CANADIAN NUCLEAR SOCIETY

https://www.cns-snc.ca

President's Message

Doddy Kastanya

Dear fellow CNS members,

Welcome to the third issue of the 2023 CNS Newsletter. As in the previous newsletter, I would like to use this opportunity to provide you with some updates related to activities around the CNS since August as well as providing you with a sneak peek of what you should expect to see in this edition of the CNS Newsletter.

The CNS council members have been quite busy since our last issue of the newsletter. We have held the 211th and 212th council meetings on September 8th and October 27th, respectively. The strategic planning and the business support committees have been working hard collaboratively to come up with an updated longer-term strategic plan for our organization. We are also working on finalizing the business plan for 2024, a feat that has not been accomplished in recent history of the CNS. It is my hope that by the time this newsletter is sent out, we will be in a good position to distribute the 2024 Sponsorship and Exhibitor package to many companies which have continuously supported the CNS over the years as well as the new players in the Canadian nuclear community which will hopefully begin to show their support to our conferences.

successful conferences. We started with three of them in the month of August: the 21st Environmental Degradation of Materials in Nuclear Power Systems – Water Reactors Conference which was held in St. John's Newfoundland and two other conferences in Niagara Falls namely the 2023 International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering and the 5th Canadian Conference on Waste Management, Decommissioning, and Environmental Restoration. In October, also in Niagara Falls, we hosted the 4th International Conference on Fire Safety and Emergency Preparedness for the Nuclear Industry. We also hosted the Canadian Workshop on Fusion Energy Science and Technology which was held virtually on October 24th, 2023. To complete the list of successful conferences, early in November we hosted the hybrid Disruptive, Innovative, and Emerging Technologies conference. On top of these conferences, the CNS also provides a couple of virtual lunch and learns on topics which are hopefully of interest for our members.

In order to make our conferences successful and to alleviate the burden of the organizing committee, for some of our conferences, the CNS hires a Professional Conference Organizer (PCO) to assist with the preparation process. I would like to share with you the outcome of the PCO selection process I mentioned in the last newsletter. The PCO selection committee selected the Quantum Events as the PCO to support three big conferences that will be held in 2024 and 2025 namely the annual conferences as well as the G4SR-5 which will be held in 2024.

We are also trying to strengthen our collaboration with other nuclear societies around the world. We are in the process of renewing our cooperation agreements with the Atomic Energy Society of Japan (AESJ) and with the American Nuclear Society (ANS). With regards to the ANS, I had the pleasure of meeting the President, the VP/President-Elect, and the CEO of the ANS at the 2023 ANS Winter Meeting in Washington DC. Preliminary discussions on several potential collaborations between the two organizations were covered during this brief meeting.

Concerning the contents of this edition of the CNS Newsletter, you will find the usual reminders of upcoming events that might interest you as well as a brief look back at some of our recent successful conferences. We are also showcasing a couple short writings contributed by our members as well as the announcement for the 2024 CNS scholarships. To complete this edition, we include the essay from the second-place winner of the 2023 Student Essay contest. By the way, the invitation to participate in the 2024 Student Essay contest was already announced.

Finally, I would like to thank Cheryl Tasker-Shaw for her continued support during the preparation of our Newsletters. As I mentioned last time, I am sure she will welcome any volunteers who want to share her joy through the journey. This is an opportunity to show your support to our organization and to serve the nuclear community in Canada.

Recent and Upcoming Events

We are pleased to announce that the Canadian Nuclear Society (CNS) is organizing the

43rd Annual CNS Conference and 48th Annual CNS/CNA Student Conference

June 16th – 19th, 2024

Saskatoon, Saskatchewan

Sheraton Cavalier Hotel

www.cns-anncon24.ca

Saskatchewan is the kind of place that exists beyond the limits of expectation. Like our storytellers, Saskatchewan isn't phased by misperceptions, but continues to compel you with layers of cultural and geographical diversity – and entices you to stay and reconnect.

It's a place where grit and determination has helped people thrive through challenging circumstances and continue to grow, innovate and evolve. That tenacity comes through in how we speak and live our lives.

The 43rd Annual CNS Conference takes place over the course of three days with engaging topics, speakers, a student-based event, and a reception at the Remai Modern Gallery.
Conference topics may include:

- Enhancing Safety and Security
- Operations, Aging Management and Refurbishment
- Facilitating Energy Policy and Global Consensus
- Environmental Protection and Waste Management

- Developing New Technology, Innovations and Applications
- Addressing Public Concerns about Radiation Impacts
- Facing Competitors and Reducing Cost
- Acquiring Medical (isotopes) and Biological Benefits from operating plants and research reactors

Conference Chair: Derek Mullin
Plenary Program Chair: Paul Thompson
Technical Program Chair: Paul Spekkens
Student Program Chair: Samantha Binkley

For more information, please visit the website: CNS Annual Conference 2024 (cns-anncon24.ca)
If you have any questions feel free to email Rebecca Colantonio, Event Manager at
Rebecca.colantonio@quantumevents.ca

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Canadian Nuclear Society
Fusion Energy and Accelerator Science and Technology Division
http://cns-snc.ca/CNS/fusion/

CNS Fusion Energy and Accelerator Science and Technology Division (CNS-FEASTD)
Blair P. Bromley, Co-Chair of CNS-FEASTD
Peter Schwanke, Co-Chair of CNS-FEASTD
November 21, 2023

2023 Canadian Workshop on Fusion Energy Science and Technology (CWFEST-2023) a Great Success

The 7th biennial Canadian Workshop on Fusion Energy Science and Technology (CWFEST-2023) was held as an all-day virtual/online event on Tuesday, October 24, 2023, and was a great success.

Co-organized and co-hosted by CNS Fusion Energy and Accelerator Science and Technology Division (CNS-FEASTD), and the Fusion Energy Council of Canada (FECC), the event focused on where we are at with

commercialization of fusion energy challenge. The event had over 100 registrants/attendees from a broad range of backgrounds.

Presenters:

Twenty minutes is not a lot of time to explain a topic as complex as fusion and how your company or organization has a winning approach to making fusion energy a reality in the not-too-distant future. Each presenter did just that, but there is much more to the story. We encourage everyone to explore further by visiting their websites and continuing the conversation.

Andrew Holland, CEO, Fusion Industry Association (FIA) (Keynote Speaker)

- https://www.fusionindustryassociation.org/
- *The Global Fusion Industry in 2023*
- Based on the FIA's latest self-reported survey, private sector investment in fusion energy technology development continues to grow (reaching US$6.2 billion). There is increasing optimism on timescales and industry and government partnerships. However, many complex challenges / opportunities remain. The world needs fusion and fusion is ready to grow. Industry's timeline envisions the design and construction of the first pilot plant by the late 2020's, operating pilot plant and first sales in early 2030's, and rapid deployment to global deployment by mid-2030's.

Omar Hurricane, National Ignition Facility (NIF) (Keynote Speaker)

- https://www.llnl.gov/
- *Lesson's from Fusion Ignition and the Implications for Fusion Energy Science and Engineering*
- Dr. Hurricane provided a detailed description of how the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory (LLNL) achieved an "existence proof" that ignition is possible in December 2022 and June 2023.

Nicholas Hawker, First Light Fusion

- https://firstlightfusion.com/
- *Inertial Fusion with a One-sided Drive*
- First light uses a one-sided inertial fusion driver with a projectile driver approach that is claimed to be simpler and hence less costly than other approaches. Their liquid first wall design sidesteps major engineering challenges. The current focus is on building the M4 DP5 ignition demonstrator, a modular 3-level, 72-meter machine.

Marius Schollmeier, MARVEL Fusion

- https://marvelfusion.com/
- *Laser-driven Inertial Fusion with Direct Drive Volume Ignition*
- Marvel deploys a novel direct drive fusion approach based on mixed fuel types. Facilitated by the rapid innovation in solid state, diode-pumped, ultrashort-pulse laser technology that make commercialization feasible. Based in Munich Germany, Marvel is currently partnering with Colorado State University (CSU) to construct a US$150 million high intensity laser facility.

Brian Berzin, CEO, Thea Energy (formerly known as Princeton Stellarator)

- https://thea.energy/
- *Fusion energy made faster and simpler*
- Thea Energy builds upon the stellarator legacy of Lyman Spitzer, the founder of Princeton Plasma Physics Laboratory (PPPL) in 1951. The stellarator is an alternative to the Tokamak, relying on complex fabricated external field coils to provide twisting magnetic fields, rather than by an internal current. Thea Energy eliminates complicated modular coils by using Dynamic System Control capable of optimizing machine parameters and changing operating points in real time. Their vision is to design, construct and operate a large-scale neutron source stellarator, currently in pre-conceptual design and expected to be completed in early 2030.

Klaas Rodenburg on behalf of Axel Meisen, Fusion Energy Council of Canada (FECC)

- https://fusionenergycanada.ca/
- *Status of Fusion in Canada*
- FECC's mission is to *"mobilize human, financial, and other resources for the participation of Canadians and Canadian enterprises in first generation fusion energy systems and uses, with the objective of creating economic,*

Nuclear Laboratories (CNL), General Fusion, University of Alberta and Tritium Conference 2025 organizing committee. Internationally, the FECC is well positioned to work with stakeholders in the United States, United Kingdom, European Union Japan and Korea on research, education, regulatory framework, and commercialization.

Alex Creely, Head of Tokamak Operations, Commonwealth Fusion Systems

- https://cfs.energy/
- *High-field Path to Fusion Energy*
- Commonwealth Fusion builds upon the physics demonstrated in Tokamak machines around the world and has demonstrated its ground-breaking high-temperature superconductor (HTS) magnets that allow for the reduction in size of the machines and aimed at making them commercially viable. They are currently working on SPARC, slated to be completed in 2025 and expected to achieve net fusion energy. This device will be followed by the ARC fusion reactor, expected to be deployed in the early 2030's. The ARC reactor is expected to be capable of sending carbon-free electrical power to the grid.

Michael Hua, Director of Radiation Safety and Nuclear Science, Helion Energy

- https://www.helionenergy.com/
- *Nuclear Engineering Considerations for Pulsed, Magneto-inertial Fusion Using Field Reversed Configurations (FRCs)*
- Helion is based in Everett, Washington State, USA, and fully funded to reach commercialization (US$ 600 million) Its Trenta: 6th generation prototype uses deuterium-helium-3 fuel and a direct energy conversion system to produce electricity. The next step will be to construct a 30,000 square feet facility housing a 50 MW Plant, to be operational in 2028 with its first customer being Microsoft followed by Nucor Steel in 2030.

Hiroshi Gota, TAE Technologies

- https://tae.com/
- *Overview of TAE Technologies' Fusion Program Towards Aneutronic Fusion*
- TAE is working towards aneutronic (neutron free) fusion via a high-beta reversed field configuration (RFC) plasma confinement device named Copernicus. Their long-term goal is to use the proton-Boron-11 fusion fuel combination. They also have two spin-off companies in the life sciences (medical) and power industries. TAE's five experimental versions of their machine provide the foundation for the next machine named Norman that will provide proof of concept (2016-2024), followed by Copernicus in final design (2027), and DaVinci the first integrated demonstration (DEMO) plant to be constructed in Irvine, CA and be operational in late 2020's.

Conner Galloway, CEO Founder, Xcimer Energy Corporation

- https://www.xcimer.energy/
- *Bigger is Better: NLO-Boosted Excimer Lasers for Inertial Fusion Energy*
- Founded in January of 2022, Xcimer's is pursuing the development of a low-cost KrF laser driver for use in inertial confinement fusion (ICF). Their approach employs laser pulse compression using optical stimulated scattering, in a mirror-less axial irradiation geometry of a more efficient target design. Their design takes advantage of the Lawrence Livermore National Laboratory (LLNL) HYLIFE ICF chamber design for wall protection. Initial laser system performance is scheduled for 2025 and a 50 MW demonstration plant in Phoenix, AZ is to be completed by the mid 2030's.

Robin Langtry, Avalanche Energy

- https://www.avalanche.energy/
- *Electrostatic Orbitron Fusion Reactor*
- Located in Seattle, Washington State, USA, Avalanche is developing the Orbitron, the world's smallest fusion reactor for mobility and distributed applications. The Orbitron is design variant of Inertial Electrostatic Confinement (IEC) fusion, using a combination of both electrostatic fields and magnetic fields for fusion plasma confinement. Their 33-person team is working on overcoming the challenges of small scale fusion machines with several prototypes code named "Neon" (100 kV, 0.07 Tesla), "Marty" (300 kV), and "Janice" (material sciences).

Megan Wilson, Chief Strategy Officer, General Fusion

- https://generalfusion.com/
- *Transforming how we energize the world*
- Located in Vancouver, British Columbia, Canada, General Fusion uses Magnetized Target Fusion (MTF), which they believe to be the fastest practical pathway to commercial fusion. MTF is a confinement approach that is considered an intermediate between low-density, long-time-scale magnetic confinement and high-density, short-time-scale

Key Take-away Ideas from CWFEST-2023:

- Interest in fusion is gaining momentum globally at all levels of academia, private sector companies and investors and government.
- There are a wide variety of approaches to making commercial fusion energy a reality. Each approach has its pros and cons, and tradeoffs.
- Important scientific, engineering, and technological progress and innovations in fusion and supporting technologies over the last 20 years is being leveraged by private sector fusion companies to develop commercial prototypes. Progress is occurring rapidly.
- As a result of progress and innovations, the private sector is optimistic and ambitious on their ability to build and successfully operate prototype demonstration fusion power plants to generate electricity and send power to the grid by early to mid-2030's. The procurement contract that Microsoft has signed with Helion is noteworthy.
- All private sector fusion companies are hiring, and looking for the best talent available. This situation will provide opportunities for Canadian universities to partner with industry to develop highly qualified people and career opportunities for students and young researchers.
- There is a need for a harmonized fusion regulatory framework worldwide so that all development and permitting is consistent and predictable.

CWFEST-2023 was a great success, and we look forward to organizing and hosting it again in 2025. For more information about CNS-FEASTD and FECC, please visit our websites at:

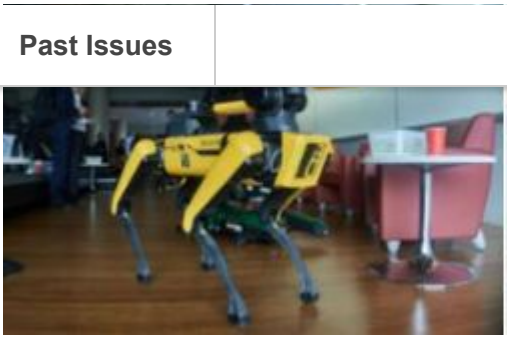
- **http://www.cns-snc.ca/CNS/fusion/**
- **https://fusionenergycanada.ca/**

DIET 2023: Innovation Unleashed

November 6th-8th 2023, Toronto ON

DIET '23 *Innovation Unleashed* successfully concluded its first-ever in person event early November! This year's conference delved into how companies, academics, and governments are using and planning to use innovative technologies and methodologies in nuclear energy, medicine, regulation and more.

With over 190 attendees and 123 for our in person day, DIET was able to provide exceptional presentations and discussion panels to all the guests. Our agenda featured engaging plenary discussions such as AI in the Wild, Women in Leadership, Digital Twins, Global Perspectives on Advanced Reactor Tech, Frontiers in Nuclear & Beyond, International Regulatory Perspective, and Advanced Manufacturing; all presented by renowned professionals and innovators within the industry to provide their valuable insights and experiences. Hosting 7 plenary sessions and 8 technical sessions within the three days, these were all made accessible to those virtually and in person.




Hosting a full first-day event at the beautiful George Brown Waterfront Campus, attendees additionally had the option of attending online through a virtual platform. Notably, this year's conference not only showcased 1 spot robot, but a total of 4; the robots coming from Kinectrics, OPG, Ontario Tech U, and NPX Innovations. This enabled guests to visually see the innovative steps taken to break through new barriers in technology. With Quantum Events as the PCO, they lead and coordinated all aspects of the in person day but also the virtual component.

Beyond the plenary sessions, attendees also enjoyed a fully catered lunch and hors d'oeuvres/wine evening, all prepared by the fantastic Chartwells George Brown team. This created an open space for attendees to network and socialise with some of the greatest minds in the industry. Due to this year's success, decisions about 2024 have already begun and will share this information in the new year.

To learn more information on DIET 2023 or see post-event updates, photos, and videos, please visit our website or follow our socials (linkedin, twitter).

FSEP 2023

The CNS Fire Safety & Emergency Preparedness Conference for the Nuclear Industry (FSEP 2023) took place from October 18th to 20th, 2023, at the Hilton Fallsview Hotel in Niagara Falls. This 2.5-day event brought together renowned professionals in Fire Safety and Emergency Preparedness to discuss advancements for enhancing fire safety and emergency preparedness for the Nuclear Industry. Esteemed Subject-Matter experts delivered 48 technical and plenary presentations covering diverse topics such as new and operational nuclear power plants (NPPs), Small Modular Reactors, research facilities, decommissioned facilities, uranium production, and mining facilities.

The conference fostered information exchange among nuclear industry professionals, fire protection and emergency preparedness experts, suppliers, government officials, regulators, students, and various stakeholders. FSEP 2023 was a resounding success, receiving an average satisfaction score of 90%+ in surveys from attendees, exhibitors, and presenters. The FSEP conference organizing committee expresses gratitude to all participants and anticipates the next conference in the Fall of 2025.

5th Canadian Conference On Nuclear Waste, Decommissioning and Environmental Restoration Niagara Falls Aug 27th to 31st 2023 (NWMDER 2023)

The conference was held in Sheraton Fallsview Hotel In Niagara Falls ON.

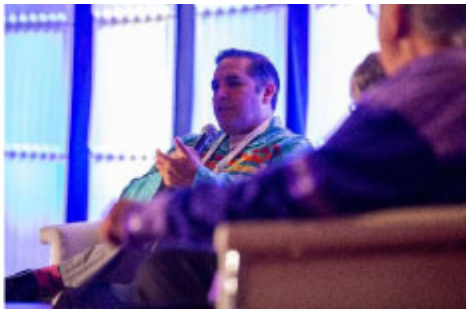
For the 1st time in conference's history, it was sold out in advance of the conference. It consisted of a Sunday Welcome with Trade Exhibition followed by 3 full days of presentations both plenary and streamed presentations followed by an optional technical tour selection to

- The NWMO Test Facility & McMaster University Reactor,
- Pickering NPP to look at waste and plans for decommissioning,
- Port Hope Area Initiative looking at the environmental restoration of the town from historical radioactive discharges.

The Monday morning was opened by Indigenous Drummers and Prayers by the Strong Water Group which set the scene for the first plenary session which was about understanding the Indigenous viewpoint in planning our work.

This panel was made up of a number of influential members of First Nations from both Ontario and Manitoba including Anishinabek Nation Grand Council Chief Reg Niganobe and Brenda Morrisseau, Manager, Niigan Aki

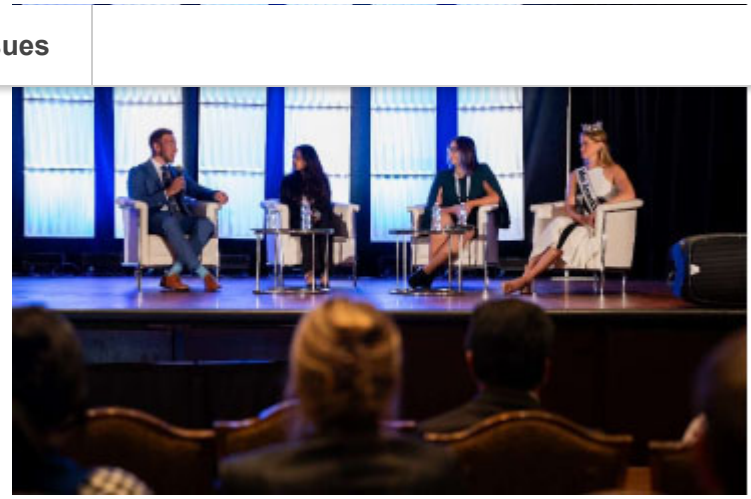
moderated by Christine John, Senior Manager, Indigenous Relations, Ontario Power Generation.



The morning progressed with talks by international speakers from the UK, Belgium, and Finland amongst others about the progress being made overseas on waste management and transport.

The afternoon was started by an uplifing speech on Young People in Nuclear Industry by Grace Stanke, a Nuclear Engineering Graduate from University of Wisconsin, Madison who is also Miss America 2023.

Grace then joined a panel of Students and Young Nuclear Professionals moderated by Matthew Mairinger, the 2023 President of the NAYGN to discuss the future of the industry through the eyes of the next generations.



The conference progressed with a number of presentations on all aspects of waste, decommissioning and environment.

On Tuesday night, we held the Conference Banquet over at Queen Victoria Place overlooking the Falls where delegates enjoyed a menu of the tastes of Canada and generally socialized and networked.

The Wednesday sessions carried on similar themes and concluded with a Panel made up of Kim Baines, a Senior Environmental Officer for IAEA, Rumina Velshi, President of CNSC and Terrence Hubbard, President of Impact Assessment Agency Canada (IAAC) speaking for the first time in a Nuclear Conference, moderated by Fred Dermarker, President of AECL where the way forward for planning future nuclear projects (both decommissioning and construction of waste facilities) were discussed.

post-conference survey.

I would like to give Special thanks to my colleagues, Prof Khash Ghandi Dr Peter Keech and Katie Hanlon who chaired the various sub-commitiees and made it such an amazing event.

Ian Wigginton

Chair NWMDER 2023

Core Business Blog

by Neil Alexander

In the last newsletter I wrote about the CNS “statements” that will become the core of our communications program. These statements will allow us to get ahead of the news cycle and allow us to lead discussions on relevant issues rather than follow them as has been the tendency in the past.

Over the last few months, I have been building the foundations of this program. It’s taken time but these foundations will be key to the success of the program so it’s important to invest the effort.

The steering committee is a key foundation. This committee will decide on the statements that the CNS will work on, will identify, and agree on the sub-committees that will write the statements, will advise the authors, and will decide when the statements are well enough developed to present to the executive/ council for adoption.

My first focus was on creating the right team to steer the communications program. It’s important that it is a team, as the statements need to represent the position of the CNS and not those of an individual. Without careful consideration teams can end up being like-minded and then prone to “group think”. Group think is one of the greatest dangers in communications as it can lead to messaging that fails to connect with the audience or even to have the opposite effect to that which the group expects.

I have to say that with a need to recruit our steering committee from CNS membership I was concerned that our volunteers might all have a classic nuclear industry profile, but I am pleased to say that we have been able to

everything in between. We have representatives from the conventional nuclear industry and from the new SMR companies and we have nuclear engineers, environmental scientists, journalists and entrepreneurs.

I believe this group will very effectively represent the position of the CNS as an organization and will do it in a way that will resonate with our audience, and I am looking forward to working with the committee in the coming years.

This is your CNS Communications Program Steering Committee:

Jennifer O'Meara is a communications and policy advisor for the Municipality of Clarington. She has an Honours Bachelor of Journalism and more than 15 years of experience as an award-winning community newspaper reporter.

John C. Fraser is retired. His career included being Business Administrator/ Comptroller for Bruce B and an examination and certification officer for the CNSC/AECB. His most recent nuclear "exposure" was a trip in 2018 to see Ukraine and a fascinating two-day tour of the Chernobyl site.

Renee Silke Is an environmental professional who has 20 years of experience in the nuclear industry where she has specialized in Environmental Toxicology. She presently works for CNL where her primary focus is planning for the cleanup of Canada's most complex nuclear legacy site.

Colin Hunt is now retired but remains actively engaged with CNS where he is Co-Chair of the CNS Government & Regulatory Affairs Committee and an elected Member of Council. He worked for 19 years at the Canadian Nuclear Association (CNA) and was the head of its research program and secretary of the CNA board.

Jane Christopher Akpan is an energy economist and policy analyst. She works as a Strategic Research and Reporting Specialist at the Saskatchewan Government Insurance (SGI) and is a PhD Candidate at the Johnson Shoyama Graduate School of Public Policy (JSGS) at the University of Regina, where her research focuses on Small Modular Reactors (SMR) Economics and Policy Analysis.

Pamela Bishop-Byers is Manager, Reconciliation & Indigenous Communications at the NWMO where she leads Indigenous communications strategy and supports Indigenous perspectives. A dual citizen, the first 10 years of her career were spent in New York City. She has an M.S. in Public Relations from Syracuse University as well as a B.A. in Political Science from York University.

Raphaël Schirrer is the principal consultant at Strategic Nuclear Solutions International (SNSI) based in Alberta and a Council Member of the CNS. He advises companies on business strategy and supports their marketing & sales teams during all phases of business development. A safety engineer by training, he has 20 years of nuclear industry experience in Canada, France, and the United Kingdom.

Guy Hotte (Co-Chair) is a Montreal-based Executive Consultant to Kinetrics where he brings over 30 years of Safety and licensing experience developed at Gentilly-2. He is an active member of the CNS-SNC, where as President he initiated the process that led to the creation of the Communication Director position and CNS-SNC communications strategy.

Dr Neil Alexander (Co-Chair) is the serving Communications Director for the CNS and principal consultant at Bucephalus Consulting where he undertakes technical, market and economic studies, advises companies on market entry and helps prepare winning commercial proposals.

Advisors to the Committee

Ulf Stahmer is a member of the engagement team at the Nuclear Waste Management Organization (NWMO) where he is assisting in the siting of Canada's centralized deep geological repository. He has been actively engaged in finding ways to calibrate nuclear issues in a way that the public can understand and will be reviewing the statements to ensure that we are doing this in the best way possible.

Dispatch from the Danube

Making the world safe from itself

Jeremy Whitlock
Nov 5, 2023

It's hard to find a shining example of successful global policy these days, with the world apparently coming apart at the seams. Many of these seams were carefully stitched with tired and bloodied hands in the years after World War II, by folks determined to prevent that level of obscenity from ever happening again.

However, from the depths of that obscenity came one of our highest ideals: that every citizen of earth deserves to share the liberating potential of nuclear energy, and not live in fear of its misuse. The symbolism was intoxicating: the apex of science from the first half of the 20th century, triumphing over the apex of evil from that same time period.

Thus it was, 70 years ago on December 8, 1953, that US President Eisenhower stood before a young United Nations, and encouraged the world to follow his vision of "Atoms for Peace". From this ideal emerged the International Atomic Energy Agency (IAEA) in 1957: a steward for the nuclear path out of Eisenhower's "dark chamber of horrors", towards "peace and happiness and well-being".

At the end of the 1960s this path was mapped in the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), establishing the means by which nuclear-armed States would prevent the spread of this threat (and reduce its

Over half a century later, the NPT – weathered and weary – remains one the most subscribed-to treaties on the planet, and arguably one of the most successful (with the notable exception of its principle for disarmament).

The NPT obliges non-nuclear-weapon States to accept full IAEA safeguards on their nuclear programmes, and nuclear-weapon States to not transfer weapons know-how. Thus, the IAEA not only lights the pathway of Eisenhower's "Atoms for Peace"; it enables it.

Canada has held high the IAEA torch from the beginning, playing a role in its founding, administration, and technical activities without interruption – eight Canadians have chaired the IAEA Board of Governors (nine if you include France's Bertrand Goldschmidt – a key figure in the Canadian wartime nuclear programme). Today some 60-70 Canadian ex-pats contribute their expertise to the IAEA's various departments, most sharing a common history from Chalk River, the CNSC, or the mining and operations sectors.

This key support includes the Department of Safeguards, where Canada played a unique role as one of the nuclear pioneer nations – with a vast nuclear fuel cycle, and a breadth and depth of capabilities to match (the first State that could have pursued nuclear weapons but chose not to).

A Canadian helmed the IAEA Safeguards department at the close of the 1980s, an era sometimes viewed as "the end of innocence" for the department – when the discovery of a clandestine nuclear weapons programme in Iraq (despite full safeguards), and equally concerning developments in North Korea and elsewhere, led to an extensive strengthening of safeguards capabilities through the 1990s that strengthened the focus on clandestine scenarios.

The Canadian leading the IAEA Department of Safeguards to this existential awakening was Jon Jennekens, Deputy Director General for IAEA Safeguards from 1987 to 1993. Prior to this Jon headed Canada's nuclear regulator (now the Canadian Nuclear Safety Commission, CNSC) after rising through its ranks as a staff member.

And of course, before that Jon did a stint at Chalk River – as everyone seems to do (at least back then).

Jon Jennekens, officer of the Order of Canada, and one of the nicest, most good-natured souls you could meet, passed away this past September – just shy of his 91st birthday.

Jon's generation built a world based on peace and respect, at a time when the stench of the ashes of the previous world was still in the nostrils. He believed in the value of science to humanity, and in harmony – with nature, with each other.

For Eisenhower's generation – which won us the opportunity to live better, and for Jon's – which built a world where we did just that, let's hope the stitches hold.

Brightening up the dinnerware

The precautions needed when using uranium and other similar radioactive materials are well known, but this was not always the case. The contamination problems encountered at Port Hope are a prime example. In the days before the discovery of fission, uranium ore was mined almost exclusively for the miniscule amount of valuable radium that could be extracted from it; the radium was primarily being used to treat cancer because of its strong gamma emissions. The tailings from radium processing (i.e., uranium and daughter products) were then distributed haphazardly in the Port Hope area, until the value of uranium as nuclear reactor fuel was realized, along with the associated potential health dangers.

Nevertheless, smalls amount of uranium and thorium have been, and continue to be used, in a number of consumer products. During a recent evaluation of materials in the “Diefenbaker Bunker” near Carp ON, a curious device was located (*https://www.atlasobscura.com/articles/museums-radioactive-artifacts).* It was a ceramic water cooler, built around 1910, which had a lead and uranium lining. The device called a “Revigator” was advertised as a healthful product designed to result in curative and invigorating effects. Neither of two liner materials are looked at kindly a century later, from a health point of view.

The Canadian Nuclear Heritage Museum has not succeeded in adding a Revigator to its collection, but it does have examples of tableware that were produced with uranium additives. The largest of these is a 39-cm diameter Fiestaware platter. The distinctive “Fiesta Red” glaze used on the platter was produced using natural uranium ore; a Geiger counter placed near it confirms the presence of radioactive material. Production of platters with this glaze began in 1936 but was curtailed by restrictions in the USA on uranium usage until 1959. Since that time production has continued using depleted uranium in the glaze formula.

Also in the collection at the museum is a set of six 22-cm diameter, “Vaseline glass” plates. These plates, of 1930s vintage, were located at a Saint Barnabas (Deep River) church auction and donated to the Museum. The glass incorporates uranium and, in addition to producing a telling click rate from the Geiger counter (much less than the Fiestaware), the plates give off a lovely green glow when illuminated with an ultra-violet light source.

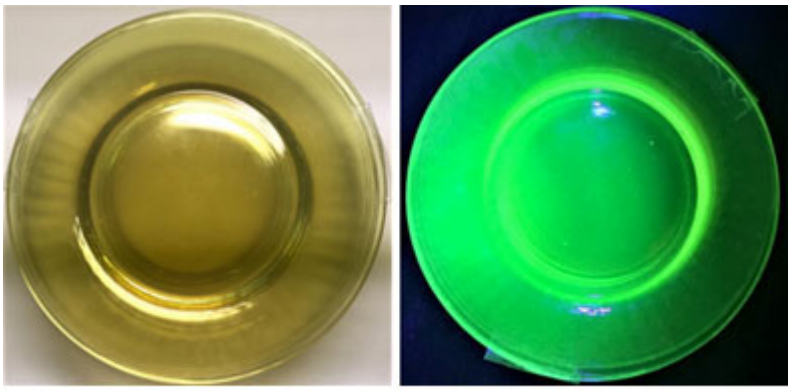
Thorium-doped glass has a relatively high refractive index. As a result, it has been used to make lighter-weight optical lenses both for use in eyeglasses and cameras. While the use in eyewear is now strongly discouraged, the use in optical devices continues and has, on at least one occasion, caused some confusion. A number of years ago, during routine radiation inspection when leaving the Whiteshell Laboratories of Atomic Energy of Canada Ltd, the cameras of a CBC film crew rang the radiation alarms. Only after a bit of detective work and head-scratching was it discovered that the problem was not one of contamination having been picked up, but that the source of the radiation was the radioactive content in the lenses.

Another early use of uranium was in the production of photographs – a Wheeler Scientific video illustrates this

uranium because of a lack of other sources of the now-valuable commodity!

Bruce Heinmiller is a retired health physicist, and one of the board members of the Society for the Preservation of Canada's Nuclear Heritage Inc. (SPCNHI), the registered charitable organization behind the Canadian Nuclear Heritage Museum. Bruce recently performed a complete assessment of all the SPCNHI artifacts, determining their activity and dose rate to the public and museum volunteers. None of the artifacts, including our dinnerware, are significantly radioactive, but it is prudent to know the complete inventory for due diligence and to answer questions from our visitors. The maximum effective dose rate measured was in the order of 0.2 μSv/h, when very close to certain artifacts, more than an order of magnitude less than the typical equivalent dose rates at altitude aboard commercial airline flights!

Visitors to the Canadian Nuclear Heritage Museum are always welcome. Individual or group tours can be arranged by sending a message to info@nuclearheritage.com. Cameras, even those with radioactive lenses are welcome, and you can see and record images of our "glowing" tableware.



Ordinary light Ultraviolet light

Small Modular Reactors: Where It Started and Where It's Heading

Maryam Karam
Mackenzie Community School, Deep River, Ontario
[Second Place Winner of the 2023 Essay Contest]

Introduction

The nuclear power industry is currently dominated by large Nuclear Power Plants (NPPs) [1]. Nuclear accidents such as the Three Mile Island in the USA, the Chernobyl disaster in Ukraine, and the Fukushima meltdown in Japan, showed how dangerous nuclear power could be and have influenced a negative public opinion on nuclear power [2]. Public anxiety and an antinuclear point of view closed operating plants and slowed new approvals.

public acceptance and improve the safety and economics of nuclear power. Despite the recent hype of SMRs, the idea of SMRs isn't relatively new, and has been around ever since the beginning of nuclear power [1].

The Beginning of SMRs

The idea of SMRs started in the late 1940s, with the U.S. Air Force, Army, and Navy. In an attempt to create a reactor that could power long-range bombers, over 1 billion USD were spent on research and development towards small reactors of many different types. Unfortunately, it seemed like this program was going nowhere, which influenced the decision to cancel it. The Army had an extensive Nuclear Power Program which influenced more research that was conducted on small reactors and their potential, which led to the creation of 8 small reactors. These reactors were located in remote army bases. But, many malfunctions occurred with these reactors, including cracks and leaks, which led the army to cancel the program and replace it with conventional diesel generators. However, The Navy had more luck with creating small reactors for submarines and aircraft carriers [3].

In the 1950's, the U.S. Atomic Energy Commission took interest in small reactors, and put forward a number of small civilian reactors in the USA. Small reactors were seen as an opportunity to provide energy to rural areas that wouldn't need a large reactor, and to serve as prototype reactors that could advance larger reactors. However, due to electricity costs, these small reactors were forced to shut down [3].

It wasn't until the 1980's that small reactors were pushed forward again due to the expensive costs of the construction of large NPPs. As a result, more research and development were conducted on smaller reactors, which leads us to where we are today with SMRs [3].

The Definition of SMRs

SMRs are defined as nuclear reactors with a power output of 10-300 megawatts electric, which is approximately a third of the generating capacity of a traditional nuclear reactor. An SMR is also defined to have a standardized modular design. Modular refers to modular deployment, whereby additional units could be added as needed when anticipated electricity demand is projected to increase. Modular also refers to modular methods of construction, in a factory rather than the traditional on-site construction typical for current large NPPs [1]. SMRs still need to undergo the same regulatory approval process as large NPPs, which takes several years.

The Case for SMRs

In the future, most developed countries' power systems will be mainly renewable based. But, they need to do this with a stable baseload electricity production. Nuclear energy has been pushed forward as a solution to this problem as it's a stable, long-term baseload energy source and is a great solution in combating climate change. Furthermore, the Russian-Ukrainian war has disrupted energy security, fossil fuel supply, and the global energy market [4]. This increased the interest around Europe and other countries in introducing nuclear energy to reduce their dependence on oil and natural gas. SMRs are viewed as a powerful solution as they pose many advantages, compared to large NPPs. These advantages include how SMRs are safer than conventional nuclear plants. Older conventional nuclear plants are complex and rely on external power systems to cool reactor fuel in case of a power loss, which increases the risk of accidents. SMRs are less reliant on active safety systems like pumps, generators and batteries, instead relying on passive systems that remove the heat from the core without the need

target is a goal set by many countries that involves balancing the amount of carbon released into the atmosphere and the amount of carbon removed by 2050 [6].

The Future of SMRs in Canada

The benefits that SMRs offer have attracted interest in the technology from all over the world, including Canada. SMRs can be the future for Canada, with the potential to provide non-carbon emitting energy sources for a wide range of applications, from grid-scale electricity generation to use in heavy industry and remote communities. In fact, Canada is in the position of being a world leader in the development of SMR technology with its SMR Action Plan [7]. This plan was created in December of 2020 by the Government of Canada and provinces and territories. With this plan, the government intends to deploy SMRs across Canada [8]. As a matter of fact, the plan is already in action, as recently Ontario Power Generation and the Canada Infrastructure Bank have agreed to invest $970 million in Canada's first SMR [9].

Conclusion

The revitalization of the nuclear power industry has been attributed to the growing interest in SMRs. Considerable interest in SMRs has formed due to improved safety, economics and potential scalability. Energy security and the reduction of carbon emission are the two major priorities that can be addressed by the deployment of SMR technologies. However, public acceptance and a lengthy regulatory process may hinder the adaptation of SMRs. Despite these benefits, SMR technologies still need to be demonstrated in order to achieve regulatory approval and public acceptance.

References

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[2] Nuclear and radiation accidents and incidents - Wikipedia
[3] The forgotten history of small nuclear reactors | Wise International
[4] Russia's War on Ukraine – Topics - IEA
[5] Small Modular Nuclear Reactors: Potential Benefits and Major Shortcomings
[6] Why is 'net zero' so important in the fight against climate change?
[7] Canada's Small Modular Reactor Action Plan
[8] SMR Action Plan
[9] Media release > CIB commits $970 million towards Canada's first Small Modular Reactor - OPG

Are SMR companies the bad guys?

by Neil Alexander

This week, the National Observer published "Bad guys and bombs: The nuclear risks of small modular reactors" (https://www.nationalobserver.com/2023/11/03/news/bad-guys-bombs-nuclear-risks-small-modular-reactors).

(https://www.ccnr.org/Trudeau_letter_Sept_22_2023.pdf) that suggested that the proposed Moltex WAste To Stable Salts (WATSS) process, being considered in New Brunswick, is a proliferation risk. This letter was itself one of a series in which vague and changing accusations were followed by a series of changing requests that started with a demand that the project be stopped, moved to a request for a full review, and finished with a request for nothing more than a meeting.

It would appear that the government has not responded, likely because the letters are so vague that the government could not work out what they had to respond to. The request for a full review is particularly bizarre because the licensing process would require a full review, and the authors would have known that.

But the National Observer convened a kangaroo court of people who do not understand the issues and decided to find the entire SMR industry guilty, describing them all as bad guys, even though most are not involved in this issue at all. This sets out their stall for what becomes a ludicrously biased and inaccurate piece of anti-nuclear reporting.

One might forgive them for their gullibility if they had not had the opportunity to fully inform themselves. But they did have plenty of opportunity. Both the CNS and Moltex have corrected them in the past. CNS wrote to them and even offered to do an interview with them. They pretended to be interested and then didn't respond to our attempts to set up the interview. They told us our letter to them had "some logical gaps" but failed to identify any, probably because they couldn't. They did interview Rory but then used his quotes out of context to create a misleading narrative.

The most egregious corruption in the article is the frequent reference to plutonium being separated out or extracted, for example "*Moltex plans to separate plutonium from uranium in CANDU waste and use the extracted plutonium to power new SMRs*". This is despite the fact that everyone involved knows that plutonium is not separated or extracted in the WATSS process. It is concentrated by the process, but it remains in the fuel with a lot of other things, so it cannot be used in a weapon without a lot of additional processing. All of the people involved knew this.

And when one of the so-called experts says "*that by separating and concentrating plutonium, Moltex is completing one of the most difficult steps on the path to making a bomb,*" they seem to be forgetting that commercial nuclear fuel is inappropriately laden with plutonium isotopes that are unsuitable for making weapons because:

- Pu-240 has a high rate of spontaneous fission, meaning that the plutonium in the device will continually produce many background neutrons, requiring a more sophisticated bomb design than those presently in use.
- Pu-238 decays relatively rapidly, thereby significantly increasing the rate of heat generation in the material and requiring still more sophisticated design to remove heat while maintaining containment.
- Americium-241 (which results from the 14-year half-life decay of Pu-241 and hence builds up in reactor-grade plutonium over time) emits highly penetrating gamma rays, increasing the radioactive exposure of any personnel handling the weapons.

than any of the existing weapons states currently have. In other words they would need to be technologically more advanced than the USA but at the same time not have the capability to adapt existing pyroprocessing technology in the way Moltex propose.

So basically, while someone might possibly consider making weapons out of used commercial reactor fuel, why would they actually do it? HEU (high enriched uranium) would be a better material, and it is relatively easy to make. If they really wanted decent plutonium, they would build a research reactor. This might be a rather technical point, but it is fundamental, and it's worrying that the experts that wrote the letter neither mentioned it nor addressed it. It is a lie by omission.

But this is not the only lie by omission. A large part of the credibility derives from the authors being experts, and evidence they present t support this idea is that they routinely present to the American government. That does appear quite convincing, doesn't it? But the more important fact is that the American government has ignored those presentations. Surely the reporter should have pointed this out. It's very relevant. It means that not only does it appear that the Canadian government is not concerned about Moltex's plans, but it appears that the American government is not concerned either. And the Americans take a very hard line on signs of proliferation.

The use of the phrase "bad guys" is very revealing because it comes from the very core of this rather vague conspiracy theory which envisages the Canadian government becoming a SPECTRE-like organization, or Rory O'Sullivan (CEO of Moltex Energy Canada) being a modern-day Blofeld building nuclear weapons in plain sight. Or possibly it could envision someone who has an island with extensive nuclear facilities but who needs to steal source material from Canada because, for some inexplicable reason, they chose not to make it themselves. Remember you can get uranium from the sea.

So, like any good Bond film, all we need to do to embrace this plot is to entirely suspend reality and ignore the almost impenetrable institutional, societal, and technological barriers that would need to be overcome.

While the National Observer article and the most recent letter appear to focus on these rather imaginative scenarios, the letter-writing "experts" were originally more concerned about technology leakage. This is at least a credible concern, but in fact, as the experts themselves confirm, "*The technology proposed by Moltex appears to be based on the more complex pyroprocessing technology developed by the Idaho National Laboratory*" and is, in other words, already fully understood and available to anyone that wants it.

Basically, to brew it all down, the only negative contribution Moltex could make to proliferation risk is to help develop a technology that already exists into a state that is licensable in Canada. But I somehow doubt that a "bad guy," building secret reprocessing and bomb-making facilities, will be applying for a licence from the CNSC.

On the other hand, for anyone that is concerned civil nuclear fuel is a proliferation risk, it will lead to a reduction in available material as Moltex will consume the plutonium in their reactor.

I am not a soothsayer and so cannot say with complete certainty that there will be no proliferation of nuclear weapons from civil nuclear programs. I cannot say with certainty that all the Canadian political parties have not come together to create a weapons program that is so secret that no one, including the Americans, have noticed. I cannot say with certainty that Rory does not execute his poor-performing staff by pressing a button and having

But I did learn from Britannica that "*More than 20 countries have developed nuclear power industries without building nuclear weapons. On the other hand, countries that have built and tested nuclear weapons have followed other paths than purchasing commercial nuclear reactors, reprocessing the spent fuel, and obtaining plutonium. Some have built facilities for the express purpose of enriching uranium; some have built plutonium production reactors; and some have surreptitiously diverted research reactors to the production of plutonium. All these pathways to nuclear proliferation have been more effective, less expensive, and easier to hide from prying eyes than the commercial nuclear power route".*

And I am fairly certain that if I suggested a plot for the next James Bond movie that involved the sort of conspiracy being proposed by the National Observer, they would suggest I go away and come up with something people could believe.

Let's face it, anyone planning to build a secret nuclear weapons program is not going to want to engage Canada to help them because they will know at some point, we would stop, tell the world and sanctions would immediately begin. They would go to existing rogue states who would be more than happy to help them, because bad guys help bad guys and good guys don't.

CNS SCHOLARSHIP PROGRAM 2024

The Canadian Nuclear Society (CNS) is pleased to offer scholarships and travel grants to promote Nuclear Science and Engineering to students at Canadian universities.

GRADUATE SCHOOL ENTRANCE SCHOLARSHIPS ($3,500)

This scholarship is designed to encourage undergraduate students to enter a graduate program related to Nuclear Science and Engineering at a Canadian university.

The value of the scholarship is $3,500.

The recipient(s) of the scholarship will be selected based on their academic standing and other information to be supplied with the application as listed below.

Student Eligibility

To be eligible for the scholarship, you must be enrolled in a full-time undergraduate program at a Canadian university and be a member of the CNS (membership in the CNS is free for students enrolled in Canadian universities).

Your application package (pdf preferred) should include:

- Your most recent university transcript (unofficial copy accepted).
- Your curriculum vitae (CV), including your extracurricular activities and achievements.
- A brief essay (max. 500 words), in which you explain your interest in Nuclear Science and Engineering.
- The name and email address of the faculty member who has agreed to be your graduate program supervisor.

You should send your application to: scholarships@cns-snc.ca

You will receive a confirmation of receipt, and your prospective supervisor will receive a request for a letter of reference.

The Scholarship Committee of the Canadian Nuclear Society will collect and review the submissions and make the award decisions.

Deadlines

- February 5, 2024: Submission
- March 4, 2024: Notice of Awards
- March 6, 2024: Payment

Expectations

If you receive the scholarship, you are expected to deliver a report (1500 - 2000 words plus images) on the research performed prior to obtaining your graduate degree. You are also encouraged to present your research at one of the CNS conferences.

UNDERGRADUATE STUDENT RESEARCH SCHOLARSHIPS ($2,000)

This scholarship is designed to encourage undergraduate students to participate in research in Nuclear Science and Engineering during the summer months.

The value of the scholarship is $2,000.

The recipient(s) of the scholarship will be selected based on their academic standing and other information to be supplied with the application as listed below

Student Eligibility

To be eligible, you must be enrolled in a full-time undergraduate program at a Canadian university for at least two years and be a member of the CNS (membership in the CNS is free for students enrolled in Canadian universities).

The scholarship must be matched by a grant of at least $5,000 from your supervisor, for a total of at least $7,000.

Your application package (pdf preferred) should include:

- Your most recent university transcript (unofficial copy accepted).
- Your curriculum vitae (CV), including your extracurricular activities and achievements.
- A brief essay (max. 500 words), in which you explain your interest in Nuclear Science and Engineering.
- The name and email address of the faculty member who has agreed to supervise your research for at least 12 weeks during the summer.

You should send your application to: scholarships@cns-snc.ca

You will receive a confirmation of receipt, and your prospective supervisor will receive a request for a letter of reference.

The Scholarship Committee of the Canadian Nuclear Society will collect and review the submissions and make the award decisions.

Deadlines

- February 5, 2024: Submission
- March 4, 2024: Notice of Awards
- March 6, 2024: Payment

Expectations

If you receive the scholarship, you are expected to deliver a report (1500 - 2000 words plus images) on the research performed, by October 1, 2024.

TRAVEL AND TRAINING GRANTS (up to $1,000)

This scholarship is designed to encourage undergraduate students to participate in research in Nuclear Science and Engineering during the summer months.

The value of the grant is up to $1,000.

The recipient(s) of the grant will be selected based on their academic standing and other information to be supplied with the application as listed below.

Please note that the grant cannot be combined with other CNS subsidies beyond a reduced registration fee for students at a CNS conference.

Student Eligibility

To be eligible, you must be enrolled in a full-time undergraduate program for at least two years, or in a graduate program that has a length of at least two years. The program of study must be at a Canadian university, and you must be a member of the CNS (membership in the CNS is free for students in Canadian universities).

Procedure for Application

Your application package (pdf preferred) should include:

- Your most recent university transcript (unofficial copy accepted).
- Your curriculum vitae (CV), including your extracurricular activities and achievements.
- A brief essay (max. 500 words), in which you explain why attendance at the event is important to your studies or career.
- The name and email address of the faculty member who may comment on the quality of your contributions and achievements and confirm that attendance at the event would be beneficial to you.

You should send your application to: scholarships@cns-snc.ca

You will receive a confirmation of receipt and your prospective supervisor will receive a request for a letter of reference.

The Scholarship Committee of the Canadian Nuclear Society will collect and review the submissions and make the decisions regarding the award and the amount.

Deadlines

Applications are accepted at any time of the year. Decisions will be made by the committee on an ongoing basis.

Expectations

If you receive the grant, you are expected to deliver a brief report on the event within two months following the event.

Questions regarding the above scholarships should be addressed to: scholarships@cns-snc.ca

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PROGRAMME DE BOURSES D'ÉTUDES SNC 2024

La Société Nucléaire Canadienne (SNC) est heureuse d'offrir trois genres de bourses en 2024 afin d'encourager les étudiants dans les universités canadiennes à étudier la science et le génie nucléaire.

BOURSE D'ENTRÉE AUX ÉTUDES SUPÉRIEURES : 3,500$

Le montant de cette bourse est de 3,500$.

Les gagnant(e)s des bourses seront sélectionné(e)s à partir de la qualité de leur dossier académique, ainsi que d'autres données à être fournies en même temps que la demande de bourse.

Éligibilité

Vous devez être inscrit(e) à plein-temps à un programme d'au moins deux ans poursuivant la licence dans une université canadienne, et être membre de la SNC. (Adhésion à la SNC est gratuite pour les étudiants dans une université canadienne.)

Procédure de soumission

Votre demande de bourse doit inclure :

- Votre dossier récent de notes d'université.
- Votre curriculum vitae, incluant vos activités extracurriculaires et vos accomplissements.
- Une courte composition (maximum 500 mots) qui explique votre intérêt en science et génie nucléaire.
- Le nom et l'adresse courriel du dirigeant qui a accepté d'être votre futur superviseur diplômé.

Envoyez votre demande de bourse à : scholarships@cns-snc.ca

Vous recevrez un accusé de réception et votre dirigeant éventuel recevra une demande de lettre d'appui.

Le Comité des bourses de la Société Nucléaire Canadienne recevra et étudiera les candidatures, et attribuera les bourses.

Dates limites

- 5 février 2024 : soumission de la demande
- 4 mars 2024 : avis de l'octroi
- 6 mai 2024 : paiement de la bourse

Attentes

Si vous obtenez la bourse, vous devrez soumettre un rapport (1500 – 2000 mots, plus images) sur la recherche effectuée avant la fin de vos études supérieures. Nous vous encourageons également à présenter vos recherches à l'une des conférences de la SNC.

BOURSE DE RECHERCHE POUR ÉTUDIANTS POURSUIVANT LA LICENCE (2,000$)

Le but de cette bourse est d'encourager les étudiants poursuivant la licence à participer à la recherche en science et génie nucléaire pendant l'été.

Le montant de cette bourse est de 2,000$.

Les gagnant(e)s des bourses seront sélectionné(e)s à partir de la qualité de leur dossier académique, ainsi que d'autres données à être fournies en même temps que la demande de bourse.

Éligibilité

université canadienne.)

La bourse doit être complémentée par un montant d'au moins 5,000$ de la part de votre dirigeant, pour un total d'au moins 7,000$.

Procédure de soumission

Votre demande de bourse doit inclure :

- Votre dossier récent de notes d'université.
- Votre curriculum vitae, incluant vos activités extracurriculaires et vos accomplissements.
- Une courte composition (maximum 500 mots) qui explique votre intérêt en science et génie nucléaire.
- Le nom et l'adresse courriel du dirigeant futur qui a accepté d'être votre superviseur pour une période d'au moins 12 semaines pendant l'été.

Envoyez votre demande de bourse à : scholarships@cns-snc.ca

Vous recevrez un accusé de réception et votre dirigeant éventuel recevra une demande de lettre d'appui.

Le Comité des bourses de la Société Nucléaire Canadienne recevra et étudiera les candidatures, et attribuera les bourses.

Dates limites

- 5 février 2024 : soumission de la demande
- 4 mars 2024 : avis de l'octroi
- 6 mai 2024 : paiement de la bourse

Attentes

Si vous obtenez la bourse, vous devrez soumettre un rapport (1500 – 2000 mots, plus images) sur la recherche effectuée, avant le 1 octobre 2024.

BOURSES POUR DÉPENSES DE VOYAGE ET DE FORMATION (allant jusqu'à 1,000$)

Ces bourses sont offertes à des étudiants au cas par cas, afin de leur donner l'occasion de participer à des événements liés à la science ou à la technologie nucléaire. Les événements peuvent inclure des conférences, des ateliers, des cours ainsi que d'autres activités.

Le montant de la bourse est de 1,000$.

Le gagnant ou la gagnante de cette bourse sera sélectionné(e) à partir de la qualité de son dossier académique ainsi que d'autres données à être fournies en même temps que la demande de bourse (voir ci-dessous).

Veuillez noter que la bourse ne peut pas être jumelée à d'autres subventions au-delà d'un tarif d'inscription réduit pour les étudiants.

Vous devez être inscrit(e) à plein-temps à un programme poursuivant la licence d'au moins deux ans, ou à un programme d'études supérieures d'une durée d'au moins deux ans, dans une université canadienne, et vous devez être membre de la SNC. (Adhésion à la SNC est gratuite pour les étudiants dans une université canadienne.)

Procédure de soumission

Votre demande de bourse doit inclure :

- Votre dossier récent de notes d'université.
- Votre curriculum vitae, incluant vos activités extracurriculaires et vos accomplissements.
- Une courte composition (maximum 500 mots) qui explique pourquoi la participation à l'événement serait avantageuse pour vos études ou votre carrière.
- Le nom et l'adresse courriel de votre dirigeant qui pourrait confirmer la qualité de vos accomplissements, et confirmer que la participation à l'événement serait avantageuse pour vous.

Envoyez votre demande de bourse à : scholarships@cns-snc.ca

Vous recevrez un accusé de réception et votre dirigeant recevra une demande de lettre d'appui.

Le Comité des bourses de la Société Nucléaire Canadienne recevra et étudiera les candidatures, et attribuera les bourses.

Dates limites

Les soumissions peuvent être acceptées à toute date. Les décisions seront faites par le comité aussi tôt que possible.

Attentes

Si vous obtenez la bourse vous devrez soumettre un court rapport sur l'événement et/ou la formation pas plus tard que deux mois après l'événement.

Les questions devraient être adressés à : scholarships@cns-snc.ca

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Obituary

JENNEKENS, John Hubert Felix
(October 21, 1932 – September 4, 2023)

With sadness, surrounded by his loving family, we announce the passing of John Jennekens.

Jon is survived by his devoted wife of 69 years Norah (Magee), his daughters Sandra Jennekens-Leger (Anthony Leger) and Jennifer Jennekens, his son Jon Darren Jennekens, his six grandchildren: Janine (Leger) Scott and Colin Leger, Mathew Daviau and Danielle Daviau, Avery (Jennekens) Meron and Heyden Jennekens, one great-grandchild Norah Scott, and his sister Elizabeth (Betty) Langdon. Jon was predeceased by his 22-month-old son, Jon Lyndon Hubert Jennekens.

While a cadet at the Royal Military College, Jon met Norah Magaret Magee. Following graduation, they married and three weeks later, he departed to serve in Korea with United Nations Forces. Upon his return to Canada, Jon enrolled at Queen's University and graduated with a B.Sc. (Honours) in Mechanical Engineering.

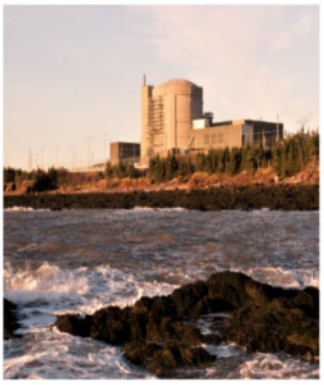
From 1958 to 1962, Jon worked in the Nuclear Operations Division of the Chalk River Nuclear Laboratories. In 1962, he joined the staff of the Atomic Energy Control Board, now known as the Canadian Nuclear Safety Commission. After 16 years as a staff member, Jon was appointed President, CEO and Chairman of the Board. He served in this capacity for over 8 years.

From 1987 to 1993, Jon served as Deputy Director General (Nuclear Safeguards) of the International Atomic Energy Agency, Vienna, Austria. Two primary challenges for the IAEA were working with the United Nations Special Commission on Iraq (UNSCOM) following the 1st Gulf War and dealing with North Korea after the discovery by IAEA nuclear safeguards inspectors of a clandestine nuclear weapons program at Yongbyong in May 1992.

From 1993 to 1999, Jon served as chairman of Ontario Hydro's Technical Advisory Panel on Nuclear Safety. From 1996 to 2002, he was a member of the Nuclear Safety Review Group of the International Bank of Reconstruction and Development following the Chernobyl failure. From 1995 to 2004, Jon also served as a member of Atomic Energy of Canada Limited's Research and Development Advisory Panel. In 1998, Jon was appointed the Canadian member and later chairman of the Nuclear Safety Advisory Group of the Korean Peninsula Energy Development Organization (KEDO) headquarters in New York.

Jon was appointed an officer of the Order of Canada in 1987. In subsequent years, he was elected a Fellow of the Canadian Academy of Engineering and received awards from the Canadian Nuclear Society, the Korea Veterans Association of Canada, the Canadian Society of Senior Engineers and in 2015 he was awarded the Engineering Institute of Canada's Sir John Kennedy Medal for "outstanding service rendered to the engineering profession". Condolences/Tributes/Donations Hulse, Playfair & McGarry
www.hpmcgarry.ca
613-233-1143

Join or Renew CNS Membership



Reasons to become a member of the CNS

- Take advantage of many excellent opportunities to grow professionally by meeting and networking with colleagues in Canada and internationally.
- Many volunteer positions are available which offer opportunities to grow personally by learning and networking with others in Canada's nuclear field.
- Receive special member registration fees to CNS Conferences and Courses.
- Membership is free for students and discounted rates are available for retirees and recent graduates!
- Receive early notices by e-mail of many other items of interest

Membership fees:

- $92.00 for regular members, and $86.40 for each additional year
- $54.10 for retiree members, and $48.40 for each additional year
- $31.00 for student members from outside Canada
- **Free for Canadian students! As part of the registration process, you will be asked to confirm your full-time-student status (student card or other institution documents) in the current year. Once that confirmation is received, your membership will be approved.**
  Note: to be eligible for the student fee for CNS conferences and courses, you must be a CNS student member in good standing.

Canadian Nuclear Society
Société Nucléaire Canadienne

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