



# 2017

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**ANNUAL INDUSTRY REVIEW  
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# CNS President's Report

By Peter Ozemoyah



**Peter Ozemoyah**

It has been a very challenging, exciting and fruitful year for me as President, for the CNS, and for the nuclear industry. What with the ongoing refurbishment at Darlington, the several joint ventures between industries of various countries the nuclear industry never lacks excitement.

The CNS year started after the 19th Annual General Meeting on 19th June in Toronto. This was followed immediately with the 36th Annual Conference at the same venue. It was a great conference with the 2015 Nobel Laureate in Physics (Arthur McDonald) delivering a talk on the topic that won him the Nobel Prize.

A number of other successful conferences and courses were held during the year. Among them were:

- CNS CANDU Reactor Technology & Safety Course;
- 4th International Technical Meeting on Small Reactors (ITMSR-4);
- 3rd Canadian Conference on Nuclear Waste Management, Decommissioning and Environmental Restoration; and
- 13th International Conference on CANDU Fuel.

Many thanks to the volunteers that made these possible.

In the 2012/2013 Council Year, the CNS launched the Nuclear 101 Course. The success of this course since then has resulted in putting on the course at least twice a year. Great job by the Education and Communications Committee (ECC), the custodian of the course. As a result of this success, and due to demand from the

nuclear industry, the CNS, through the ECC, is concluding the process of putting on a new course – Nuclear Safety Culture Foundation Course. We look forward to the start of this initiative.

Before the end of last Council Year, the CNS Executive took the initiative to visit some stakeholder industries. The initiative termed “Relationship Visits” was for CNS to establish a better working relationship with the Management of these various establishments by understanding their needs and rehashing areas of common interest. This initiative was continued this year and has so far proven to be a very successful venture. Thanks to Paul Thompson who was given the mandate to spearhead the initiative, and who has done a great job of it. The team has visited 12 establishments, including the three Utilities. This fits well into the 2017-2022 Strategic Plan of the Society. The Strategic Plan Committee led by Jacques Plourde has put together an achievable and realizable 5-year plan for the CNS. The committee is also overseeing the implementation of the plan.

This year, the Branch Affairs and the International Liaison Committees jointly established a new initiative. It involves having an expert from one of our sister International Societies coming to give talks

in our Branches, with a reciprocal visit from one of our experts to the sister Society the following year. Arrangements have been concluded to have the first Speaker come from the Nuclear Institute (Britain) in October/November this year. CNS expert will be going to Britain in the Fall of 2018. This is great for the Branches which have been marvelous throughout the year.

In 2012, the CNS for the first time participated in the Federal Government's request for expressions of interest in AECL. Since then, the Society has actively participated in similar Hearings. This year, CNS was invited by Parliament to make presentation before the House Standing Committee on Natural Resources. Another Intervention presentation by CNS on NB Power license extension was in May this year.

In Paul Thompson's report last year, he concluded by saying “I offer to him (incoming President Peter Ozemoyah) my continuing support throughout the coming year” I will say here that Paul kept that promise; and I am making the same promise to the incoming President Daniel Gammage.

It has been a great year for me. I hope it was for you too. 🍁



New steam generators ready for shipment. (Bruce Power photo)



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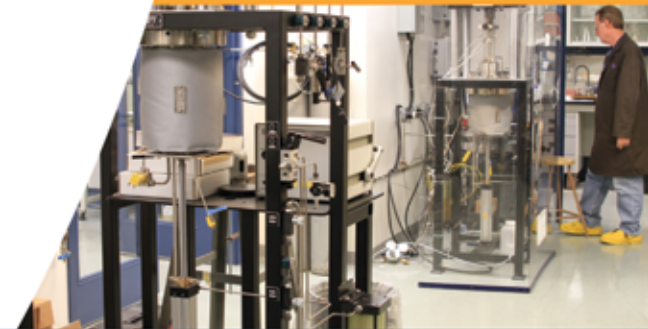
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**FROM THE MEN AND WOMEN WHO HELP KEEP THE LIGHTS ON.**



# 2016 Year in Review

By Colin Hunt, Publisher and Editor, Nuclear Canada Yearbook



**Colin Hunt**

## Introduction

2016 has been a remarkable year for Canada's nuclear industry. The year included new investments in nuclear science and technology, strong performance by Canada's nuclear reactor fleet, and important investments for the future of Canadian infrastructure.

Starting with science and technology, a principal feature for the year was the opening of the Harriet Brooks Building on October 10, 2016. The commissioning of the new laboratory represents the first investment in new facilities at the Chalk River site in years.

Also during the year, came some of the first public investment in new nuclear reactor technology not related to CANDU. For the first time, the federal government began making investments in small reactor technology.

Nuclear operations in Canada also had a year of strong performance as shown in the data tables later in this Yearbook. CANDU reactors performed well during the year, both in Canada and around the world. Of particular importance during the year was the start of the refurbishment of Darlington Unit 2. Also important was the announcement of the plans of Bruce Power for the refurbishment of Units 3 to 8. Further details of Bruce Power's refurbishment plan can be found in this Yearbook.

2016 has also been a very successful year for the Canadian Nuclear Society (CNS). Some of these highlights are noted in the

## CANDU 6 Nuclear Reactor Performance – 2016

Reactor	In Service	Capacity (MW)	Performance In 2016 (%)	Lifetime Performance (%)
Point Lepreau	1983	705	78.5	70.0
Wolsong 1	1983	679	53.6	76.6
Wolsong 2	1987	678	74.2	92.5
Wolsong 3	1998	698	70.8	92.8
Wolsong 4	1999	703	75.6	93.8
Embalse*	1983	648	0	76.3
Cernavoda 1	1996	707	83.5	89.8
Cernavoda 2	2007	705	98.5	94.5
Qinshan 4	2002	700	92.1	90.8
Qinshan 5	2003	700	76.6	91.3

<https://www.iaea.org/PRIS/CountryStatistics/CountryDetails.aspx?current=CA>

### Notes

1. Embalse under refurbishment in 2016.

reports by President of the CNS Peter Ozemoyah, and by the CNS Education and Communications and Program Committees.

## Nuclear Research in Canada

Before the end of 2016, the Canadian National Energy Alliance (CNEA) had completed its first year of operation of Canadian Nuclear Laboratories (CNL). CNEA consists of a consortium of five companies: SNC-Lavalin Inc., CMH2 Hill Canada Ltd., Fluor Government Group Canada Inc., EnergySolutions Canada Group Inc., and Rolls-Royce Civil Nuclear Canada Inc.

On October 10, 2016, the new Harriet Brooks Building was opened by Natural Resources Canada Minister Jim Carr and Parliamentary Secretary Kim Rudd. This large new centre represents the first large investment in new research facilities at Chalk River Laboratories in years. A key focus of the new facility will be the testing of new materials and processes. Areas of interest include materials performance, corrosion and equipment decontamination. This research will help nuclear operators and regulators enhance safety and environmental protection and improve the performance of nuclear systems.

"We are at a pivotal time – when the world is making a historic transition

to a lower-carbon future; when climate change is one of the great challenges of our generation; and when investing in clean technology and innovation is today's new imperative. The recent announcement of our government to invest \$800 million in the revitalization of the laboratories at the Chalk River site will be key to advancing science and technology initiatives in Canada's world-class nuclear industry," stated Jim Carr, Minister of Natural Resources at the opening.

CNEA remains committed to the shutdown of the NRU research reactor and has not indicated it is considering a replacement. The NRU's operating licence has been extended to March 2018.

There were non-CANDU nuclear science and technology developments in Canada as well during the year. Terrestrial Energy, which is developing the Integral Molten Salt Reactor (IMSR), was awarded a \$5.7 million grant from the Sustainable Development Technology Canada's (SDTC) SD Tech Fund(TM). SDTC is a foundation funded by the Government of Canada.

Grants funds will be used to support Terrestrial Energy's pre-commercial activities, which conclude with the construction of an electrically-heated non-nuclear mock-up within 30 months.





Hoisting East side Unit 1 bulkhead panel. (Bruce Power photo)

The mock-up will test and demonstrate many aspects of the IMSR's operation, and will include the data collection over a wide range of operating scenarios of the performance of the IMSR's passive cooling systems; this will validate Terrestrial Energy's safety analysis computer codes, an industry and regulatory requirement. The results will support Terrestrial Energy's regulatory engagement and key aspects of the IMSR's Safety Case, one built on simple, natural and passive cooling mechanisms.

On February 16, 2016, the CNSC agreed to conduct a phase 1 vendor design review for the Terrestrial Energy integral molten salt reactor design concept. The review duration is estimated to take 18 months as determined by Terrestrial Energy's schedule for submissions.

Terrestrial Energy was not the only company advancing new reactor technology in Canada in 2016. Also new was a project by Starcore. Montréal-based StarCore,

founded in 2008, is focused on developing small modular reactors (SMRs) to provide power and potable water to remote communities in Canada. Its standard High Temperature Gas Reactor (HTGR) unit would produce 20 MWe (36 MWh), expandable to 100 MWe, from a unit small enough to be delivered by truck. The helium-cooled reactor uses Triso fuel - spherical particles of uranium fuel coated with carbon which effectively gives each tiny particle its own primary containment system - manufactured by BWXT Technologies. Each reactor would require refuelling at five-yearly intervals.

StarCore describes its reactor as "inherently safe", with a steep negative thermal coefficient of reactivity which eliminates the possibility of a core meltdown. The use of helium - which does not become radioactive - as a coolant means that any loss of coolant would be "inconsequential", the company says. The reactors would be embedded 50 metres underground in concrete silos sealed with ten-tonne caps.

By the end of 2016, no less than seven companies including some from Britain and the United States had applications before the Canadian Nuclear Safety Commission (CNSC) for review of various reactor proposals. All of these proposals were under the general classification of small modular reactors.

### **Nuclear Operations in Canada**

Nuclear plant operations in Canada were strong throughout last year. Of particular note was the strong performance of all six reactors at the Pickering nuclear generating station with three of its six operating reactors performing at or near 90 per cent capability. Also performing extremely well were the reactors at the Bruce nuclear power station, with three of its units performing well above 90 per cent capability factor, as shown in the data tables later in this yearbook. In the case of Darlington Unit 1, the reactor ran at more than 98 per cent for the year, essentially at full power for nearly the entire year.

But the real news was in the future of nuclear operations. Darlington Unit 2 was shut down for full refurbishment exactly on schedule on October 14, 2016. It marked the beginning of a 10-year, \$12.8 billion dollar program to refurbish all four Darlington reactors. When complete, the program will ensure the operation of Darlington reactors to 2055.

At the end of 2016, Ontario Power Generation (OPG) President Jeffrey Lyash could announce that the refurbishment of Darlington 2 was ahead of schedule in completing fuel removal and vault preparation.

Earlier in the year, the Federal Court of Appeal unanimously dismissed a lawsuit seeking a judicial review of the 2013 environmental assessment of the Darlington refurbishment project. The appeal court decision followed a rejection of the lawsuit in 2014 before the Federal Court to overturn the environmental assessment. The decision by the appeal court represented the end of legal objections to the Darlington refurbishment.





Equally important during the year was the announcement by Bruce Power of its future refurbishment plans. Two reactors, Units 1 and 2, have already been fully refurbished, and based on that experience Bruce Power outlined future refurbishment of Units 3 to 8. Implementing this plan means that nuclear operations at Bruce will continue to at least the mid 2060s. Details of Bruce Power's plan are outlined later in this Yearbook.

In summary, the completion of nuclear refurbishment in Ontario means that nuclear power will continue to generate the bulk of the province's electricity supply well past the mid-point of this century.

### New Global Prospects for CANDU

Turning to CANDU reactors outside Canada, the fleet performed well with two reactors, Cernavoda 2, and Qinshan 4, operating at a capability factor well over 90 per cent. Details are shown in the accompanying table of CANDU 6 reactors.

SNC-Lavalin has signed a deal with two Chinese companies on a joint venture that will see Canadian CANDU reactor technology used to build nuclear plants in China and possibly elsewhere.

The Montreal-based engineering company said in a release September 22 that it will partner with China National Nuclear Corp. and Shanghai Electric Group Co. Ltd. to place two "design centres" – one in Canada and another in China – which will develop at least two nuclear power plants in China using the most advanced version of the CANDU technology

The Advanced Fuel CANDU Reactor (AFCR) will use recycled uranium fuel from existing reactors to produce power. Each AFCR can use the fuel of four light-water reactors to generate up to 6 million megawatt-hours of electricity without needing any new natural uranium fuel, SNC said. Roughly speaking, that's enough to power four million Chinese households every year.

There were also new reactor developments for Canada's nuclear industry in

Argentina. SNC-Lavalin announced that it has been awarded a pre-project contract from Argentina's Nucleoeléctrica Argentina SA (NA-SA) for the CANDU nuclear new build project at the Atucha site in the district of Zárate, about 100 kilometres from Buenos Aires. If this project materializes, it would be the first CANDU new build since Cernavoda Unit 2 came on line in 2007.

The six-month contract will allow SNC-Lavalin to engage with suppliers for long-lead equipment, conduct preliminary design work, deliver safety analysis, offer licensing support and provide technical assistance from Canada. SNC-Lavalin is also participating in the life extension of Argentina's existing Candu 6 reactor at Embalse.

### The CNS in 2016

The Canadian Nuclear Society (CNS) has also had a very successful year in 2016. Of particular note is the strong and growing program of courses and conferences offered by the CNS. Two conferences in specific were outstandingly successful: the 3rd Canadian Conference on Nuclear Waste Management, Decommissioning and Environmental Restoration, September 11-14; and the 4th International Technical Meeting on Small Reactors, November 2-4. For both of these conferences, attendance greatly exceeded expectation.

With respect to courses offered by the CNS, the Society began development of a new nuclear safety culture course intended to meet the needs of contractors to Canada's nuclear industry. The course has attracted strong interest from nuclear industry suppliers. The first offering of the course is expected in 2017.

### In Closing

In 2015, as noted in last year's Year in Review, governments in Canada and around the world made important policy decisions about the future of Canada's nuclear industry. That was the year of decision. In 2016, these policies have begun to be implemented.

The successful beginning of the refurbishment of Darlington 2 and the commitments in personnel and resources by Bruce Power

to its future refurbishment means that resources were being committed during 2016 to ensuring the future of Canada's nuclear infrastructure. The construction of the Harriet Brooks Building means assurance of the continuation of nuclear research and development at Chalk River Laboratories as well. Outside Canada, the industry has signed contracts related to new reactor construction in China and Argentina.


But it's not just about CANDU. There are now seven applications before the Canadian Nuclear Safety Commission (CNSC) for approval for new reactor designs, all of them small modular reactors. All of them are based on different types of technology than CANDU intended for a variety of applications, both on grid and off grid.

It should also be observed that a number of these applications come from outside Canada. There are sound reasons for this. Canada possesses a large industrial infrastructure with the skills and experience needed for new nuclear development work. It also has a highly effective and efficient regulatory system capable of making timely decisions regarding new nuclear technology as well.

In short, in contrast with some other nuclear sectors elsewhere in the world, Canada's nuclear industry has become once again a sector of growth and opportunity. In 2016, those signs of growth have started.

### Notes on the Performance Data Tables

Since its inception in 1976, Nuclear Canada Yearbook has presented annual summaries of reactor performance. The sources of this information have changed somewhat for this and future editions of the Yearbook. Data is now gathered by the World Association of Nuclear Operators (WANO) and provided to the International Atomic Energy Agency (IAEA). This data is now reported by the IAEA in its Power Reactor Information System (PRIS). PRIS reports reactor performance as Unit Capability Factor, not Capacity Factor.

Nuclear Canada Yearbook will henceforth be reporting PRIS data from the IAEA and not using previous sources. 



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# Bruce Power's 50-Year Life Extension Plan

Bruce Power's role in the future of Ontario's electricity supply was solidified on Dec. 3, 2015, when the company and the Independent Electricity System Operator (IESO) entered into an amended, long-term agreement to secure 6,400 megawatts of electricity from the Bruce site, through a multi-year Life-Extension Program. The life extension began on Jan. 1, 2016, and will continue through 2053, allowing Bruce Power's units to operate safely through to 2064.

The life extension also includes the Major Component Replacement Project, which will begin in Unit 6 in 2020 and extend the life of Units 3-8 over a period of 16 years.

In 2005, Bruce Power entered into the Bruce Power Refurbishment Implementation Agreement (BPRIA) to enable the restart of Bruce Units 1 and 2, to return the site to its full operating capacity of eight units. The amended agreement enables the company to progress with a series of incremental life-extension investments, including Major Component Replacement, to secure a clean, reliable and low-cost source of electricity for Ontario families and businesses for decades, as outlined in Ontario's 2013 Long-Term Energy Plan (LTEP).

***Bruce Power will invest about \$13 Billion PRIVATE dollars into Units 3-8, which are still owned by Ontario taxpayers.***

"This is a major milestone in the history of Bruce Power as we build on our existing agreement with the province and extensive experience to enter the next phase of our site development," said Mike Rencheck, Bruce Power's President and CEO. "This provides us the opportunity to secure our long-term role as a supplier of low-cost electricity by demonstrating we can successfully deliver this program incrementally."

Over the past 14 years, Bruce Power has returned its eight-unit site to its full capacity, allowing Ontario to phase out coal-fired power generation, while providing low-cost, reliable and carbon-free electricity to families and businesses.



Preparing for fuel channel replacement. (Bruce Power photo)

The amended agreement, which took economic effect on Jan. 1, 2016, allows Bruce Power to immediately invest in life-extension activities for Units 3-8, followed by a Major Component Replacement program, optimizing the operational life of the site and offering significant ratepayer and system benefits.

"In the short term, this amended agreement will allow us to establish the building blocks to be successful with our long-term program by investing to extend the operational life of the units, while also preparing for the first Major Component Replacement, which will commence in 2020," Mike said. "This will set us up for success by allowing us to manage resources and facilitate a coordinated schedule to complete this program."

## Highlights of the arrangement include:

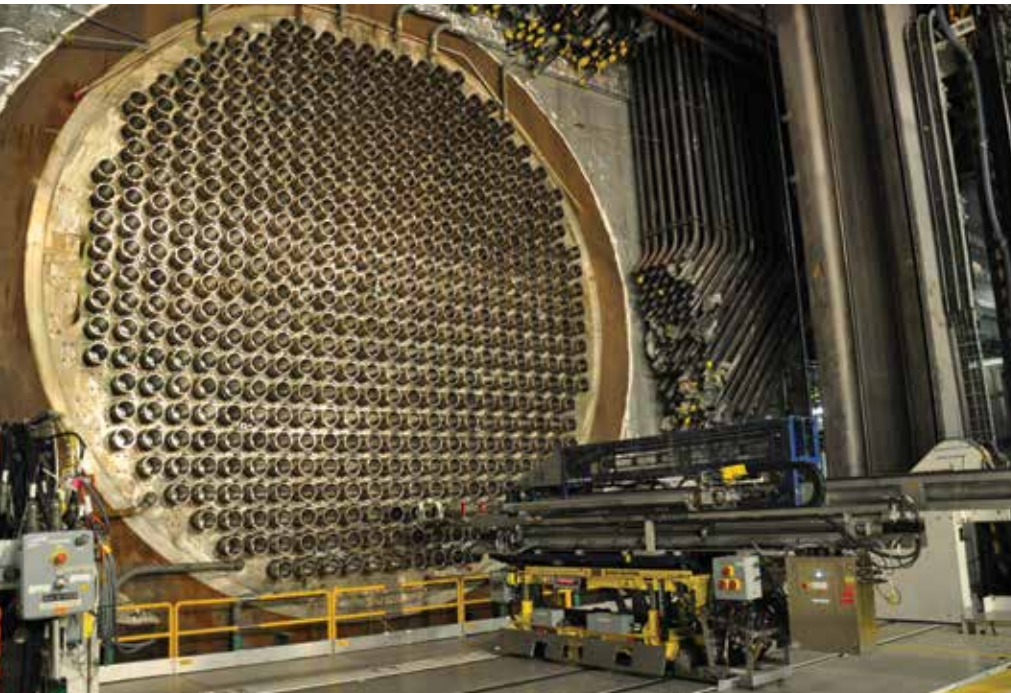
- On Jan. 1, 2016, Bruce Power began receiving a single price for all output from the site of \$65.73 per megawatt hour (MW/h), which is about 30%

less than the average price of residential electricity in the province paid in 2015 of \$98.90 MW/h.

- Bruce Power, as a private sector operator, will continue to meet all investment requirements for the site. While there is a process to determine the cost of the work and off-ramps, it is estimated the six units in the agreement will cost \$8 billion (\$2014), in addition to \$5 billion (\$2014) in a range of other life-extension activities from 2016-53. In the short-term, between 2016 and 2020, the company will be investing approximately \$2.3 billion (\$2014) as part of this plan. This is incremental to the company's ongoing financial investments to sustain eight units of operation.
- The life-extension of each unit will add approximately 30 to 35 years of operational life, while other investments will add a combined 30 reactor years of operational life to the units. This approach provides additional benefit in terms of sequencing life-extension activities and optimizing asset life.



## Bruce Power's 50-Year Life Extension Plan *continued from page 9*



Bruce reactor face: workers will train in a full-scale mockup for fuel channel replacement. (Bruce Power photo)

- Bruce Power will bear the risk of delivering these projects on time and budget with upside sharing for better than planned performance with the IESO. The price of these life-extension activities will be finalized prior to each project through a defined, transparent process in the agreement.
- The agreement allows for Bruce Power to invest in the pre-planning of life-extension activities, leading to greater predictability, which will lead to the successful delivery of the program. All of the future plant investment activities outlined in this agreement have been previously completed by Bruce Power over the last 14 years, and the company will build on these lessons learned moving forward. The price of electricity will be adjusted as funds are incrementally spent as part of the investment program.
- The program will secure an estimated 22,000 jobs directly and indirectly from operations, and an additional 3,000-5,000 jobs

annually throughout the investment program, injecting billions into Ontario's economy as outlined in the updated Economic Impact Study, released in 2016. Learn more about job projections through this long-term outlook for Major Component Replacement.

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*During the Units 1 and 2 Restart Project, Bruce Power completed its calandria tube removal program 77% more quickly in Unit 1 than Unit 2 thanks to lessons learned.*

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- Consistent with the LTER, a series of realistic off-ramps have been built into the agreement related to both life-extension performance and if the province's market conditions change.
- Bruce Power will continue to provide approximately one-third of its output (2,400 MW) as flexible generation, allowing the province to permanently

balance system needs in a post-coal environment. This is a feature that only the Bruce Power units can provide, and has been used frequently by the IESO since 2009.

- As has been the case since 2001, Bruce Power will continue to assume responsibility for operating the site. In Canada, nuclear facilities are regulated by the federal government through the Canadian Nuclear Safety Commission (CNSC) and Bruce Power, as a licensee, will be responsible for meeting all regulatory requirements and gaining the necessary approvals to implement the investment program. The life-extension timetable is consistent with Bruce Power's current site license that runs to 2020, which assumes there will be no Major Component Replacement work completed within this period. The CNSC licensing process is an open, transparent process that provides the opportunity for public, community and Aboriginal engagement, and, consistent with past practice, Bruce Power will have started the external engagement as part of this process. 🍁



When complete, the Major Component Replacement Program will extend the life of Bruce reactors to 2064. (Bruce Power photo)

# Education and Communications Committee Report for 2016

By Ruxandra Dranga & John Roberts, Co-Chairs Education and Communications Committee



In 2016 the Education and Communications Committee (ECC) continued to be a key contributor towards the CNS's core objectives, through a number of activities and programs that encourage education in, and knowledge about nuclear science and technology, increase members' involvement in public educational programs, and facilitate the exchange of information between CNS members and the general public.

## Geiger Kits to High Schools across Canada

The Geiger Program was again mostly in "maintenance mode" in 2016. Bryan White, who is the single point of contact between the CNS and high schools across Canada that have a Geiger kit, has been providing technical support for science teachers.

An additional important component of the Geiger Program is the Ionising Radiation Workshop, which demonstrates the use of the detector in a classroom setting. Geiger kit demonstrations were performed during the Science Teacher's Association of Ontario Conference which was attended last November and as part of the Nuclear-for-Everyone workshop organized in collaboration with the CNS Annual Conference. Five teachers elected to return their Geiger kits in 2016 and these were refurbished and deployed to teachers on our waiting list.

As part of the CNS strategic plan expansion of the Geiger Kit program is being considered. To this end volunteers are being sought to assist with expansion of this program.

## "Nuclear 101" Course

2016-2017 was once again successful year for the "Nuclear 101" course, with one course in Toronto in May 2016. An additional Nuclear 101 course is being organized in Ottawa, in May 2017. The "Nuclear 101" course is specifically design for individuals with or without a technical

background who are part of the nuclear science and technology community and who find themselves interacting with the public. The course has been very popular amongst individuals in the nuclear community (both technical and non-technical) and received excellent reviews from all participants.

A three-hour seminar version of the "Nuclear 101" course, titled "Nuclear-for-Everyone", was first introduced in 2014. This course is for individuals who do not directly work in the nuclear industry, but who collaborate and interact with organizations which are part of the nuclear community was again organized as an embedded seminar in the Technical Program for the 2016 CNS Annual Conference in Toronto. The seminar was well attended and received positive feedback. As a result, one other seminar was presented during the Nuclear Waste Management, Decommissioning and Environmental Restoration conference in September 2016, and another embedded seminar is being organized during the 2017 CNS Annual Conference in Niagara Falls.

CNS is seeking qualified volunteers to expand the frequency of delivering Nuclear 101 and Nuclear for Everyone Courses.

## Nuclear Science Week

Canada again participated in Nuclear Science Week with activities held in Alberta, Saskatchewan and Ontario through collaboration with the Canadian Institute for Nuclear Physics, Sylvia Fedoruk Canadian Centre for Nuclear Innovation, University of Regina, University of Saskatchewan, University of Guelph, University of Calgary, Canadian Nuclear Society and the world wide Nuclear Science Week committee.

Activities included, but were not limited to presentations on:

- how nuclear science is fighting cancer;
- how stable isotopes are used to study the atmosphere;

- how nuclear physics makes stars shine;
- how the chart of the nuclides tells us about nuclei;
- energy education; and
- the science and risks of low dose radiation.

The activities were universally well received with participation from all age groups. Expanded participation is expected during 2017. The organisers found that talking with people who are curious and enthusiastic about nuclear science and technology was invigorating.


## Nuclear Safety Culture Foundation Course

Following a request from a Canadian based Engineering company CNS agreed to prepare and deliver a Nuclear Safety Culture foundation course. Course development remains on schedule and positive feedback has been received. The first course is scheduled for delivery during mid-2017.

## Public Advocacy

At the invitation of the House of Commons Standing Committee on Natural Resources, on November 15, 2016 the CNS testified before the Committee on the future of nuclear power in Canada. The evidence presented by the CNS was posted on the Standing Committee's website at the following link: <http://www.parl.gc.ca/HousePublications/Publication.aspx?Language=e&Mode=1&Parl=42&Ses=1&DocId=8597503>.

## Further Information

For further information on the CNS' activities in Education and Communication, contact Ruxandra Dranga or John Roberts (Co-Chairs, CNS Education and Communication Committee) at [ECC@cns-snc.ca](mailto:ECC@cns-snc.ca) 



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# Program Committee Chair Report for 2016

By Keith Stratton, Chair Program Committee

Organizing conferences and presenting courses is a primary way the CNS fulfills its objectives. Please review the 2017-2019 Events Calendar elsewhere in this Yearbook to see the planned conferences and courses. Upcoming CNS Conferences of particular note are the 37th Annual CNS Conference & 41st Annual CNS/CNA Student Conference, June 4-7, 2017; the 2nd CNS Conference on Fire Safety and Emergency Preparedness for the Nuclear Industry, |Sept. 17-20, 2017 and the 11th International Conference on CANDU Maintenance & Nuclear Components Conference (CMNCC), Oct. 1-4, 2017.

The following highlights the events held during 2016:

## **CNS CANDU Reactor Technology & Safety Course**

March 14-16, Courtyard by Marriott Downtown Toronto

The CANDU Reactor Technology and Safety Course is intended to enhance the professional and technical capabilities of its members (and non-members) working in, or interested in, the nuclear industry. It provides an introduction to the basic design, technology, and operation of nuclear reactors. The course presents the major systems in a nuclear plant, as well as the important CANDU reactor safety principles and systems. Preparation and execution of safety analysis to meet licensing demands is also covered.

The course is ideally suited for beginning professionals, but also beneficial to experienced professionals. It continues to be one of the most popular courses organized by the CNS and has been offered since 1996.

There were 12 presenters and 37 registrants.

## **Nuclear 101 May 16-17, 2016**

Fairfield Inn & Suites Toronto Airport Toronto, Ontario

The two-day Nuclear-101 course is specifically designed for individuals (including students) within the nuclear community (with or without a technical background) who may interact with the public. The

course enables a good understanding of nuclear and energy fundamentals, along with the tools to explain to others in simple, factual terms how the technology works, some of the interesting twists and turns of its exciting history, and the important contribution nuclear science and technology makes to our society. It consists of three modules, and includes demonstrations, Q&A, and a discussion of each module's relevance to public outreach.

There were 3 presenters and 45 registrants.

## **36th CNS Annual Conference and 40th CNS/CNA Student Conference**

June 19-22, 2016, Marriott Toronto Eaton Centre Hotel 525 Bay St. Toronto, ON M5G 2L2

The central objective of this annual conference is to provide a forum for exchanging views, ideas and information relating to the application and advancement of nuclear science and technology, and for discussing energy-related issues in general. The theme for the 2016 conference was "Nuclear in the 21st Century: Global Directions and Canada's Role". Peter Ozemoyah was the Executive Chair (with a committee of seventeen) and succeeded Paul Thompson as CNS President at the Annual General Meeting held in conjunction with the conference. John Mackinnon (President & CEO, AMEC Foster Wheeler) was the Honorary Chair of the conference. Nobel Laureate Prof. Art McDonald (Queen's University) presented a most interesting W.B. Lewis Lecture titled "The Sudbury Neutrino Observatory: A Nobel Use for Heavy Water". There were six plenary sessions with 33 speakers and eighteen technical sessions with 63 speakers. The "Nuclear for Everyone" seminar proved to be popular again. There were 38 exhibit booths by the nuclear industry. Total registration for the conference was 328.

The CNS and CNA jointly recognized 40 recipients for their outstanding contributions within the Canadian Nuclear industry and the Canadian nuclear research and academic communities. Awards were presented for seven out of the ten available

award categories, to recipients who exemplify the expertise, innovation and commitment found across our industry. The awards were presented by Mr. Paul Thompson, CNS President (2015 – 2016), and Dr. John Barrett, CNA President. Go to <https://cns-snc.ca/cns/awards/> to see the complete list of recipients.

There was also a very successful Student Program, with students at the Bachelor's, Master's and Ph.D. levels presenting their research at a Student Poster Session. There were 33 posters on display.

The North American Young Generation Nuclear (NAYGN) held a professional development seminar June 19 that was supported by eight senior members of the nuclear industry.

## **13th International Conference on CANDU Fuel**

Aug. 15-18, 2016, Holiday Inn Waterfront Hotel Kingston, Ontario

The theme of the conference was "CANDU Fuel: Evolution towards Optimal Performance". The Conference Chair was Dr. Paul Chan (with a committee of 10). The Royal Military College continued to be heavily involved with the conference. There were 80 registrants. Papers were presented under 14 parallel technical sessions and one plenary session. The conference was held in co-operation with the International Atomic Energy Agency and the ASME Journal of Nuclear Engineering and Radiation Science. It is one of most international conferences within CNS with delegates from Argentina, Austria, China, Hong Kong, India, Korea, Romania, Sweden, United States of America and, of course, Canada.

Mr. Erl Kohn and Mr. Michael Notley received the 2016 CNS Fuel Technology Awards.

*continued on page 15...*

# Serving CANDU Reactors Worldwide

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### NGS Installations:

- OPG Pickering (8 Units)
- OPG Darlington (4 Units)
- OPG/BP Bruce (8 Units)
- HQ Gentilly (1 Unit)
- NB Power Point Lepreau (1 Unit)
- Cernavoda Romania (2 Units)
- Quinshan China (2 Units)
- Wolsong South Korea (4 Units)
- Embalse Argentina (1 Unit)

### Designers and OEM's:

- AECL
- GE Canada
- SNC-Nuclear
- CANDU Energy
- AREVA

### Products:

- Annulus seal bellows for calandria fuel channel
- Bellows for snout indexing mechanism & loop liner tube
- F/M head separator & linear potentiometer assemblies
- Reactivity mechanism expansion joints
- Main steam penetration & dousing expansion joints
- Containment passage expansion joints
- Pressure balanced crossover expansion joints
- Metallic & rubber expansion joints for RSW, CWC and CWS

### Registered Quality Systems:

- CSA N285.0, B51, CAN3 Z299.3
- ASME B31.1, B31.3
- ASME U Stamp
- ASME NCA4000 NQA-1 NPT Stamp (In Progress)
- ISO 9001:2008
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expansion joints



Containment passage rectangular  
expansion joints



Main steam penetration gimbal  
expansion joints



In-line pressure balanced rubber  
expansion joints



## Program Committee Chair Report for 2016 *continued from page 13*

### 3rd Canadian Conference on Nuclear Waste Management, Decommissioning and Environmental Restoration

Sept. 11-14, 2016, Marriott Hotel  
Marriott Hotel, Ottawa, Ontario

The Conference Theme was “Collaborative Solutions for Current & Future Needs”. Similar to previous NWMD&ER conferences, the emphasis was on the sharing and exchange of information between specialists, government representatives and officials, industry, community, Aboriginal and Métis communities, and other stakeholders to foster collaborations for the benefit of Canadian and international nuclear industries as a whole. The NWMDER 2016 conference was very successful and may become a biannual event. Parva Alavi was the Conference Chair (with a committee of 10). The Conference Host was Ken Nash, President and CEO Nuclear Waste Management Organization. The Honorary Conference Chair was Laurie Swami, Senior VP Decommissioning and Nuclear Waste Management, OPG. There were 350 registrants of which were over 40 municipal representatives of communities, including First Nation, that are engaged with the first phase of the NWMO site process. There were 15 Exhibitors. Women-in-Nuclear (WiN) held a networking evening in conjunction with the conference.

There were 8 plenary sessions, including one workshop and one International panel. A number of significant developments including the OPG DGR, the Port Hope Area Restoration Initiative, the geological disposal facility for LILW at CRL site, and the NWMO plan for site activities were reported at the Conference. HQ decommissioning activities and International plenary sessions on waste management were amongst the plenary sessions. The plenary sessions had presentations by OPG, NRCAN, CNSC, AECL, NBP, BP, and Cameco.

There were 5 parallel technical sessions each day with approximately 120 presentations in total. The technical papers were by most of the major organizations in Canada dealing with WM, D, and ER, as well as work done outside of Canada, in the USA, UK, Sweden, Finland, Japan and the IAEA.

The conference lunch speakers were highlights of the conference: Kim Rudd, Parliamentary Secretary to the Minister of Natural Resources, Michael Binder, President and CEO of CNSC, and LAKE Barrett, US Consultant to Fukushima.

### 4th International Technical Meeting on Small Reactors (ITMSR-4)

Nov 2-4, 2016, Delta City Centre Hotel  
Ottawa

The conference theme was “Next Generation Small Reactors and Research Reactors”. The conference was jointly organised by Canadian Nuclear Laboratories (CNL) and the Canadian Nuclear Society (CNS) and chaired by Dr. Steve Bushby of AECL (with a committee of 11). The current interest in Small Reactors is highlighted by the fact that the number of participants for ITMSR-4 (160) was significantly greater than for ITMSR-3.

There were two plenary sessions that covered a series of talks on Canada's commitments to reduce greenhouse-gas (GHG) emissions, Federal government programs that are being implemented to meet these commitments, provincial (Ontario, Saskatchewan) needs of power, how SMRs can help meet these needs and the roles of CNL (R&D and prototype site) and the CNSC (licensing) in helping SMR technology to become a reality.

ITMSR-4 included 2 parallel technical tracks: one on research reactors and the other on small modular reactors (SMRs) including 55 presentations over two days. 🍁



Bruce Power is the site of the world's largest nuclear generating complex. Units 1 and 2 have already been refurbished with Units 3-6 to follow over the next decade. (Bruce Power photo)





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# Canadian Nuclear Association (CNA) President's Report Taking Stock and Looking Ahead

By John Barrett, President & CEO, CNA

2016 was a positive year for Canada's nuclear industry and for the Canadian Nuclear Association. Strong industry engagement with CNA coupled with association staff efforts on the ground yielded many positive outcomes for our sector.

## Major Success in Advocacy – Inclusion of Nuclear in Canada's Climate Change Policies and Low-Carbon Energy Strategy

When the Liberal government returned from COP21 in Paris in December 2015, there was no mention of nuclear in government statements or policies on climate change. We lobbied long and hard in early 2016 to include it in the suite of energy technologies recognized by the government as “clean energy/clean tech”. In June, the government officially stated that nuclear was included in federal climate change policies (e.g. “Mission Innovation”). CNA's intervention and persistence helped make the difference, tilting the balance away from those in the government who advocate renewables to the exclusion of other proven sources of decarbonization – such as nuclear power. Following COP22 in November, the government included nuclear energy in Canada's Mid-Century Long-Term Low GHG Development Strategy as a contributing low-carbon energy source.

## Focused Policy Advocacy on the Industry's Future

CNA has consistently positioned nuclear technology as a strategic asset for Canada, not only in helping the government meet its sustainable development goals but also in achieving Canada's wider foreign policy objectives.

In outreach to government (federal and provincial) and public communications, the narrative is changing. Today's world needs solutions to the many challenges we face – worldwide as well as here in Canada. Nuclear is a provider of solutions. Accentuating the benefits nuclear

technology and nuclear energy helps a skeptical public and government audiences understand what's in it for them. Our industry brings a multitude of solutions: clean, reliable, affordable, safe and copious energy; with a small geographic footprint, with waste controlled, managed, limited and paid for; applications in the everyday world that save lives (cancer diagnosis and treatment through nuclear medicine) or prevent accidents (identifying weakness in aircraft and vehicle materials, while helping find stronger industrial products).

In Ontario, CNA and its members implemented an action plan to ensure substantial industry participation in the Ontario government's consultations over the 2016-2019 Long-Term Energy Plan. Ontario's decision to invest in the refurbishment of ten reactors and to extend the life of the Pickering NPS until 2024 is a strong vote of confidence in our industry's future. It is, as CNA has proclaimed to one and all, the largest clean energy investment by any jurisdiction in North America (and even beyond).

## International Prominence in Representing Canada's Nuclear Industry

Over the past year, CNA has established its role as a trusted advisor to the Government in international engagements, whether at the 2016 Nuclear Security Summit (NSS) (Washington DC, March 2016), in China at the Pacific Basin Nuclear Conference (Beijing, April 2016), the IAEA General Conference (Vienna, September 2016), or at the IAEA Ministerial Conference on Nuclear Security (Vienna, December 2016). Prime Minister Justin Trudeau visited the Canadian industry booth at the Nuclear Security Summit (NSS) in Washington DC, and many governments and nuclear industry players from around the world were on hand when CNA received the Chairman's Award for our contribution to the Nuclear Industry Summit held in parallel to the NSS.

## Uranium Mining and Sustainable Development

In August, CNA spoke at the annual Energy and Mines Ministers Conference (EMMC) in Winnipeg. It was an opportunity to highlight the role that uranium exports play in offsetting GHG emissions in Canada and abroad, wherever Canadian uranium is (or has been) used to generate electricity from nuclear power.

## Regulatory and Environmental Affairs

2016 was a very busy year on the regulatory and environmental review front. CNA has actively engaged the Canadian Nuclear Safety Commission (CNSC) to provide feedback and commentary on a wide range of proposed revisions to regulatory documents and guidelines. In addition, the federal government has launched reviews of the Canadian Environmental Assessment Act (CEAA) and the Fisheries Act, both of which could have a significant impact on the nuclear industry. CNA appeared before the Expert Panel on CEAA Review. We have also provided written submissions to the CEAA Expert Panel and to the Parliamentary Committee reviewing the Fisheries Act.

## Communications and Messaging

Highlights of the year include our continued and expanded digital strategy, public and member newsletters, and, just recently, the newly updated CNA Factbook. Our “Key Messages on Key Issues” was developed and launched and the 2017 Factbook was published. These initiatives are part of a concerted effort to move boldly into the social media space, while increasing the content and the platforms by which CAN communicates its messages.

## Outreach

Over the course of 2016, CNA staff held several hundred separate interventions on behalf of the Association and its

*continued on page 19...*

# Toronto Marriott Downtown Eaton Centre Hotel

## Toronto, ON, September 17 – 20



### 2<sup>nd</sup> International Meeting on Fire Safety & Emergency Preparedness for the Nuclear Industry (FSEP 2017)



Forum for nuclear professionals to  
network and communicate changes  
presently impacting the industry.

#### FSEP-2017 Themes

Business Performance & Governance, Human  
Performance, Technology and Process & Programs

#### Specific topics to be discussed at FSEP-2017 include:

- ✓ Industry Management Perspective
- ✓ Fire Protection Overview
- ✓ Emerging Operating Experience
- ✓ Fire Probabilistic Risk Assessment
- ✓ NFPA 805 Transition
- ✓ Inspection Experience
- ✓ Industry Best Practices
- ✓ Research and Development

The **Technical Program Committee** invites the submission of abstracts for proposed presentations pertaining to the topic areas within each of the four conference themes. Abstracts are to be no more than 300 words in length and the deadline for submission of abstracts is **2017 May 12**.

#### FSEP 2017 is the ideal marketing vehicle to:

- ✓ Launch and demonstrate new products and services.
- ✓ Demonstrate your expertise and solutions to industry professionals.
- ✓ Generate new sales leads.
- ✓ Obtain customer feedback and conduct market research.
- ✓ Meet your clients and prospective clients face-to-face.
- ✓ Strengthen customer and supplier relations.

#### Sponsorship and Exhibitor Opportunities

The conference is seeking sponsors and offers a spectrum of benefits

#### Key Dates

Abstract submission	2017 May 12
Acceptance/Author notification	2017 June 09
Final Presentation submission	2017 August 01
Early Bird Registration Before	2017 August 01

[www.cns-snc.ca](http://www.cns-snc.ca)

<http://cns-snc.ca/media/fsep-2017/>



## Taking Stock and Looking Ahead *continued from page 17*

membership. The President and CEO alone participated in 71 meetings with business stakeholders; 66 with government representatives (federal and provincial); 38 with foreign diplomats and international officials; 43 with CNA members; 22 public speaking engagements and media interviews. It was also a year in which CNA organized events and activities for its membership – such as the 2016 Annual Conference & Trade Show; a Parliament Hill Day in Ottawa; a Legislature Day at

Queen's Park, Toronto; and the annual CNA Fall Energy Seminar in Toronto.

### Looking Ahead to 2017

In addition to its ongoing advocacy, policy, regulatory and communications activities at both the federal and provincial levels, the CNA will be working with its members to put the finishing touches on a “Canadian Nuclear Strategy”. The strategy will include an Innovation Roadmap that sets out the aspirations of the industry – and the policy

and investment steps needed – to continue and expand Canada's innovative nuclear technology future. We also propose the creation of a Nuclear Innovation Council, with the participation of industry, federal and interested provincial governments. Such a Council would bring together key stakeholders to align the nuclear industry's Nuclear Technology & Innovation Roadmap with the Canadian Energy Strategy and to a pan-Canadian framework for clean growth. 🍁

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# Canadian Nuclear Workers Council (CNWC)

The collective voice of organized labour in the nuclear industries

By David Shier, President CNWC



The Canadian Nuclear Workers Council (CNWC) is an umbrella organization of Unions representing workers in all sectors of the Canadian nuclear industry. Founded in 1993, it represents sectors including electric power utilities, uranium mining and processing, radioisotope production for medical and industrial purposes, nuclear research, construction and trades in Ontario and labour councils in host communities.

CNWC activities are focused on the following objectives:

- Ensure that the interests and perspectives of nuclear workers are heard by decision-makers;
- Strengthen the collective role of nuclear workers as a partner in their industry;
- Enhance public knowledge and understanding of nuclear issues by providing factual information, and;
- Build support for the nuclear industry and its future potential.

During 2016, several presentations and briefs were made on behalf of the membership. In the spring, CNWC made a submission in support of Canadian Nuclear Laboratories' license extension for their Chalk River facility. As well, in coordination with twelve other labour organizations the CNWC made a submission opposing the CNSC's proposed Fitness for Duty/Drug & Alcohol Testing of Workers Regulation. During October and November, CNWC member Unions attended a number of the Ontario Government's consultation sessions regarding the Long-Term Energy Plan (LTEP). In November, the CNWC made an oral presentation and a written submission in support of Cameco's relicensing application for its Port Hope facility. A written submission was made in December regarding the Uranium Mining and Waste Management Oversight Report.

Also in December, the CNWC made a written submission on LTEP to Ontario's Minister of Energy. Additionally, the CNWC, with the help of other groups launched an on-line petition to support the continuing importance of nuclear power in the LTEP.

In January 2016, delegates from the CNWC, SPEA, SEP and the PWU attended a CNSC 101 session on the regulatory and its processes in Toronto. The CNWC will continue to coordinate these presentations to the union membership in the coming year. The CNWC will publish four editions of the Nuclear Worker, update the various fact sheets found on the website and continue with its display booth activities in 2017.

The CNWC's 2016 education and outreach activities included attendance (with our display booth) at the Canadian Nuclear Association's 2016 Annual Conference. In May, the Council, with member unions undertook a lobby day with federal Members of Parliament in Ottawa and participated in a Queen's Park outreach day organized by the Canadian Nuclear Association in October. In December, the CNWC made a presentation to the IBEW's Nuclear Conference and coordinated a tour of Darlington by four NDP MPPs and their staff.

Public communications included four newsletters issued quarterly. The CNWC's website was also updated. The various fact sheets found on the website will be updated in 2017.

The CNWC's 2016 Annual Convention was held October 15th to 18th in Toronto. The revised governance structure approved at the 2015 Convention has been implemented. This year's conference will be held in Peterborough, Ontario on October 14-17, 2017. The CNWC represented its membership at several conventions/conferences --Provincial Federation of Labour Conventions, and the Annual INWUN meeting held Kiev, Ukraine to mark the 30th anniversary of the accident at Chernobyl. The CNWC also participated along with member Unions in the annual meeting with the CNSC. In 2017, the CNWC will participate in this year's CLC (May), CNS (June), CUPE (October) and OFL (November) conventions

In 2017, CNWC education and outreach activities will focus on: expansion of the membership from nuclear supply chain companies, construction union, and local labour councils; support for the Canadian Nuclear Laboratories license extension; Bruce Power's and OPG's refurbishment projects; the extended operation of Pickering NGS; Point Lepreau Hearing; MacLean Lake Uranium Mill Hearing; NPP Oversight Hearings; the CNSC's Fitness for Duty Regulation; OPG's DGR facility; Nuclear Waste Management Organizations process; continued participation in the Nuclear Leadership Forum; and the hosting of more nuclear facility tours for labour leaders. Leadership changes in these groups create the need for the new leadership to be updated about current and emerging nuclear industry issues and opportunities. The CNWC will continue to engage provincial officials and will also pursue meetings with relevant federal ministers and members of Parliament during the year.

## CNWC Member Unions:

- District Labour Councils (Grey/Bruce, Durham, Northumberland)
- International Association of Firefighters
- International Federation of Professional & Technical Engineers (160 & 164)
- International Association of Machinists & Aerospace Workers (608)
- International Brotherhood of Electrical Workers (37 & 863)
- International Union of Operating Engineers (772)
- Construction & Building Trades Council of Ontario
- Power Workers' Union
- Professional Institute of the Public Service of Canada (PIPS)
- CRPEG
- Society of Energy Professionals Union
- UNIFOR (599, 48S, 252, 524)
- United Steel Workers (14193, 13173, 8562, 8914, 7806, 1568) 🍁



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# Organization of Canadian Nuclear Industries (OCNI), President's Report

By Ron Oberth, President & CEO  
Organization of Canadian Nuclear Industries (OCNI)



The Organization of Canadian Nuclear Industries rebranded as “OCNI” in late 2016 with a new logo and user friendly website – OCNI.CA. Our “rebranding” aligns with the positive outlook for the Canadian nuclear industry following the Government of Ontario announcements in late 2016 and early 2017 of its plan to invest over \$25 billion over the next 15-20 years in refurbishment of four Darlington, support major component replacement projects at six Bruce reactors, and extend the operation of six Pickering reactors to 2022/24.

**OCNI's Vision** is “to lead and strengthen a thriving Canadian nuclear supply chain”.

**OCNI's Mission** is “to promote and support the Canadian nuclear supply chain by offering services that enable its members to be successful in domestic and global nuclear markets”.

OCNI strives to deliver value to member companies and to the customers they serve by initiating programs and organizing events aligned with four strategic focus areas:

- strengthen linkages between suppliers and utilities;
- increase supplier readiness for domestic refurbishment projects;
- assist suppliers in developing international opportunities; and
- enhance government and public support for nuclear power.

Specific to each strategic focus OCNI:

1) organizes supplier days at utility and customer sites; 2) sponsors technical workshops on topics relevant to the supply chain; 3) leads trade missions to key target markets, and 4) participates in outreach activities and advocacy.

OCNI membership grew in 2016/17 to more than 215 leading suppliers to the nuclear industry in Canada and abroad. Our member companies collectively employ more than 12,000 highly skilled and specialized people who manufacture major equipment and components and provide engineering services and support to the 19 operating CANDU nuclear power plants in Canada as well as to CANDU and LWR plants in offshore markets. This number is expected to increase significantly as the Darlington refurbishment and Bruce MCR projects swing into high gear over the next few years.

## Over the last year, OCNI:

- Organized supplier days at Bruce Power, OPG, Canadian Nuclear Laboratories and SNC-Lavalin.
- Co-hosted workshops, in collaboration with COG, on Refurbishment Execution and Safety Culture. We also organized a workshop with Darlington Refurbishment EPC suppliers in August and a Decommissioning Workshop in February of this year.
- Led trade missions to China in April 2016, the World Nuclear Exhibition in Paris last June, the PowerGen conference in Orlando in December and Argentina in March 2017. We hosted an incoming delegation of potential Polish nuclear suppliers in September. OCNI signed a Memorandum of Collaboration with the US Nuclear Infrastructure Council (USNIC) in July;
- Secured more than \$200,000 in co-funding from the Global Affairs Canada (GAC) Global Opportunities for Associations (GOA) Program that enables OCNI to host Canadian pavilions at international trade shows and provides financial assistance to member companies participating on our trade missions.

- Prepared submissions, in March 2017, to the Canadian Environmental Assessment Agency in support of OPG's proposed Deep Geologic Repository Project at Kincardine and to the Ontario Ministry of Energy in November 2016 that advocated for increased use of nuclear energy in Ontario's Long Term Energy Plan (LTEP) to help Ontario meet its GHG emission reduction targets.
- OCNI provided support to the CNA on its “Hill Day” in Ottawa in May and its Queens Park Day in Toronto in October respectively that help inform MP's and MPP's on the important role of nuclear energy in Canada in generating safe, reliable, and affordable electricity, creating high value and sustainable jobs, while supporting Canada's GHG emission reduction program.
- OCNI presented the Annual OCNI Jack Howett awards to deserving nuclear engineering and science students at McMaster, UOIT and UNB. We also committed to five-year Bursary programs with Conestoga College, Durham College, Georgian and Mohawk College to encourage students to pursue careers in the skilled trade that will be in high demand as the refurbishment and MCR projects get underway.

OCNI will continue to work closely with the CNA, CNS, COG, WiN and NAYGN in advocating for and supporting strong and sustained nuclear industry in Canada. Collectively our voices will resonate with energy policy decision makers in the federal and provincial governments and by the public. 🍁



# Women in Nuclear (WiN) Canada President's Report

By Heather Kleb, President WiN-Canada

As the nation celebrates 150 years of Confederation, WiN-Canada also takes this time to remember all of our accomplishments from this past year, and the growth the organization has seen since its inception in 2004. The organization has grown to over 1,600 members and six Chapters across the country. WiN-Canada continues to be the premier networking organization for women working in all aspects of nuclear energy, science, trades and technology.

WiN-Canada would not be able to accomplish all that we do as an organization without our industry sponsors. Companies like Bruce Power, Ontario Power Generation and SNC-Lavalin, to name a few, provide the support needed to produce the variety of activities and programs WiN-Canada offers. This report showcases how the organization has been striving to meet its goals through the variety of initiatives that have been carried out over the past year.

## Promoting the Industry and Women in Nuclear-Related Occupations

Active involvement in WiN-Global is a critical component of WiN-Canada's mandate to connect Canadian nuclear professionals with their counterparts around the world. While WiN-Global plans the upcoming international conference in Beijing, WiN-Canada continues to play an active part in the global organization through leadership roles on the Board of Directors, the Communications Committee, as well as the Mentorship Committee.

WiN-Canada participated in several industry initiatives over the past year, including the Canadian Nuclear Association's Annual Conference where we participated in round table discussions with the Honourable Kim Rudd, Parliamentary Secretary to the Minister of Natural Resources. Members of the

WiN-Canada Board joined Women for Nature, a partnership of over 150 women of influence. WiN-Canada continues to promote the economic and environmental benefits of nuclear energy with legislative days on Parliament Hill and at Ontario's Queen's Park. WiN-Canada also participated in the public consultation on Ontario's Long-term Energy Plan.

The 13th WiN-Canada Conference and Annual General Assembly were held on November 7th, 2016 and was hosted by the WiN-Golden Horseshoe West Chapter and SNC-Lavalin. Some 190 participants converged in Brampton, Ontario to hear from our dynamic speakers and network with fellow members and industry professionals.

## WiN's Role in Increasing Public Awareness

The volunteers that devote their time and expertise to the organization contribute significantly to its ongoing success. The influential women who serve on the Board and Chapter committees have been creating awareness for WiN-Canada by making an impact within the community. This year, our Chapters hosted family events such as Control Room and simulator tours, sent representatives to speak at high schools and elementary schools, and raised money for local charities.

WiN-Canada also continued to advocate for nuclear energy as a crucial component of Canada's energy mix and a career interest in nuclear science and technology. The organization also intervened at Canadian Nuclear Safety Commission hearings in support of OPG's Pickering Waste Management Facility's licence renewal. A report, developed by a consultant retained by WiN-Canada, will be presented at the public hearing in April 2017.

## Promoting Nuclear Careers for Women and Young People

In 2016, WiN-Canada launched the Speakers' Clearinghouse, an initiative that provides WiN-Canada subject matter experts opportunities to reach out to the public, especially women, to help them better understand the benefits of the nuclear industry and the careers it provides. Several speakers have spoken at organizations for young people and students in Toronto and Ottawa over the past year, including at Ryerson University, Bishop Strachan and the Elmwood School for Girls.

A number of activities hosted by WiN Chapters have created mentorship opportunities for young people and increased career interest in science and technology, including:


- Participation in the 2016 Skills Ontario summer camp;
- WiN-Golden Horseshoe West Mentors and Models Panel;
- WiN-New Brunswick Take Your Kid to Work Day; and
- WiM/WiN's inaugural scholarship program.

In the coming year, WiN-Canada will continue to deliver on its Strategic Plan while preparing for the future. Redstone Agency, the association management company that provides WiN-Canada's Executive Director services, is helping the organization harness digital trends and develop emerging leaders to support WiN-Canada today and as it grows into the future.

To see a schedule of speaking engagements or to learn more about our goals and objectives you can visit us online at:

[www.wincanada.org](http://www.wincanada.org)

[www.facebook.com/womeninnuclear.canada](https://www.facebook.com/womeninnuclear.canada)

[twitter.com/win\\_canada](https://twitter.com/win_canada) 

# 2017 Conference Schedule



This programme lists events which are organized or co-sponsored by the Canadian Nuclear Society or considered to be of interest to its members.

The current listing of events is posted on the CNS website at [www.cns-snc.ca](http://www.cns-snc.ca)

## 2017 June 4-7

37th Annual CNS Conference & 41st Annual CNS/CNA Student Conference  
Sheraton on the Falls Hotel, Niagara Falls, ON  
Organized by: CNS  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cns2017conference.org](http://www.cns2017conference.org)

## 2017 June 11-15

ANS Annual Meeting  
San Francisco, CA, USA  
Organized by: ANS  
Website: [www.ans.org/meetings](http://www.ans.org/meetings)

## 2017 July 31-Aug. 4

13th International Topical Meeting on Nuclear Applications of Accelerators (AccApp '17)  
Hilton Québec Hotel, Québec City, Québec  
Organized by: ANS  
Co-sponsored by CNS  
Website: [www.accapp17.org](http://www.accapp17.org)

## 2017 September 17-20

2nd CNS Conference on Fire Safety and Emergency Preparedness for the Nuclear Industry  
Toronto Marriott Downtown Eaton Centre Hotel, Toronto, ON  
Organized by: CNS  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: <https://www.cns-snc.ca/media/fssep-2017>

## 2017 September 24-29

Global 2017 International Fuel Cycle Conference  
Sheraton Grande Walkerhill, Seoul, South Korea  
Website: <http://www.global2017.org/congress/index3.php>

## 2017 October 1-4

11th International Conference on CANDU Maintenance & Nuclear Components Conference (CMNCC)  
Toronto Marriott Downtown Eaton Centre Hotel, Toronto, ON  
Organized by: CNS NOM Division  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cmncc2017.org/CMNCC\\_html/CMNCC2017\\_home.html](http://www.cmncc2017.org/CMNCC_html/CMNCC2017_home.html)

## 2017 October 12-13

CANDU Fuel Technology Course  
Hilton Garden Inn Toronto/Ajax, Ajax, ON  
Organized by: CNS FT Division  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cns-snc.ca/events/2017\\_fuel\\_technology\\_course](http://www.cns-snc.ca/events/2017_fuel_technology_course)

## 2017 October 21

Nuclear Job Fair  
UOIT/Durham College North Oshawa Campus  
Organized by the Durham Region, UOIT, Toronto, Sheridan Park & Golden Horseshoe Branches  
In collaboration with UOIT, Durham College and OCN  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cns-snc.ca](http://www.cns-snc.ca)

## 2017 November 12-16

2017 ANS Winter Meeting and Nuclear Technology Expo  
Washington, DC, USA  
Organized by: ANS  
Website: [www.ans.org/meetings/c\\_1](http://www.ans.org/meetings/c_1)

## 2017 Fall

CANDU Thermalhydraulics Course  
Toronto  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cns-snc.ca](http://www.cns-snc.ca)

## 2018 February

CNA Nuclear Industry Conference and Tradeshow  
Westin Hotel Ottawa, ON  
Organized by: CNA  
Website: [www.cna.ca/2018-conference](http://www.cna.ca/2018-conference)

## 2018 March

CANDU Technology & Safety Course  
Organized by: CNS NSE Division  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cns-snc.ca](http://www.cns-snc.ca)

## 2018 April 22-26

PHYSOR 2018  
Cancún, Mexico  
Organized by: ANS  
Website: [www.physor2018.mx](http://www.physor2018.mx)

## 2018 May

Nuclear 101  
Organized by: CNS Education and Communication Committee  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cns-snc.ca](http://www.cns-snc.ca)

## 2018 June 3-6

38th Annual CNS Conference & 42nd Annual CNS/CNA Student Conference  
Sheraton Cavalier Hotel, Saskatoon, SK  
Organized by: CNS  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
E-mail: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cns-snc.ca](http://www.cns-snc.ca)

## 2018 June 17-21

ANS Annual Meeting  
Philadelphia, PA  
Organized by: ANS  
Website: [www.ans.org/meetings](http://www.ans.org/meetings)

## 2018 September 30-October 3

PBNC 2018  
San Francisco, CA  
Website: [www.pacificnuclear.net/pnc/pbnc.html](http://www.pacificnuclear.net/pnc/pbnc.html)  
[www.ans.org/meetings/c\\_2](http://www.ans.org/meetings/c_2)

## 2018 November 11-15

2018 ANS Winter Meeting  
Orlando, FL  
Organized by: ANS  
Website: [www.ans.org](http://www.ans.org)

## 2018 Fall

Waste Management, Decommissioning and Environment Restoration for Canada's Nuclear Activities  
Organized by: CNS E&WM Division  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cns-snc.ca](http://www.cns-snc.ca)

## International Conference on Simulation Methods in Nuclear Engineering

Organized by: CNS NSE Division  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cns-snc.ca](http://www.cns-snc.ca)

## International Technical Meeting on Small Reactors

Organized by: CNS  
**Contact: Canadian Nuclear Society Office**  
Tel: 416-977-7620  
Email: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)  
Website: [www.cns-snc.ca](http://www.cns-snc.ca)



# CANDU Nuclear Reactor Performance and World Uranium Production

## CANDU Nuclear Reactor Performance – 2016

Reactor	In Service	Capacity (MW)	Performance In 2016 (%)	Lifetime Performance (%)
Point Lepreau	1983	705	78.5	70.0
Wolsong 1*	1983	679	53.6	76.6
Wolsong 2	1987	678	74.2	92.5
Wolsong 3	1998	698	70.8	92.8
Wolsong 4	1999	703	75.6	93.8
Embalse	1983	648	0	76.3
Cernavoda 1	1996	707	83.5	89.8
Cernavoda 2	2007	705	98.5	94.5
Qinshan 4	2002	700	92.1	90.8
Qinshan 5	2003	700	76.6	91.3
Pickering 1	1971	542	93.1	64.4
Pickering 4	1973	542	54.3	66.4
Pickering 5	1983	540	96.0	73.9
Pickering 6	1984	540	88.2	77.9
Pickering 7	1985	540	61.8	77.2
Pickering 8	1986	540	48.5	75.2
Bruce 1	1977	825	91.7	67.8
Bruce 2	1978	825	73.2	63.9
Bruce 3	1978	825	75.9	73.2
Bruce 4	1979	825	87.0	72.7
Bruce 5	1985	872	94.0	85.0
Bruce 6	1984	872	95.8	82.0
Bruce 7	1986	872	69.4	84.2
Bruce 8	1987	872	70.2	82.7
Darlington 1	1992	934	98.2	84.5
Darlington 2	1990	934	74.3	78.9
Darlington 3	1993	934	87.1	85.9
Darlington 4	1993	934	74.9	85.7

[www.iaea.org/PRIS/CountryStatistics/CountryDetails.aspx?current=CA](http://www.iaea.org/PRIS/CountryStatistics/CountryDetails.aspx?current=CA)

### Notes

1. Darlington 2 entered plant refurbishment, October 2016.
2. Embalse undergoing plant refurbishment.
3. All reactor performance now based on Load Factor, not Capacity Factor

## World Uranium Production – 2014

Country or area	Production (tU)					Known Resources 2015
	2010	2011	2012	2013	2014	
Australia	5900	5983	6991	6350	5001	1,664,100
Botswana	-	-	-	-	-	73,500
Brazil	148	265	231	198	231	276,800
Canada	9783	9145	8999	9332	9134	509,000
China*	827	1599	1500	1450	1500	272,500
Czech Rep	254	229	228	225	193	-
France	7	6	3	0	3	-
Germany	-	52	50	27	33	-
India*	400	400	385	400	385	-
Jordan	-	-	-	-	-	47,700
Kazakhstan	17 803	19 451	21 317	22 567	23 127	743,300
Mongolia	-	-	-	-	-	141,500
Malawi	670	846	1101	1132	369	-
Namibia	4496	3259	4495	4315	3255	267,000
Niger*	4198	4351	4667	4528	4057	291,500
Pakistan*	45	45	45	45	45	-
Romania*	77	77	90	80	77	-
Russia	3562	2993	2872	3135	2990	507,800
South Africa	583	582	465	540	573	322,400
Tanzania	-	-	-	-	-	58,100
Ukraine*	850	890	960	1075	962	115,800
USA	1660	1537	1596	1835	1919	62,900
Uzbekistan*	2400	3000	2400	2400	2400	130,100
Other	-	-	-	-	-	232,400
<b>Total</b>	<b>53 671</b>	<b>53 493</b>	<b>58 394</b>	<b>59 673</b>	<b>56 252</b>	<b>5,718,400</b>

\*WNA estimate

All figures taken from the World Nuclear Association

WNA most recent update was July 2015

# World Reactor Capacity



## World Reactor Capacity – 2016

Country	Operating		Planned or Under Construction 03/01/16		Electricity Generation 2016	
	No	MW	No	MW	%	TWh
Argentina	3	1627	5	3277	4.8	6.5
Armenia	1	376	1	1060	34.5	2.6
Bangladesh			2	2400		
Belarus			4	4788		
Belgium	7	5943			37.5	24.8
Brazil	2	1901	5	5405	2.8	13.9
Bulgaria	2	1926	1	950	31.3	14.7
Canada	19	13553			16.6	95.6
Chile			4	4400		
China	36	32637	200	228786	3	161.2
Czech Rep.	6	3904	3	3600	32.5	25.3
Egypt			4	4800		
Finland	4	2764	3	4400	33.7	22.3
France	58	63130	2	3500	76.3	419
Germany	8	10728			14.1	86.8
Hungary	4	1889	2	2400	52.7	15
India	22	6219	69	72900	3.5	34.6
Indonesia			5	4030		
Iran	1	915	9	8300	1.3	3.2
Israel			1	1200		
Italy						
Japan	42	39952	14	19848	0.5	4.3
Jordan			2	2000		
Kazakhstan			4	1200		
Korea (N)			1	950		
Korea (S)	25	23081	11	15800	31.7	157.2
Lithuania			2	2700		
Malaysia			2	2000		
Mexico	2	1600	2	2000	6.8	11.2
Netherlands	1	485	1	1000	3.9	4
Pakistan	3	725	4	2980	3.7	3.9
Poland			6	6000		
Romania	2	1310	3	1965	17.3	10.7
Russia	35	26865	55	57659	18.6	182.8
Saudi Arabia			16	17000		
Slovakia	4	1816	3	2142	55.9	14.1
Slovenia	1	696	1	1000	37.2	6.1
South Africa	2	1830	8	9600	4.7	11
Spain	7	7121			20.3	54.8
Sweden	9	8849			34.3	54.5
Switzerland	5	3333	3	4000	33.5	22.2
Taiwan	6	4927	2	2700	na	na
Thailand			5	5000		
Turkey			8	9300		
Ukraine	15	13107	13	13900	56.5	82.4
UAE			14	20000		
UK	15	8883	13	17900	18.9	63.9
USA	99	99535	46	39312	19.5	798
Vietnam			10	10700		
<b>World</b>	<b>446</b>	<b>391627</b>	<b>569</b>	<b>624852</b>		<b>2406.6</b>

### Notes

All figures taken from the World Nuclear Association, March 1, 2016.



## CNS Council and Staff

### CNS Executive



**Peter Ozemoyah**  
President



**Dan Gammage**  
1st Vice-President



**John Luxat**  
2nd Vice-President



**Paul Thompson**  
President



**Mohamed Younis**  
Treasurer



**Colin Hunt**  
Secretary



**Benjamin Rouben**  
Executive Director



**Ken Smith**  
Financial  
Administrator



**Peter Easton**  
Communications  
Director

## The Canadian Nuclear Society

The Canadian Nuclear Society (CNS) was established in 1979 as an organization of individual members, paying membership dues. It was established as an independent section of the Canadian Nuclear Association to benefit from the office support structure of the CNA. In 1997, after twenty years of operation in this mode, and after building its own asset base, the CNS obtained a federal charter as an independent not-for-profit organization. The CNS, through its base of individual members, promotes the exchange of information on all aspects of nuclear science and technology – including uranium mining and refining, electricity generation by nuclear power, medical and industrial uses of radionuclides, management of radioactive wastes, and various associated research and development activities.

The activities of the CNS are managed by a Council that is elected by the CNS members at the Annual General Meeting, normally held in June. The Council term of office is one year. The elected Council consists of six Officers plus up to 30 Members-at-Large – all volunteers. Various members of Council are appointed to Chair Committees that look after specific issues. The Council is supported by a full time Office Manager, and by other part-time specialists.

### Elected Executive for June 2016 to June 2017:

**Peter Ozemoyah**  
President

**Dan Gammage**  
1st V-P

**John Luxat**  
2nd V-P

**Colin Hunt**  
Secretary

**Mohamed Younis**  
Treasurer

**Paul Thompson**  
Past President

### Part-time Specialists and Office Staff:

**Ben Rouben**  
Executive  
Director

**Ken Smith**  
Financial  
Administrator

**Brian Blosser**  
Accountant

**Amanda Blosser**  
Bookkeeper

**Bob O'Sullivan**  
Office Manager

**Peter Easton**  
Communications  
Director

The CNS is organized into Branches and Technical Divisions, both directed towards involvement of the individual member. Branches are established on a geographical basis, and hold local meetings on issues of interest. Technical Divisions are established for specific technical areas of interest – and are responsible for organizing topical conferences, courses, and seminars.

Members of the CNS Council and staff are listed on the next page.

An outline of the activities of the CNS, including a list of upcoming conferences and courses, is provided elsewhere in this Yearbook.



## CNS Council Members at Large



**Farzad Ardeshiri**



**Parva Alavi**



**John Barrett**  
President and CEO, CNA



**Fred Boyd**



**Chris Ciaravino**



**Rudy Cronk**



**Ruxandra Dranga**



**Peter Easton**



**Mohinder Grover**



**Jerry Hopwood**



**Kris Mohan**



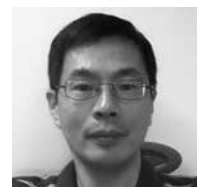
**E.M (Dorin) Nichita**



**Nick Preston**



**John Roberts**



**Wei Shen**



**Nick Sion**



**Michael Smith**



**Keith Stratton**



**Ron Thomas**



**Aman Usmani**



**Kamal Verma**



**Pauline Watson**



**Stephen Yu**

## CNS Staff



**Bob O'Sullivan**  
CNS Office Manager



**Colin Hunt**  
Publisher  
CNS Bulletin



**Ric Fluke**  
Editor  
CNS Bulletin



**Brian Blosser**  
Accountant



**Amanda Blosser**  
Bookkeeper



# International Nuclear Organizations

## ARGENTINA

Autoridad Regulatoria Nuclear (ARN)  
Av. Del Libertador 8250  
(1429) Buenos Aires  
Tel: [+54 11] 6323-1770  
Fax: [+54 11] 6323-1771/1798

Comision Nacional de Energia Atomica (CNEA)  
Avenida del Libertador 8250  
Buenos Aires 1429  
Tel: [+54-11] 4704-1000

## AUSTRIA

International Atomic Energy Agency (IAEA)  
Wagramerstrasse 5  
P.O. Box 100  
A-1400 Vienna, Austria  
Tel: +431 2600-0

United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)  
P.O. Box 500  
A-1400 Vienna, Austria  
Tel: +43 1 26060 4360  
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## AUSTRALIA

Australian Nuclear Science and Technology Organization  
Lucas Heights Res. Labs.  
New Illawarra Road  
Lucas Heights  
Locked Bag 2001,  
Kirrawee DC NSW 2232  
Tel: +61 2 9717 3111  
Fax: +61 2 9543 5097

Uranium Information Centre Ltd.  
GPO Box 1649N  
Melbourne, 3001  
Tel: 03 9629 7744  
Fax: 03 9629 7207

## Bangladesh

Bangladesh Atomic Energy Commission  
G.P.O. Box 158, 4 Kazi Nazrul  
Islam Avenue, Dhaka-1000  
Tel: +880 2 502 600  
Fax: +880 2 861 3051

## BELGIUM

Commission of the European Communities Nuclear Safety Research Directorate  
24-26, rue Jean-André de Mot/  
Jean-André de Motstraat  
B-1049 Brussels, Belgium  
Tel: +32 2 2299 11 11

FORATOM – European Atomic Forum  
Avenue des Arts 56  
1000 Brussels  
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Tel: +32 2 502 4595  
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Forum Nucléaire Belge (ASBL)  
Avenue des Arts 56  
1000 Bruxelles – Belgique  
Tel: +32 2 761 94 50

Institute for Reference Materials and Measurements (IRMM) European Commission Joint Research Centre  
Retieseweg, B-2440 Geel  
Belgium  
Tel: +32 14 57 12 11  
Fax: +32 014 58 4273

Joint Research Centre (JRC) Commission of the European Communities  
Rue de la Loi 200  
B-1049 Brussels, Belgium  
Tel: +32 2 299 11 11

Ministere des Affaires Economiques Administration de L'Energie  
Service des applications Nucléaires  
North Gate III, boul. du Roi Albert 11, 16  
1000 Bruxelles  
Tel: 02 206 42 58  
Fax: 02 206 57 11

Union of the Electricity Industry EURELECTRIC  
Bd de l'Impératrice 66  
1000 Brussels  
Tel: +32 2 515 1000  
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## BRAZIL

Comissao Nacional de Energia Nuclear (CNEN)  
22294 Rua General Severiano 90  
Rio de Janeiro, R.J.  
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## CANADA

North American Young Generation in Nuclear  
c/o P.O. Box 1268  
Fredericton NB E3B 5C8  
Tel: (877) 526-2946

TRIUMF  
4004 Westbrook Mall  
Vancouver BC V6T 2A3  
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## CHINA

Beijing Institute of Nuclear Engineering (BINE)  
P.O. Box 840  
100840, Beijing  
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Fax: (010)68418086

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Fax: +86 1 867 188

National Nuclear Safety Administration (NNSA)  
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Beijing 100088, PRC  
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Fax: 86-10 6225 7804

Czech Republic State Office for Nuclear Safety (SUJB)  
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Fax +420 222 220 917

## DENMARK

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## EGYPT

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3 Ahmed El cliques –  
Nasr City – Cairo  
Arab Republic of Egypt

## FINLAND

Advisory Committee on Nuclear Energy, Ministry of Trade and Industry Energy Department  
Pohjoinen Makasiinikatu 6  
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SF-000130 Helsinki 13  
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Centre for Radiation and Nuclear Safety (STUK)  
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Fax: +33 140 57 6559



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Fax: +33 1 40 849 034

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Fax: 01 53 58 32 11

## GERMANY

Bundesministerium für  
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und Reaktorsicherheit  
(BMU/GRS)  
Alexanderplatz 6  
10178 Berlin  
Tel: +49 1888/305-0  
Fax: +49 1888/305 4375

Bundesministerium  
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Arbeit (BMWA)  
Scharnhorststr. 34-37  
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Fax: +49 1888-615-7010

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e. V. (DAfF)  
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Kerntechnische Gesellschaft  
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## HUNGARY

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H-1539 Budapest 114  
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Fax: 36-1 375 7402

## INDIA

Department of  
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Fax: 62-21 525 1110

## ISRAEL

Israel Atomic Energy  
Commission  
26 Chaim Levanon St.  
P.O. Box 7061  
Tel-Aviv 61070  
Tel: +972 646 2922

## ITALY

Comitato Nazionale per la  
Ricerca e per lo Sviluppo  
dell'Energia Nucleare e dell'  
Energia Alternative (ENEA)  
Lungotevere Thaon di Revel  
76 - 00196 Roma  
Tel: +39 6-36271  
Fax: +39 6-36272591/2777

Ispira-Joint Research Centre  
1-21020 Ispira (Varese), Italy  
Tel: +39 332 789 743  
Fax: +39 332 789 903

## JAPAN

Japan Atomic Industrial  
Forum Inc. (JAIF)  
6th Floor, Toshin Building  
1-13, 1-chome Shimbashi  
Minato-Ku  
Tokyo 105-8605  
Tel: +81 3 508 2411

Atomic Energy Society  
of Japan (AESJ)  
1-1-13 Shimbashi,  
Minato-Ku  
Tokyo 105-0004  
Tel: +81 3 3508 1261

## KOREA

Ministry of Science and  
Technology (MOST)  
Government Complex-Gwacheon  
Gwacheon City  
Kyunggi-Do 427-760  
Tel: 82-2 503 7645  
Fax: 82-2 503 7673

Korean Atomic Industrial  
Forum (KAIF)  
21 Youido-doug  
Yongdungpo-ku  
Seoul 150-875  
Tel: +82 2 785 2570

## NETHERLANDS

Netherlands Atoomforum  
P.O. Box 1  
NL-1775 ZG Petten  
Tel: +31 2246 4082

Netherlands Nuclear Society  
c/o Kema NV  
Utrechtsweg 310  
NL-6812 AR Arnhem  
Tel: +31 85 56 2491

## NORWAY

OECD Halden Reactor Project  
P.O. Box 173  
N-1751 Halden, Norway  
Tel: +47 69 21 22 00  
Fax: +47 69 21 22 01

## PAKISTAN

Pakistan Atomic  
Energy Commission  
P.O. Box 1114  
Islamabad  
Tel: +92 51 9204276

## PERU

Instituto Peruano de Energia  
Nuclear (IPEN)  
Av. Canada 1470-San Borja  
Lima 41-Peru  
Tel: 511226-0030/  
511226-0038  
Fax: 511224-8991

## POLAND

National Atomic  
Energy Agency  
36 Krucza Str.  
00-921 Warsaw  
Tel: +48 2 628 27 22

## ROMANIA

National Commission  
for Nuclear Activities  
Control (CNCAN)  
14 Libertatii Blvd.  
Bucharest - 5, Romania  
Tel: 401 410 27-54  
Fax: 401 411 14 36

## SOUTH AFRICA

National Nuclear  
Regulator (NNR)  
PO Box 7106  
CENTURION 0046  
Tel: 27 12 663 5500  
Fax: 27 12 663 5513

## SPAIN

Cosejo de Seguridad  
Nuclear (CSN)  
c/o Justo Dorado,  
11 - 28040 Madrid  
Tel: 34-913 460105  
Fax 34-913 460103  
  
Foro de la industria  
nuclear espanola  
Boix y Morer 6 - 28003 Madrid  
Tel: +34 1 553 63 03  
Fax: +34 1 535 08  
Email: correo@foronuclear.org

Sociedad Nuclear  
Espanola (SNE)  
Campoamor 17  
E-28004 Madrid  
Tel: +34 1 308 63 18

## SWEDEN

International Commission  
on Radiological Protection  
(ICRP)  
SE-171 16 Stockholm, Sweden  
Tel: +46 8 729 727 5  
Fax: +46 8 729 729 8

Statens Karnkraftinspektion  
(Swedish Nuclear Power  
Inspectorate)  
Klarabergsviadukten 90  
SE-106 58 Stockholm  
Tel: 468 698 8400  
Fax: 468 661 9086



## Stockholm International Peace Research Institute (SIPRI)

Signalistgatan 9  
SE-16970, Solna, Sweden  
Tel: +46 8 655 9700  
Fax: +46 8 655 9733

## Swedish Atomic Forum

C/o Energiforum AB  
Allhegonavagen 25  
S-61135 Nyköping  
Tel: 46 155 281070

## SWITZERLAND

### CERN European Laboratory for Particle Physics

CH-1211 Geneva 23  
Switzerland  
Tel: +41 22 767 61 11

### European Nuclear Society

Belpstrasse 23  
P.O. Box 5032  
CH-3001 Berne, Switzerland  
Tel: +41 31 320 6111

### Hauptabteilung für die Sicherheit der Kernanlagen (HSK)

CH-5232 Villigen – HSK  
Tel: 41 56 310 39 36  
Fax: 41 56 310 49 36

### Schweizerische Vereinigung für Atomenergie (SVA) [Swiss Association for Atomic Energy]

Postfach 5032  
Ch-3001 Bern  
Tel: +41 31 32 065 25

## TAIWAN

### Atomic Energy Council

No. 67, Lane 144, Sec. 4  
Keelung Rd.  
Taipei, Taiwan, R.O.  
Tel: 886 2 2363 4180

## TURKEY

### Turkish Atomic Energy Authority (TAEK)

Eskisehir Yolu 9. km  
Lodumlu, 06530 ANKARA  
Tel: 90-312 287 1529  
Fax: 90-312 285 1537

## UNITED KINGDOM

### British Nuclear Energy Society (BNES)

1-7 Great George Street  
London SW1P 3AA  
Tel: +44 20 7222-7722

### British Nuclear Industry Forum (BNIF)

First FL., Whitehall House  
41 Whitehall  
London, SW1A 2BY  
Tel: +44 20 7766 6640  
Fax: +44 20 7839 4695

### British Nuclear Fuels PLC (BNFL)

Risley Warrington  
Cheshire WA3 6AS  
Tel: +44 925 832 000

### CNSC-H&SE/NII

Railway Inspectorate  
2nd floor SW, Rose Court  
2 Southwark Bridge  
London SE1 9HS  
Tel: 44-171 717 6887  
Fax: 44-171 717 6095

### JET Joint Undertaking

Abingdon, Oxfordshire  
United Kingdom OX14 3EA  
Tel: +44 235 528 822  
Fax: +44 235 464 755

### Scottish Power (Head Office)

Cathcart House, Spean St.  
Glasgow, Scotland G44 4BE  
Tel: +44 41 637 7177

### United Kingdom Atomic Energy Authority (UKAEA)

Marshall Bldg.  
521 Downs Way  
Harwell, Didcot, Oxfordshire  
OX11 0RA  
Tel: +44 1235 820 220

### Women in Nuclear Global (WiN)

c/o World Nuclear Association  
Carlton House  
22a St. James' Square  
London SW1Y 4JH  
United Kingdom  
Tel: +44 (0)207 451-1520  
Fax: +44 (0)207 839-1501

### World Association of Nuclear Operators (WANO)

King's Buildings,  
16 Smith Square  
London, United Kingdom  
SW1P 3HQ  
Tel: +44 71 828 2111  
Fax: +44 71 828 6691

### World Energy Council (WEC)

5th Floor, Regency House  
1-4 Warwick St.  
London, United Kingdom  
SW1B 5LT  
Tel: +44 20 7734 5996  
Fax: +44 20 7734 5926

### World Nuclear Association

22a St James's Square  
London, United Kingdom  
SW1Y 4JH  
Tel: +44 (0)20 7451 1520  
Fax: +44 (0)20 7839 1501

## UNITED STATES

### American Nuclear Society (ANS)

555 North Kensington Ave.  
La Grange Park, Illinois 60526  
Tel: (708) 352-6611

### Argonne National Laboratory (East)

9700 South Cass Ave.  
Argonne, Illinois 60439  
Tel: (630) 252-2000

### Argonne National Laboratory (West)

P.O. Box 2528  
Idaho Falls, Idaho  
83403-2528  
Tel: (208) 533-7341

### Brookhaven National Laboratory (BNL)

Upton, NY 11973-5000  
Tel: (631) 344-8000

### CNSC-USNRC Office of Public Affairs (OPA)

Washington, D.C. 20555  
Tel: 301-415 0317  
Fax: 301-415 2395

### Edison Electric Institute (EEI)

701 Pennsylvania Ave. NW  
Washington, D.C.  
20004-2696  
Tel: (202) 508-5000

### Electric Power Research Institute (EPRI)

3412 Hillview Ave.  
P.O. Box 10412  
Palo Alto, California 94303  
Tel: (415) 855-2000

### Environmental Protection Agency (EPA)

1200 Pennsylvania Ave., NW  
Washington, D.C. 20460  
Tel: (202) 260-2090

### Lawrence Livermore National Laboratory

P.O. Box 808  
Livermore, CA 94551-0808  
Tel: (925) 422-1100

### Los Alamos National Laboratory (LANL)

P.O. Box 1663  
Los Alamos, N.M. 87545  
Tel: (505) 667-7000

### National Council on Radiation Protection and Measurements (NCRP)

7910 Woodmont Ave.  
Suite 800  
Bethesda, Maryland  
20814-3095  
Tel: (301) 657-2652

### Nuclear Energy Institute

1776 I Street, NW, Suite 400  
Washington, D.C.  
20006-3708  
Tel: 202.739.8000  
Fax: 202.785.4019

### Nuclear Regulatory

Commission (NRC)  
Mail Stop TA-13  
Washington, D.C. 20555  
Tel: (301) 415-8200

### Oak Ridge National Laboratory (ORNL)

P.O. Box 2008  
Oak Ridge, Tennessee 37831  
Tel: (615) 574-4160

### Sandia National Laboratories

Albuquerque, N.M.  
87185-5800  
Tel: (505) 844-5678

### U.S. Department of Energy (DOE)

1000 Independence Ave., S.W.  
Washington, D.C. 20585  
Tel: (202) 586-5000

## YUGOSLAVIA

### Yugoslavia Federal Secretariat for Energy and Industry

Bulevar AVNOJ-A 104 11070  
Novi Beograd  
Tel: (38-11) 195 244

# Guide to Nuclear-Related Organizations



## FEDERAL GOVERNMENT

**Atomic Energy of Canada Limited (AECL)**  
Place de Ville, Tower B112  
Kent St., Suite 501  
Ottawa ON K1P 5P2  
Tel: (613) 589-2085

**CNL Chalk River Laboratories**  
Chalk River ON K0J 1J0  
Tel: 1-866-513-2325

**CNL Low-level Radioactive Waste Management**  
National Office  
Suite 200  
1900 City Park Drive  
Ottawa ON K1J 1A3  
Tel: 1-866-513-2325

**CNL Whiteshell Laboratories**  
P.O. Box 550  
Pinawa MB R0E 1L0  
Tel: 1-866-513-2325

**Canadian Nuclear Safety Commission**  
P.O. Box 1046  
280 Slater Street  
Ottawa ON K1P 5S9  
Tel: (613) 995-5894

**Department of Foreign Affairs and International Trade (DFAIT)**  
Lester B Pearson Bldg.  
125 Sussex Dr.  
Ottawa ON K1A 0G2  
Tel: (613) 996-9134

**Environment Canada**  
351 Joseph Blvd.  
Hull QC K1A 0H3  
Tel: (613) 997-2800

**Health and Welfare Canada**  
A.L. 0900C2  
Ottawa ON K1A 0K9  
Tel: (613) 957-2991

**National Energy Board**  
444 Seventh Ave. S.W.  
Calgary AB T2P 0X8  
Tel: (403) 292 4800

**National Research Council Canada Institute for Scientific and Technical Information (CISTI)**  
Bldg. M55, Room 148  
Montreal Rd. Campus  
Ottawa ON K1A 0S2  
Tel: (613) 993-1600

**Natural Resources Canada (Uranium, Nuclear Energy & Waste Management)**  
580 Booth Street  
Ottawa ON K1A 0E4  
Tel: (613) 995-0947

**Natural Sciences and Engineering Research Council of Canada (NSERC)**  
350 Albert St., Tower 2  
Ottawa ON K1A 1H5  
Tel: (613) 995-5992

**Nuclear Waste Management Organization (NWMO)**  
22 St. Clair Avenue East  
Sixth Floor  
Toronto ON M4T 2S3  
Tel: 416-934-9814  
Fax: 416.934.9526

## PROVINCIAL ORGANIZATIONS

**Hydro-Québec**  
75 René-Lévesque Blvd., West  
Montréal QC H2Z 1A4  
Tel: 514 289-2211

**New Brunswick Power**  
515 King Street  
P.O. Box 2000  
Fredericton NB E3B 4X1  
Tel: 1-800-663-6272

**New Brunswick Point Lepreau Generating Station**  
P.O. Box 600  
Lepreau NB E5J 2S6  
Tel: (506) 659-2220

**Ontario Power Generation (OPG)**  
700 University Ave.  
Toronto ON M5G 1X6  
Tel: (416) 592-2555

**Ontario Power Generation Darlington Generation Station Information Centre**  
P.O. Box 4000  
Bowmanville ON L1C 3Z8  
Tel: (905) 623-7122

**Ontario Power Generation Pickering Generating Station Information Centre**  
1675 Montgomery Park Rd.  
Pickering ON L1V 2R5  
Tel: (905) 839-0465

## ASSOCIATIONS

**Association of Consulting Engineers of Canada**  
130 Albert St., Suite 420  
Ottawa ON K1P 5G4  
Tel: (613) 236-0569

**Association of Major Power Consumers of Ontario (AMPCO)**  
65 Queen Street West  
Suite 1510  
Toronto ON M5H 2M5  
Tel: (416) 260-0280  
Fax: (416) 260-0442

**Canadian Association of Medical Radiation Technologists**  
85 Albert St., Suite 1501  
Ottawa ON K1P 6A4  
Tel: (613) 234-0012

**Canadian Association of Radiologists**  
600 – 294 Albert Street  
Ottawa ON K1P 6E6  
Tel.: 613 860-3111  
Fax: 613 860-3112

**Canadian Electricity Association**  
275 Slater Street, Suite 1500  
Ottawa ON K1P 5H9  
Tel: (613) 230-9263  
Fax: (613) 230-9326

**Canadian Standards Association (CSA)**  
178 Rexdale Blvd.  
Rexdale ON M9W 1R3  
Tel: (416) 747-4000

**Engineering Institute of Canada**  
1295 Hwy 2 East  
Kingston ON K7L 4V1  
Tel: (613) 547-5989

**Electricity Distributors Association**  
3700 Steeles Ave. W.  
Woodbridge ON L4L 8K8  
Tel: (905) 265-5300

**Institute de Recherche d'Hydro-Québec (IREQ)**  
1800, boul. Lionel-Boulet  
Varennes QC J3X 1S1  
Tel: (450) 652-8011

**Radiation Safety Institute of Canada**  
1120 Finch Avenue W.  
Suite 607  
Toronto ON M3J 3H7  
Tel: (416) 650 9090



## Guide to Nuclear-Related Organizations *continued from page 33*

### UNIVERSITY/ EDUCATION

**Association of Universities  
and Colleges of Canada**  
350 Albert St., Suite 600  
Ottawa ON K1R 1B1  
Tel: (613) 563-1236

**Carleton University**  
1125 Colonel By Drive  
Ottawa ON K1S 5B6  
Tel: (613) 788-7400

**Dalhousie University**  
1459 Oxford St.  
Halifax NS B3H 4R2  
Tel: (902) 494-2211

**École Polytechnique**  
C.P. 6079 Centre-Ville  
Montréal QC H3C 3A7  
Tel: (514) 340-4711

**Institut Armand-Frappier**  
531, boulevard des Prairies  
C.P. 100  
Laval QC H7V 1B7

**Institut National de la  
Recherche Scientifique  
(INRS)**  
2600, boulevard Laurier  
C.P. 7500  
Ste-Foy QC G1V 4C7  
Tel: (418) 654-2500

**McGill University**  
845 Sherbrooke St. W.  
Montréal QC H3A 2T5  
Tel: (514) 398-4455

**McMaster University**  
1280 Main St. W.  
Hamilton ON L8S 4L8  
Tel: (905) 525-9140

**Queen's University**  
99 University Ave.  
Kingston ON K7L 3N6  
(613) 533-2000

**Royal Military  
College of Canada**  
Station "Forces"  
P.O. Box 17000  
Kingston ON K7K 7B4  
Tel: (613) 541-6000

**Trent University**  
1600 West Bank Dr.  
Peterborough ON K9J 7B8  
Tel: (705) 748-1011

**University of Alberta**  
114 Street – 89 Ave.  
Edmonton AB T6G 2M7  
Tel: (708) 492-3111

**University of British Columbia**  
2329 West Mall  
Vancouver BC V6T 1Z4  
Tel: (604) 822-2211

**University of Manitoba  
Department of Physics  
and Astronomy**  
Winnipeg MB R3T 2N2  
Tel: (204) 474-8880

**Université de Montréal**  
C.P. 6128, Succursale A  
Montreal QC H3C 3J7  
Tel: (514) 343-6111

**University of New Brunswick**  
3 Bailey Dr.  
P.O. Box 4400  
Fredericton NB E3B 5A3  
Tel: (506) 453-4864

**University of Ontario  
Institute of Technology**  
2000 Simcoe Street North  
Oshawa ON L1H 7L7  
Tel: (905) 721-3190

**University of Ottawa**  
550 Cumberland  
P.O. Box, 450 Stn. A  
Ottawa ON K1N 6N5  
Tel: (613) 562-5700

**University of Saskatchewan  
Physics Department**  
116 Science Place  
Saskatoon SK S7N 5E2  
Tel: (306) 966-4343

**University of Toronto –  
Centre for Nuclear  
Engineering**  
Contact: Brian C.  
Wallberg Bldg.  
184 College Street  
Toronto ON M5S 3E5  
Tel: (416) 978-2127

**University of Victoria  
Faculty of Engineering**  
PO Box 3055, EOW 248  
Victoria BC V8W 3P6  
Tel: (250) 721-8677

**University of Western Ontario**  
1151 Richmond Street  
Suite 2  
London ON N6A 5B8

**University Network of  
Excellence in Nuclear  
Engineering (UNENE)**  
For more information  
please contact your local  
UNENE representative

**World Nuclear  
University (WNU)  
Atoms for Sustainable  
Development**  
For more information  
please visit their website  
at [www.world-nuclear-university.org](http://www.world-nuclear-university.org)

**Nuclear Power  
Plant Operators  
Bruce Power Inc.**  
P.O. Box 1540, B32  
Tiverton ON N0G 2T0  
Tel: (519) 361-7777

**Hydro-Québec Gentilly 2  
Nuclear Power Station**  
4900 Becancour Blvd.  
Gentilly QC G0X 1G0  
Tel: (819) 298-2943

**New Brunswick  
Point Lepreau  
Generating Station**  
P.O. Box 600  
Lepreau NB E5J 2S6  
Tel: (506) 659-2220

**Ontario Power Generation  
Darlington Generation  
Station Information Centre**  
P.O. Box 4000  
Bowmanville ON L1C 3Z8  
Tel: (905) 623-7122

**Ontario Power Generation  
Pickering Generating Station  
Information Centre**  
1675 Montgomery Park Rd.  
Pickering ON L1V 2R5  
Tel: (905) 839-0465

**National Organizations  
Canadian Nuclear  
Association**  
130 Albert Street  
Suite 1610  
Ottawa ON K1P 5G4  
Tel: (613) 237-4262

**Canadian Nuclear  
Society (CNS)**  
700 University Avenue  
4th floor  
Toronto ON M5G 1X6  
Tel: (416) 977-7620

**Canadian Nuclear  
Workers Council**  
244 Eglinton Ave. E.  
Toronto ON M4P 1K2  
Tel: (416) 484-4491

**CANDU Owners Group**  
480 University Ave.  
Suite 200  
Toronto ON M5G 1V2  
Tel: (416) 595-1888

**The Canadian Centre  
for Energy Information**  
201, 322 – 11 Avenue, S.W.  
Calgary AB T2R 0C5  
Tel: (403) 263-7722

**Organization of Canadian  
Nuclear Industries (OCI)**  
1730 McPherson Court Unit 2  
Pickering ON L1W 3E6  
Tel: (905) 839-0073



## INTERNATIONAL ORGANIZATIONS

### Commission of the European Communities Nuclear Safety Research Directorate

200, rue de la Loi  
B-1049 Brussels, Belgium  
Tel: +32 2 2299 11 11

### European Nuclear Society

Rue Belliard, 15-17  
1040 Brussels, Belgium  
Tel: +32 2 505 30 50  
Fax: +32 2 502 3902

### FORATOM – European

Atomic Forum  
Rue Belliard, 15-17  
1040 Brussels, Belgium  
Tel: +32 2 502 4595  
Fax: +32 2 502 3902

### International Atomic Energy Agency (IAEA)

Wagramerstrasse 5  
P.O. Box 100  
A-1400 Vienna, Austria  
Tel: +43 12600-0

### International Energy Agency (IEA)

9, rue de la Fédération  
75739 Paris, Cedex 15 France  
Tel: +33 140 5765  
Fax: +33 140 57 6559

### International Radiation Protection Association (IRPA)

Route du Panorama  
BP48-F92263  
Fontenay-aux-Roses Cedex  
France  
Tel: +33 1 46 547 476  
Fax: +33 1 40 849 034

### (OECD) Organisation for Economic Cooperation and Development Nuclear Energy Agency (NEA)

Le Seine Saint-Germain  
12, boulevard des les  
F-92130 Issy-les-Moulineaux,  
France  
Tel: +33 (1) 45 24 82 00  
Fax: +33 (1) 45 24 11 10

### United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)

P.O. Box 500  
A-1400 Vienna, Austria  
Tel: +43 1 211 31, ext. 4330

### World Association of Nuclear Operators (WANO)

Tower House  
10 Southampton Street  
London, United Kingdom  
WC2E 7HA  
Tel: +44 (0)20 7451 1520

### World Council of Nuclear Workers

49 rue Lauriston  
75116 Paris, France  
Tel: +33 (0)1 53 70 88 99  
Fax: +33 (0)1 53 70 01 08

### World Energy Council (WEC)

5th Floor, Regency House  
1-4 Warwick St.  
London, United Kingdom  
SW1B 5LT  
Tel: +44 20 7734 5996  
Fax: +44 20 7734 5926

### World Nuclear Association

12 Floor, Bowater House W.  
114 Knightsbridge, London  
SW1X 7LJ, UK  
Tel: +44 20 7225 0303  
Fax: +44 20 7225 0308

### World Nuclear Transport Institute

Remo House  
310-312 Regent Street  
London, W1B 3AX  
Tel: +44 (0) 207 580 1144  
Fax: +44 (0) 207 580 5365  
www.wnti.co.uk



## TURNKEY TOOL & METAL SURVEY/DECON SERVICES

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- Turnkey Export Management Service
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| • Extension Cords   | • Welders       | • Drill Presses           |
| • Fork Lifts        | • Scissor Lifts | • Instrument Power Panels |
| • Electrical Cables | • Rad Boots     | • Machine Tools           |
| • Transformers      | • Scaffolding   | • Structural Steel        |
|                     | • Cables        | • Refuel / PHT Motors     |
|                     | • Reactor Tools | • And More!               |



### CONTACT US:

(800) 344-3824

info@unitechcdn.com  
www.UniTechCDN.com



# Canada's Nuclear Facilities

This list contains, by licence type, power reactors, uranium mine/mill facilities, uranium refineries and fuel fabrication facilities, radioisotope management facilities, research reactors, particle accelerators and radioisotope uses licensed by the Canadian Nuclear Safety Commission in Canada.

Information is based upon Canadian Nuclear Safety Commission licensing information in 2013.

## Power Reactor Licences

Facility and Location	Type and Number of Units/Capacity	Startup	Status
Pickering Nuclear Generating Station A Pickering, Ontario (Ontario Power Generation)	CANDU-PHW 2 x 500 MW(e)	1971	Operating
Pickering Nuclear Generating Station A Pickering, Ontario (Ontario Power Generation)	CANDU-PHW 2 x 500 MW(e)	1971	Shutdown To be decommissioned
Pickering Nuclear Generating Station B Pickering, Ontario (Ontario Power Generation)	CANDU-PHW 4 x 500 MW(e)	1983	Operating
Darlington Nuclear Generating Station Bowmanville, Ontario (Ontario Power Generation)	CANDU-PHW 4 x 850 MW(e)	1989	Operating
Bruce Nuclear Generating Station A Tiverton, Ontario (Bruce Power)	CANDU-PHW 4 x 750 MW(e)	1976	Operating
Bruce Nuclear Generating Station B Tiverton, Ontario (Bruce Power)	CANDU-PHW 4 x 840 MW(e)	1984	Operating
Gentilly-2 Nuclear Generating Station Gentilly, Québec (Hydro-Québec)	CANDU-PHW 1 x 600 MW(e)	1983	Shutdown To be decommissioned
Point Lepreau Generating Station Lepreau, New Brunswick (New Brunswick Power Corp.)	CANDU-PHW 1 x 600 MW(e)	1982	Operating

## Non-Power Reactor Licences

Unit	Type	In Service	Status
University of Toronto, Toronto, Ontario	Subcritical Assembly	1958	Decommissioned
McMaster University, Hamilton, Ontario	Pool-Type 5 MW(T)	1959	Operating
École polytechnique, Montréal, Québec	Subcritical Assembly	1974	Operating
University of Toronto, Toronto, Ontario	SLOWPOKE-2 20 kW(t)	1976	Decommissioned
École polytechnique, Montréal, Québec	SLOWPOKE-2 20 kW(t)	1976	Operating
Dalhousie University, Halifax, Nova Scotia	SLOWPOKE-2 20 kW(t)	1976	Decommissioned
University of Alberta, Edmonton, Alberta	SLOWPOKE-2 20 kW(t)	1977	Operating
Saskatchewan Research Council, Saskatoon, Saskatchewan	SLOWPOKE-2 20 kW(t)	1981	Operating
Royal Military College, Kingston, Ontario	SLOWPOKE-2 20 kW(t)	1985	Operating
Atomic Energy of Canada Ltd., Chalk River, Ontario	Maple 1 & 2 Reactors 10 MW(t)		Shutdown pending decommissioning

## Nuclear Research and Test Establishment Licences

Unit	Type	Status
<b>Chalk River Laboratories (AECL)</b>		
NRX Reactor	42 MW(t)	Decommissioning
NRU Reactor	135 MW(t)	Operating
Recycle Fuel Fabrication Laboratories	Manufacture of small quantities of mixed oxide fuel for research and demonstration	Operating
PTR Reactor	100 W(t)	Decommissioned and released
ZED-2 Reactor	200 W(t)	Operating



### Nuclear Research and Test Establishment Licences *(continued)*

Unit	Type	Status
Universal Cells	3 isolation cells for examining radioactive material	Operating
Molybdenum-99 Production Facility	Production of Mo-99 and Xe-133	Operating
Health Physics Neutron Generator	Electrostatic accelerator 150 KeV	Operating
Gamma Beam Irradiator GC60	Irradiation Facility	Operating
Gamma Beam 150 C Irradiation Facility	Irradiation Facility	Operating
Waste Treatment Centre and Associated Facilities	Treatment of solid and liquid waste	Operating
Fuels and Materials Cells	12 isolation cells for examining radioactive material	Operating
Waste Management Areas	Storage and handling of waste	Operating/Shutdown
Nuclear Fuel Fabrication Facility	Production of low enriched uranium fuel for research reactors	Operating
Nuclear Fuel Fabrication Facility	Production of low and high enriched uranium fuel targets for research reactors	Operating
Heavy Water Upgrading Facility	Upgrading of heavy water	Decommissioning
CECEUD Test Facility	Upgrade and detritiate heavy water	Shutdown pending decommissioning
Tritium Laboratory	Processing of tritium	Operating
<b>Whiteshell Laboratories (AECL)</b>		
WR-1 Reactor	Organically cooled experimental reactor	Decommissioning
WL Concrete Canister Storage Facilities	Storage of irradiated fuel	Operating
Van de Graaf Accelerator	Proton accelerator, >30 microamps	Decommissioned
14 MeV Neutron Generator		Decommissioned
Active Liquid Waste Treatment Centre	Treatment of liquid waste	Operating
WL Shielded Facilities	Post irradiated examination of fuels, reactor core components and other	Decommissioning
WL Waste Management Area	Storage and handling of waste	Operating
SLOWPOKE Demonstration Reactor	2 MW pool-type reactor	Decommissioned

### Uranium Mine and Mill Facility Licences

Facility	Activity	Status
Beaverlodge, Saskatchewan (Cameco Corporation)	Long-term monitoring	Decommissioned
Cigar Lake Project, Saskatchewan (Cameco Corporation)	Mining	Operating
Cluff Lake, Saskatchewan (AREVA Resources Canada Inc.)	Long-term monitoring	Decommissioned
Key Lake Operation Saskatchewan (Cameco Corporation)	Milling	Operating
McArthur River Project, Saskatchewan (Cameco Corporation)	Mining	Operating
McClellan Lake Project, Saskatchewan (AREVA Resources Canada Inc.)	Milling	Operating
Rabbit Lake Saskatchewan (Cameco Corporation)	Mining and milling	Decommissioning
Denison Mines, Elliot Lake, Ontario (Denison Mines Ltd.)	Above-ground tailings	Decommissioned
Stanrock, Elliot Lake, Ontario (Denison Mines)	Above-ground tailings	Decommissioned
Madawaska Bancroft, Ontario (Madawaska Mines Ltd.)	Long-term monitoring	Decommissioned



## Canada's Nuclear Facilities *continued from page 37*

### Refinery and Fuel Fabrication Facility Licences

Facility	Annual Licensed Production Limit	Status
GE Hitachi Nuclear Energy Canada Inc., Toronto, Ontario	1,800 tonnes of uranium	Operating
GE Hitachi Nuclear Energy Canada Inc., Peterborough, Ontario	1,800 tonnes of uranium	Operating
Port Hope Fuel Manufacturing Facility, Port Hope, Ontario (Cameco)	125 tonnes of UO <sub>2</sub>	Operating
Blind River Uranium Refinery, Blind River, Ontario (Cameco)	24,000 tonnes of uranium as UO <sub>3</sub>	Operating
Port Hope Uranium Conversion Facility, Port Hope, Ontario (Cameco)	12,500 tonnes of uranium as uranium hexafluoride 3,800 tonnes of uranium as UO <sub>2</sub> 1,000 tonnes of uranium as ammonium diuranate 2,000 tonnes of uranium metals	Operating

### Waste Management Licences

Facility	Activity	Status
Radioactive Waste Operations Site 1 Tiverton, Ontario (OPG)	Storage of intermediate level radioactive waste from the Douglas Point nuclear reactor in in-ground concrete trenches and tile holes. The licence was amended in July 2006 to include the Spent Solvent Treatment Facility as minor amounts of nuclear substances remain in the facility from the past processing of spent solvents contaminated with nuclear substances. No new radioactive waste is accepted at the facility.	Storage with surveillance
Western Waste Management Facility, Tiverton, Ontario (OPG)	Processing and/or storage of low level radioactive waste and storage of intermediate level radioactive waste, and processing and storage of spent nuclear fuel from the Bruce NGS	Operating
Pickering Waste Management Facility Pickering, Ontario (OPG)	Processing and storage of spent nuclear fuel from the Pickering NGS and storage of retube components from the Pickering NGS	Operating
Bruce Heavy Water Plant Tiverton, Ontario (OPG)	Decommissioning of the heavy water plant and remediation of the site	Decommissioning
Douglas Point Radioactive Waste Storage Facility Tiverton, Ontario (AECL)	Storage of solid waste from Douglas Point Generating Station, spent fuel storage, no new waste accepted	Storage with surveillance
Gentilly-1 Radioactive Waste Storage Facility Gentilly, Quebec (AECL)	Storage of solid waste from Gentilly-1 NGS, spent fuel storage. No new radioactive waste is accepted.	Storage with surveillance
Gentilly-2 Radioactive Waste Storage Facility Gentilly, Quebec (Hydro-Quebec)	Storage of solid waste and spent fuel storage from Gentilly-2 NGS	Operating
Point Lepreau Solid Radioactive WMF Point Lepreau, New Brunswick (NB Power Nuclear Corporation)	Storage of solid waste and spent fuel storage from Point Lepreau NGS	Operating
Darlington Waste Management Facility Bowmanville, Ontario (OPG)	Processing and storage of spent nuclear fuel from the Darlington NGS	Operating
University of Toronto WMF Toronto, Ontario (University of Toronto)	Storage, handling and compaction of waste from university	Operating
Central Maintenance and Laundry Facility Tiverton, Ontario (Bruce Power)	Managing waste (slightly radioactive clothing materials) from decontamination activities	Operating
Energy Solutions WMF Brampton, Ontario (Energy Solutions Canada)	Storage, handling and compaction of waste from Ontario and Quebec	Operating
Nuclear Power Demonstration WMF Rolphton, Ontario (AECL)	Storage of solid waste from the partial decommissioning of NPD NGS. No new waste accepted.	Storage with surveillance
Port Granby Long-term (LT) WMF Clarington, Ontario (AECL)	Storage of historic waste and chemical treatment of drainage and run-off. No new waste is accepted. Currently undergoing construction.	Storage with surveillance and remediation
Port Hope Long-term (LT) WMF Port Hope, Ontario (AECL)	Storage of historic waste and treatment of drainage and run-off. No new waste is accepted. Currently undergoing construction.	Storage with surveillance and remediation



### Waste Management Licences *(continued)*

Facility	Activity	Status
Elliot Lake WMF Elliot Lake, Ontario (Rio Algom Ltd.)	Multiple tailings management site, chemical treatment of effluent. No new waste accepted.	Decommissioned
Port Hope PSE TSS Port Hope, Ontario (Low-Level Radioactive Waste Management Office)	Storage of historic waste	Operating
Port Hope WMF Port Hope, Ontario (Low-Level Radioactive Waste Management Office, Pine St. Extension Temporary Storage Site)	Storage of historic waste no new waste accepted	Storage with surveillance
Roving Locations (Low-Level Radioactive Waste Management Office, decontamination projects)	Possession of historic waste on an as requested basis	Operating
Agnew Lake Idle Mine Site Nairn Centre, Ontario (Ontario Ministry of Northern Development and Mines)	Above-ground tailings	Decommissioned
Dyno Idle Mine Site Bancroft, Ontario (EWL Management Ltd)	Above-ground tailings	Decommissioned
Rayrock Idle Mine Site Northwest Territories (Department of Indian Affairs and Northern Development)	Above-ground tailings	Decommissioned
Port Radium Idle Mine Site Northwest Territories (Department of Indian Affairs and Northern Development)	Above-ground tailings	Decommissioned
Madawaska Bancroft, Ontario (EWL Management Ltd.)	Above-ground tailings	Decommissioned
Bicroft Tailings Storage Facility Bancroft, Ontario (Barrick Gold Corporation)	Above-ground tailings	Decommissioned

### Particle Accelerator Licences

Facility	Type	Status
Health PEI Charlottetown, Prince Edward Island	2 linacs	Operating
Region Health Authority B Saint John, New Brunswick	3 linacs	Operating
Centre de santé et de services sociaux de Chicoutimi Chicoutimi, Québec	3 linacs	Operating
Centre universitaire de santé McGill Montréal, Québec	3 linacs	Operating
Hospital Maisonneuve-Rosemont Montréal, Québec	6 linacs	Operating
The Board of Governors of the Kingston General Hospital, Kingston, Ontario	4 linacs	Operating
Thunder Bay Regional Health Sciences Centre Thunder Bay, Ontario	3 linacs	Operating
Windsor Regional Hospital Windsor, Ontario	3 linacs	Operating
Cancer Care Manitoba Winnipeg, Manitoba	7 linacs	Operating
Saskatchewan Cancer Agency Regina, Saskatchewan	3 linacs	Operating
Saskatchewan Cancer Agency Saskatoon, Saskatchewan	3 linacs	Operating
Alberta Health Services Calgary, Alberta	6 linacs	Operating
Alberta Health Services Edmonton, Alberta	5 linacs	Operating
Alerta Health Services Lethbridge, Alberta	2 linacs	Operating
Hôpital Général Juif Montréal, Québec	3 linacs	Operating

## Canada's Nuclear Facilities *continued from page 39*

### Particle Accelerator Licences *(continued)*

Facility	Type	Status
Cape Breton District Health Authority Sydney, Nova Scotia	2 linacs	Operating
Régie régionale de la santé (Beauséjour) Moncton, New Brunswick	3 linacs	Operating
British Columbia Cancer Agency Kelowna, British Columbia	3 linacs	Operating
British Columbia Cancer Agency Victoria, British Columbia	3 linacs	Operating
British Columbia Cancer Agency Prince George, British Columbia	2 linacs	Operating
British Columbia Cancer Agency Abbotsford, British Columbia	4 linacs	Operating
Cancer Care Ontario St. Catharines, Ontario	3 linacs	Operating
British Columbia Cancer Agency Vancouver, British Columbia	9 linacs	Operating
Eastern Regional Integrated Health Authority (Eastern Health) St. John's, Newfoundland	4 linacs	Operating
Centre hospitalier universitaire de Sherbrooke Sherbrooke, Québec	1 linac	Operating
Centre hospitalier universitaire de Sherbrooke Fleurimont, Québec	3 linacs	Operating
Centre hospitalier universitaire de Québec Québec, Québec	4 linacs	Operating
Capital District Health Authority Halifax, Nova Scotia	3 linacs	Operating
Hamilton Health Sciences Corporation Hamilton, Ontario	10 linacs	Operating
Centre hospitalier de l'Université de Montréal Montréal, Québec	7 linacs	Operating
Centre de sante et services sociaux Champlain-Charles-Le-Moyne Greenfield Park, Québec	4 linacs	Operating
Hôpital régional de Sudbury Sudbury, Ontario	6 linacs	Operating
The Ottawa Hospital Ottawa, Ontario	9 linacs	Operating
Sunnybrook Health Sciences Centre Toronto, Ontario	10 Cyclotron	Operating
Sunnybrook Health Sciences Centre Barrie, Ontario	3 linacs	Operating
Ciment Québec Inc. Saint-Basile, Québec	2 Neutron Generator	Operating
General Fusion Inc. Burnaby, British Columbia	1 Plasma Injector	Operating
Hilliburton Group Canada Inc. Nisku, Alberta	1 Neutron Generator	Operating
Hunter Well Science Ltd. Calgary, Alberta	1 Neutron Generator	Operating
Centre de sante et de services sociaux de Gatineau Gatineau, Québec	3 linacs	Operating
University Health Network Toronto, Ontario	20 linacs	Operating
Grand River Hospital Corporation Kitchener, Ontario	4 linacs	Operating
London Health Sciences Centre London, Ontario	8 linacs	Operating
McMaster University Hamilton, Ontario	1 tandetron accelerator	Operating





### Particle Accelerator Licences *(continued)*

Facility	Type	Status
McMaster University Hamilton, Ontario	1 cyclotron	Operating
McMaster University Hamilton, Ontario	1 Van de Graaff	Operating
University of Guelph Guelph, Ontario	1 linac	Operating
University of Western Ontario London, Ontario	1 tandetron accelerator	Operating
Queen's University at Kingston Kingston, Ontario	2 Neutron Generator	Operating
Université de Montréal Montréal, Québec	1 Van de Graaff tandem accelerator	Operating
Centre de santé et services sociaux de Laval Laval, Québec	1 tandetron accelerator	Operating
National Research Council Canada Ottawa, Ontario	2 linacs	Operating
Schlumberger Canada Limited Calgary, Alberta	2 linacs	Operating
Scientific Drilling International (Canada) Calgary, Alberta	1 Neutron Generator	Operating
Hotwell Canada Ltd. Calgary, Alberta	1 Neutron Generator	Operating
Montreal Neurological Institute and Hospital Montreal, Quebec	1 Cyclotron	Operating
Centre for Addiction and Mental Health Toronto, Ontario	1 Cyclotron	Operating
Centre hospitalier universitaire de Sherbrooke Sherbrooke, Québec	1 Cyclotron	Operating
Hamilton Health Sciences Corporation Hamilton, Ontario	1 Cyclotron	Operating
University of Ottawa Heart Institute Ottawa, Ontario	1 Cyclotron	Operating
Mervex Corporation Stittsville, Ontario	1 linac	Operating
Lakeridge Health Oshawa, Ontario	6 linacs	Operating
PharamaLogic P.E.T. Services of Montreal Company Lachine, Québec	1 Cyclotron	Operating
Southlake Regional Health Centre Newmarket, Ontario	3 linacs	Operating
St. Joseph's Health Care London, Ontario	1 linac	Operating
Vancouver Cancer Centre Vancouver, British Columbia	1 Cyclotron	Operating
Weatherford Canada Ltd. Edmonton, Alberta	1 Neutron Generator	Operating
Winnipeg Regional Health Authority Winnipeg, Manitoba	1 Cyclotron	Operating

### Nuclear Substance Processing Facility Licences

Facility	Type	Status
New Processing Facility Chalk River Laboratories Chalk River, Ontario	Production and processing	Operating
Nordion (Canada) Inc., Ottawa, Ontario	Production and processing	Operating
SRB Technologies, Pembroke, Ontario	Processing	Operating
Shield Source Inc., Peterborough, Ontario	Processing	Shutdown



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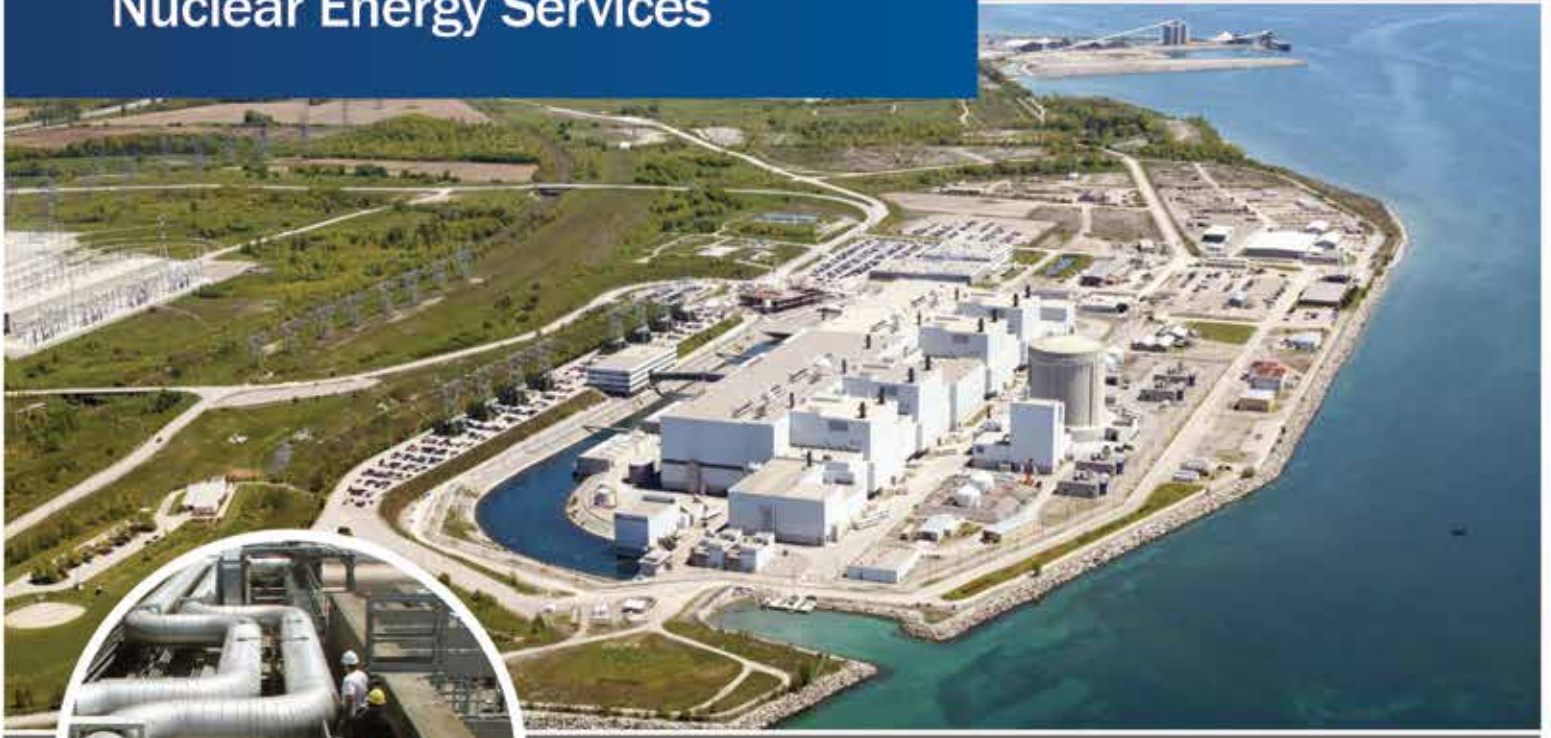




## Nuclear Products, Materials and Services



# Nuclear Energy Services



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Tetra Tech supports the entire nuclear project life cycle, from mining through waste management.

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- Preliminary and detailed design
- Radioactive waste management

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- Procurement
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- Preventative maintenance optimization
- Condition assessments and aging management

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# Nuclear Products, Materials and Services



## A

### Air Filtration Systems

CCI Thermal Technologies Inc.

### Air Headers

Special Electronics and Designs Inc.

### Airlocks, Reactor

RCM Technologies  
Canada Corp. .... 16  
SNC-Lavalin Inc. .... 60

### Alarm Systems

SNC-Lavalin Inc. .... 60

### Analyzers

Avensys Solutions

### Architects, Engineers

SNC-Lavalin Inc. .... 60  
Tetra Tech Wei Inc. .... 44

### Assay Equipment and Services, Uranium

McMaster Nuclear Reactor

### Associations – Guide to Nuclear Related Organizations

Ontario Society of Professional Engineers

## B

### Base Listing Fee

Canadian Nuclear Workers' Council  
Power Workers' Union ..... 4

### Bellows, Metal

Thorburn Flex Inc. .... 14, 58

## C

### Cable Assemblies, Radiation Resistant

Kanata Electronic Services Limited  
Mirion Technologies  
(IST Canada) Inc. .... OBC  
Promation Nuclear Ltd.

### Calandrias, Reactor

Thorburn Flex Inc. .... 14, 58

### Calibration Services

Marsh Instrumentation Ltd. .... 46

### Castings, Nuclear Quality

Promation Nuclear Ltd.

### Chambers, Fission

Cameco Fuel Manufacturing ..... 52  
LND Inc. .... 51  
Mirion Technologies  
(IST Canada) Inc. .... OBC  
SNC-Lavalin Inc. .... 60

### Chambers, Ionization

Cameco Fuel Manufacturing ..... 52  
LND Inc. .... 51  
Mirion Technologies  
(IST Canada) Inc. .... OBC  
SNC-Lavalin Inc. .... 60

### Clothing, Protective

UniTech Services Group ... 35

### Combined Communication Air Hoses

Special Electronics and Designs Inc.

### Commercial Grade Dedication

Kinectrics Inc. .... 2  
Nuclear Logistics Inc. .... 42  
Promation Nuclear Ltd.

### Communications Equipment

Special Electronics and Designs Inc.

### Compressors, Gas

Thorburn Flex Inc. .... 14, 58

### Computer Software Development & Maintenance

SWI Systemware

### Computers, Reactor Control

RPC Radiy  
SNC-Lavalin Inc. .... 60  
Tetra Tech Wei Inc. .... 44

### Configuration Management

Hatch Ltd.

### RCM Technologies

Canada Corp. .... 16  
SNC-Lavalin Inc. .... 60  
SWI Systemware

### Confined Space Communications

Special Electronics and Designs Inc.

### Connectors, Electrical, Radiation Resistant

Kanata Electronic Services Limited

### Construction Management

E.S. Fox Limited ..... 19  
Hatch Ltd.

### Construction, Modular

E.S. Fox Limited ..... 19

### Consultant, Waste and Decommissioning Planning

Arcadis Canada Inc.

Candesco ..... 2  
Nuvia Canada  
Promation Nuclear Ltd.  
SNC-Lavalin Inc. .... 60  
Tetra Tech Wei Inc. .... 44

### Consultants, Design

BWXT Canada Ltd. .... IFC  
Hatch Ltd.  
Marsh Instrumentation Ltd. .... 46  
RCM Technologies  
Canada Corp. .... 16  
SNC-Lavalin Inc. .... 60  
SWI Systemware  
Tetra Tech Wei Inc. .... 44

### Consultants, Economic

Hatch Ltd.

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**BWXT Canada Ltd.**..... IFC  
 Hatch Ltd.  
**Marsh Instrumentation Ltd.** ..... 46  
 NA Engineering Associates Inc.  
**RCM Technologies Canada Corp.**..... 16  
 Rolls-Royce Civil Nuclear Canada Ltd.  
**SNC-Lavalin Inc.** ..... 60  
**Tetra Tech Wei Inc.**..... 44

**Consultants, Environmental**  
 Arcadis Canada Inc.  
 EcoMetrix Incorporated  
 Hatch Ltd.  
**SNC-Lavalin Inc.** ..... 60  
**Tetra Tech Wei Inc.**..... 44

**Consultants, Geotechnical**  
**SNC-Lavalin Inc.** ..... 60

**Consultants, Management**  
**Candesco**..... 2  
 Hatch Ltd.  
**RCM Technologies Canada Corp.**..... 16  
 SWI Systemware  
**Tetra Tech Wei Inc.**..... 44

**Consultants, Materials**  
**RCM Technologies Canada Corp.**..... 16

**Consultants, Procurement**  
**BWXT Canada Ltd.**..... IFC  
 Hatch Ltd.  
**RCM Technologies Canada Corp.**..... 16  
**SNC-Lavalin Inc.** ..... 60  
**Tetra Tech Wei Inc.**..... 44

**Consultants, Radiation and Health**  
 Arcadis Canada Inc.  
**Candesco**..... 2  
 EcoMetrix Incorporated  
 Nuvia Canada  
**Tetra Tech Wei Inc.**..... 44

**Consultants, Seismic**  
**BWXT Canada Ltd.**..... IFC  
 Hatch Ltd.  
**RCM Technologies Canada Corp.**..... 16  
**SNC-Lavalin Inc.** ..... 60  
**Tetra Tech Wei Inc.**..... 44

**Consultants, Stress, Thermal, Vibration**  
**BWXT Canada Ltd.**..... IFC  
 Hatch Ltd.  
**Kinectrics Inc.**..... 2  
**RCM Technologies Canada Corp.**..... 16  
**SNC-Lavalin Inc.** ..... 60  
**Tetra Tech Wei Inc.**..... 44

**Containers, Radiation Shielding**  
 Container Products Corporation  
**E.S. Fox Limited** ..... 19  
 EnergySolutions Canada  
**Niagara Energy Products** ..... 47  
 Nuvia Canada  
 Promation Nuclear Ltd.  
 Rolls-Royce Civil Nuclear Canada Ltd.  
**SNC-Lavalin Inc.** ..... 60

**Containers, Shipping**  
 Container Products Corporation  
**E.S. Fox Limited** ..... 19  
 Promation Nuclear Ltd.

**Containment Structures, Reactor**  
**SNC-Lavalin Inc.** ..... 60  
**Tetra Tech Wei Inc.**..... 44  
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**Contract Staffing**  
 CTS North America  
 SWI Systemware

**Control and Absorber Rods**  
**Cameco Fuel Manufacturing** ..... 52

**Control Rod Drive Mechanisms**  
**Cameco Fuel Manufacturing** ..... 52  
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**Control Rods**  
**Cameco Fuel Manufacturing** ..... 52

**Control Systems, Computerized**  
 Hatch Ltd.  
 Lakeside Process Controls Ltd.  
**Marsh Instrumentation Ltd.** ..... 46  
 RPC Radiy  
**SNC-Lavalin Inc.** ..... 60  
 SWI Systemware  
**Tetra Tech Wei Inc.**..... 44

**Controllers, Programmable**  
**Marsh Instrumentation Ltd.** ..... 46  
 RPC Radiy  
**Tetra Tech Wei Inc.**..... 44

**Controls Modernization**  
 Hatch Ltd.  
 RPC Radiy

**Cranes, Hoists and Material Handling Equipment**  
 Konecranes Nuclear Equipment and Services, LLC.

**Custom Control Panels**  
 Avensys Solutions  
 CCI Thermal Technologies Inc.  
**Nuclear Logistics Inc.** ..... 42  
**SNC-Lavalin Inc.** ..... 60  
**Tetra Tech Wei Inc.**..... 44

**D**  
**Data Acquisition & Handling Systems**  
**BWXT Canada Ltd.**..... IFC  
**Marsh Instrumentation Ltd.** ..... 46  
**Tetra Tech Wei Inc.**..... 44



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## Decommissioning Services Candesco..... 2

EcoMetrix Incorporated  
EnergySolutions Canada  
Nuvia Canada  
Promation Nuclear Ltd.

**SNC-Lavalin Inc. .... 60**  
**Tetra Tech Wei Inc..... 44**  
**UniTech Services Group ... 35**

## Decontamination Services: PCB, Fire/Smoke UniTech Services Group ... 35

## Decontamination, Chemicals, Equipment and Processes

EnergySolutions Canada  
**Kinectrics Inc..... 2**  
Promation Nuclear Ltd.  
**SNC-Lavalin Inc. .... 60**

## Doors, Radiation Shielding E.S. Fox Limited ..... 19

Promation Nuclear Ltd.

## Dryers, Vapour Recovery CCI Thermal Technologies Inc. Tetra Tech Wei Inc.....

## E

Education Courses, Nuclear  
**Canadian Nuclear  
Society ..... 18, 48, 54**

**Educational Services,  
Industry**  
**Kinectrics Inc..... 2**

**Educational Services, Public**  
**Canadian Nuclear  
Society ..... 18, 48, 54**

**Electrical Distribution  
Equipment**  
**Nuclear Logistics Inc.. .... 42**  
RPC Radiy  
**Electrical Engineering**  
**Tetra Tech Wei Inc..... 44**

**Electrical Motors**  
**Nuclear Logistics Inc. .... 42**

**Electronic Repair and  
Refurbishment**  
**Marsh Instrumentation  
Ltd. .... 46**  
**Nuclear Logistics Inc. .... 42**  
Promation Nuclear Ltd.

**End Fittings**  
Laker Energy Products Ltd.  
Niagara Fasteners Inc.  
**Thorburn Flex Inc. .... 14, 58**

**Engineering Construction**  
Hatch Ltd.  
NA Engineering Associates Inc.  
**RCM Technologies  
Canada Corp..... 16**  
**SNC-Lavalin Inc. .... 60**

**Engineering Tools (Design &  
Operation Support)**  
**SNC-Lavalin Inc. .... 60**

**Environmental Qualification**  
**Kinectrics Inc..... 2**  
**Marsh Instrumentation  
Ltd. .... 46**  
**Tetra Tech Wei Inc..... 44**

## F

**Fabrication, Pipe, Nuclear**  
CCI Thermal Technologies Inc.  
Promation Nuclear Ltd.  
**Thorburn Flex Inc. .... 14, 58**

**Fabrication, Pipe, Nuclear**  
**E.S. Fox Limited ..... 19**  
**Niagara Energy  
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**Thorburn Flex Inc. .... 14, 58**

**Fasteners, Nuclear Quality**  
Laker Energy Products Ltd.  
Niagara Fasteners Inc.

**Feeder Services**  
**BWXT Canada Ltd..... IFC**

**Filter Baskets**  
CCI Thermal Technologies Inc.

**Filters, Air**  
CCI Thermal Technologies Inc.

**Filters, Gland Injection  
and Monitor**  
CCI Thermal Technologies Inc.

**Filters, Water, Nuclear**  
CCI Thermal Technologies Inc.

**Fire Protection**  
Hatch Ltd.  
Nuvia Canada  
**SNC-Lavalin Inc. .... 60**  
**Tetra Tech Wei Inc..... 44**

**Flasks, Shielding**  
**E.S. Fox Limited ..... 19**  
Promation Nuclear Ltd.


**Flasks, Shielding**  
**Cameco Fuel  
Manufacturing ..... 52**  
**SNC-Lavalin Inc. .... 60**


**Flow Meters**  
Advanced Measurement and  
Analysis Group Inc. (AMAG Inc.)  
Avensys Solutions  
Lakeside Process Controls Ltd.  
**Marsh Instrumentation  
Ltd. .... 46**  
**Nuclear Logistics Inc. .... 42**

**Flow Switches**  
Avensys Solutions

**Flux Monitor Components**  
**Cameco Fuel  
Manufacturing ..... 52**  
RPC Radiy  
**SNC-Lavalin Inc. .... 60**

**Forgings, Nuclear Quality**  
**Niagara Energy  
Products ..... 47**  
Niagara Fasteners Inc.



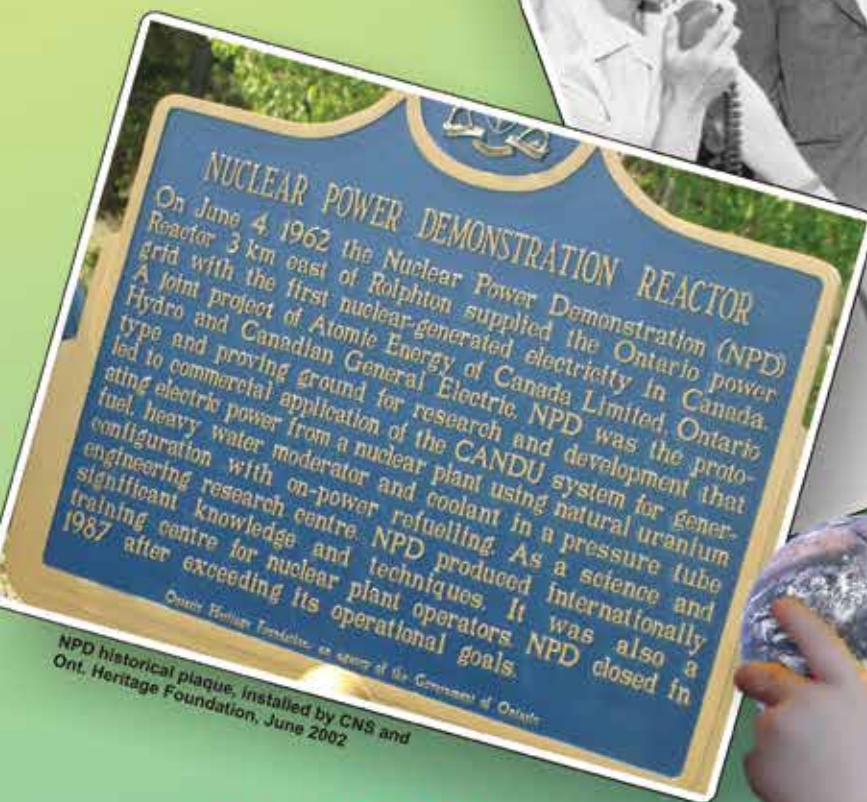


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# Nuclear Products, Materials and Services *continued from page 47*



## Fuel Channel Components

B.C. Instruments  
**BWXT Canada Ltd.**..... IFC  
**Cameco Fuel Manufacturing** ..... 52  
 Laker Energy Products Ltd.  
 Promation Nuclear Ltd.  
**SNC-Lavalin Inc.** ..... 60

## Fuel Element Cladding

**Cameco Fuel Manufacturing** ..... 52

## Fuel Fabrication

**BWXT Canada Ltd.**..... IFC  
**Cameco Fuel Manufacturing** ..... 52

## Fuel Handling Equipment

B.C. Instruments  
**BWXT Canada Ltd.**..... IFC  
 Konecranes Nuclear Equipment and Services, LLC.  
 Laker Energy Products Ltd.  
**Marsh Instrumentation Ltd.** ..... 46  
 Promotion Nuclear Ltd.  
**SNC-Lavalin Inc.** ..... 60  
**Tetra Tech Wei Inc.**..... 44

## Fuel Manufacture

**BWXT Canada Ltd.**..... IFC  
**Cameco Fuel Manufacturing** ..... 52

## Fuel Shuffling Bay Equipment

Konecranes Nuclear Equipment and Services, LLC.  
 Promation Nuclear Ltd.

## Fuel Support Assemblies

**BWXT Canada Ltd.**..... IFC

## Fuel, Power Reactors

**Cameco Fuel Manufacturing** ..... 52

## Fuel, Research Reactors

**Cameco Fuel Manufacturing** ..... 52

## Fuelling Machine Carriages

**BWXT Canada Ltd.**..... IFC  
 Konecranes Nuclear Equipment and Services, LLC.  
 Promation Nuclear Ltd.

## Fuelling Machine Heads

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The full-scale mock-up reactor at Ontario Power Generation's Darlington training and tooling facility.

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**BWXT Canada Ltd.**..... IFC  
**Cameco Fuel**  
**Manufacturing** ..... 52  
 Swagelok Central Ontario  
**Thorburn Flex Inc.** ..... 14, 58

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**Cameco Fuel**  
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### Zirconium

**Kinectrics Inc.**..... 2  
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# U N E N E • R E U G N

University Network of Excellence in Nuclear Engineering  
Réseau d'Excellence Universitaire en Génie Nucléaire

## What the UNENE Universities offer...

- Cutting-edge nuclear research giving real-world post-graduate training.
- Education: A Master's of Engineering Degree from one of the member universities.

- Courses tailored to individuals already working in the nuclear industry, and delivered on weekends in Whitby and via distance learning for all courses, so as not to conflict with core working hours.
- For the degree 10 courses, or 8 courses and an industrial research project, must be successfully completed over a period of 5 years.
- A nuclear engineering diploma\*. The diploma is a four-course subset of the M.Eng.
- A student can take just one or a few courses rather than the full program.
- Students must be registered as graduate students in one of the participating universities.
- The courses are also offered using Distance Education tools for sites remote from the GTA.

The courses comprise:

- ☐ Nuclear Plant Systems and Operations
- ☐ Reactor Physics
- ☐ Heat Transport System Design
- ☐ Nuclear Reactor Safety Design
- ☐ Nuclear Materials
- ☐ Control, Instrumentation and Electrical Systems in CANDU Power Plants
- ☐ Engineering Risk and Reliability
- ☐ Fuel Engineering
- ☐ Fuel Management
- ☐ Operational Health Physics
- ☐ Reactor Chemistry and Corrosion
- ☐ Project Management
- ☐ Operational Health Physics

PLUS: FREE refresher mini-courses prior to the core subjects.

\*Prospective students are advised that offers of admission to a new program may be made only after the university's own quality assurance processes have been completed and the Ontario Universities Council on Quality Assurance has approved the program.

## Who we are...

*The University Network of Excellence in Nuclear Engineering (UNENE) is an alliance of universities, nuclear power utilities, research and regulatory agencies for the support & development of nuclear education, research and development capability in Canadian universities.*

*UNENE's mission is to assure a sustainable supply of qualified nuclear engineers and scientists, and to build and apply university experience to meet the current and future needs of the Canadian nuclear industry.*

For more information, please:

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- HQ Gentilly (1 Unit)
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### Designers and OEM's:

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- GE Canada
- SNC-Nuclear
- CANDU Energy
- AREVA

### Products:

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- D<sub>2</sub>O drum adapter assemblies
- Metallic & rubber hose assemblies for F/M catenary systems
- F/M head fluid quick couplings
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- Water treatment flexible piping assemblies
- Metallic braided hose assemblies for steam service
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Quality Systems

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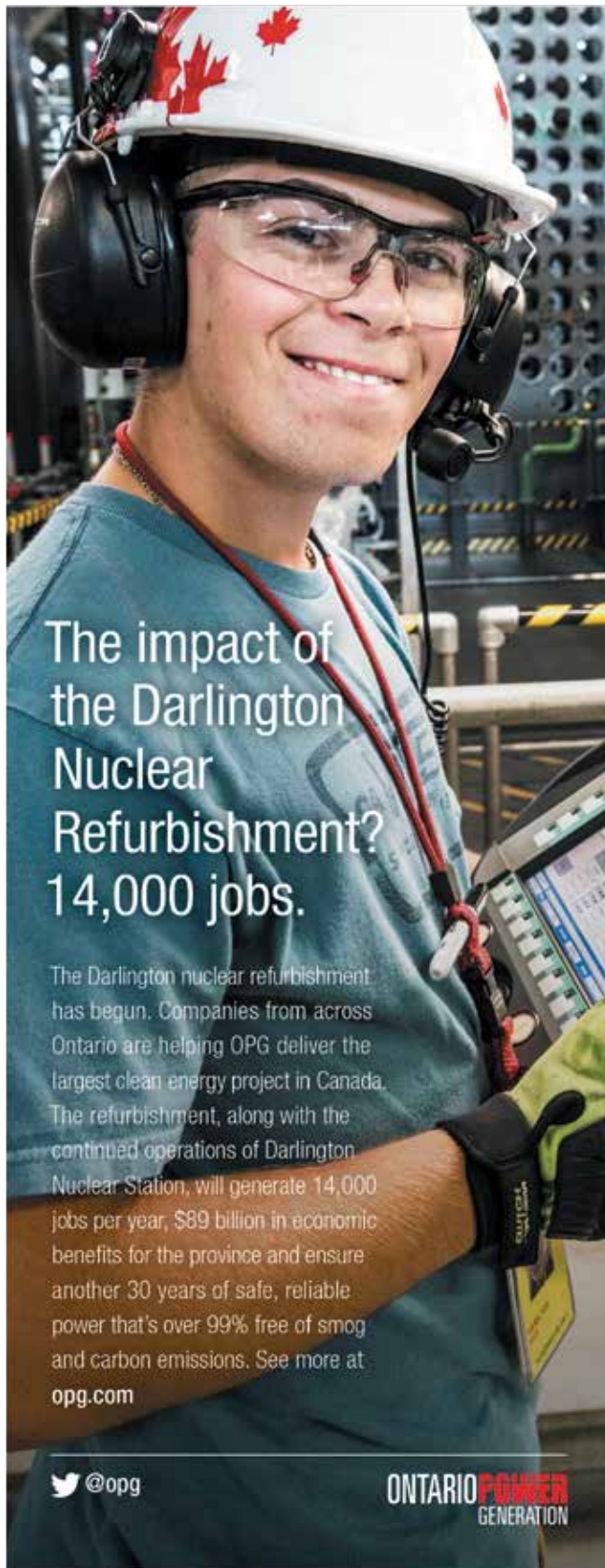
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