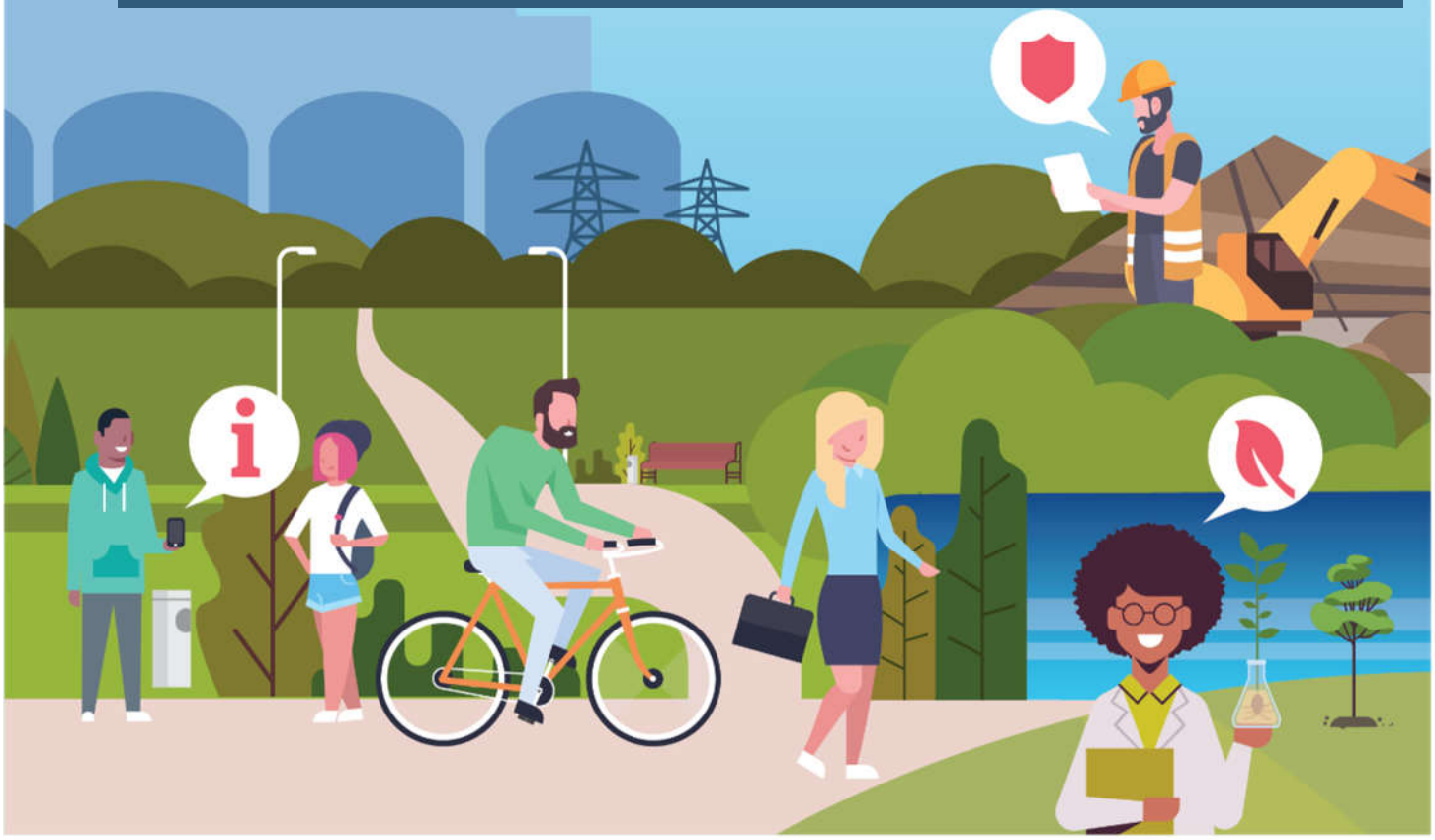
Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CNSC's Annual Report

2019–20

The Canadian Nuclear Safety Commission's (CNSC) annual report provides an overview of Canada's nuclear industry and the regulatory activities that the CNSC undertakes to ensure Canadians' safety.



Canada

2019–20 Annual Report
Canadian Nuclear Safety Commission

ISSN: 1912-0753

Government of Canada Catalogue Number: CC171E-PDF

Published by authority of the Honourable Seamus O'Regan, P.C., M.P., Minister of Natural Resources

Table of contents

Message from the President

As the President and Chief Executive Officer of the Canadian Nuclear Safety Commission (CNSC), I am pleased to present our *2019–20 Annual Report*. This report provides parliamentarians and Canadians with information about the CNSC's work and results achieved over the past fiscal year. The end of the 2019–20 fiscal year brought new and unexpected challenges with the declaration of a global pandemic following the onset of the novel coronavirus (COVID-19). For the CNSC, this meant readying employees to work remotely for an extended period of time. I am proud to say that we have risen to these challenges and met them head on, finding new and innovative ways to ensure that we fulfill our mandate while keeping our staff healthy and safe.

Navigating such uncertain times has demonstrated that we are well served by the CNSC's four organizational priorities, which have continued to guide our efforts over the last year:

- to have a **modern** approach to nuclear regulation
- to be a **trusted** regulator
- to maintain our **global** nuclear influence
- to be an **agile** organization

A **modern** approach to nuclear regulation follows science-based, risk-informed and technically sound regulatory practices that take into account uncertainties and evolving expectations. In 2019–20, the CNSC developed a regulatory readiness strategy to address the challenges of regulating advanced technologies including Small Modular Reactors (SMRs) and to prioritize regulatory efforts. The CNSC also took an important step by signing a memorandum of cooperation with the U.S. Nuclear Regulatory Commission (NRC) to collaborate on licensing activities of SMRs. We continued our oversight of the refurbishments of the Darlington Nuclear Generating Station, and of the Bruce Nuclear Generating Station major component replacement project. Inspections and oversight of these complex infrastructure projects will continue with strong CNSC regulatory oversight of existing facilities.

We also continued work on environmental assessments, including those for the Canadian Nuclear Laboratories' project for a Near Surface Disposal Facility in Ontario, Global First Power's application to prepare a site for a small modular reactor on Atomic Energy of Canada Limited's property at the Chalk River Laboratories location, and two new mine project proposals.

To ensure that the public and Indigenous peoples are confident that the CNSC is an independent, competent and transparent regulator, we are developing a coordinated and focused strategy on

trust building. In 2019, the CNSC continued to work in the spirit of collaboration and partnership to formalize its relationship with three Indigenous groups: the Métis Nation of Ontario, the Saugeen Ojibway Nation and the Historic Saugeen Métis. Terms of reference were signed with these Indigenous groups providing a forum through which we can collaborate and address areas of interest or concern.

The CNSC has always been a leader on the **global** stage, as we strongly believe in the importance of collaborating with fellow regulators and multilateral organizations. In February 2020, I was asked to serve as the new Chairperson of the International Atomic Energy Agency (IAEA) Commission on Safety Standards for a four-year term. This appointment is a testament to the IAEA's high regard for the CNSC's safety culture and leadership, and it serves to further strengthen our position as a global influencer and leader in nuclear safety.

With the high value we place on international collaboration, the CNSC participated in two peer review missions in 2019. On behalf of Canada, the CNSC hosted an Integrated Regulatory Review Service (IRRS) mission in September 2019. This mission offered a unique opportunity for other regulators and the IAEA to assess the CNSC's regulatory framework against international standards and best practices. We also participated in an Emergency Preparedness Review (EPREV) mission to test Canada's level of preparedness for nuclear or radiological emergencies. As a result of the EPREV mission, Canada has created an EPREV Steering Committee to oversee its commitment in addressing all six recommendations and six suggestions. Canada has shared both the IAEA's report and Canada's response with the public in both official languages to hold ourselves accountable. The CNSC's EPREV planning team was awarded the Canadian Nuclear Society 2020 John S. Hewitt Team Achievement Award.

Finally, we have continued to take the necessary steps to ensure that the CNSC is an **agile**, flexible and inclusive organization, with an empowered and equipped workforce, able to quickly adapt to an evolving operating environment. We prioritize the health and well-being of our staff, as we know they are fundamental to our success. Our efforts in this area were recognized this year when the CNSC was named one of the National Capital Region's Top 25 Employers.

We believe diversity and inclusion are critical to spurring innovation, solving complex issues and improving results for Canadians, which is why we developed and implemented the CNSC's new *Diversity and Inclusion Plan 2019–22*. This plan outlines ongoing and new commitments to leverage diversity and to make progress on ensuring we have a safe, inclusive workplace. An important piece of this is my personal goal to promote careers in science, technology, engineering and mathematics – or STEM disciplines – especially for girls and women. We know that infusing our industry with new energy and new perspectives and involving the best and brightest of all genders will help us to adapt to a changing world. The CNSC has continued working on a strategic plan to support our Women in STEM initiative in order to strengthen support and provide a roadmap for our efforts.

I wish to once again recognize the CNSC's highly skilled, professional staff, who are dedicated and committed to keeping Canada's people and environment safe through our regulatory work. In light

of the recent global events I referenced, it is clear that our employees will not be deterred from their regulatory duties and that we will continue to be true to our goals and to enforce the highest safety standards.

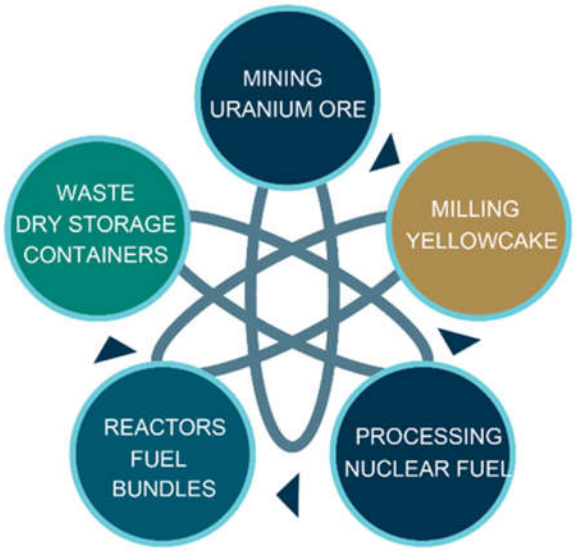
_____

Rumina Velshi

Canada’s nuclear regulator

Who we are

The Canadian Nuclear Safety Commission (CNSC) regulates all nuclear facilities and activities in Canada, including the nuclear fuel cycle.



What is the nuclear fuel cycle?

The nuclear fuel cycle starts with uranium mining, followed by the processing of uranium into fuel for nuclear power plants. After the fuel has been used in nuclear reactors, the CNSC also regulates the safe management of the nuclear waste. Beyond the fuel cycle, the CNSC monitors and ensures the safe use of nuclear materials in medicine, research and other industries.

What the CNSC regulates

1. Uranium mines and mills
2. Nuclear processing and research
3. Nuclear power generation
4. Nuclear medicine
5. Nuclear substances and transportation
6. Waste management
7. Protection of the environment
8. National security and international commitments

The CNSC's regulatory objective

Safe and secure nuclear facilities and processes used solely for peaceful purposes, and a public that is objectively informed about the effectiveness of Canada's nuclear regulatory regime.

To support this objective, the CNSC has five regulatory programs:

Nuclear Fuel Cycle Program

This program regulates facilities associated with the nuclear fuel cycle; specifically, nuclear processing facilities, nuclear waste management facilities, and uranium mines and mills. The program regulates all the lifecycle stages for these facilities – from site preparation, construction and operation to decommissioning (or long-term management, in the case of some nuclear waste facilities).

Nuclear Reactors Program

This program regulates nuclear power plants and research reactors over all lifecycle stages – from site preparation, construction and operation to decommissioning and abandonment (once operations are ended).

Nuclear Substances and Prescribed Equipment Program

This program regulates the use and transport of nuclear substances; prescribed equipment manufacturers and users; and dosimetry providers. It includes regulating the possession of nuclear substances and the delivery of dosimetry services, overseeing the safe transport of nuclear substances, certifying transport packages and prescribed equipment, and overseeing the certification of radiation safety officers for Class II nuclear facilities.

Nuclear Non-Proliferation Program

This program provides assurance to both the Canadian public and the international community that the development, production and use of nuclear energy and nuclear substances, prescribed equipment and prescribed information in Canada are safe and conform to the control measures and international obligations to which Canada has agreed. The CNSC is responsible for implementing Canada's nuclear non-proliferation policy, which contains two broad, long-standing objectives:

1. to assure Canadians and the international community that Canada's nuclear exports do not contribute to the development of nuclear weapons or other nuclear explosive devices
2. to promote a more effective and comprehensive international nuclear non-proliferation regime

Scientific, Regulatory and Public Information Program

This program generates scientific and technical information, institutionalizes the information within the regulatory framework, and publicly disseminates objective scientific, technical and regulatory information.

How the CNSC works

The CNSC is Canada's nuclear regulator. It is composed of a Commission that is independent, and is supported by highly skilled, professional staff who are dedicated and committed to protecting health, safety, security and the environment with respect to all types of authorized nuclear activity.

Reporting

Publishing regulatory actions and reports

CNSC actions are widely communicated to the public, including government, licensees, stakeholders and Indigenous peoples.

Setting requirements

Setting requirements, clarifying when needed and seeking feedback

Requirements are established through legislation, regulations, licences and licence conditions, and are supported by regulatory documents and applicable standards, with ongoing consultations with CNSC stakeholders.

Licensing and certification

Assessing if designs, competencies and measures are sufficient to ensure safety

Reviews to evaluate applications ensure that all those who carry out nuclear-related activities are qualified and capable of undertaking these activities safely.

Overseeing compliance

Verifying that licensees are operating safely

Inspections and reviews are conducted to monitor licensee activity, and to ensure that appropriate corrective measures are taken to address and correct deficiencies or lack of compliance with requirements.

Where we work

The CNSC has headquarters in Ottawa, as well as offices at each of Canada's four power reactor sites, a site office at Chalk River Laboratories, and four regional offices across the country.

1. Calgary Western regional office
2. Saskatoon Uranium Mines and Mills Division regional office
3. Bruce Nuclear Generating Station A and B site office
4. Mississauga Southern regional office
5. Pickering Nuclear Generating Station site office
6. Darlington Nuclear Generating Station site office
7. Chalk River site office
8. Ottawa headquarters
9. Laval Eastern regional office
10. Point Lepreau Nuclear Generating Station site office

Safety starts with people like us

Our staff and their commitment

This report is dedicated to the talented women and men who work for the CNSC – Canada's nuclear regulator. They are more than 900 people who dedicate themselves every day to regulating all nuclear activities and facilities in Canada, and to ensuring that these facilities and activities are safe for Canadians and our environment.

The CNSC has the regulatory power to protect the environment and this responsibility is reflected in all its licences. Its regulatory processes and actions rigorously enforce environmental protection.

The organization's workforce of scientific technical experts and support personnel is composed of a diverse group of individuals. All play an important role in achieving its mandate.

The CNSC is proud to be an inclusive workplace, and is committed to building a skilled workforce that reflects Canadian society. Diversity and inclusion in the workplace are critical to building a healthy environment, where different viewpoints spur innovation and improve results.

The CNSC's staff and their commitment to their work are integral to its motto: "We will never compromise safety."

Commission

Making independent and transparent decisions

The Commission is an independent administrative, quasi-judicial tribunal that makes informed, fair and transparent decisions on the licensing of major nuclear-related activities or facilities, and is central to the functioning of the CNSC. It also establishes legally binding regulations, and sets regulatory policy on matters related to the protection of health, safety, security and the environment and to the implementation of international obligations respecting the peaceful use of nuclear energy.

Before the Commission decides whether to license nuclear-related activities, it considers applicants' proposals, recommendations from CNSC staff and, in most cases, the views from Indigenous peoples, the public and stakeholders. Each licensing decision is based on information that demonstrates if the activity or the operation of a given facility can be carried out safely, how the environment and the health and safety of persons are to be protected, and whether the applicant is qualified. In accordance with its enabling statute, and to promote openness and transparency, the Commission conducts its regulatory business in public hearings[1] and meetings[2] and, where appropriate, it does so in communities where the regulated activities take place. Indigenous peoples and other members of the public can participate in most public proceedings via written submissions and/or oral presentations. Commission hearings and meetings can also be viewed as live webcasts on the CNSC website, and transcripts of public hearings and meetings are also available. Webcasts are archived on the site for at least three months, and the transcripts are available for approximately two years after the session.

Commission members

At fiscal year end, the Commission had five permanent members and three temporary members appointed by the Governor in Council. Four of these permanent members are appointed on a part-time basis. All Commission members are chosen based on their qualifications and expertise. All are independent of political, governmental, special interest group or industry influences and have committed to the highest ethical and conflict-of-interest standards. The CNSC President is the only full-time Commission member. You can read more about the Commission members[3] on the CNSC website.

Results at a glance

The commitment to the CNSC's core responsibility of **nuclear regulation**, the fulfillment of its mandate and the achievement of its departmental results for 2019–20 are guided by four organizational priorities

Results

1 The environment is protected from releases from nuclear facilities and activities.

Page 25

2 Canadians are protected from radiation resulting from nuclear facilities and activities.

Page 25

3 Nuclear material and substances, facilities and activities are secure and used for peaceful purposes.

Page 29

4 Canadians, including Indigenous peoples, have meaningful information about, and the opportunity to participate in, the nuclear regulatory process.

Page 32

Results achieved table

Page 37

Highlights by priority

To have a **modern** approach to nuclear regulation

- Regulatory readiness strategy
- Small Modular Reactors (SMRs)
- Memorandum of cooperation with the U.S. NRC
- Regulating new nuclear technologies in Canada

To be a **trusted** regulator

- Collaboration with Indigenous groups
- CNSC Trust strategy
- *Strengthening Public Trust* side event at the IAEA General Conference

To maintain our **global** nuclear influence

- EPREV and IRRS missions
- CNSC President appointed new Chair of the IAEA Commission on Safety Standards

To be an **agile** organization

- Digital transformation
- Diversity and Inclusion Plan
- Women in Science, Technology, Engineering and Math (WISTEM)

Modern

The CNSC is committed to a **modern approach to nuclear regulation** using science-based, risk-informed, and technically sound regulatory practices that take into account scientific uncertainties and evolving expectations.

Technology continues to advance at a rapid pace, and a growing gap can be observed between this pace and the rate at which government adopts policies and regulations. The drive for innovative technologies in the nuclear sector, such as SMRs and proton therapy facilities, is shaping Canadians' expectations of government and the CNSC. In the context of the CNSC, regulation will need to account for any number of these innovative technologies in the nuclear sector.

Regulatory readiness strategy

In 2019–20, the CNSC focused on developing the capability to evaluate the scope of the regulatory implications of new and innovative nuclear technologies. In particular, it developed a regulatory readiness strategy[4] to address the challenges of regulating advanced reactor technologies and to prioritize regulatory efforts.

Figure 1: The three pillars of the CNSC's regulatory readiness strategy

The CNSC's regulatory readiness strategy for new advanced reactors is built upon three fundamental pillars: risk-informed processes; a capable and agile workforce; and a robust but flexible regulatory framework (see figure 1). A steering committee has been established to provide governance and to ensure that these pillars are appropriately balanced. This regulatory

readiness strategy also resulted in the development and publication of REGDOC-1.1.5, *Supplemental Information for Small Modular Reactor Proponents*[5], which provides guidance for SMR proponents seeking to have their technology licensed in Canada.

In 2019–20, the CNSC formed a working group to explore potential impacts of disruptive, innovative and emerging technologies (DIET) on the CNSC's regulatory framework and to develop an evergreen strategy to respond to them creatively and with agility. DIET can entail both new nuclear technologies to be regulated, and tools that replace human activities in the operation and maintenance of a nuclear facility (artificial intelligence, drones, autonomous vehicles, additive manufacturing, etc.). The DIET working group held meetings with industry and other governmental organizations to discuss technologies they are considering in their work, and to explore regulatory changes that may be needed in the future to continue keeping people and the environment safe. The working group will report to CNSC senior management on potential direction, such as the review of specific regulatory documents or the potential for new or amended regulations.

Regulating new nuclear technology in Canada

The CNSC is no stranger to regulating nuclear innovations. Since 1946, Canada's nuclear regulator has been regulating activities associated with the nuclear industry in Canada. In recent years, new nuclear technologies that have the potential to supply power to smaller electrical grids have been under development. These new reactor designs are widely known as small modular reactors, or SMRs.

On March 20, 2019, Global First Power[6] submitted an application for a licence to prepare site for a small modular reactor[7] on Atomic Energy of Canada Limited's property at the Chalk River Laboratories[8] location. On July 15, 2019, the notice of commencement of an environmental assessment (EA) was posted, inviting comments on the project description from members of the public and Indigenous groups. The comment period closed on September 14, 2019. The next step will be a Commission hearing on the scope of the EA.

Another highlight from 2019–20 was the completion of Phase 1 of the vendor design review (VDR) of the ARC-100 SMR, which demonstrates the CNSC's preparedness at each milestone in the regulatory process for emerging technologies. Currently, the CNSC is engaged in many pre-licensing VDRs[9] for SMRs. A VDR provides an optional opportunity for a vendor to seek CNSC staff assessment of a design prior to any licensed activities that would use that design. An application by a vendor for a review is not an application for a licence to prepare a site or to construct or operate a nuclear power facility, and is not an indication of intent to proceed with a project. Nor does this review certify a reactor design. The conclusions of any design review do not bind or otherwise determine decisions made by the Commission.

More information on SMRs[7] and the CNSC's role in licensing new reactor facilities[10] is available on the CNSC website.

Collaborating on the regulation of technology

The CNSC took an important step in 2019 in signing a memorandum of cooperation[11] with the U.S. Nuclear Regulatory Commission to collaborate on licensing activities for SMRs and Advanced Reactors. Working together allows both regulators to better leverage skills and information in innovative nuclear technologies, to develop common nuclear safety regulatory positions and ultimately to improve efficiencies in regulatory practices.

CNSC President Rumina Velshi and U. S. NRC Chairman Kristine Svinicki sign the memorandum of cooperation during an official signing ceremony in Ottawa, Ontario.

Both regulators have begun cooperating on sharing regulatory insights, starting with two technology vendors which are currently conducting engagement activities in the U.S. and Canada: Terrestrial Energy Inc. (Integral Molten Salt Reactor) and NuScale Power (Integral Pressurized Water Reactor). In Canada, these vendors are currently undergoing vendor design reviews with the CNSC to identify any potential issues that the technologies' designs may present with respect to meeting Canadian regulatory requirements. Looking ahead to 2020–21, future collaborative activities will allow comparison between U.S. and Canadian regulatory practices.

In 2019–20, CNSC President Rumina Velshi delivered presentations in which she shared her thoughts on how regulators could possibly enable the international harmonization of regulations for SMRs and advanced reactors. In November 2019, she discussed this topic during the International Framework for Nuclear Energy Cooperation's Global Ministerial Conference. To view of all President Velshi's presentations, visit the CNSC website[12]. Further to the collaborative effort with the U.S. Nuclear Regulatory Commission, the CNSC also participated in the 2019 International SMR and Advanced Reactor Summit in Atlanta, Georgia. The CNSC's Executive Vice-President and Chief Regulatory Operations Officer Ramzi Jammal was a session chair and delivered a presentation[13], "Advanced Reactor Projects in Canada: Regulatory Status and Perspectives," to share the CNSC's insights.

Boeing Lessons Learned Working Group

Following the fatal crashes involving the Boeing 737-8 MAX aircrafts in October 2018 and March 2019, the CNSC created a Boeing Lessons Learned Working Group to monitor the progress in understanding and to review the responsible authorities' accident investigation reports. The working group is seeking to learn if anything from these accidents could be applicable to the CNSC and the nuclear industry.

The working group has performed a review of the recommendations and grouped them into common themes. The group is taking a risk-informed approach and focusing the review on operating nuclear power plants and small modular reactors. In parallel, the working group is discussing collaboration with other governmental departments and international counterparts. The working group is aiming to deliver a final report in 2020.

Environmental reviews

The *Impact Assessment Act* (IAA) came into force on August 28, 2019. The IAA broadens the scope of assessments to include environmental, health, social and economic effects – both positive and negative – of a proposed project. Under the IAA and the *Physical Activities Regulations*, impact assessments will be conducted on projects identified as having the greatest potential for adverse environmental effects in areas of federal jurisdiction.

Under the IAA, the Impact Assessment Agency of Canada (IAAC) will lead the reviews of major projects and work in collaboration with the CNSC to review projects that are also subject to regulation under the *Nuclear Safety and Control Act*.

In October 2019, the CNSC signed a memorandum of understanding[14] (MOU) with the IAAC. The MOU confirms the commitment of the two signatories to collaborate on integrated impact assessments under the IAA. The CNSC and the IAAC wish to ensure that the principle of "one project – one assessment" is followed in reviewing designated projects regulated by the CNSC, and that all reviews are conducted in an efficient and effective manner, without unnecessary delays or duplication of effort.

In 2019–20, the CNSC worked towards ensuring that managers and employees have the information and support they need to implement the readiness plan in a timely manner. Targeted revisions are being made to REGDOC-2.9.1, *Environmental Protection: Assessments and Protection Measures*[15], which will incorporate changes and update content to reflect the new process under the IAA. The publication of the document with these revisions is scheduled for July 2020.

Trusted

The CNSC continuously strives to be a **trusted regulator** recognized by the public and Indigenous peoples as independent, open and transparent, and as a credible source of scientific, technical and regulatory information.

Building and strengthening relationships

It is our goal to build long-term positive relationships with Indigenous peoples, stakeholders and the public who have an interest in CNSC-regulated facilities and activities, and to be a leader in consultation, engagement and reconciliation. To this end, in 2019–20, the CNSC continued proactive, regionally focused and formalized engagement with interested Indigenous communities and organizations.

Following the Commission hearing for the licence renewal for the Bruce Power Nuclear Generating Station in 2018, the CNSC has continued to work in the spirit of collaboration and partnership to formalize its relationship with 3 Indigenous groups, the Métis Nation of Ontario (MNO), the Saugeen Ojibway Nation (SON) and the Historic Saugeen Métis (HSM).

On December 17, 2019 the CNSC and the MNO signed terms of reference[16] to provide a forum to collaborate and to address areas of interest or concern raised by the MNO regarding CNSC-regulated facilities and activities within the MNO's regions and traditional territories.

CNSC Vice-President and Chief Communications Officer, Jason Cameron, and MNO President Margaret Froh signed the terms of reference in Owen Sound, Ontario.

In April 2019, the CNSC and the HSM, in the spirit of collaboration and partnership, signed terms of reference for long-term engagement. This formalizes our relationship and provides a forum through which both organizations can collaborate and address areas of interest or concern raised by the HSM regarding CNSC-regulated facilities and activities within the HSM's traditional territory.

In May 2019, the CNSC and the SON signed terms of reference to strengthen their relationship and to meaningfully involve the SON in CNSC regulatory activities for nuclear activities in the SON Territory. Work between the SON and the CNSC will include the development of new study and analysis programs, joint review of environmental protection reports, and collaboration in the CNSC's Independent Environmental Monitoring Program. This work will also involve the review and analysis of potential mitigation measures to reduce the impact of the Bruce Nuclear Generating Station on the waters of the SON territory.

From left to right Chief Lester Anoquot, Chief Regulatory Operations Officer Ramzi Jammal, and Chief Greg Nadjiwon.

The CNSC engaged with civil society organizations in 2019 through the first meeting of the Civil Society Forum, which was created with the intent to foster dialogue and cooperation between the CNSC and civil society organizations with an interest in nuclear regulatory activities. The CNSC and environmental non-governmental organizations (ENGOs) have taken steps to collaborate on the establishment of this forum. Beginning with an initial exploratory meeting in February 2020, the forum is intended to reinforce the CNSC's commitment to establishing an ongoing dialogue with ENGOs interested in the CNSC's nuclear regulatory activities. This forum will enable the CNSC and ENGOs to better understand issues of interest or concern and explore opportunities to address those issues. The next step in the process is to work to formalize the forum through drafting terms of reference.

Trust strategy

Building trust with stakeholders is directly connected to CNSC's mandate and is generally delivered through communicating objective, scientific and regulatory information to the public. The CNSC shares this information in an effort to build public confidence and trust in the CNSC's role as a nuclear regulator.

In 2019–20, the CNSC comprehensively examined the issue of public engagement to prepare for developing a strategy for building trust. Nanos Research was retained to conduct a project that included surveying 1,003 Canadians and holding interviews with stakeholders from civil society, elected municipal officials, industry and Indigenous groups. The results revealed that municipal governments, industry stakeholders and Indigenous groups have high

Trust in motion

At the IAEA General Conference in September 2019, Canada hosted a side event entitled Strengthening Public Trust. At this event, the CNSC shared a video[17] which demonstrates how its stakeholders view trust and offers an opportunity for each of us to initiate important conversations about the CNSC and our sustained, steadfast efforts to gain public confidence.

Austin Paul, Wolastoqey First Nation, participates in the Trust in Motion video.

confidence in the CNSC's ability to deliver on its mandate, and that all stakeholders and Indigenous peoples have high confidence in the CNSC's professionalism. In addition, industry and municipal stakeholders, and Indigenous peoples interviewed, believe that the CNSC is ethical, bases its decisions on science, and maintains open dialogue with stakeholders.

The results also highlighted areas where the CNSC could do more. For instance, Nanos found that public awareness of CNSC's work is low; approximately 50% of the public are unaware of the CNSC's existence and 18% of this cohort were unable to formulate an impression of the CNSC. This highlights an opportunity to address gaps and to ensure that the CNSC has an effective awareness strategy.

Continuously improving our regulatory safety culture

Safety is at the heart of everything we do at the CNSC, and a strong regulatory safety culture plays a key role in our work. The CNSC defines safety culture as the characteristics of the work environment, such as values, rules and common understandings, that influence workers' perceptions and attitudes about the importance that the licensee places on safety.

Launched in 2019, the management system – the CNSC Navigator – integrates the key elements of CNSC's work into the holistic framework of programs and activities through which we achieve our goals as Canada's nuclear regulator. Organizations of all sizes have a management system. It is the composite of policies, structures, people, programs, processes, practices, technologies, etc., that are put in place to make the organization work effectively as a single entity with unified objectives.

Following the launch of the Navigator, CNSC published its *Regulatory Safety Culture Policy* in 2020. As an important step in the ongoing work to strengthen the CNSC's regulatory safety culture, this policy identifies the desired regulatory safety culture traits we strive to achieve:

1. Leadership for safety
1. Continuous learning and improvement
2. Personal accountability
3. Questioning attitude
4. Safe environment for raising concerns
5. Communication and collaboration

Global

The CNSC maintains its **global nuclear influence**, leveraging and influencing global nuclear efforts relevant to Canadian interests and activities to enhance international nuclear safety, security and non-proliferation. The CNSC continues to increase collaboration with nuclear regulators from other countries in pursuit of these goals. The CNSC's membership and participation in international activities also ensure that the CNSC's regulatory activities are consistent, as appropriate, with internationally agreed upon best practices and principles.

International peer reviews

From September 3 to 13, 2019, the CNSC hosted an Integrated Regulatory Review Service[18] (IRRS) mission on behalf of Canada. The IRRS is a service provided by the International Atomic Energy Agency (IAEA) to Member States which offers a unique opportunity for other regulators and the IAEA to assess the CNSC's regulatory framework against international standards and best practices.

All CNSC counterparts, IAEA counterparts and team leads who participated in the IRRS mission.

The results from the peer review mission were published in the 2019 IRRS Report to Canada[19], along with Canada's response[20] in February 2020. Through this report, the IAEA confirmed that the CNSC has a strong, effective regulatory framework and demonstrates leadership in multiple areas. The review team noted six good practices that go beyond the fulfillment of international requirements and expectations, and also made 16 suggestions and 4 recommendations to further improve Canada's framework for nuclear safety.

The CNSC took the lead on developing Canada's response to the IRRS mission team's findings, with support from Natural Resources Canada and Health Canada. The CNSC will be tracking progress on all commitments made in Canada's response through its Harmonized Plan Program. The CNSC will take part in a follow-up mission within the next 4 years to demonstrate its

commitment to continuous improvement by confirming that the recommendations and suggestions have been fully addressed. You can learn more about IRRS Mission 2019[21] on the CNSC's website.

Externally, Executive Vice-President, Ramzi Jammal continued to cultivate the CNSC's global influence by leading IRRS missions in the United Kingdom in 2019 and to Japan in 2020. Along with many internal processes, the CNSC's international cooperation provides an additional tool to affirm that nuclear material and substances, facilities and activities are secure and used for peaceful purposes.

International agreements

The CNSC establishes and maintains bilateral regulatory cooperation arrangements with its international counterparts to share information and best practices, with a view of further enhancing nuclear safety and security in Canada and abroad. In 2019, on the margins of the International Atomic Energy Agency (IAEA) General Conference, the CNSC signed memoranda of understanding for cooperation and exchange of information in nuclear regulatory matters with 3 national nuclear regulators: the Moroccan Agency for Nuclear and Radiological Safety and Security, the French Nuclear Safety Authority and the Nuclear Regulatory Authority of Ghana.

You can learn more about international agreements[22] on the CNSC's website.

Emergency preparedness

Being prepared in the event of an emergency is an essential part of being a responsible nuclear regulator. Because nuclear emergency preparedness and response is a shared responsibility in Canada, the CNSC has a comprehensive emergency preparedness program in place and works with nuclear operators, municipal, provincial and federal government agencies, first responders and international organizations to always be ready.

In 2019–20, the CNSC participated in an Emergency Preparedness Review[23] (EPREV) mission to evaluate Canada's level of preparedness for nuclear or radiological emergencies. Led by international experts from the IAEA and hosted by Health Canada, the EPREV mission focused on Canada's compliance with IAEA standards and on determining further actions to protect the health and safety of Canadians during a nuclear emergency. The mission examined arrangements and capabilities at the federal level, and within the provinces of Ontario and New Brunswick, and in the host communities surrounding the Darlington and Point Lepreau nuclear generating stations. The mission provided valuable insight and commended Canada on its well developed and mature nuclear emergency preparedness and response system across all levels of government.

The EPREV review team also acknowledged Canada's successful implementation of the IAEA Safety Standards throughout its emergency preparedness and response program and for exceeding them in some cases. The mission identified several good practices, as well as some opportunities for improvement to further strengthen Canada's ability to prepare for, and

respond to, nuclear emergencies. In February 2020, the IAEA published the final report[24] on the EPREV mission to Canada. In response, Canada prepared an action plan[25] to address the review team's recommendations and suggestions over the next few years.

The CNSC had a strong presence at this year's Structural Mechanics in Reactor Technology (SMiRT 25) conference, held in August 2019 in Charlotte, North Carolina. Nuclear regulators and operators from around the world gathered to discuss a number of current topics, including small modular reactors and the decommissioning of nuclear facilities. This is just another example of how the CNSC builds ties with international partners, shares the results of Canada's regulatory approaches and advanced research, and learns about best practices in other jurisdictions.

Members of the CNSC team at SMiRT 25. From left to right: Seyun Eom, Nebojsa Orbovic, Peter Elder, Rumina Velshi, Khalid Chaudhry and Genady Sagals.

CNSC President appointed new Chair of the Commission on Safety Standards

In early 2020, the International Atomic Energy Agency (IAEA) announced that President Velshi was appointed the new Chair of its Commission on Safety Standards (CSS) for a four-year period. The IAEA's CSS is a standing body responsible for establishing standards relevant to nuclear, radiation, transport and waste safety, and emergency preparedness and response. Forums such as this one provide an important opportunity to consider key safety issues and to discuss how countries can harmonize their work, as well as to share and/or implement bold new approaches. Upon accepting this opportunity, President Velshi shared the following thoughts on her appointment:

> "Here at the CNSC, we strongly believe in the importance of collaborating with fellow regulators and multilateral organizations. I intend to use the chairmanship to build on Canada's contribution and to champion the importance of greater harmonization of standards and ensure they support nuclear innovation while never compromising safety. In doing so, I will be guided by the CNSC's four organizational priorities: modern regulation, trust in the nuclear regulator, global influence and agility. I will also be relying on the hard work and expertise of CNSC staff, and will seek your input and support."

Agile

The CNSC continues to ensure that it is a flexible and inclusive organization, with an empowered and equipped workforce, able to quickly adapt to an evolving operating environment.

Agility through the COVID-19 pandemic

The COVID-19 pandemic quickly altered our reality and has had real implications for all Canadians. The CNSC activated its business continuity plan on March 15, 2020 to ensure continued effective regulatory oversight of the nuclear industry while at the same time, providing for the health and safety of its workers, the public and the environment.

With the activation of business continuity, staff were directed to stay home on March 16, 2020, with critical staff working remotely to oversee the safety of the nuclear industry in Canada. The CNSC quickly adjusted its compliance efforts to continue to maintain oversight while at the same time protecting the health and safety of staff.

A new governance expectation was issued by the CNSC modifying compliance activities during the pandemic, focusing on inspections that cannot be delayed despite the current situation. As of May 1, 2020, some inspections resumed under strict COVID-19 protocol. The transition of the CNSC to a teleworking model required that all staff be provided with the necessary equipment and network access capabilities. This need was given priority and the majority of CNSC staff have been equipped to continue to conduct their work.

The CNSC's focus remains on the health and safety of our staff, our families and our communities while ensuring we have the ability to carry out our mandate to safeguard the public and the environment. As a result, staff will continue to work from home as much as possible while preparations are made for a gradual and phased return to the workplace and a new normal.

Digital transformation

In 2019–20, the CNSC embarked on a digital transformation of key business processes to ensure efficient and effective regulatory oversight. The CNSC's Digital Strategy was developed to support the CNSC's mandate by offering an approach to digital transformation that, as a modern, world-class nuclear regulator, the CNSC must adopt to stay relevant in an ever-evolving technological landscape.

To enable CNSC to reach its defined strategic goals and desired outcomes, the Digital Strategy is supported by four pillars: renovating platforms and processes; modernizing service delivery; leveraging information and data; and fortifying IT security. Key accomplishments in 2019–20 include the publication of the CNSC's information management and data strategy.

Knowledge management

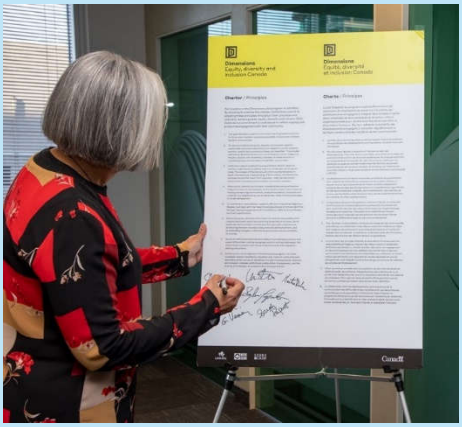
Knowledge management (KM) is about capturing, sharing and building knowledge through people, processes and technology. KM involves ensuring that needed knowledge is consistently stored, transferred, and available when needed. At the CNSC, this is critical for maintaining regulatory excellence and is part of a healthy safety culture. The CNSC's KM initiative is composed of three phases:

- Phase I: Raise awareness and take stock (2016–17)
- Phase II: Identify knowledge and risks (2017–18)
- Phase III: Develop and implement a three-year KM plan (2017–18 to 2019–20)

In 2019–20, the CNSC conducted activities to continue its efforts in ensuring effective KM. These activities included interviews with experts in the CNSC's Power Reactor Program and transformation of the information into knowledge maps, which will be used as a basis for developing knowledge transfer plans. The CNSC also conducted the second annual "Know-vember" information blitz, focused on highlighting tools and mechanisms in place to build, capture and share knowledge at the CNSC.

Supporting equity, diversity and inclusiveness in research

In February 2020, President Rumina Velshi signed the Dimensions EDI charter[26], which aims to foster research excellence, innovation and creativity within the post-secondary sector in Canada across all disciplines, through greater equity, diversity and inclusion. The Dimensions program addresses obstacles faced by, but not limited to women, Indigenous peoples, persons with disabilities, members of visible minorities/racialized groups, and members of LGBTQ2+ communities.



President Rumina Velshi signing the Dimensions EDI Charter.

As a science-based organization, the CNSC is proud to endorse the Dimensions charter, a Government of Canada initiative that provides the foundation of the Dimensions pilot program. Jointly administered by the Natural Sciences and Engineering Research Council of Canada, the Canadian Institutes of Health Research and the Social Sciences and Humanities Research Council, the charter strives to foster post-secondary research excellence through increased equity, diversity and inclusion. By committing to these principles, organizations create opportunities for the full pool of potential participants within the research community.

Diversity and inclusion

The CNSC believes diversity and inclusion are critical to spurring innovation, solving complex issues and improving our results for Canadians. The CNSC strives to be a safe and healthy workplace – one that is inclusive and free from harassment and discrimination – where all employees are able to effectively use their skills, expertise and experience to help deliver on the CNSC's important mandate. Developed and implemented in the 2019–20, the CNSC's new *Diversity and Inclusion Plan 2019–2022* outlines ongoing and new commitments to leverage diversity and to make progress in creating a safe, inclusive workplace.

Women in science, technology, engineering and math: Highlights

Launched in 2019, the Women in STEM initiative[27] (WISTEM) supports women in STEM careers at the CNSC and elsewhere, and aims to raise awareness of STEM in collaboration with interested partners like government, industry and academia. Championed by President Velshi, this initiative contributes to the development of STEM careers for women within our organization and in the broader scientific community. As a science-based organization within a government dedicated to the advancement of women and minorities, the CNSC is taking a leadership role in this area. It is the CNSC's shared belief that the nuclear industry benefits from diverse voices and diverse leadership.

To achieve these goals CNSC is raising awareness of unconscious bias, encouraging and supporting attendance of staff to Women in STEM-related conferences and events, building partnerships among female researchers, and providing mutual support to the IAEA[28] and NEA Initiatives on Gender Mainstreaming[29].

CNSC staff attending a symposium at the National Research Council to celebrate International Day of Women and Girls in Science.

Results: What we achieved

Core responsibility

Nuclear regulation

Departmental result 1

The environment is protected from releases from nuclear facilities and activities.

Departmental result 2

Canadians are protected from radiation resulting from nuclear facilities and activities.

The CNSC regulates the use of nuclear energy and materials to protect health, safety, security and the environment; implements Canada's international commitments on the peaceful use of nuclear energy; and disseminates objective scientific and regulatory information to members of the public. The CNSC maintains a regulatory framework and conducts licensing (including environmental assessments), compliance verification and enforcement. The CNSC is committed to building and maintaining the confidence of the public and Indigenous peoples through transparent, open and inclusive regulatory processes.

For the CNSC to achieve its planned results, risks must be identified, monitored and controlled across all nuclear facilities and activities by CNSC inspectors who conduct compliance verification activities for nearly 1,600 licensees across various sectors. Ensuring compliance with legislation, regulations and licensing requirements is one of the CNSC's core business processes and is carried out through compliance verification and enforcement[30]. Together, these activities enable the CNSC to assure Canadians about licensees' continuing compliance and safety performance, which provide for the protection of the environment and Canadians.

To learn more about the CNSC's oversight of safety procedures and adherence to regulatory policy of licensees, read the CNSC's Regulatory Oversight Reports[31].

Environmental assessments

The CNSC continued environmental assessments under the *Canadian Environmental Assessment Act, 2012,* with projects including Global First Power's Micro Modular Reactor and the Near Surface Disposal Facility proposed by Canadian Nuclear Laboratories (CNL). Some of the decommissioning projects of which the CNSC is conducting environmental assessments are CNL's Nuclear Power Demonstration facility and Whiteshell Reactor-1. In 2019, the CNSC began overseeing

environmental assessments of two new mines, Denison Mines Corporation's Wheeler River and NexGen Energy Ltd.'s Rook I.

In 2019–20, the CNSC continued to provide regulatory oversight of and environmental reviews for the Port Hope Area Initiative, representing the Government of Canada's commitment to respond to community-recommended solutions for the cleanup and local, long-term, safe management of historic low-level nuclear waste. In addition, the CNSC reviewed licensee planning for new radioisotope production at the Bruce and Darlington Nuclear Generating Stations. CNSC staff continue to work closely with Bruce Power and Ontario Power Generation (OPG) to provide oversight of these first-of-a-kind technologies. OPG and their partners are progressing with work on the Mo-99 isotope irradiation system and CNSC staff continue to perform regulatory oversight activities as planned.

Refurbishments and major component replacement

The CNSC is providing regulatory oversight for the refurbishment activities at the Darlington Nuclear Generating Station and the major component replacement at the Bruce Nuclear Generating Station.

At the Darlington Nuclear Generating Station, the CNSC is continuing to perform inspections throughout the refurbishment process of two units. Unit 2 was scheduled to return to service by June 2020, but in light of the uncertainty caused by COVID-19 and related impacts, OPG has revised this start date to early November 2020. Additional information on the refurbishment and continued operation of the Darlington Nuclear Generating Station[32] is available on the CNSC website.

The major component replacement at Bruce began on January 17, 2020 as scheduled, and all fuel was removed from the core on March 11, 2020. The CNSC will continue to execute inspections throughout the four-year activity. The COVID-19 pandemic, however, has caused the licensee work to be delayed but the project is going. CNSC oversight activities have been completed as planned, with one exception – a training inspection of contractor onboarding practices, which has also been delayed due to the pandemic.

The CNSC is not only providing ongoing robust regulatory oversight of existing facilities, but also conducting research on aging reactors throughout their lifecycle to maintain safety throughout the lifecycle of Canada's nuclear stations.

Waste and decommissioning highlights

The following draft regulatory documents are scheduled to go before the Commission for its consideration in June 2020. If they are approved, these documents will complete the CNSC's regulatory framework for waste and decommissioning.

1. REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste*

2. REGDOC-2.11.1, *Waste Management, Volume III: Safety Case for Long-Term Radioactive Waste Management*, Version 2
3. REGDOC-2.11.2, *Decommissioning*
4. REGDOC-1.2.1, *Guidance on Deep Geological Repository Site Characterization*
5. REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities*

Laboratories Canada initiative

The CNSC laboratory is planning to join other federal laboratories under the Laboratories Canada Initiative (formerly the Federal Science and Technology Infrastructure Initiative). The laboratory is key to many of the CNSC's scientific developments and is collaborating with other federal government departments to improve government science as a whole.

A number of activities related to this initiative were undertaken in 2019–20, including a review of the National Capital Area TerraCanada science plan by the Government Chief Scientific Advisors review panel and the development of the Laboratory Science Statement of Functional Requirements.

Independent Environmental Monitoring Program

Complementary to its ongoing compliance verification program, the CNSC independently verifies that the public, Indigenous communities and the environment around licensed nuclear facilities are safe through its Independent Environmental Monitoring Program (IEMP)[33]. The IEMP process consists of developing site-specific sampling plans for each nuclear facility, and then processing and analyzing the samples collected. The sampling plans focus on measuring concentrations of contaminants in the environment at publicly accessible locations such as parks, residential communities and beaches, and in areas of interest identified in environmental risk assessments. Samples may be taken for air, water, soil, sediment, vegetation such as grass and weeds, and some food such as meat and produce. Samples are analyzed in the CNSC's laboratory for both radioactive and hazardous substances related to a facility's activities and the results are compared to applicable guidelines, screening levels or reference locations.

All results from the operations of the sites sampled in 2019, the CNSC's eighth year of IEMP sampling, demonstrated that there were no expected impacts to the environment and human health. The nuclear sites sampled in 2019 were: Chalk River Laboratories; Bancroft closed mine sites; BWXT Nuclear Energy Canada Inc. (Toronto and Peterborough); Bruce Power nuclear power generating site; Port Hope Project and Port Granby Project; and TRIUMF.

Regulatory framework

The current *Radiation Protection Regulations*[34] (RPR) are largely based upon the 1991 recommendations of the International Commission on Radiological Protection (ICRP 60). In order to ensure that the Regulations take into account the most up-to-date international

standards and recommendations, a regulatory proposal was pre-published in the *Canada Gazette, Part I*[35] on June 15, 2019. The CNSC will take all comments into account prior to finalizing the proposal for consideration by the CNSC's Commission to make the regulations, and for the Governor in Council to consider approval of the regulations.

In addition, the CNSC maintains its regulatory framework, consisting of the laws[36] passed by Parliament that govern the regulation of Canada's nuclear industry, and the regulations, licences and regulatory documents that are used to regulate the industry. In 2019–20, the CNSC published 11 regulatory documents[37]. Regulatory documents may contain practical guidance to licensees and applicants on how to meet the CNSC's regulatory requirements. Such guidance can include information on possible approaches to the design of nuclear facilities, the design and implementation of required management and operational programs, and forms for applying for licences or reporting information to the Commission.

Gender-based analysis plus (GBA+) in regulations

The CNSC continues its efforts towards incorporating GBA+ considerations in all its regulatory framework documents, evaluations, and development of cabinet proposals.

In 2019–20, GBA+ considerations were taken into account in the development of proposed amendments to our *Radiation Protection Regulations*. The CNSC focused on the changes that could have unintended impacts on different groups such as female nuclear energy workers and breastfed infants.

An internal working group was created to draft a GBA+ policy statement and action plan for the organization. This working group collaborated with other federal departments to learn from their experiences with GBA+.

Nuclear security

Departmental result 3

Nuclear material and substances, facilities and activities are secure and used for peaceful purposes.

Nuclear security is a major consideration in all activities of the CNSC. The CNSC is responsible for enforcing Canada's *Nuclear Security Regulations*[38] and works closely with nuclear operators, law enforcement and intelligence agencies, international organizations and other government departments to ensure that nuclear materials and facilities are adequately protected. Licensees adhere to stringent nuclear security requirements set forth by the CNSC and have programs in place to prevent the theft, loss or illicit use of nuclear substances.

The *Nuclear Security Regulations* define security-related information requirements for certain nuclear facilities, including high-security sites. The regulations are in place so that Canada continues to fulfill its international obligations for the security of nuclear and radioactive materials, both in Canada and internationally. In its efforts to enhance nuclear security in Canada, in 2019–20 the CNSC continued to review and modernize its *Nuclear Security Regulations* as the last major revision to the regulations was completed in 2006. Since then, security threats, operational experience and technological advancements have evolved. There is a need to ensure that requirements consider technological advancements and keep up with international recommendations, guidance and best practices.

The CNSC will engage with industry and other potentially impacted stakeholders and Indigenous groups in 2021 to obtain feedback on its regulatory proposals.

To ensure that effective, efficient and relevant regulatory oversight and guidance continues to be provided to licensees of high-security sites, the CNSC has continued work in 2019–20 to address the findings from a number of activities. These activities include: the evaluation of the CNSC's Performance Testing Program (PTP); the 2015 International Physical Protection Advisory Service mission; the 2016 U.S. NRC Inter-Agency visit; and a four year (2014–17) review of the PTP Security Exercise and Licensee (High-Security Sites) Drill and Exercise Program.

Combining the findings of these activities, the action plan identifies areas where the CNSC needed to establish a strategy to ensure development of its own personnel and resources for future

sustainability, and provide regulatory guidance to licensees in order to promote the development of their programs.

In 2019–20, the CNSC continued to implement the improvement initiatives in this action plan, including revising the manual used by licensees during PTP exercises to provide greater clarity of regulatory expectations.

Cyber security

In 2019–20, the CNSC continued work on preparing a documented strategy for its regulatory oversight of cyber security though its cyber security roadmap. The strategy considers both computer-based systems and cyber security intelligence, and is intended for broad implementation, in a risk-informed manner, across all licensed facilities and activities.

The objectives of the strategy are to set the regulatory framework's high-level cyber security goals, which will be achieved by regulatory documents and activities for cyber security. Some of the elements in the strategy include:

- how threat assessment is performed, documented and maintained
- how cyber security objectives are determined
- approaches for implementation, integration and coordination of cyber security activities
- measures to maintain and sustain computer security capabilities
- how secure information is shared within the CNSC and amongst stakeholders
- measures and resources for responding to cyber-attacks

Non-proliferation and import/export controls

The major elements of Canada's nuclear non-proliferation policy involve supporting international non-proliferation initiatives and activities, import and export controls, implementation of international safeguards measures, and security commitments.

The CNSC implements regulatory programs to ensure that CNSC licensees – and Canada at large – meet the obligations arising from international safeguards agreements. Safeguards agreements ensure that all nuclear materials in Canada remain in peaceful use, and that international transfers of nuclear goods and technology are used solely for peaceful purposes. Within the IAEA's annual Safeguards Statement[39], a "broader conclusion" is issued for designated states, verifying that nuclear material is not diverted from peaceful uses. In 2019–20, the CNSC maintained the IAEA broader conclusion for Canada, as it has every year since 2005.

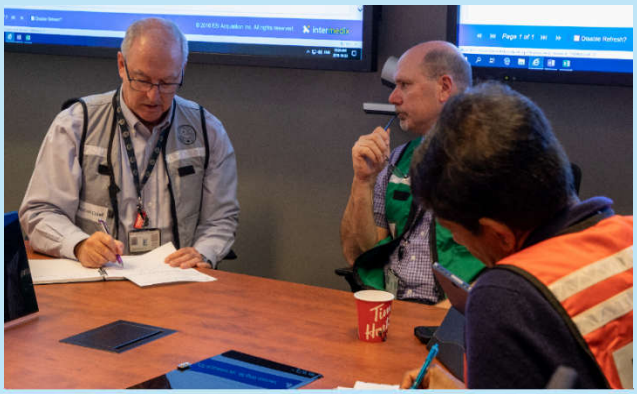
During 2019–20, the CNSC conducted technical licensing assessments and made licensing decisions on applications for the import and export of nuclear substances, prescribed equipment and prescribed information, in accordance with the *Nuclear Non-proliferation Import and Export Control Regulations*[40] and the *General Nuclear Safety and Control*

Regulations[41]. A total of 1,014 import and export licensing decisions were made by the CNSC under these regulations.

Emergency Management

Being prepared in the event of an emergency is an essential part of being a responsible nuclear regulator. Because nuclear emergency preparedness and response is a shared responsibility in Canada, the CNSC has a comprehensive emergency preparedness program in place and works with nuclear operators, municipal, provincial and federal government agencies, first responders and international organizations to always be ready. As per CNSC REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response,* Version 2[42], enhanced safety requirements and regulatory requirements, as well as through rigorous training, all Canadian nuclear power plant operators are required to perform emergency exercises and drills to ensure they are prepared for the unexpected.

On October 22 and 23, the CNSC Emergency Operations Centre was activated in Ottawa as CNSC staff participated in "Huron Resilience", Bruce Power's full-scale nuclear exercise. During the exercise, simulated seismic events affected the stability of station units at Bruce Power. Staff worked in collaboration with the licensee, the Municipality of Kincardine, the Office of the Fire Marshal and Emergency Management, and Health Canada to oversee Bruce Power's emergency management response to ensure that the public was well informed and that the environment was protected throughout the emergency exercise.



CNSC staff in the Emergency Operations Centre work through the status of the exercise event.

On Sunday January 12, 2020 the CNSC's emergency response was put into practice when a broadcast intrusive alert, alleging an incident at the Pickering Nuclear Generating Station, was mistakenly sent across Ontario. The alert was sent out during a routine test by the Provincial Emergency Operations Centre, which coordinates the Government of Ontario's response to major emergencies. The Government of Ontario's Ministry of the Solicitor General published a report on the investigation[43] into the emergency alert, as well as developed a Provincial Emergency Operations Centre Action Plan[44]. Various groups within the CNSC, including the Strategic Communications Directorate and the Emergency Management Programs Division, are reviewing the impact of the false alert and are participating in a lessons-learned exercise to continuously improve emergency management and response. The CNSC's response to the false alert was presented to the Commission in June 2020.

Scientific and regulatory information

Departmental result 4

Canadians, including Indigenous peoples, have meaningful information about, and the opportunity to participate in, the nuclear regulatory process.

The CNSC integrates the best available science into its decision making. The CNSC maintains research initiatives and programs to ensure that it keeps abreast of new scientific information, develops its own knowledge base and shares its research findings with stakeholders and scientists in Canada and abroad.

Research is carried out on a wide range of topics, from health studies on nuclear workers and host communities to research the long-term management of nuclear waste in geological repositories.

The CNSC offers the public a comprehensive list of all relevant scientific and technical information[45] on its website. Topics can be searched according to the CNSC's 14 safety and control areas (SCAs)[46], which are used to assess, evaluate, review, verify and report on regulatory requirements and performance. The SCAs are presented in a comprehensive framework and grouped into three primary functional areas: management, facility and equipment, and core control processes.

Research and Support Program

The CNSC funds an external research program to obtain knowledge and information needed to support its regulatory mission. The program provides the CNSC with access to independent advice, expertise, experience, information and other resources via contracts, grants and contributions placed in the private sector, and with other agencies and organizations in Canada and elsewhere.

Research and Support Program: **$3.4 M**

- **$1.29M** invested in 24 research projects
- **$2.05M** invested in 28 contribution agreement
- **$63K** towards 10 grants

Directed by CNSC staff, research initiatives and programs are often completed with the support of independent third parties and/or in collaboration with national and international partners, providing access to valuable expertise, state-of-the-art facilities and the best available data. The outcome of these research activities helps the CNSC understand and address new or emerging safety issues, gain third-party perspectives on nuclear science, and share scientific knowledge with the nuclear industry and the public at large. For more information on the outcomes of this program, visit the CNSC's website[47].

The program is compiled from project proposals submitted from across the CNSC. In 2019–20, $1.29 million was invested in 24 research projects, $2.05 million was invested in 28 contribution agreements, and 10 grants totaling $63,000 were made.

Health studies at the CNSC

The CNSC continuously conducts and reviews health studies in various areas associated with the production, possession or use of nuclear substances. The information gathered in these studies guides the CNSC in decisions that strengthen its regulatory framework.

In the fall of 2019, the CNSC gained the distinction of becoming the first non-European organization to join the Multidisciplinary European Low Dose Initiative, or MELODI[48], a European platform dedicated to low- dose radiation risk research. CNSC's involvement in MELODI will help to advance low dose radiation research coordination and collaboration on an international scale and bring a Canadian perspective.

The Canadian Organization on Health Effects from Radiation Exposure (COHERE) was initiated in 2019. The initiative built on the formal agreement between Health Canada and the CNSC to share information and to cooperate on studies or assessments relevant to the health effects of nuclear substances and nuclear energy. COHERE's immediate goals include maintaining and enhancing expertise in dosimetry, radiobiology and epidemiology within the Government of Canada; aligning research priorities; and providing informed and consistent messaging on matters involving low-dose/dose rate ionizing radiation.

You can find more information on research conducted on health-related issues[49] on the CNSC website.

Consultation and engagement

Consultation with the public, Indigenous groups, licensees and interested organizations is an important part of the CNSC's process for developing many of the tools within its regulatory framework. The CNSC welcomes input from the public and Indigenous groups on draft regulatory documents that are open for consultation.

Each regulatory document open for public comment is made available for a specified period of time (at least 30 days). At the end of the consultation period, CNSC staff review all input and comments are posted for feedback on the CNSC website. Comments submitted (including names and affiliations) are made public in the official language in which they were received. The CNSC also holds workshops and meetings with stakeholders on a case-by-case basis and on request.

The consultation section[50] of the CNSC website provides up-to-date information on current consultations for regulatory initiatives, the necessary information and guidance on how to participate.

Regulatory consultation

In 2019–20, public consultation was conducted for one set of proposed regulations (*Radiation Protection Regulations*) via the *Canada Gazette, Part I*. In addition, nine draft regulatory documents were posted for public consultation:

1. REGDOC-1.6.2*, Developing and Implementing an Effective Radiation Protection Program for Nuclear Substances and Radiation Devices*
2. REGDOC-2.2.4, *Fitness for Duty, Volume II: Managing Drug and Alcohol Use,* Version 3
3. REGDOC-2.7.1, *Radiation Protection*
4. REGDOC-2.7.2, *Dosimetry, Volume I: Ascertaining Occupational Dose*
5. REGDOC-2.10.2, *Fire Protection*
6. REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste*
7. REGDOC-2.11.1, *Waste Management, Volume III: Assessing the Long Term Safety of Radioactive Waste Management,* Version 2
8. REGDOC-2.11.2, *Decommissioning*
9. REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities*

Indigenous and public engagement and consultation

The CNSC is a responsive regulator that supports public and Indigenous participation in the CNSC's regulatory processes. The CNSC's public hearings and meetings are open to the public, held where appropriate in communities where activities take place and always live webcast. This is recognized internationally as a best practice.

The public and Indigenous peoples are also provided with the opportunity to review and give input on draft regulatory framework documents prior to publication, as well as regulatory oversight reports and other CNSC reports and initiatives, where appropriate. Furthermore, the CNSC frequently participates in community outreach activities, and responds to media calls and public information inquiries.

In particular, the CNSC makes it a priority to build long-term positive relationships and trust with Indigenous communities with an interest in CNSC-regulated activities and facilities. The Whiteshell Laboratories licence renewal hearings in October 2019 garnered specific attention from this population. CNSC President Rumina Velshi reached out to the leadership of a number of Indigenous communities with an interest in the Whiteshell site to offer them the opportunity to have an introductory meeting and discuss their concerns and priorities. Interested groups had the opportunity to participate in tours and discussions with President Velshi within their communities.

President Velshi meeting with leadership from Sagkeeng First Nation in February 2020 in their community during her tour of Manitoba.

Funding to enhance Indigenous and public participation

The CNSC continued to administer its Participant Funding Program (PFP), which was established in 2011 to enhance the participation of Indigenous peoples, members of the public, and stakeholders in Commission proceedings, including environmental assessments for major nuclear facilities.

This past year, the PFP awarded $1,125,192.34 to 88 recipients. This included funding to 51 Indigenous communities or organizations to support participation in CNSC regulatory processes, including appearances before the Commission to share their findings and perspectives, meetings with CNSC staff, and Indigenous knowledge studies related to CNSC-regulated facilities and activities.

In 2019–20, the CNSC's PFP awarded funding to support **18** meetings with Indigenous communities and organizations and CNSC staff.

In addition, the PFP awarded a total of **$1,125,192.34** to **88** recipients of which **51** were Indigenous communities or organizations.

Learn more about the PFP[51] and watch a short CNSC information video[52] about it by visiting the CNSC website.

Reaching out to Canadians

Disseminating information is a large part of the CNSC's mandate. CNSC staff travel across the country to visit Canadians and answer questions on nuclear regulation. They participate in community meetings, town halls and open houses to build relationships with stakeholders. This

ongoing dialogue is important for increasing public understanding and trust in the CNSC's role of protecting Canadians, their health and the environment.

Engaging stakeholders through "Meet the Nuclear Regulator" sessions

From uranium mines to facilities for research and final waste disposal, Canada's nuclear facilities remain among the safest and most secure in the world. The CNSC offers opportunities throughout Canada to meet the experts who make that possible.

These dynamic sessions introduce the CNSC and its work of ensuring that Canadian nuclear facilities and activities are safe. Through information sessions, CNSC staff strive to build understanding of and public confidence in Canada's nuclear regulatory regime, as well as to offer the public an opportunity to learn about how to participate in the licensing process.

In 2019–20, there were **41** "Meet the Nuclear Regulator sessions" attended by **1,308** total participants.

This past year, 41 information sessions were delivered either in person or online through webinars to a total of 1,308 participants. Learn how to participate in an upcoming "Meet the Nuclear Regulator" session[53] by visiting the CNSC website.

Keeping the public informed

In its ongoing commitment to transparency and openness, CNSC staff continued to respond to public questions about nuclear safety. In 2019–20, the CNSC responded to 1,220 public information inquiries. The CNSC posted 4 feature articles to its website and disseminated 13 new publications.

Online engagement

899,027 YouTube views in 2019–20

Disseminating information is part of the CNSC's mandate, but that information also has to be accessible and understood. One of the goals of the CNSC's social media platforms – YouTube[54], Facebook[55], LinkedIn[56] and Twitter[57] – is to provide technical information in plain language that explains complicated nuclear science in simple terms. In 2019–20, the CNSC posted 2,030 times on social media channels and engaged with the public through these platforms a total of nearly 40,000 times.

The CNSC continues to invest resources in its social media engagement, not only by sharing information, but also by answering questions from its followers, often with the assistance of a subject-matter expert.

Results achieved

Departmental results	Performance indicators	Target	Date to achieve target	2017–18 Actual results	2018–19 Actual results	2019–20 Actual results
The environment is protected from releases from nuclear facilities and activities.	Number of instances of radiological releases that exceeded regulatory limits	0	March 31, 2020	1[58]	0	1[59]
	Number of instances of hazardous releases that exceeded regulatory limits	0	March 31, 2020	2[60]	9[61]	2[62]
	Percentage of Independent Environmental Monitoring (IEMP) samples (food, water, air and vegetation) that met guidelines	100%	March 31, 2020	90%[63]	97%[63]	98.9%[64]
Canadians are protected from radiation resulting from nuclear facilities and activities.	Number of radiation doses to members of the public that exceeded regulatory limits	0	March 31, 2020	0	1[65]	0
	Number of radiation doses to workers that exceeded regulatory limits	0	March 31, 2020	1[66]	1[67]	2[68]
Nuclear material and substances, facilities and activities are secure and used for peaceful purposes.	Number of instances of non-peaceful or malicious use of Canadian exports of nuclear substances, equipment and information	0	March 31, 2020	0	0	0
	Number of lost or stolen radioactive sealed sources	≤2	March 31, 2020	0	0	0
	Canada's international commitments to the International Atomic Energy Agency (IAEA) with respect to nuclear safeguards and verification are met	Receipt of broader conclusion	December 31, 2019	Met	Met	Met
Canadians, including Indigenous peoples, have meaningful information about, and the opportunity to participate in, the nuclear regulatory process.	Percentage of CNSC proceedings that were accessible to members of the public and Indigenous peoples	90%	March 31, 2020	100%	100%	100%
	Percentage of CNSC proceedings for which the Participant Funding Program (PFP) was made available to members of the public and Indigenous peoples	90%	March 31, 2020	100%	100%	100%
	Percentage of CNSC proceedings documents that were available to members of the public and Indigenous peoples in a timely manner	90%	March 31, 2020	100%	100%	100%
	Number of Indigenous peoples who participated in CNSC proceedings	Increasing trend	March 31, 2020	20	18[69]	22

The notes cited in the table above, which provide additional information on the CNSC's results, are available at the end of report.

Budgetary financial resources (dollars)

2019–20 Main Estimates	2019–20 Planned spending	2019–20 Total authorities available for use	2019–20 Actual spending (authorities used)	2019–20 Difference (Actual spending minus Planned spending)
100,803,165	107,748,059	107,318,207	101,570,723	(6,177,336)

Human resources (full-time equivalents)

2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2019–20 Difference (Actual full-time equivalents minus Planned full-time equivalents)
639	605	(34)

Financial, human resources and performance information for the CNSC's program inventory is available in the GC InfoBase[70].

Internal services

Description

Internal services are those groups of related activities and resources that the federal government considers to be services in support of programs and/or required to meet corporate obligations of an organization. Internal services refer to the activities and resources of the 10 distinct service categories that support Program delivery in the organization, regardless of the internal services delivery model in a department. The 10 service categories are:

- Acquisition management
- Communications
- Financial management
- Human resources management
- Information management
- Information technology
- Legal services
- Materiel management
- Management and oversight
- Real property management

Experimentation

In 2019–20, the CNSC used design thinking workshops to review the effectiveness of the organization's programs. This opportunity allowed staff to identify gaps and offer solutions to improve existing processes and procedures. Some workshop topics included: planning and reporting, CNSC outreach, the processes and content of Commission Member Documents and dissemination of information.

Employee health and well-being

The CNSC strongly believes that ensuring a mentally healthy work environment helps all employees perform at their best. Throughout the year, the organization works to promote mental well-being through activities including participation in the Bell Let's Talk[71] event, monthly mental health breaks, and a friendly annual fitness challenge to encourage physical activity.

To support employees who may be facing challenges with their mental health, the organization offers a number of resources, including access to "LifeSpeak", an online health and wellness platform. Through this platform employees have access to videos, podcasts, action plans and "Ask the Expert" sessions on issues from depression to nutrition to financial health and parenting.

Providing a respectful and healthy workplace is not only essential but the right thing to do. Working together, we can drive positive change. Each of us has a role to better understand mental health and building healthy workplaces.

Budgetary financial resources (dollars)

2019–20 Main Estimates	2019–20 Planned spending	2019–20 Total authorities available for use	2019–20 Actual spending (authorities used)	2019–20 Difference (Actual spending minus Planned spending)
43,842,009	48,511,367	46,726,220	46,394,660	(2,116,707)

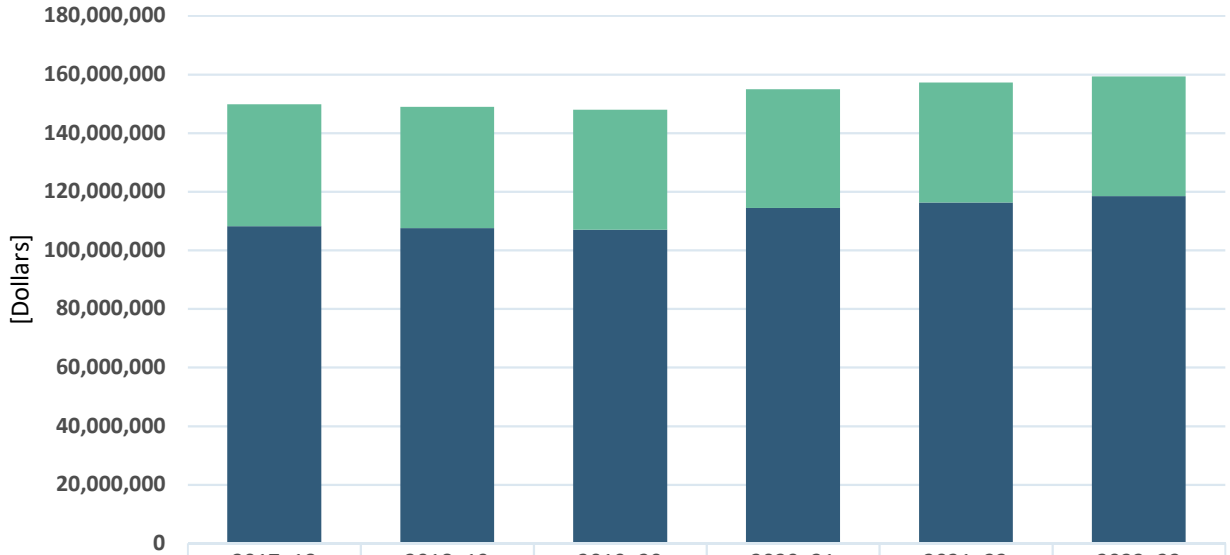
Human resources (full-time equivalents)

2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2019–20 Difference (Actual full-time equivalents minus Planned full-time equivalents)
296	281	(15)

Analysis of trends in spending and human resources

Actual expenditures

Departmental spending trend graph



	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23
Voted	41,624,040	41,367,246	40,926,404	40,522,928	40,914,452	40,914,452
Statutory	108,169,265	107,555,860	107,038,979	114,445,507	116,276,937	118,420,555
Total	149,793,305	148,923,106	147,965,383	154,968,435	157,191,389	159,335,007

Budgetary performance summary for core responsibilities and internal services (dollars)

Core Responsibilities and Internal Services	2019–20 Main Estimates	2019–20 Planned spending	2020–21 Planned spending	2021–22 Planned spending	2019–20 Total authorities available for use	2017–18 Actual spending (authorities used)	2018–19 Actual spending (authorities used)	2019–20 Actual spending (authorities used)
Nuclear regulation	100,803,165	107,748,059	106,939,338	108,473,336	107,318,207	102,683,841	100,067,374	101,570,723
Internal services	43,842,009	48,511,367	48,029,097	48,718,053	46,726,220	47,109,464	48,855,732	46,394,660
Total	144,645,174	156,259,426	154,968,435	157,191,389	154,044,427	149,793,305	148,923,106	147,965,383

The CNSC's Main Estimates for the fiscal year 2019-20 totaled $144.6 million, compared to total authorities of $154.0 million. The $9.4 million increase is primarily attributable to:

- contributions to employee benefit plans for personnel expenditures related to subsections 21(3) of the *Nuclear Safety and Control Act* that are not included in the 2019–20 Main Estimates, $9.6 million
- funds received from the Treasury Board of Canada Secretariat for negotiated salary adjustments and for the reimbursement of eligible paylist expenses, $1.9 million
- an operating budget carry-forward from 2018–19 to 2019–20, $1.1 million
- an decrease of revenue spending authority based on final costs, ($3.2 million)

The marginal decrease in actual spending from $149.8 million in 2017-18 to $148.9 million in 2018-19 is due to reduced retroactive salary payments and professional services, offset in part by implementation costs to replace the CNSC's financial and material management system, which was operational on April 1, 2019. In 2019-20, actual spending decreased to $148.0 million due to the non-recurring implementation costs incurred in 2018-19 for the CNSC's new financial and material management system, a decrease full-time equivalent (FTE) utilization, partially offset by retroactive salary payments made in 2019-20.

Actual spending was $148.0 million in 2019-20, compared with planned spending of $156.3 million due to cost containment measures implemented internally subsequent to the 2019-20 Departmental Plan, augmented by some activities being delayed into 2020-21, in part due to COVID-19.

Planned spending is forecasted to increase to $155.0 million in 2020-21 and $157.2 million in 2021-22, primarily as a result of salary increases under the collective agreement and a projected higher level of staffed positions.

The CNSC has taken a number of measures to prevent the effects of the COVID-19 virus such as safety and health measures for our staff (like physical distancing and working from home). For 2019-20, the financial impact on our organization and results is limited mostly to a reduction in planned travel, conferences and some professional services offset by equipment purchases to support staff in working remotely.

Actual human resources

Human resources summary for core responsibilities and internal services (full-time equivalents)

Core responsibilities and internal services	2017–18 Actual full-time equivalents	2018–19 Actual full-time equivalents	2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2020–21 Planned full-time equivalents	2021–22 Planned full-time equivalents
Nuclear regulation	585	625	639	605	618	612
Internal services	269	293	296	281	287	286
Total	854	918	935	886	905	898

The increase in FTEs from 854 FTEs 2017-18 to 918 FTEs in 2018-19 was mainly due to the implementation of the workforce renewal initiative, which focused on the recruitment and development of new graduates to meet the organization's future needs for senior regulatory and technical officers. In 2018-19, the CNSC amended the FTEs determination to include students and alumni personnel and implemented a more effective methodology to allocate costs and FTEs by program.

The decrease in FTEs from 918 in 2018-19 to 886 in 2019-20 was mainly due to the cost containment initiatives and the timing of positions vacated and subsequently staffed during the year.

The FTE forecast anticipates marginal changes to 905 FTEs in 2020-21 and 898 FTEs in 2021-22.

Expenditures by vote

For information on the CNSC's organizational voted and statutory expenditures, consult the Public Accounts of Canada 2019–2020[72].

Government of Canada spending and activities

Information on the alignment of the CNSC's spending with the Government of Canada's spending and activities is available in the GC InfoBase[70].

Financial statements and financial statements highlights

Financial statements

The CNSC's financial statements (audited) for the year ended March 31, 2020 are available on the departmental website[73].

Financial statements highlights

Condensed statement of operations (unaudited) for the year ended March 31, 2020 (dollars).

Financial information	2019–20 Planned results	2019–20 Actual results	2018–19 Actual results	Difference (2019–20 Actual results minus 2019–20 Planned results)	Difference (2019–20 Actual results minus 2018–19 Actual results)
Total expenses	175,514,000	167,523,084	165,533,480	(7,990,916)	1,989,604
Total revenues	125,496,000	118,507,107	117,090,114	(6,988,893)	1,416,993
Net cost of operations before government funding and transfers	50,018,000	49,015,977	48,443,366	(1,002,023)	572,611

The actual total revenues of $118.5 million were 5.6% or $7.0 million lower than planned revenues of $125.5 million, as a result of lower than initially planned salaries and employee benefits expenses, and slightly lower than planned fees for special projects. The actual total expenses of $167.5 million were 4.6% or $8.0 million less than planned expenses of $175.5 million as a result of lower than planned salaries and associated employee benefits costs, professional and special services and travel expenses.

The CNSC's total expenses increased by 1.2% or $2.0 million and revenues increased by 1.2% or $1.4 million from 2018-19 to 2019-20. The increase in expenses was primarily due to amortization as a result of implementing the new financial system and rising contributions under the Research and Support Program and the Participant Funding Program. The increase in revenue was attributable to an increase in fees for nuclear substances used for commercial and industrial activities as the CNSC continues to phase in increases to recover the costs for these activities, in addition to an increase in revenues from special projects due to increased demand for vendor design reviews for small modular reactors.

Condensed statement of financial position (unaudited) as of March 31, 2020 (dollars)

Financial Information	2019–20	2018–19	Difference (2019–20 minus 2018–19)
Total net liabilities	51,282,603	45,320,297	5,962,306
Total net financial assets	34,208,634	28,499,853	5,708,781
Departmental net debt	17,073,969	16,820,444	253,525
Total non-financial assets	13,467,852	16,815,543	(3,347,691)
Departmental net financial position	(3,606,117)	(4,901)	(3,601,216)

The increase of $6.0 million in the CNSC's net liabilities is mainly due to an increase in the amounts of year-end refunds payable to licensees resulting from the excess collection of fees charged over the actual fees earned at year-end.

The increase of $5.7 million in the CNSC's net financial assets is primarily a result of an increase in the amount due from the Consolidated Revenue Fund, which are amounts due from the federal government that may be disbursed without further charges to the CNSC's authorities.

The increase of $0.3 million in departmental net debt is a result of the increase of net liabilities offset by an increase in total net financial assets.

The decrease of $3.3 million in non-financial assets is a result of a decrease in the net book value of tangible capital assets as amortization expenses exceeded the cost of new capital acquisitions.

The decrease of $3.6 million in CNSC's departmental net financial position, which is the difference between total non-financial assets and the departmental net debt, is attributable to the decrease in tangible capital assets.

Additional information

Organizational profile

Appropriate minister: Seamus O'Regan
Institutional head: Rumina Velshi
Ministerial portfolio: Natural Resources Canada[74]
Enabling instrument: *Nuclear Safety and Control Act*[75]
Year of incorporation / commencement: 2000
Other: The CNSC's headquarters are located in Ottawa, Ontario. The CNSC maintains 11 regional offices, both at major facilities and elsewhere, in order to conduct inspections of licensees across the country on a regular basis.

Raison d'être, mandate and role: Who we are and what we do

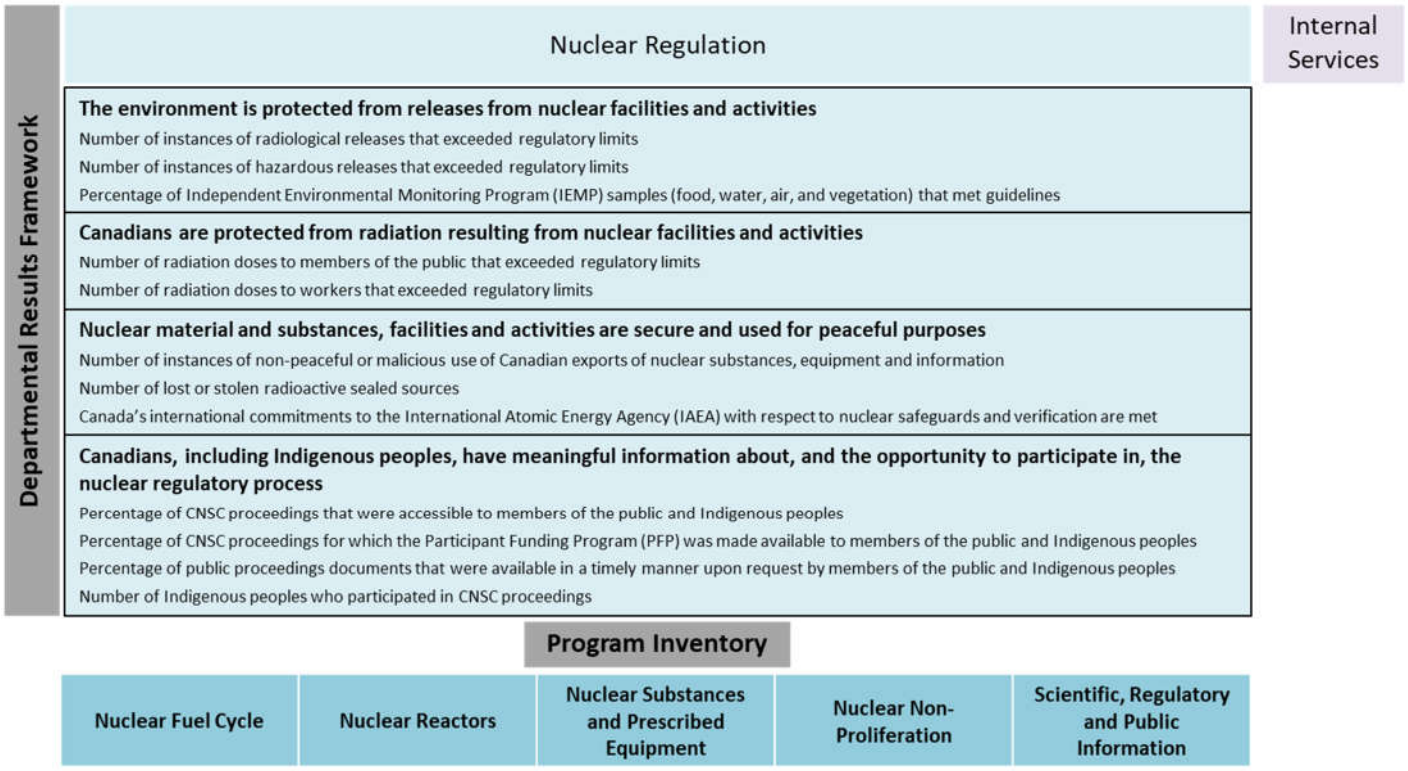
"Raison d'être, mandate and role: who we are and what we do" is available on the CNSC's website[76].

Operating context and key risks

Information on operating context and key risks is available on the CNSC's website[76].

Reporting framework

The CNSC's departmental results framework and program inventory of record for 2019–20 are shown below.



Supporting information on the program inventory

Financial, human resources and performance information for the CNSC's program inventory is available in the GC InfoBase[70].

Supplementary information tables

The following supplementary information tables are available on the CNSC's website[76]

- Corporate information
- Departmental Sustainable Development Strategy
- Gender-based analysis plus (GBA+)

Federal tax expenditures

The tax system can be used to achieve public policy objectives through the application of special measures such as low tax rates, exemptions, deductions, deferrals and credits. The Department of Finance Canada publishes cost estimates and projections for these measures each year in the Report on Federal Tax Expenditures[77]. This report also provides detailed background information on tax expenditures, including descriptions, objectives, historical information and references to related federal spending programs. The tax measures presented in this report are the responsibility of the Minister of Finance.

Organizational contact information

Head office
280 Slater Street
P.O. Box 1046, Station B
Ottawa Ontario K1P 5S9
Canada

Telephone: 613-995-5894
Toll free: 1-800-668-5284
Fax: 613-995-5086

Email: cnsc.info.ccsn@canada.ca
Website: nuclearsafety.gc.ca

Appendix: Definitions

appropriation (crédit)

Any authority of Parliament to pay money out of the Consolidated Revenue Fund.

budgetary expenditures (dépenses budgétaires)

Operating and capital expenditures; transfer payments to other levels of government, organizations or individuals; and payments to Crown corporations.

Core Responsibility (responsabilité essentielle)

An enduring function or role performed by a department. The intentions of the department with respect to a Core Responsibility are reflected in one or more related Departmental Results that the department seeks to contribute to or influence.

Departmental Plan (plan ministériel)

A report on the plans and expected performance of an appropriated department over a three-year period. Departmental Plans are tabled in Parliament each spring.

Departmental Result (résultat ministériel)

A Departmental Result represents the change or changes that the department seeks to influence. A Departmental Result is often outside departments' immediate control, but it should be influenced by program-level outcomes.

Departmental Result Indicator (indicateur de résultat ministériel)

A factor or variable that provides a valid and reliable means to measure or describe progress on a Departmental Result.

Departmental Results Framework (cadre ministériel des résultats)

Consists of the department's Core Responsibilities, Departmental Results and Departmental Result Indicators.

experimentation (expérimentation)

Activities that seek to explore, test and compare the effects and impacts of policies, interventions and approaches, to inform evidence-based decision-making, by learning what works and what does not.

full-time equivalent (équivalent temps plein)

A measure of the extent to which an employee represents a full person-year charge against a departmental budget. Full-time equivalents are calculated as a ratio of assigned hours of work to scheduled hours of work. Scheduled hours of work are set out in collective agreements.

gender-based analysis plus (GBA+) (analyse comparative entre les sexes plus [ACS+])

An analytical process used to help identify the potential impacts of policies, Programs and services on diverse groups of women, men and gender differences. We all have multiple identity factors that intersect to make us who we are; GBA+ considers many other identity factors, such as race, ethnicity, religion, age, and mental or physical disability.

government-wide priorities (priorités pangouvernementales)

For the purpose of the 2019–20 Departmental Results Report, those high-level themes outlining the government's agenda in the 2015 Speech from the Throne, namely: Growth for the Middle Class; Open and Transparent Government; A Clean Environment and a Strong Economy; Diversity is Canada's Strength; and Security and Opportunity.

horizontal initiative (initiative horizontale)

An initiative where two or more departments are given funding to pursue a shared outcome, often linked to a government priority.

non-budgetary expenditures (dépenses non budgétaires)

Net outlays and receipts related to loans, investments and advances, which change the composition of the financial assets of the Government of Canada.

performance (rendement)

What an organization did with its resources to achieve its results, how well those results compare to what the organization intended to achieve, and how well lessons learned have been identified.

performance indicator (indicateur de rendement)

A qualitative or quantitative means of measuring an output or outcome, with the intention of gauging the performance of an organization, program, policy or initiative respecting expected results.

performance reporting (production de rapports sur le rendement)

The process of communicating evidence-based performance information. Performance reporting supports decision making, accountability and transparency.

plan (plan)

The articulation of strategic choices, which provides information on how an organization intends to achieve its priorities and associated results. Generally a plan will explain the logic behind the strategies chosen and tend to focus on actions that lead up to the expected result.

planned spending (dépenses prévues)

For Departmental Plans and Departmental Results Reports, planned spending refers to those amounts presented in Main Estimates.

A department is expected to be aware of the authorities that it has sought and received. The determination of planned spending is a departmental responsibility, and departments must be

able to defend the expenditure and accrual numbers presented in their Departmental Plans and Departmental Results Reports.

priority (priorité)

A plan or project that an organization has chosen to focus and report on during the planning period. Priorities represent the things that are most important or what must be done first to support the achievement of the desired Strategic Outcome(s) or Departmental Results.

program (programme)

Individual or groups of services, activities or combinations thereof that are managed together within the department and focus on a specific set of outputs, outcomes or service levels.

result (résultat)

An external consequence attributed, in part, to an organization, policy, program or initiative. Results are not within the control of a single organization, policy, program or initiative; instead they are within the area of the organization's influence.

statutory expenditures (dépenses législatives)

Expenditures that Parliament has approved through legislation other than appropriation acts. The legislation sets out the purpose of the expenditures and the terms and conditions under which they may be made.

Strategic Outcome (résultat stratégique)

A long-term and enduring benefit to Canadians that is linked to the organization's mandate, vision and core functions.

target (cible)

A measurable performance or success level that an organization, program or initiative plans to achieve within a specified time period. Targets can be either quantitative or qualitative.

voted expenditures (dépenses votées)

Expenditures that Parliament approves annually through an Appropriation Act. The Vote wording becomes the governing conditions under which these expenditures may be made.

Endnotes

[1] Canadian Nuclear Safety Commission, Public Commission hearings, http://www.nuclearsafety.gc.ca/eng/the-commission/hearings/index.cfm

[2] Canadian Nuclear Safety Commission, Public Commission meetings, http://www.nuclearsafety.gc.ca/eng/the-commission/meetings/index.cfm

[3] Canadian Nuclear Safety Commission, Commission Members, http://www.nuclearsafety.gc.ca/eng/the-commission/commission-members/index.cfm

[4] Canadian Nuclear Safety Commission, Strategy for Readiness to Regulate Advanced Reactor Technologies, http://www.nuclearsafety.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/readiness-regulate-advanced-reactor-technologies.cfm

[5] Canadian Nuclear Safety Commission, REGDOC-1.1.5, *Supplemental Information for Small Modular Reactor Proponents*, http://nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/history/regdoc1-1-5.cfm

[6] Canadian Nuclear Safety Commission, Global First Power Micro Modular Reactor Project, https://www.nuclearsafety.gc.ca/eng/reactors/research-reactors/nuclear-facilities/chalk-river/global-first-micro-modular-reactor-project.cfm

[7] Canadian Nuclear Safety Commission, Small Modular Reactors, http://www.nuclearsafety.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/small-modular-reactors.cfm#_blank

[8] Canadian Nuclear Safety Commission, Chalk River Laboratories, http://www.nuclearsafety.gc.ca/eng/reactors/research-reactors/nuclear-facilities/chalk-river/index.cfm

[9] Canadian Nuclear Safety Commission, Pre-Licensing Vendor Design Review, http://www.nuclearsafety.gc.ca/eng/reactors/power-plants/pre-licensing-vendor-design-review/index.cfm

[10] Canadian Nuclear Safety Commission, New Reactor Facilities, http://www.nuclearsafety.gc.ca/eng/reactors/power-plants/new-reactor-facilities/index.cfm

[11] Canadian Nuclear Safety Commission, CNSC signs a memorandum of cooperation with the U.S. Nuclear Regulatory Commission, https://www.nuclearsafety.gc.ca/eng/resources/international-cooperation/international-agreements/cnsc-usnrc-smr-advanced-reactor-moc.cfm

[12] Canadian Nuclear Safety Commission, Presentations by CNSC President and CEO, http://nuclearsafety.gc.ca/eng/resources/presentations/2019.cfm#president

[13] Canadian Nuclear Safety Commission, Advanced Reactor Projects in Canada: Regulatory Status and Perspectives, https://www.nuclearsafety.gc.ca/eng/pdfs/Presentations/VP/2019/20190403-Ramzi-presentation-Atlanta.eng.pdf

[14] Canadian Nuclear Safety Commission, CNSC Signs MOU with the Impact Assessment Agency of Canada, http://www.cnsc-ccsn.gc.ca/eng/acts-and-regulations/memorandums-of-understanding/mou-impact-assessment-agency-canada.cfm

[15] Canadian Nuclear Safety Commission, REGDOC-2.9.1, *Environmental Policy, Assessments and Protection Measures* – Impact Statement, http://www.nuclearsafety.gc.ca/eng/acts-and-regulations/consultation/comment/regdoc2-9-1-policy/impact.cfm

[16] Canadian Nuclear Safety Commission, Indigenous Consultation, Engagement and Reconciliation, http://www.nuclearsafety.gc.ca/eng/resources/aboriginal-consultation/index.cfm

[17] Canadian Nuclear Safety Commission, Trust in Motion, https://www.youtube.com/watch?v=E_VtmrPgD2Y&feature=youtu.be

[18] International Atomic Energy Agency, Integrated Regulatory Review Service (IRRS), https://www.iaea.org/services/review-missions/integrated-regulatory-review-service-irrs

[19] International Atomic Energy Agency, 2019 IRRS Report to Canada, https://www.iaea.org/sites/default/files/documents/review-missions/irrs_canada_2019_final_report.pdf

[20] Canadian Nuclear Safety Commission, Canada's Response to the 2019 IRRS Report http://www.nuclearsafety.gc.ca/eng/resources/international-cooperation/irrs/canada-response-irrs-2019.cfm

[21] Canadian Nuclear Safety Commission, IAEA Integrated Regulatory Review Service Mission to Canada, http://www.nuclearsafety.gc.ca/eng/resources/international-cooperation/index.cfm#review

[22] Canadian Nuclear Safety Commission, International Agreements, https://www.nuclearsafety.gc.ca/eng/resources/international-cooperation/international-agreements.cfm

[23] International Atomic Energy Agency, Emergency Preparedness Review (EPREV) Service, https://www.iaea.org/services/review-missions/emergency-preparedness-review-eprev-service

[24] International Atomic Energy Agency, EPREV Mission to Canada, https://www.iaea.org/node/51147

[25] Canada, Canada's response: 2019 International Atomic Energy Agency emergency preparedness review, https://www.canada.ca/en/health-canada/services/health-risks-safety/radiation/radiological-nuclear-emergencies/how-canada-prepares/international-atomic-energy-agency-emergency-preparedness-review-mission-canada-june-2019/canada-response.html

[26] Natural Sciences and Engineering Research Council of Canada, Dimensions Charter, https://www.nserc-crsng.gc.ca/NSERC-CRSNG/EDI-EDI/Dimensions-Charter_Dimensions-Charte_eng.asp

[27] Canadian Nuclear Safety Commission, Women in STEM, http://www.nuclearsafety.gc.ca/eng/resources/women-in-stem.cfm

[28] International Atomic Energy Agency, Gender at the IAEA, https://www.iaea.org/about/overview/gender-at-the-iaea

[29] Nuclear Energy Agency, Bridging the gender gap: NEA Initiative To Encourage Girls To Pursue STEM, https://www.oecd-nea.org/news/2018/2018-05.html

[30] Canadian Nuclear Safety Commission, The CNSC's Approach to Compliance Verification and Enforcement, http://www.nuclearsafety.gc.ca/eng/acts-and-regulations/compliance-verification-and-enforcement/index.cfm

[31] Canadian Nuclear Safety Commission, Regulatory Oversight Reports, http://www.nuclearsafety.gc.ca/eng/resources/publications/reports/regulatory-oversight-reports/index.cfm

[32] Canadian Nuclear Safety Commission, Darlington Nuclear Generating Station, http://www.nuclearsafety.gc.ca/eng/reactors/power-plants/nuclear-facilities/darlington-nuclear-generating-station/index.cfm

[33] Canadian Nuclear Safety Commission, Independent Environmental Monitoring Program (IEMP), http://www.nuclearsafety.gc.ca/eng/resources/maps-of-nuclear-facilities/iemp/index-iemp.cfm

[34] Canada, *Radiation Protection Regulations,* SOR/2000-203, https://laws-lois.justice.gc.ca/eng/regulations/sor-2000-203/page-1.html

[35] Canada, *Canada Gazette Part I*, http://www.gazette.gc.ca/rp-pr/p1/2019/2019-06-15/pdf/g1-15324.pdf

[36] Canadian Nuclear Safety Commission, Acts, www.nuclearsafety.gc.ca/eng/acts-and-regulations/acts/index.cfm

[37] Canadian Nuclear Safety Commission, Regulatory Documents, www.nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/index.cfm

[38] Canada, *Nuclear Security Regulations*, SOR/2000, http://laws.justice.gc.ca/eng/regulations/sor-2000-209/page-1.html

[39] International Atomic Energy Agency, *Safeguards Statement for 2018*, www.iaea.org/sites/default/files/19/06/statement-sir-2018.pdf

[40] Canada, *Nuclear Non-proliferation Import and Export Control Regulations*, SOR/2000-210, www.laws-lois.justice.gc.ca/eng/regulations/SOR-2000-210/page-1.html

[41] Canada, *General Nuclear Safety and Control Regulations*, SOR/2000-202, www.laws-lois.justice.gc.ca/eng/regulations/SOR-2000-202/index.html

[42] Canadian Nuclear Safety Commission, REGDOC-2.10.1: *Nuclear Emergency Preparedness and Response*, http://www.nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-10-1/index.cfm

[43] City of Pickering, Investigation into the Emergency Alerts Sent on January 12, 2020, https://www.pickering.ca/en/city-hall/resources/Emergency-Management-Investigation-FINAL.pdf

[44] City of Pickering, Provincial Emergency Operations Centre Action Plan, https://www.pickering.ca/en/city-hall/resources/Emergency-Management-Action-Plan-FINAL-EN.pdf

[45] Canadian Nuclear Safety Commission, Scientific and Technical Information, http://www.nuclearsafety.gc.ca/eng/resources/research/index.cfm

[46] Canadian Nuclear Safety Commission, Safety and Control Areas, http://www.nuclearsafety.gc.ca/eng/resources/publications/reports/powerindustry/safety-and-control-areas.cfm

[47] Canadian Nuclear Safety Commission, Research and Support Program. http://www.nuclearsafety.gc.ca/eng/resources/research/research-and-support-program/index.cfm

[48] Multidisciplinary European Low Dose Initiative (MELODI), http://www.melodi-online.eu/

[49] Canadian Nuclear Safety Commission, Health Studies, http://www.nuclearsafety.gc.ca/eng/resources/health/index.cfm

[50] Canadian Nuclear Safety Commission, Consultation, http://www.nuclearsafety.gc.ca/eng/acts-and-regulations/consultation/index.cfm

[51] Canadian Nuclear Safety Commission, Participant Funding Program, http://www.nuclearsafety.gc.ca/eng/the-commission/participant-funding-program/index.cfm

[52] Canadian Nuclear Safety Commission, CNSC Videos – Participant Funding Program, http://www.nuclearsafety.gc.ca/eng/resources/videos/player/index.cfm?videoid=participant-funding-program

[53] Canadian Nuclear Safety Commission, Meet the Nuclear Regulator and the People Who Keep Canada's Industry Safe, http://www.nuclearsafety.gc.ca/eng/stay-connected/get-involved/meet-the-nuclear-regulator/index.cfm

[54] Canadian Nuclear Safety Commission, YouTube channel, https://www.youtube.com/user/cnscccsn

[55] Canadian Nuclear Safety Commission, Facebook page, https://www.facebook.com/CanadianNuclearSafetyCommission

[56] Canadian Nuclear Safety Commission, LinkedIn account, https://ca.linkedin.com/company/cnsc-ccsn

[57] Canadian Nuclear Safety Commission, Twitter account, https://twitter.com/CNSC_CCSN

[58] The reported exceedance was in relation to the monthly average discharge limit for radium-226 at the Elliot Lake decommissioned uranium mine site for the month of January 2018. Follow-up monitoring in the environment confirmed that there were no radiological impacts to the public or the environment.

[59] DraxImage event, reported to the Commission in December 2019. Jubilant Draximage Inc. reported that its weekly sampling monitoring results were above the weekly release limit for I-131 as specified in its licence. On November 20, 2019 the average weekly release concentration was calculated as 322 Bq/m^3 for I-131 and the weekly release limit for I-131 is 175 Bq/m^3.

[60] In 2017–18, there were two exceedances of limits, both at the Bruce NGS. There was an exceedance of the ammonia provincial discharge limit and the acute toxicity limit. CNSC staff reviewed the event and concluded that the licensee took appropriate corrective actions. The exceedances were reported to the Commission in Commission member document (CMD) 18-M39 on November 8, 2018. CNSC staff confirmed that the public in the vicinity of Bruce NGS were protected and that there were no expected health impacts resulting from exceedances of provincial hazardous substances limits at the Bruce NGS.

[61] In 2018–19, there were nine total exceedances of provincial hazardous substances limits, all at nuclear power plants. At Pickering Nuclear Generating Station (NGS), there were four exceedances of provincial hazardous substances limits. One exceedance was for morpholine concentration, two were for oil and grease, and one was an effluent temperature exceedance. At Darlington NGS, one morpholine result was slightly above provincial hazardous substances limits. At Bruce NGS, there were two toxicity exceedances and two ammonia exceedances of the provincial hazardous substances limits. The number of exceedances are related to minor sporadic issues at the nuclear power plants and vary from year to year. For all instances, CNSC staff reviewed the event and concluded that the licensee

took appropriate corrective actions. The exceedances were discussed in CMD 19-M30, scheduled for November 6–7, 2019. The provincial hazardous substances regulatory limit exceedances have always been reported in the CNSC's regulatory oversight reports. However, in previous years, the CNSC had not reported this information at the departmental level, as it was considered duplicative to any provincial reporting. In 2018–19, the CNSC started to report these exceedances at the departmental level as well to improve transparency and dissemination of information. CNSC staff confirmed that the public in the vicinity of these nuclear power plants were protected and that there were no expected health impacts resulting from exceedances of provincial hazardous substances limits at these nuclear power plants.

[62] First instance: environmental release control: A refrigerant leak on refrigeration Unit 0-73910-RFU2 (Halocarbon release over 100 kg) at Darlington Nuclear Generating Stations was reported on December 9, 2019. On September 25, 2019 while performing a routine monthly leak check, mechanical maintenance found a refrigerant leak on Unit 0 refrigeration unit 0-7391 0-RFU2, which resulted in an unacceptable amount (833lbs or 378 kg) of refrigerant (R-134a) being released in a spill to the environment. Second instance: environmental release: Potential discharge directly from inactive drainage to circulating cooling water duct (toxicity test failure (rainbow trout) at Darlington Nuclear Generating Station, reported on December 11, 2019. On November 23, 2019 a sump isolation valve was found to be in the open position instead of the normally closed position. This could have led to a discharge of inactive drainage to the lake. Samples were collected and the toxicity test of rainbow trout failed. The investigation could not conclusively determine if water was discharged. For due diligence, the conservative decision was made to report this potential discharge as a lethality limit exceedance. In all noted cases, CNSC staff have concluded that the public and environment are protected from ongoing releases from nuclear facilities and activities.

[63] Some sites are known to be contaminated; therefore, if sampling occurs near a contaminated site during a fiscal year, the percentage of samples that meet guidelines will trend downwards that year. Noted exceedances for all three fiscal years were expected, as they are similar to values reported by CNSC licensees' environmental monitoring programs. No additional unexpected exceedances were noted. In 2018–19, there were four exceedances at Elliott Lake historical sites for two sediment results and two water results. These exceedances are related to iron, lead and zinc in sediment and water. These heavy metals are contaminants from historical industrial activities at the Elliott Lake site. There were also 27 exceedances at the Deloro Mine site for 15 sediment results and 12 water results. Exceeding a guideline does not mean that there is an expected health impact; rather, it triggers a more in-depth assessment by CNSC staff to ensure that the health and safety of people and the environment are protected. In all noted cases, CNSC staff have concluded that the public and environment are protected from ongoing releases from nuclear facilities and activities. More information in IEMP results for each site is available on the CNSC website.

[64] In the fiscal year 2019–20, the percentage of the IEMP results that met the guidelines was 98.9%. Exceedances for the 2019–20 fiscal year were expected, and similar to the values reported by CNSC licensees' environmental monitoring programs. No unexpected exceedances were noted. There were two exceedances of uranium in the surface water near the Bancroft mine sites. The exceedances are a result from historical activities and consistent with the results submitted by the licensee. There was also exceedance of iron in one water sample taken near Chalk River Laboratories. The exceedance is not reflective of activities at Chalk River, and is deemed associated with either natural concentrations or other local construction activities. No health or environmental impacts are expected at these levels. At the Port Hope Area Initiative, there were four samples where some parameters were above the applicable guidelines i.e. arsenic exceedance in one sediment sample and total dissolved solid (TDS)

exceedance in three water samples. The arsenic exceedance in the sediment sample was expected given the historical releases. Although this value is above the Canadian Council of Ministers of the Environment (CCME) interim sediment quality guideline, it is significantly below CCME probable effect level for aquatic organisms. In addition, the TDS exceedance for the water samples does not pose any risk for public health and the environment, given that the guidelines for TDS in water are an aesthetic objective (AO) rather than a health based benchmark. Exceeding a guideline does not mean that there is an expected health impact; rather, it triggers a more in-depth assessment by CNSC staff to ensure that the health and safety of people and the environment are protected. In all noted cases, CNSC staff have concluded that the public and environment are protected from ongoing releases from nuclear facilities and activities. More information in IEMP results for each site is available on the CNSC website.

[65] During the period of March 1, 2017 to February 28, 2018 a member of the public received a cumulative dose of approximately 1.06 mSv. This dose is above the annual regulatory effective dose limit of 1 mSv for members of the public, but would not result in any effect on the health and safety of the person. This person was a non-nuclear energy worker responsible for transporting packages, the majority of which contain nuclear substances. CNSC staff reviewed an investigation report submitted by the licensee and are satisfied with the actions taken to prevent a recurrence. The incident was reported to the Commission in Commission member document (CMD) 18-M43 on August 22, 2018.

[66] On October 28, 2016 a nuclear energy worker received a dose of approximately 1,100 mSv to the left hand when the worker experienced contamination during routine administration (injections) of a nuclear substance to patients. The dose was in excess of the annual regulatory equivalent dose limit of 500 mSv. No health effects have been observed since the incident and no physical effects due to the exposure are expected. The incident was reported to the Commission in CMD16-M72 on December 14, 2016. On March 1, 2017 a nuclear energy worker received a dose of approximately 2,300 mSv to the right hand when the worker experienced contamination during the administration of therapeutic doses of a nuclear substance to patients. The dose was in excess of the annual regulatory equivalent dose limit of 500 mSv. No health effects have been observed since the incident and no physical effects due to the exposure are expected. The incident was reported to the Commission in CMD 17-M22 on April 12, 2017.

[67] In November 2018, a nuclear energy worker received an equivalent dose of approximately 1,680 mSv to the left hand, in excess of the annual regulatory equivalent dose limit of 500 mSv. No health effects have been observed since the incident and no physical effects due to the exposure are expected. The incident was reported to the Commission in CMD 18-M65 on December 13, 2018.

[68] Unexplained dose of 1.85 mSv on quarterly badge reading of a non-nuclear energy worker, which exceeded the annual dose limit of 1 mSv/year. No health effects were observed or expected as a consequence of this event. This event was reported to the Commission in November 2019 in CMD 19-M41. Unexplained dose on quarterly badge reading of a nuclear medicine technologist. NEW worker exceeded both the one-year effective dose limit (recorded dose of 56.91 mSv) and equivalent dose limit for the lens (recorded dose of 174.9 mSv). Investigation concludes that the recorded dose is likely non-personal but rather due to contamination on the dosimeter although this cannot be demonstrated conclusively. No health effects were observed or expected. This event will be reported to the Commission in 2020.

[69] The decrease in Indigenous participation in 2018–19 relative to 2017–18 is due to fewer total public proceedings.

[70] GC InfoBase, www.tbs-sct.gc.ca/ems-sgd/edb-bdd/index-eng.html#start

[71] Bell, Bell Let's Talk, https://letstalk.bell.ca/en/

[72] Canada, Public Accounts of Canada, https://www.tpsgc-pwgsc.gc.ca/recgen/cpc-pac/index-eng.html

[73] Canadian Nuclear Safety Commission, Financial Reports, http://www.nuclearsafety.gc.ca/eng/resources/publications/reports/quarterly-financial-reports/index.cfm

[74] Natural Resources Canada, www.nrcan.gc.ca/home

[75] Canada, *Nuclear Safety and Control Act*, www.laws-lois.justice.gc.ca/eng/acts/N-28.3/

[76] Canadian Nuclear Safety Commission, Departmental Results Report, http://www.nuclearsafety.gc.ca/eng/resources/publications/reports/departmental/index.cfm

[77] Finance Canada, Report on Federal Tax Expenditures, https://www.canada.ca/en/department-finance/services/publications/federal-tax-expenditures.htm