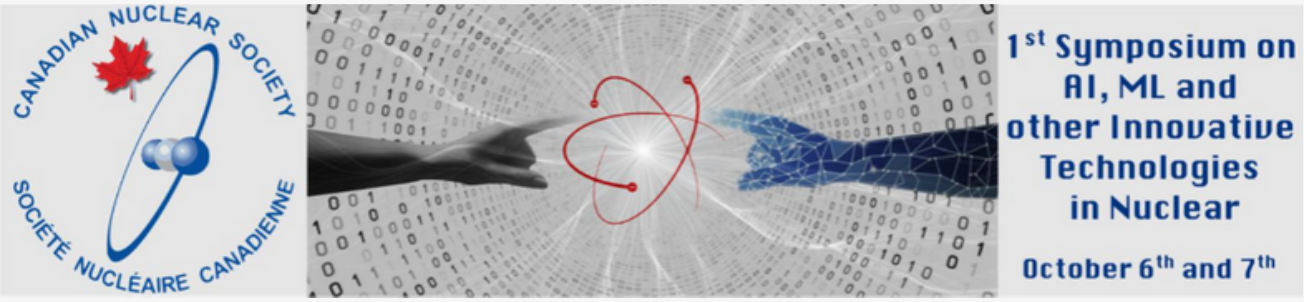
- The importance of understanding Indigenous history in Canada and local history as context setting for a project area
- Aboriginal and treaty rights
- The value of research, expertise and an Indigenous engagement capacity
- Duty to Consult: who holds it and the role of proponents
- Setting the tone for a willing project host community
- The role of partnerships, procurement, employment and training
- The importance of an Indigenous relations policy
- Canadian Indigenous regulatory requirements in today's nuclear landscape

For G4SR-2 Webinars: ·

- August 20 (Thurs), 2020 - Integrated Safety Assessment Methodology (ISAM) - Invited Speaker, Dr.Thambiayah (Nithy) Nitheanandan, Director, Canadian Nuclear Safety Commission (CNSC)
- Sept. 17 (Thurs), 2020 - Establishing requirements for Advanced Reactors – Invited Speakers: Andrew Sowder, Senior Technical Executive, Electric Power Research Institute (EPRI); Rachna Clavero, Deputy CEO, CANDU Owners Group (COG)
- Webinars beyond Sept, under planning, please stay tuned.

Please stay tuned for the Virtual Summit update by periodic CNS email announcements and visit our web site www.g4sr.org currently in development with forthcoming details on the Virtual Summit and Webinars.

2-DAY VIRTUAL SYMPOSIUM ON AI, MACHINE LEARNING AND OTHER INNOVATIVE TECHNOLOGIES (EVENT CHAIR MOE FADAEE)



Symposium website: cns2020ai.com

The central objective of this Symposium is to provide a forum for exchanging views, ideas and information relating to "Innovation, Artificial Intelligence, Machine Learning, Data Analysis, and Big Data". There is a considerable recognition that through collaboration, the nuclear industry needs to move forward and deal with the challenges it faces in upcoming decades of the 21st century. The influence of AI and ML on our daily lives is greater than ever, industries are adopting AI to their benefit, and the nuclear industry in Canada is not exempt from this. Innovation is what kept our industry so strong for the past 60 years, and it will keep us strong in the future.

Keeping this vision, and to help direct the development of the conference program, it is proposed that the theme of the conference be:

"Innovation and AI for a Brighter Future of the Nuclear Industry"

The conference is the forum for sharing the latest knowledge and experience on adopting innovative technologies, ideas, methodologies, algorithms including different means of AI and ML, and how all of that is helping us perform our tasks more safely, more efficiently and more accurately, and even if they brighten our sight.

The topics include:

- Innovation in both
  - Technologies (including advanced rector concepts)
  - Methodologies and algorithms
- Data Analysis, innovative approaches toward data and analysis
- Artificial Intelligence and Machine Learning
- Big Data

Important Dates ·

- Abstract submission: August 24, 2020
- Acceptance of abstracts: August 31, 2020
- Pre-recorded presentation video and slide deck submission: September 21, 2020

Submission Guidelines

- Abstracts should be a maximum of 200 words in length. They must include the title of the presentation, the authors and their affiliation, and the essence of the work which will be presented.
- The presentations in the Technical Sessions will be selected based on their relevance to the symposium theme and their technical merit.
- Presentations must be consistent with a presentation time of 15 minutes. If necessary, additional information can be presented in slides which are appended at the end of the presentation slides. (15 minutes presentation plus 5 minutes for Q&A)
- There is no requirement to prepare a written paper. However, the presenters are strongly encouraged to pre-record their presentations (instructions will be provided in the symposium web site) and be available for Q&A following the broadcasting of the pre-recorded video presentation.
- If your abstract is selected, you agree to present your work at the Symposium and that the slide deck will be published in the Symposium Proceedings. The video-recorded presentation will be made available to the symposium attendees for 15 days after the symposium.
- Submissions of abstracts and presentation decks should be made via https://www.softconf.com/k/aiml2020/
- At least one of the authors must register for the Symposium by the “early-bird” registration date (September 4, 2020) for the paper to be included in the Symposium technical program.

General Inquiries: Conference Chair: Moe Fadaee at moe.fadaee@cns-snc.ca.

Inquires about technical program and presentations submission: Technical program co-chairs: Paul Spekkens at p_spekkens@hotmail.com or Ashlea Colton at ashlea.colton@cnl.ca.

Symposium Web Site: For more information, please refer to the Symposium web site cns2020ai.com.

To see the Sponsorship and Exhibition opportunities please see the website.We are currently accepting abstract, please see the conference website for more information on how to submit your presentation.

CNS SHORT COURSE ON CANDU TECHNOLOGY

Course Overview

The CNS CANDU Technology and Safety Course, held for the last many years in March, has had to be cancelled/postponed to 2021 March on account of the COVID-19 pandemic.

In order to provide a partial replacement for the full course, a shorter, on-line course is being offered on 2020 November 13.

This on-line offering will present a small number of presentations on the technology of CANDU reactors, on:

- the basic reactor design
- CANDU thermalhydraulics
- plant refurbishment and reactor tart-up tests, and
- balance-of-plant systems.

The CNS is presenting this course to enhance the professional and technical capabilities of its members (and non-members) working in, or interested in, the nuclear industry. The course is ideally suited for beginning professionals, but also beneficial to experienced professionals. Come broaden your nuclear knowledge beyond your specific area of work and your own area of expertise.

This course is eligible for Continuing Education Units in the context of the Engineering Institute of Canada Continuing Education program.

Course Agenda 2020 November 13

08:15 Opening remarks, introductions, details on course schedule, breaks between sessions, continuing-education units, and on-line-platform rules and protocol.

08:30-10:00 "CANDU Design Overview", by Ben Rouben, 12 & 1 Consulting

10:10-30 Break

10:30-12:00 "Balance of Plant", by John Froats, Ontario Tech University

12:00-13:00 Lunch Break

13:00-14:30 "Refurbishment of Darlington Unit 2 + Reactor Start-Up tests", by Constantin Banica, Ontario Power Generation

14:30-15:00 "Thermalhydraulics Principles", by David Novog, McMaster University

16:30 Closing remarks, Survey

Registration

Please register on-line via the link on the Course web page, which you can reach directly by clicking here or via the CNS web site.

The registration fees are shown below, and include HST (HST # 870488889RT)

- ☐ CNS Member: $150.00 [Must be a CNS member in good standing]
- ☐ Non-CNS Member: $200.00
- ☐ CNS Full-Time Student Member or CNS Retiree Member: $75.00

CNS SHORT COURSE ON CANDU REACTOR TECHNOLOGY (ON-LINE)

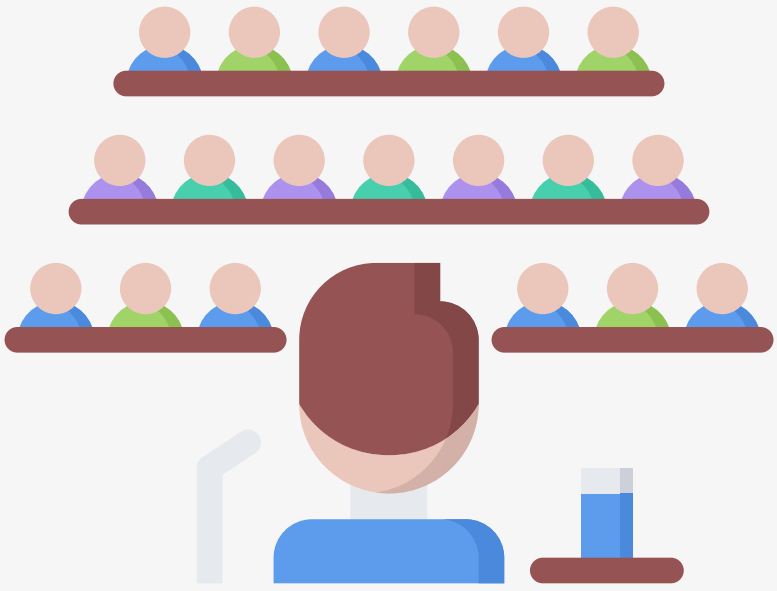
Organized by:
The Canadian Nuclear Society
Nuclear Science & Engineering Division

2020 November 13 (Friday)

Course held on-line
(Connection details to be communicated later)

Course contact (not for registration):
B. Rouben, roubenb@alum.mit.edu

For registration questions, contact CNS Office, cns_office@cns-snc.ca



CANDU SYSTEM CHEMISTRY COURSE

November 9, 2020

Course Description

This is an introductory to intermediate level course, designed to provide a solid base of understanding of the synergy between plant chemistry and material corrosion/degradation. The focus is on CANDU systems, including the objectives of chemistry control, corrosion issues, and corrosion mitigation strategies. Relevant "real-life" examples will be provided along with short-form self-assessments and ample time for Q&A to ensure maximum material retention.

Course Outcomes

By the end this course, the participant shall gain:

- Knowledge of the mechanisms of the major forms of corrosion that affect nuclear plant materials
- An understanding of chemistry control objectives for various CANDU systems
- An appreciation for the relationship between the chemistry, design, and materials of construction in major CANDU plant systems

Course Topics:

General Chemistry Overview (1.5 h, including small self-assessment)

- pH
- Conductivity
- Purification and Ion Exchange
- Water Radiolysis – potential co-instructor #1

Corrosion Principles (2 h, including small self-assessment)

- Uniform Corrosion
- Galvanic Corrosion
- Pitting and Crevice Corrosion
- Stress Corrosion Cracking (SCC)
- Flow Accelerated Corrosion

System Overview (3 h + 30 minutes for wrap up)

- Primary Heat Transport System
  - Chemistry Control
  - Corrosion Issues
    - Activity Transport
    - RIHT Rise
- Moderator
  - Chemistry Control – potential co-instructor #1
- Secondary Heat Transport System
  - Chemistry Control
  - Corrosion Issues
- Auxiliary Systems – potential con-instructor #2
  - Calandria Vault and End Shield Cooling System
  - Liquid Zone Control

NUCLEAR-FOR-EVERYONE COURSE

DATE TBD-FALL 2020

The Nuclear 101/Nuclear for Everyone team will be hosting a series of webinars in two-week intervals starting in September. Topics will be taken from the Nuclear-for-Everyone course, including:

- Radiation
- Nuclear-reactor basics
- Energy and the environment
- Radiobiology and nuclear medicine
- Small Modular Reactors
- Nuclear safety and accidents

Participation and interaction between presenters and participants will be encouraged!