Mr. Matthew Boswell, Commissioner
Competition Bureau
Place du Portage I
50 Victoria Street
Gatineau, QC K1C 0C9

Oct. 15, 2024

Application for inquiry regarding the Canadian Nuclear Association's apparent false and misleading representations about nuclear energy

Overview of Application

The Applicants bring this application under section 9 of the federal *Competition Act* requesting that the Commissioner conduct an inquiry into false and misleading representations by the Canadian Nuclear Association (CNA) and its membership that nuclear energy is "clean" and "emissions-free".

The CNA is the trade association for the nuclear industry in Canada and is comprised of over 100 member companies and organizations, including nuclear power plant operators, nuclear reactor designers, engineering firms, suppliers, academic institutions, labour unions, consultants, and law firms. The CNA describes itself as "the national voice of the Canadian nuclear industry since 1960" and it "promotes the industry nationally and internationally, works with governments on policies affecting the sector and endeavours to increase awareness and understanding of the value nuclear technology brings to the environment, economy and daily lives of Canadians."[1]

The Applicants believe that the CNA is responsible for the **frequent and widespread use of false and misleading terms to promote the nuclear industry and capture a growing share of the electricity generation market,** through refurbishment to extend the operating life of existing nuclear power plants as well as construction of new nuclear power plants, including new lines of nuclear reactors promoted as "small modular reactors" (SMRs).

The representations of nuclear energy generation as clean and emissions-free are demonstrably false. The use of these terms constitutes an effort to mislead consumers concerned about environmental and health impacts of electricity generation, and their utilities, to choose and financially support nuclear generation sources, to the detriment of other energy sources in the pursuit of securing a significant share of the electricity supply market. The Canadian electricity supply market is estimated in the trillions of dollars; electricity sales in Canada in 2022 alone were reported to total $48.9 billion.[2]

All stages of nuclear energy production produce and release into the environment toxic radioactive contaminants and other harmful substances during regular operations and produce long-lasting radioactive waste for which there is no facility for their permanent safe containment. This includes production from all types of nuclear reactors, including CANDU-type reactors which make up all the currently operating commercial reactors in Canada, as well as the proposed SMRs. The pollutants produced and released throughout the nuclear energy cycle include radioactive liquids, solids and gases that are classified as Group 1 carcinogens, meaning

[1] Canadian Nuclear Association (2024) *About the CNA*, accessed Oct. 13, 2024 online: https://cna.ca/about-cna

[2] Statistics Canada (2023) *Electricity Supply and Disposition*, accessed Oct. 13, 2024 online: https://www150.statcan.gc.ca/n1/daily-quotidien/231030/dq231030d-eng.htm

they are known to cause cancer [3], tumors and birth defects, and for which there is no safe amount of exposure.

The claims of nuclear energy being clean and non-emitting are attempts to gain an unfair market advantage, which constitutes anti-competitive practice. These claims are meant to gain consumer favour to the detriment of non-emitting sources of electricity such as wind, solar and geothermal, affecting the energy market position and funding for these non-nuclear sources. The benefits to the nuclear industry from such false and misleading claims also include support from utilities and their funds earmarked for energy technologies considered to be clean and non-emitting.

Canada and the international community have deemed the electrification of the transportation sector and other technologies a priority. It is estimated that Canada will require 2.8 times more electricity in 2050 than was needed in 2021 to meet these requirements.[4] As a result of this expected increased need for electricity, the nuclear industry has been promoting nuclear energy as clean and emissions-free in order to gain consumer and public support. The nuclear industry must convince consumers, utilities and governments that their products are clean and non-emitting, in order to receive contracts and other funds that would otherwise be reserved for competing clean and non-emitting electricity sources.

Contrary to the CNA membership claims of being clean and emissions-free, the nuclear electricity generation technology being promoted**:**

1) **Produces and emits during routine operations a wide variety of radioactive and other types of toxic air and water pollutants** that are harmful to humans and other living things, including Group 1 carcinogens (known to cause cancer according to the World Health Organization's International Agency for Research in Cancer) for which there is no safe amount of exposure.
2) **Requires fuel that involves uranium mining and processing that discards large quantities of solid, liquid and gaseous radioactive pollution and waste**, the spread of which cannot be totally controlled or contained. Large volumes of this toxic waste have to be kept out of the environment in perpetuity due to the extreme longevity and toxicity of the radioactive waste material.
3) **Creates, during routine operations, a large number of highly radioactive toxic elements that require expensive and complex containment in perpetuity**, as many of

[3] https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Radiation-2012, p. 33, 6th line - the Working Group reached the final evaluation that "All types of ionizing radiation are carcinogenic to humans (Group 1).”; accessed Oct. 13, 2024, online.
[4] David Suzuki Foundation (2022) Shifting Power: Net-Zero Emissions Electricity Across Canada by 2035, accessed Oct. 13, 2024 online: https://davidsuzuki.org/wp-content/uploads/2022/05/Shifting-Power-Zero-Emissions-Across-Canada-By-2035-Report.pdf, p.32. see Total Capacity Increase over 2021 in the Zero Plus scenario for 2050.

them present health and environmental hazards for periods measured in hundreds of thousands of years, and for which there is presently no safe long-term storage facility.

Request to the Competition Bureau

The Applicants request that the Competition Bureau find that the CNA has made materially false and misleading representations to the Canadian public, consumers and utilities about nuclear electricity generation being clean and non-emitting, and that the CNA and its membership be required, at a minimum, to:

1) **Cease the use of the terms "clean", "non-emitting", and equivalent terms** in their public information and promotion of nuclear energy, including advertising and public relations campaigns, educational and promotional material, their own websites, media releases and information about new reactors being proposed.
2) **Make a public retraction and rectify its false and misleading representations.** The CNA should publish this retraction through the same channels that it made the false and misleading statements and in other widely accessible public media and settings. The retraction should explain that nuclear energy production is not clean or non-emitting, listing the carcinogenic pollutants and waste that nuclear power plants emit.
3) **Pay a fine of $10 million that could be dedicated to support consumer awareness and education about clean and non-emitting sources of electricity**

The Applicants

Dr. Susan O'Donnell is Adjunct Research Professor at St. Thomas University and a retired Senior Research Officer at the National Research Council of Canada in Fredericton, with an interest in climate change, sustainability and nuclear energy. She is the spokesperson for *Coalition for Responsible Energy Development in New Brunswick (CRED-NB),* an organization that advocates for responsible energy development in New Brunswick to address the climate crisis and attain a nuclear-free renewable energy future.

Dr. Gordon Edwards is a retired mathematics professor at Vanier College in Montreal with a longstanding interest and expertise in nuclear technology and related issues. He is a co-founder of *Canadian Coalition for Nuclear Responsibility (CCNR)*, an organization that is dedicated to education and research on issues related to nuclear energy, whether civilian or military, including non-nuclear alternatives, especially those pertaining to Canada.

Juan Pedro Unger has worked as a researcher and policy analyst for the Federal Government in Ottawa for 34 years and is a director of the *Greenspace Alliance of Canada's Capital (GA)*. *The Greenspace Alliance of Canada's Capital* is an organization of individuals and citizens' groups

working to protect significant green spaces and environmental assets in the National Capital Region.

Dr. Catherine Vakil is a retired family doctor from Kingston, Ontario. She has been active in environmental issues for many years and is a member *of International Physicians for the Prevention of Nuclear War Canada (IPPNWC). IPPNWC* is committed to the abolition of nuclear weapons, the prevention of war, the promotion of non-violent means of conflict resolution and social justice in a sustainable world.

Angela Bischoff has been involved in environmental issues for many years and has been the director of the Toronto-based *Ontario Clean Air Alliance* (OCAA) for 15 years. The *Ontario Clean Air Alliance* produces widely respected research and educational materials addressing how Ontario can move to 100% renewable energy.

Brennain Lloyd is a public interest writer/researcher in energy, environment and natural resource issues and a natural resource policy and program analyst. She has been Project Co-ordinator of *Northwatch* for over 35 years, and is based in North Bay, Ontario. *Northwatch* is an organization that advocates for environmental protection and public participation in environmental decision-making in northeastern Ontario.

Dr. Ole Hendrickson is a resident of the Ottawa Valley and former ecologist with the *Canadian Forest Service* and science advisor with Environment Canada. He is currently President of the *Sierra Club Canada Foundation* and the *Ottawa River Institute*, and researcher for *Concerned Citizens of Renfrew County and Area*.

Part 1 – The Legal Framework

This application is made under s.9 of the Competition Act to the Commissioner for an inquiry into whether grounds exist for making an order under Part VII.1 of the Competition Act, specifically s.74.01(1). Once the Commissioner has received an application, the Commissioner is required by s.10(1) of the Competition Act to cause an inquiry to be made.

Under s.74.1 of the Competition Act, the Commissioner must decide if the CNA has made a representation to the public that is false or misleading in a material respect for the purpose of promoting, directly or indirectly, the supply or use of a product or for the purpose of promoting, directly or indirectly, any business interest, by any means whatever. As per s.52(1.2), a "representation" includes making, sending, or permitting a representation to be made or sent. In particular the representation must be shown to be false or misleading in a material respect. A representation is "material" if it is so important, pertinent, germane, or essential that it could affect the decision to purchase the product.

Part 2 – Background on Nuclear Energy Emissions

The public, utilities and governments in Canada and worldwide are extremely concerned about the climate crisis. Extreme weather events are claiming more and more lives, causing illness and disability, destroying property and livelihoods, and threatening the very liveability of our planet. It is widely recognized that burning fossil fuels to produce energy must be radically curtailed and eventually ceased, and alternatives must be rapidly developed and ramped up. These alternatives include electricity-generating and electricity-driven technology, grid interconnectivity, hydrogen fuel production and other innovative ways to decentralize power grids to transmit, store and reuse energy (such as waste heat recovery). The nuclear energy industry is attempting to position itself and take advantage of this push for clean alternative energy, by claiming to be clean and non-emitting.

All methods of electricity generation produce some types of pollution. Wind, solar and geothermal do not produce any emissions at all in their regular operations and the pollution associated with them is largely from their manufacturing. The radioactive byproducts from nuclear power generation in their totality are ongoing and extremely toxic, and remain so for hundreds of thousands of years.

Nuclear power plants produce electricity through a controlled chain reaction of atoms disintegrating through their bombardment by other atoms that emit radiation, or "radionuclides". A radionuclide is an atom with the unique property of ejecting sub-atomic particles or a type of electromagnetic energy called a gamma ray, at high speed. This is called “atomic radiation” (which is a form of “ionizing radiation”) or often simply “radioactivity”. Some radionuclides are found in nature, and some are human-made, such as those found in used fuel bundles inside nuclear reactors.

One type of sub-atomic particle emitted by radionuclides, called a beta particle, when ejected from the atom, can partially penetrate skin, causing burns. Alpha particles, which are larger and bulkier are not able to penetrate even a sheet of paper, or the outer layer of skin. However, if an alpha-emitting or beta-emitting radionuclide is inhaled or ingested, it can come in contact with living tissue. From there, the alpha or beta particles, when ejected from the radionuclide atom, release large amounts of energy that can harm local cells. Damage to these cells can precipitate cancer or other diseases. Alpha emitters are among the most dangerous of all internally deposited radionuclides. Radon, plutonium, polonium and radium, waste by-products of nuclear power generation or uranium mining, are all alpha emitters.

The photo below illustrates the tracks made by particles emitted over a 48-hour period from a plutonium particulate within lung tissue of an ape. The tracks emanating from the centre of the particulate, spoke-like, are made by alpha particles which damage the cells along each particle’s trajectory.

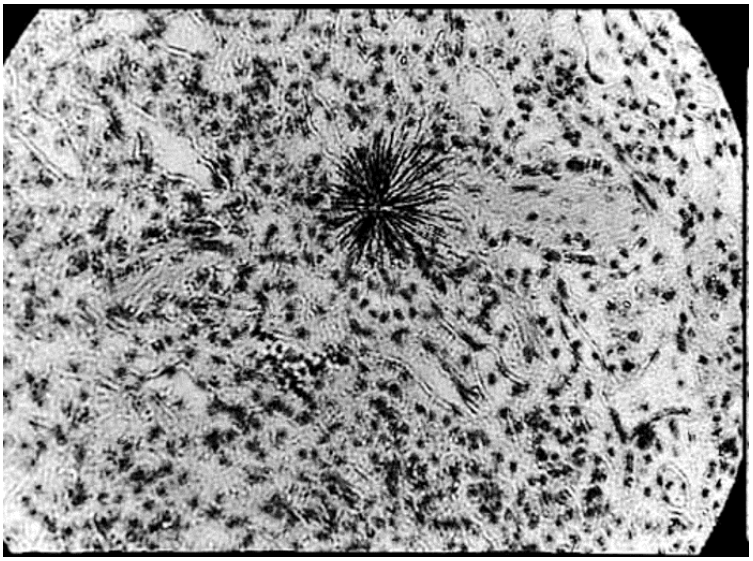

Fig. 1 Image of plutonium particle within lung tissue of an ape (photo: Robert Del Tredici) [5]

Gamma rays are a non-material type of ionizing radiation, similar to x-rays. They can penetrate through all soft tissues and damage cells when passing through such tissue, causing cancer and other diseases.

When a radionuclide disintegrates by ejecting its particle, it changes into another element that could also be radioactive. It will continue ejecting particles until it disintegrates into an element that is non-radioactive, and therefore stable. This process of successive disintegrations is called the "decay chain". The "half life" of a radionuclide is the amount of time it takes for a given amount of radionuclide to disintegrate and reach half of its original number of atoms. This could take a fraction of a second, several decades, or hundreds of thousands of years. It takes about ten half lives for a given radionuclide to be reduced to one thousandth of its original amount. This is why long-lived radioactive waste must be extremely carefully stored basically forever.

Certain radionuclides have a biochemical affinity for particular tissues. For instance, radioactive iodine has a propensity for lodging in the thyroid gland, radioactive cesium and potassium in the muscle, radium and radioactive strontium in the bone, and radon and plutonium dust in the lung. Once in these tissues, they can cause cancer or other diseases specific to those particular tissues. They can also cause cardiovascular disease, immune dysfunction, diabetes and other illnesses.

By altering the genetic structures in the nuclei of eggs and sperm, animal studies demonstrate that radionuclides can cause inheritable mutations that cause disease in future generations[6]. In

[5] https://nonuclear.se/en/deltredici.d5.particl.of.pu.html, accessed Oct. 13, 2024 online.
[6] https://www.unscear.org/unscear/uploads/documents/publications/UNSCEAR_1993_Annex-G.pdf, p. 767-769, accessed Oct. 13, 2024 online.

addition, radionuclides can damage growing fetuses, causing miscarriages, stillbirths, childhood cancer, and congenital malformations.

Rapidly growing tissue, such as in fetuses and children, is extremely sensitive to the deleterious effects of ionizing radiation. Women and girls are up to twice as sensitive to its harmful effects than men and boys.

All types of ionizing radiation are considered “Group 1 carcinogens” by the World Health Organization. The International Agency for Research in Cancer, which is the global health authority and the world standard research body on carcinogenicity, defines Group 1 carcinogens as substances known to cause cancer in humans. It concludes that "All types of ionizing radiation are carcinogenic to humans.”[7] It is widely accepted in the scientific community and by regulatory bodies that there is no proven safe amount or level of exposure to ionizing radiation.

Tritium is one of the radioactive elements emitted in abundance during the regular operations of Canada’s CANDU reactors. Tritium is radioactive hydrogen and can be incorporated into a water molecule, creating radioactive water. Tritium can also be incorporated into any organic molecule, including DNA, whereupon it is called organically bound tritium. This is particularly dangerous because all living things contain large amounts of water, and all cells contain DNA, so if ingested, inhaled, or absorbed through the skin, tritium can be incorporated extensively in the body, as organisms cannot distinguish between regular water and radioactive water. Tritium is a beta emitter, so once inside the body, can cause cancer as well as many other diseases.

Part 3 – The CNA’s materially false and misleading representations about nuclear energy

The CNA has made public representations in Canada that nuclear energy is clean and non-emitting. These representations create the general impression that nuclear energy does not cause pollution, create toxic waste byproducts, or present risks to the environment and human health.

The purpose of these false and misleading representations is to promote the business interests of the nuclear industry, which include generating social licence and consumer acceptance that nuclear energy is a clean and safe form of energy for public investment and consumer end use, and to compete against emerging sources of clean energy (wind, solar, geothermal, etc.) for finite consumer support and market share. However, **these representations are false and**

[7] https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Radiation-2012, p. 33, 6th line - the Working Group reached the final evaluation that "All types of ionizing radiation are carcinogenic to humans (Group 1).”; accessed Oct. 13, 2024 online.

misleading because nuclear energy emits radioactive pollutants at every stage of the process, from mining and refining of its fuel to the electricity generation process, and also produces extremely long-lasting radioactive waste. **These misrepresentations are material because consumers and utilities that act on their behalf factor in the potential risks for environmental and human health when assigning investments and ratepayer funds for energy sourcing.**

This Application states that:

1) The CNA and its membership have made public representations that nuclear energy is clean and non-emitting, creating the impression that the use of nuclear power plants produces no pollution and poses no risks to the environment or to human health.
2) The purpose of these representations is to promote the business interests of the Canadian nuclear industry and compete with genuinely clean and non-emitting sources of energy.
3) The representations are false and misleading because all the stages of nuclear energy production release radioactive and carcinogenic pollutants into the environment. These misrepresentations are material because they promote a perception about nuclear power generation that aligns with what Canadians and energy markets are looking for in their energy sources, the misrepresentations are in contrast to the truth about nuclear power generation, and consumers have difficulty assessing the accuracy of the representations.

Each of the above three statements will now be expanded upon and analyzed.

3.1 The CNA's public representations

The CNA and its membership have made public representations that nuclear energy is clean and non-emitting, creating the impression that the use of nuclear power plants produces no pollution and poses no risks to the environment or to human health.

3.1.1 Precedent that claims by the nuclear industry to be "emissions-free" are false

In 2010, Advertising Standards Canada ("Ad Standards"), the advertising industry's self-regulating body, concluded that an advertisement in the Globe & Mail by the Power Workers Union stating that CANDU nuclear reactors were "emissions-free" was inaccurate and

unsupported.[8] The complaint had been brought to Ad Standards by Lake Ontario Waterkeeper, an environmental protection advocacy group.[9] The Ad Standards Council decision stated:

> To Council, the general impression conveyed by the term "emission-free" was that CANDU reactors did not emit any emissions of any kind – neither greenhouse gas emissions nor any other type. According to the uncontroverted information cited by the complainant taken from Ontario Power Generation's 2009 application for renewal of its Basic Comprehensive Certificate of Approval for the Darlington nuclear generating facility, numerous different contaminants are emitted into the atmosphere at the four CANDU generating sites in Ontario. Council, therefore, concluded that the unqualified emission-free claim in this advertisement was inaccurate and unsupported.[10]

The claim before Ad Standards is very similar to this complaint. Both instances cite an unqualified claim that nuclear power is emissions-free, despite clear evidence that numerous different contaminants are emitted into the air and water from nuclear power plants in Canada. As such, the resolution of this complaint should reach a similar conclusion - that the CNA's representations are false and misleading because they are inaccurate and unsupported.

3.1.2 The CNA's representations

CNA website:

Throughout the CNA's website, the CNA represents that nuclear energy is clean and non-emitting. This includes the following statements:

- *"Canada's nuclear industry provides clean, affordable and reliable electricity."*[11]
- *"Nuclear power delivers electricity that reliably powers communities and industries, without pollution. Electricity is only as clean as its source; nuclear makes electricity clean."*[12]
- *"… nuclear power does not emit pollutants that harm human health and the environment."*[13]
- *"Nuclear energy provides a clean, emission-free source of electricity all day, every day."*[14]

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[8] Ad Standards Canada (2022) *2010 Consumer Complaint Case Summaries,* accessed Oct. 13, 2024 online: https://adstandards.ca/wp-content/uploads/2019/06/Ad-Complaints-Reports-2010.pdf, pp.6-7, under Power Worker's Union.

[9] Ontario Waterkeeper (2010) *Media watchdog finds CANDU reactor ads "inaccurate" and "unsupported"*, accessed Oct. 13, 2024 https://www.swimdrinkfish.ca/lake-ontario-waterkeeper/blog/18037

[10] Ad Standards Canada (2022) *2010 Consumer Complaint Case Summaries,* accessed Oct. 13, 2024 online: https://adstandards.ca/wp-content/uploads/2019/06/Ad-Complaints-Reports-2010.pdf, pp.6-7, under Power Worker's Union.

[11] Canadian Nuclear Association, The Advantages of Nuclear, accessed Oct. 13, 2024 online: https://cna.ca/

[12] Canadian Nuclear Association, Air Quality, accessed Oct. 13, 2024 online: https://cna.ca/advantages/air-quality/

[13] Ibid.

[14] Canadian Nuclear Association, Reactors and SMRs, accessed Oct. 13, 2024 online: https://cna.ca/reactors-and-smrs/

- *"Unlike fossil fuels, nuclear power does not emit any gases or particles that contribute to smog and acid rain. This makes nuclear power an excellent choice for provinces and countries that want clean air, as Ontario did when it moved away from coal."*[15]
- *"All four Darlington units are undergoing mid-life refurbishment, so they can generate clean, reliable electricity for the decades to come*."[16]

Ontario Power Generation (member of the CNA) ad campaign website

In the summer of 2023, Ontario Power Generation (OPG), one of the largest corporate members of the CNA, launched an advertising campaign to promote nuclear power that included numerous high-visibility billboards and posters in high-traffic transit stations and other public places in the Greater Toronto Area.[17] The campaign is described in a dedicated OPG website that makes the following representations about nuclear energy:

- *"It's time to flip the script on nuclear power – the clean energy source the world needs."*
- *"Carbon-free nuclear power is one of the cleanest energy technologies available to us today."*
- *"The next chapter of nuclear power is now being written with innovations like Small Modular Reactors (SMRs), which can provide small and remote communities access to a reliable source of clean energy."*

Teachnuclear website

The CNA has also made false and misleading misrepresentations through a website called "teachnuclear"[18] (see Appendix for screenshot of home page). This site is delivered in collaboration with "Let's Talk Science," a charitable organization that prepares youth for a changing scientific world by encouraging careers in science, technology, engineering, and mathematics (STEM). The partnership creates classroom lesson plans aimed at children that promote the nuclear energy industry. Via teachnuclear.ca, the CNA makes the following representations:

- *"These engaging resources help students understand the important role nuclear science plays in clean electricity…"*
- *"By learning about the wide range of applications of nuclear science, from producing reliable and abundant quantities of clean electricity…"*
- *"Teachnuclear resources are designed to increase awareness of nuclear applications (for example clean electricity….)"*

[15] Canadian Nuclear Association, Environmental Protection, accessed Oct. 13, 2024 online: https://cna.ca/other-innovations/environmental-protection/
[16] Canadian Nuclear Association, How a Nuclear Reactor Works, accessed Oct. 13, 2024 online: https://cna.ca/reactors-and-smrs/how-a-nuclear-reactorworks/
[17] Ontario Power Generation, Ontario's Clean Energy Future, accessed Oct. 13, 2024 online: https://recastnuclear.com/
[18] https://teachnuclear.ca/, accessed Oct. 13, 2024 online.

Facebook advertising

Between June 24 and 29, 2019, February 7 and 10, 2021, February 26 and March 1, 2021, March 1 and 16, 2021, and March 17 and 21, 2021 CNA bought ads on Facebook. These ads include the following representations (see Appendix for screenshots of these ads):

- *"More than half of Canadians think an increased reliance on nuclear as a clean energy source is an important solution in fighting climate change…."* [19]
- *"Clean nuclear technology must be part of the dynamic energy mix to fight climate change."*[20]
- *"More than half of Canadians believe it is important that Canada increase its reliance on nuclear as a clean energy source."* [21]
- *"Did you know nuclear technology like small modular reactors helps replace carbon-based fuels with clean electricity?"*[22]
- *"Q: What generates clean energy reliably and uses the smallest land footprint? A: Nuclear energy - Nuclear energy is needed now more than ever"*[23]

3.1.3 The General Impression Test

Subsections 52(4), 52.1(4) and 74.03(5) require a court to take into account the general impression conveyed by a representation, in addition to its literal meaning. The "general impression test" in the Competition Act has been interpreted by the Supreme Court of Canada to mean the general impression that a credulous and inexperienced person has after an initial contact with the entire advertisement, and it relates to both the layout of the advertisement and the meaning of the words used.[24]

The terms "clean" and "non-emitting" are used by the CNA in broad sense, without any reference to specific substances being emitted or stages of nuclear power generation. These terms are also used in combination with images of snowy mountains, forests, and lakes - natural and non-polluted landscapes which suggest that nuclear power is compatible with these places.

When encountering the material on the CNA's website and other advertising, a credulous and inexperienced person without knowledge about the intricacies of the nuclear energy industry would have the general impression that nuclear power generation does not contribute to air or water pollution, does not create toxic radioactive byproducts and does not release harmful substances into the environment.

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[19] https://www.facebook.com/ads/library/?active_status=all&ad_type=all&country=CA&view_all_page_id=177709632266504&search_type=page&media_type=all , accessed Oct. 13, 2024 online.
[20] Ibid.
[21] Ibid.
[22] Ibid.
[23] Ibid.
[24] Richard v. Time Inc., 2012 SCC 8, at paras 57, 70./,.

When describing nuclear energy as "clean" and "non-emitting", the CNA may be referring to that fact that nuclear power plants do not emit greenhouse gases (GHG) during operation. While this may be partially true if excluding their support and life-cycle operations, the CNA does not specify that it is referring to GHGs at this stage of the lifecycle of nuclear power generation. Instead, *the CNA uses these terms broadly, in a manner that suggests there are no emissions at all, GHG or otherwise, and therefore no health or environmental concerns, from any stage of nuclear power generation.* As discussed below, this ignores the GHG emissions at other stages of the lifecycle as well as the significant radioactive and carcinogenic emissions that are released into air and water at all stages of the nuclear power generation: the mining and milling of uranium, the generation of electricity, and the management and containment of nuclear waste.

3.2 The CNA made these representations to promote its business interests

The CNA has made these representations to convince the public across Canada that nuclear energy is an acceptable part of a clean energy future.

3.2.1 The nuclear industry needs public support to secure a large energy market share

Consumers are looking for clean, low-carbon energy to replace fossil fuel powered energy and to achieve our climate goals. Nuclear power is low-carbon but, compared to other low-carbon sources, it is very costly, and creates significant health and environmental hazards. Further, nuclear energy suffers from public concern about the risks and impacts of nuclear accidents and atomic radiation and this concern is a barrier to the development of nuclear energy. Therefore, it is in the business interests of the CNA to represent the nuclear industry as "clean" and "non-emitting" in order to be accepted by the general public and electricity consumers, and gain the social licence that it needs to prevail over its competitors in a growing electricity market.

3.2.2 The nuclear industry needs to overcome public concerns

Before it can obtain a larger share of the electricity market, the nuclear industry needs to gain public acceptance and confidence. Public opposition to nuclear power is regarded as one of the most significant barriers to the construction of new nuclear power plants.[25]

[25] National Academies of Sciences, Engineering, and Medicine (2023) *Laying the Foundation for New and Advanced Nuclear Reactors in the United States*. Washington, DC: The National Academies Press, p.137, accessed Oct. 13, 2024 online: https://nap.nationalacademies.org/read/26630/chapter/10.

This opposition is due to the concern about risks and impacts of nuclear power. This includes:

- Operational impacts on health, especially risk of cancer
- Nuclear accidents (such as Chernobyl, Three Mile Island, and Fukushima)
- The long-lasting risks and impacts of radioactive waste
- Terrorist attacks on a power plant
- Links to nuclear weapons
- Effective, transparent, and accountable regulatory systems[26]

The nuclear industry accepts that "public acceptance of nuclear energy is vital to the successful implementation of any nuclear power plant project."[27]

It is in the CNA's business interests, therefore, to promote nuclear energy as "clean" and "non-emitting" in order to create the general impression that nuclear power generation does not contribute to air pollution or climate change and does not release substances into the environment that are harmful to the environment or human health. This is necessary to overcome public opposition to nuclear power, which is foundational to obtaining the support required to enable nuclear power to compete with other low-carbon energy sources.

The CNA and its membership's representation of nuclear energy as clean and non-emitting causes an unfair promotion of their business interests which undermines the goal of fair competition in the marketplace. Electricity sources that are clean and non-emitting are now required to compete with nuclear energy for consumer, utility companies, ratepayer and taxpayer dollars that are intended for clean and non-emitting sources, giving nuclear energy an advantage that is undeserved.

By seizing a share or increasing the number of potential recipients for support and funds intended for energy obtained from clean sources (i.e. by increasing the available eligible recipients) the CNA and membership's false and misleading representations could damage the competitive position of clean energy suppliers. Furthermore, market opportunities for developers of clean technologies could be unfairly reduced.

The misrepresentations could therefore harm consumers as well as businesses engaging in honest practices. By giving large amounts of money to the nuclear industry, the government could be stalling development of clean non-emitting energy companies that can take Canada to greenhouse gas emission goals faster and more cheaply than using nuclear energy.

The deceptive marketing practices could also negatively impact the economy because of the large amounts of money being assigned to extending the life of nuclear plants and the development of SMRs which do not yet and may never exist, and may take many decades and

[26] Ibid, p. 141.
[27] World Nuclear News (2020) *The barrier to nuclear is perception, says panel*, accessed Oct. 13, 2024 online: https://world-nuclear-news.org/Articles/The-barrier-to-nuclear-is-perception,-says-panel.

many more billions of dollars before they produce any electricity, making them irrelevant to our climate crisis.

3.2.3 The business interests of the CNA and its members are the same

The CNA is a trade association for the nuclear industry in Canada. It acts as a public advocate for its members with the goal of advancing the interests of its membership. Therefore, the business interests of the CNA and its members are the same and, further, the CNA's representations promote the business interests of both the CNA and its members.

The Competition Bureau's guidance for trade associations confirms that trade associations must not make false and misleading representations when promoting the business interests of their members.[28] It also confirms that both trade associations and their members are liable for the consequences of violating the Act.

3.3 The CNA's representations are false and misleading in a material respect

The CNA and its membership's representations are false and misleading because all the stages of nuclear power generation release radioactive and highly carcinogenic pollutants into the environment. This is contrary to the definitions and commonly understood meanings of the words "clean" and "non-emitting".

These representations are material because they promote a perception about nuclear power generation that aligns with what Canadians and electricity consumers are looking for in their energy sources, the misrepresentations are in contrast to the truth about nuclear power generation, and consumers have difficulty assessing the accuracy of the representations.

3.3.1 Dictionary definitions of "clean" and "emitting"

The nuclear energy industry is not clean or non-emitting in the generally accepted definition and implicit understanding of the terms.

<u>Definition of "clean"</u>
These are some dictionary definitions of the word "clean":

- "free from dirt or pollution, free from contamination or disease, free or relatively free from radioactivity" - Merriam-Webster Dictionary

[28] Competition Bureau (2022) *Trade Associations and the Competition Act*, accessed Oct. 13, 2024 online: https://ised-isde.canada.ca/site/competition-bureau-canada/en/bid-rigging-price-fixing-and-other-agreements-between-competitors/trade-associations-and-competition-act ("*Trade Associations and the Competition Act*"): "If you publicly promote the business interests of your members, ensure your statements are accurate and not misleading."

- “free from any dirty marks, pollution, bacteria, etc.” - Cambridge Dictionary
- “A clean fuel or chemical process does not create many harmful or polluting substances” - Collins Dictionary – there are several definitions, one of which uses this as an example
- “free from harmful or unpleasant substances, not dirty” - Oxford Dictionary

The generally accepted interpretation of the word “clean” by the public is represented by the above definitions. When the public is told that nuclear energy is “clean”, they may be falsely led to believe that it is free from anything dirty, polluting or dangerous to health. Nuclear energy cannot be considered clean according to these definitions. This will be demonstrated below in the following section on **Emissions from Nuclear Power Generation.**

Definition of “emission”

These are some dictionary definitions of the word “emission”:

- “something sent forth by emitting: such as electromagnetic radiation from an antenna or a celestial body**;** substances discharged into the air (as by a smokestack or an automobile engine)” – Merriam-Webster Dictionary
- “an amount of something, especially a gas that harms the environment, that is sent out into the air” – Cambridge Dictionary
- “An emission of something such as gas or radiation is the release of it into the atmosphere.”; “Emissions refers to the gases that are released into the atmosphere.” – Collins Dictionary, examples of definitions
- “The action of giving off radiation or particles; a flow of electrons from a cathode-ray tube or other source.” – Oxford Dictionary, one of several definitions

According to the above definitions, the generally accepted interpretation of the words “non-emitting” and “emissions-free” describes a process whereby there are no gaseous, radioactive, or harmful substances released into the environment. The process of nuclear power generation cannot be considered “non-emitting” or “emissions-free” according to the generally accepted definitions from the above dictionaries. This will be demonstrated in the following section on **Emissions from Nuclear Power Generation.**

3.3.2 Emissions from Nuclear Power Electricity Generation

Every stage in the process of nuclear power generation – mining, milling, power generation and waste disposal - emits many types of harmful pollutants into the air and water.

Emissions – Routine Operations

The nuclear industry emits radioactive, carcinogenic pollutants on an ongoing basis as a by-product of routine operations.

The Canadian Nuclear Safety Commission (the Federal Government agency that oversees the nuclear industry) publishes annual data of the total releases of radionuclides directly to the environment from nuclear facilities in Canada from 2011 to 2022, on a Government of Canada website.[29] These facilities include power plants, processing facilities, uranium mines and mills, and Canadian Nuclear Laboratories facilities. On this website there are different data sets for different types of facilities, and these are classed as either direct discharge or emissions from the stacks of the facilities (these are accessible through the links on the website under *Similar Records*). These are annual releases, and some of the radionuclides have extremely long half-lives, so even small discharges will accumulate and be harmful for many years. They include, to name a few, tritium, iodine 131, carbon 14, xenon 135, radium 222, cobalt 60, polonium, lead 210 and thorium. All of these are radioactive and toxic.

See Fig. 4 below, for an example of the many lists on this website of radionuclides that are emitted from all nuclear facilities across Canada annually. This list below shows releases of stack emissions of radioactive iodine, tritium, carbon and particulates, from all of the nuclear power plants in Canada, just for 2022. See Appendix 4 for a complete list of stack emissions from nuclear power plants across Canada 2011 to 2022.

The website has similar spreadsheets for all years as far back as 2011, for different types of emissions, and for the different processing facilities, uranium mines and mills, and Canadian Nuclear Laboratories.

[29] http://open.canada.ca/data/en/dataset/6ed50cd9-0d8c-471b-a5f6-26088298870e, Government of Canada (2023) *Radionuclide Release Datasets*, accessed Oct. 13, 2024 online.

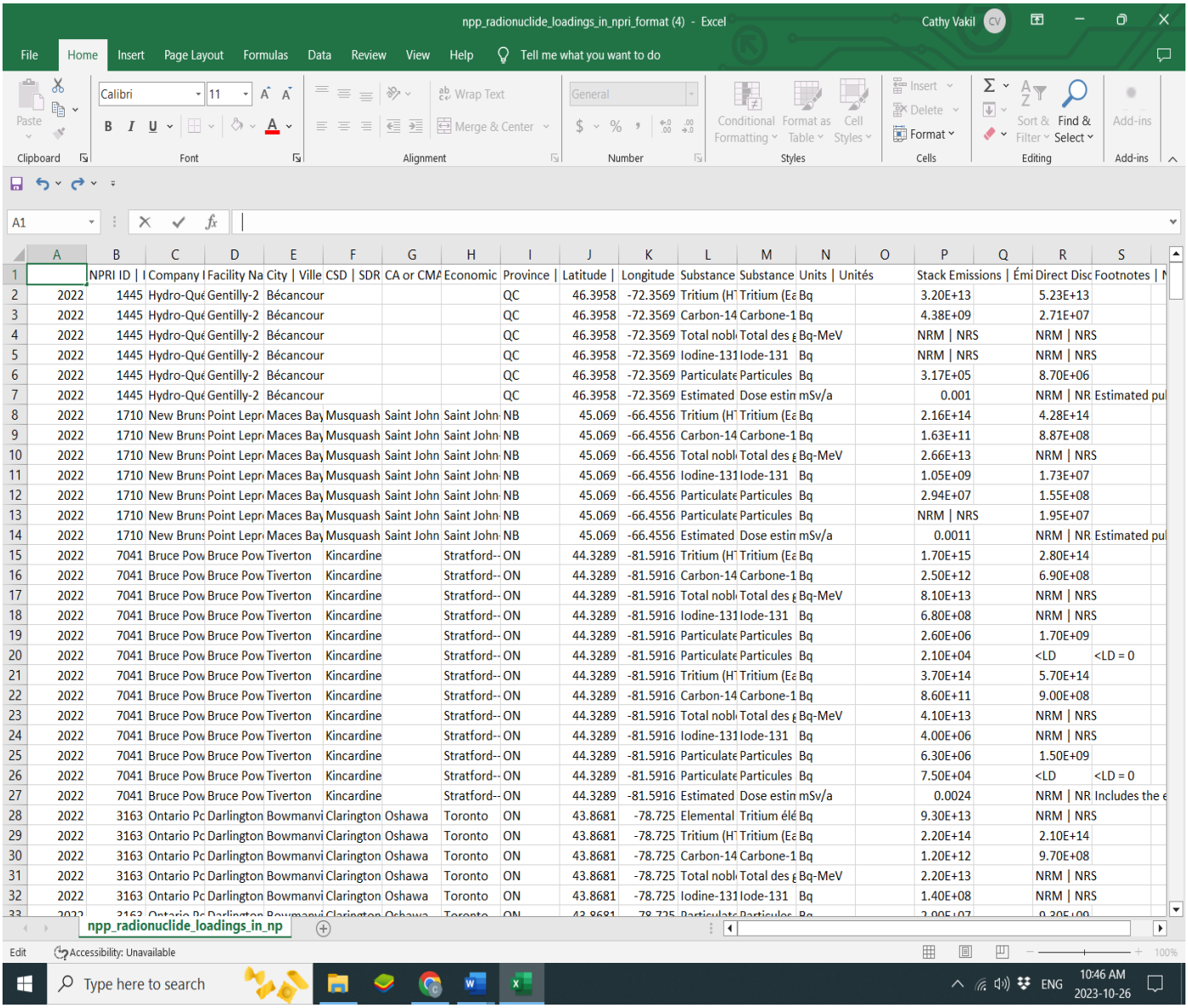


Fig. 4 Example of a spreadsheet on the Government of Canada website of ongoing routine releases of radioactive substances, this one of stack emissions from nuclear power plants across Canada in 2022. See Appendix 4 for a complete list of the above table, illustrating stack emissions from nuclear power plants across Canada 2011 to 2022. See website for many more spreadsheets of other emissions: http://open.canada.ca/data/en/dataset/6ed50cd9-0d8c-471b-a5f6-26088298870e

The Government of Canada publishes data about the release of radioactive materials from nuclear power plants (NPPs) in its *Canadian National Report for the Convention on Nuclear Safety*, a report that is released every three years under the international *Convention on Nuclear Safety*. The report states that all nuclear power plants (NPP) release radioactive materials "into both the atmosphere (as gaseous emissions) and adjoining water bodies (as liquid effluents).", and reports the magnitude of these releases for each NPP in Canada for the

years 2016 to 2018.[30] See screenshots below, in Figures 5 and 6 of relevant pages from this report, which illustrate the ongoing gaseous and liquid radioactive emissions from these nuclear power plants.

Annex 15 (b)
Radiological Emissions from Canadian NPPs

All NPPs release small quantities of radioactive materials, in a controlled manner, into both the atmosphere (as gaseous emissions) and adjoining water bodies (as liquid effluents). This annex reports the magnitude of these releases for each NPP in Canada for the years 2016 to 2018. This annex also indicates how these releases compare with the derived release limits (DRLs) imposed by the CNSC. In the majority of cases, the levels of gaseous and liquid effluents from all NPPs were below 1 percent of the DRLs.

Gaseous emissions released from Canadian NPPs, 2016–2018

Year	Tritium oxide (TBq)	Carbon-14 (TBq)	Noble gases (TBq-MeV)	Iodine-131 (TBq)	Particulates (TBq)
Bruce A					
DRL	1.98E+05	6.34E+02	1.12E+05	1.14E+00	1.73E+00
2016	5.66E+02	1.69E+00	5.63E+01	4.40E-06	3.14E-07
2017	7.32E+02	1.89E+00	9.40E+01	2.06E-05	4.39E-07
2018	6.08E+02	1.14E+00	8.46E+01	6.57E-06	1.28E-06
Bruce B					
DRL	3.16E+05	7.56E+02	2.17E+05	1.35E+00	3.61E+00
2016	5.70E+02	1.13E+00	5.25E+01	<LD[a]	1.13E-06
2017	7.14E+02	1.23E+00	4.82E+01	1.41E-06	2.34E-06
2018	3.86E+02	1.13E+00	4.24E+01	3.43E-06	2.21E-06
Darlington					
DRL	5.9E+04	3.5E+02	4.5E+04	1.4E+00	6.7E-01
2016	1.8E+02	1.6E+00	1.6E+01	1.4E-04	3.2E-05
2017	2.4E+02	1.4E+00	1.5E+01	1.5E-04	2.6E-05
2018	2.1E+02	8.4E-01	4.7E+01	1.4E-04	2.5E-05
Gentilly-2					
DRL	1.7E+05	1.2E+03	NA[1]	NA[1]	8.0E-01
2016	7.31E+01	3.79E-01	NA[1]	NA[1]	5.17E-07
2017	7.31E+01	4.47E-01	NA[1]	NA[1]	8.32E-06
2018	9.17E+01	4.63E-02	NA[1]	NA[1]	2.15E-06

Fig. 5 Screenshot excerpt from the Canadian National Report for the Convention on Nuclear Safety – 8th Report: Gaseous radiological emissions from all Canadian nuclear power plants 2016 to 2018[31]. See Appendix 4 for the complete table.

[30] https://www.iaea.org/sites/default/files/cns_8th_national_report_-_final_canada.pdf, pp.257-258. Government of Canada (2019) *Canadian National Report for the Convention on Nuclear Safety – Eighth Report*, accessed Oct. 13, 2024 online.
[31] Ibid, p. 257

Liquid effluent released from Canadian NPPs, 2016–2018

Year	Tritium oxide (TBq)	Gross beta-gamma (TBq)	Carbon-14 (TBq)
Bruce A			
DRL	2.30E+06	4.58E+01	1.03E+03
2016	2.36E+02	9.96E-04	1.66E-03
2017	2.26E+02	1.08E-03	9.13E-04
2018	1.96E+02	1.20E-03	9.73E-04
Bruce B			
DRL	1.84E+06	5.17E+01	1.16E+03
2016	5.07E+02	1.42E-03	1.76E-03
2017	7.15E+02	2.04E-03	2.39E-04
2018	5.60E+02	2.55E-03	1.38E-03
Darlington			
DRL	5.3E+06	7.1E+01	9.7E+02
2016	3.5E+02	4.9E-02	2.2E-03
2017	5.6E+02	2.6E-02	1.7E-03
2018	2.2E+02	2.6E-02	1.2E-03

Fig. 6 Screenshot excerpt from the Canadian National Report on for the Convention on Nuclear Safety – 8th Report: Liquid radiological emissions from all Canadian nuclear power plants 2016 to 2018[32]. See Appendix 4 for the complete table.

Emissions – Nuclear Waste

Nuclear power generation produces low, medium and high-level radioactive waste, which includes decommissioning of old reactors. The half-lives of some of these radionuclides are from a few hours to millions of years. Therefore, nuclear waste must be kept safely stored and separate from living things in perpetuity. There is no known method of safe long-term storage or disposal. There is one Deep Geological Repository being built in Finland but, because this has no precedent, it is unknown whether the facility or the containers stored in it will leak or breach the highly radioactive wastes, which must be guaranteed to be completely contained for hundreds of thousands of years. While construction of this first-ever deep geological repository for nuclear fuel waste is advancing as a research facility, the review of the application to operate the facility is still underway and has recently been extended. Part of this review will be consideration of the "safety case" and the ability of the operation as designed to effectively contain the radioactive wastes over the very long time period required.[33]

When removed from a reactor, spent fuel bundles are so hot – thermally and radioactively - they require cooling and shielding through ongoing immersion in cold water for at least ten

[32] Ibid, p. 258

[33] https://stuk.fi/en/-/stuk-needs-more-time-to-assess-safety-of-nuclear-waste-disposal-facility, accessed Oct. 13, 2024 online.

years before they can be handled in any way. Presently in Canada there are 3.3 million spent fuel bundles, with over 5.6 million in total expected to accumulate by the time the last of the present reactors is closed down.[34] These spent fuel bundles constitute high-level nuclear waste that is currently being kept either in water-filled pools (irradiated fuel bays) or in temporary dry storage at the reactor sites.

The chart below in Fig. 7 comes from an Atomic Energy of Canada Limited document which shows that there are many highly radioactive substances in the spent fuel bundles from CANDU reactors. This is just part of one page out of many so it is by no means complete.[35]

[34] https://www.nwmo.ca/Canadas-used-nuclear-fuel/How-much-is-there under *How Much Nuclear Fuel is There,* accessed Oct. 13, 2024.

[35] AECL-9881, J.C. Tait, I.C. Gould, G.B. Wilkin. Derivation of Initial Radionuclide Inventories for the Safety Assessment of the Disposal of Used CANDU Fuel. AECL Whiteshell Nuclear Research Establishment, Aug. 1989.

Standard Chemical Symbol	Common Name of element	Atomic Mass Number	F.P. Fission Product	F.I.A.P. Activation Product	Z.A.P. Activation Product	Actinide (includes progeny)
In	Indium	113m			¥	
In	Indium	114	¥	¥	¥	
In	Indium	114m			¥	
In	Indium	115			¥	
Sn	Tin	113			¥	
Sn	Tin	117m	¥	¥	¥	
Sn	Tin	119m	¥ ¥ ¥		¥ ¥ ¥	
Sn	Tin	121m	¥		¥ ¥ ¥	
Sn	Tin	123	¥		¥	
Sn	Tin	125	¥ ¥ ¥		¥	
Sn	Tin	126				
Sb	Antimony	124	¥		¥	
Sb	Antimony	125	¥ ¥ ¥		¥ ¥ ¥	
Sb	Antimony	126	¥		¥	
Sb	Antimony	126m	¥ ¥ ¥			
Te	Tellurium	123	¥		¥	
Te	Tellurium	123m	¥		¥	
Te	Tellurium	125m	¥ ¥ ¥		¥ ¥ ¥	
Te	Tellurium	127	¥		¥	
Te	Tellurium	127m	¥		¥	
I	Iodine	129	¥		¥	
Cs	Cesium	134	¥			
Cs	Cesium	135	¥ ¥ ¥			
Cs	Cesium	137	¥ ¥ ¥			
Ba	Barium	137m	¥ ¥ ¥			
La	Lanthanum	138	¥			
Ce	Cerium	142	¥			
Ce	Cerium	144	¥ ¥ ¥			
Pr	Praseodymium	144	¥ ¥ ¥			
Pr	Praseodymium	144m	¥ ¥ ¥			

Fig. 7 AECL-9881, J.C. Tait, I.C. Gould, G.B. Wilkin. Derivation of Initial Radionuclide Inventories for the Safety Assessment of the Disposal of Used CANDU Fuel. AECL Whiteshell Nuclear Research Establishment, Aug. 1989. Excerpt.

The nuclear industry and its advocates often seek to minimize the impact of radioactive waste by referring to the total volume of spent fuel as being relatively small, which is a misleading claim. The lethal risks of radioactive contaminants are present in individual atoms and molecules and don't require mass-quantity exposure to put lives at risk. A large population exposed to even a very small amount of radiation can result in cancers and other diseases in a significant number of people.

The spent fuel bundles from energy generation require very large and complex containment vessels and sites, which present risks of leaks and catastrophic accidents that could impact well beyond the area of intended containment and, relative to human lifespans, in perpetuity. Importantly, the production of the high-level nuclear waste from spent fuel bundles is ongoing, as reactors continue to produce waste on a daily basis. Therefore, containment, storage and disposal of this toxic waste will be a perpetual challenge, especially considering there is no known solution globally despite sixty years of nuclear power production.

SMRs will also produce a variety of radioactive waste products that will require different types of long-term management due to their more difficult to manage properties. A recently published scientific study done at Stanford University concluded that proposed SMR designs would actually increase the amount of nuclear waste produced in energy production by a factor between 2 and 30 times more than the existing types of nuclear reactors.[36] Some SMR prototype designs include what the industry calls "recycling" but in reality consists of a process to extract the extremely small amount (less than 1%) of plutonium to use as fuel. This process releases harmful radioactive gasses to the environment. The residual high-level wastes, of approximately the same volume as before the "recycling", is rendered more difficult to manage.

It is important to note that one of the radionuclides present in spent nuclear reactor fuel is plutonium, one of the most toxic substances in existence. Plutonium is a human-made radionuclide that is not found in nature and its only source is spent nuclear fuel. It is a potent alpha emitter and extremely toxic to all living things. It is used to make nuclear bombs, adding a serious and significant nuclear proliferation risk with potentially global catastrophic consequences that threaten the future of humankind and the planet itself. It is difficult to claim that an industry that produces such a potentially destructive and toxic substance can be labelled "clean".

Nuclear power generation also produces low and intermediate-level waste which is derived from routine clean-up and maintenance, used reactor components and replacement parts, and decommissioned reactors, all of which become contaminated with radioactivity, and must be carefully managed and stored in perpetuity. Decommissioning nuclear reactors, which is extremely expensive and requires decades to complete, also creates large volumes of radioactive waste.

The nuclear industry claims that a Deep Geological Repository that is currently being proposed for construction in Ontario, along with near-surface disposal facilities such as a radioactive waste dump near the Ottawa River in Ontario, and ongoing containment at the reactor sites,

[36] Nuclear Waste from Small Modular Reactors. Krall L.M., MacFarlane A.M. and R.C. Ewing. Proceedings of the National Academy of Sciences. 2022 Vol. 119 No. 23 e2111833119.

are sufficient to deal with all these waste streams.[37] However it is entirely possible that any or all of these will also release radioactive toxins into the air, soil and water over the hundreds of thousands of years that are required for their safe storage. Because this waste must be dealt with on an ongoing basis and is radioactive and toxic for millennia, we are imposing the burden of risks and contamination containment costs onto future generations.

In conclusion, generating electricity from nuclear power guarantees a constant stream of low, intermediate and high-level, lethally toxic waste that accumulates, in addition to the waste that already results from fuel production and the actual electricity-generating processes.

Emissions – Uranium fuel production

Nuclear power generation also produces air and water pollution due to its emissions from uranium mining, transportation and refining, as well as electricity generation. These emissions consist of radionuclides, heavy metals and other hazardous pollutants. Below, in the two following sections, is a short summary of the water and air emissions from nuclear power generation described in a synopsis of a Pembina Institute document "Nuclear Power in Canada, an Examination of Risks, Impact and Sustainability".[38] (See Appendix 2).

Water emissions

All mining results in tailings, which is the residual rock and soil after the desired product is removed. With uranium mining, unlike other types of mining, the tailings contain radioactive substances, along with acids, heavy metals and other toxic contaminants. Radionuclides and other contaminants have caused severe contamination of groundwater at tailings management facilities and waste rock storage areas.[39] There has also been groundwater contamination with tritium at Pickering nuclear power plant in Ontario.[40] Water bodies are also contaminated with radionuclides in liquid effluents (in particular carbon 14 and tritium) near nuclear power plants, as shown earlier in figure 6.

Air emissions

Atmospheric release of radon occurs during uranium mining and milling and from tailings management facilities, as well as release of dust that contains many types of radionuclides. Uranium mining and milling are also significant sources of releases of sulphur dioxide (SO2), volatile organic compounds (VOCs) and nitrogen oxides (NOx). Releases of dioxins and furans, hexachlorobenzene, heavy metals (principally lead), ammonia, hydrogen fluoride, nitrogen oxides (NOx), particulate matter (PM) and sulphuric acid occur from uranium refining and conversion operations. All of these substances are toxic.

[37] https://www.nwmo.ca, accessed Oct. 13, 2024 online.
[38] https://www.pembina.org/reports/Nuclear_web.pdf, pp.6-7, accessed Oct. 13, 2024 online.
[39] Ibid, pp. 32 and 104
[40] Ibid, p. 7

3.3.3 The CNA's representations are false and misleading in a material respect

The representations are false and misleading in a material respect because they promote a perception about nuclear power generation that aligns with what Canadians and consumers are looking for in their energy sources, the misrepresentations are in contrast to the truth about nuclear power generation, and Canadians have difficulty assessing the accuracy of the representations.

Typically, a misrepresentation is considered to be material "if it is so important, pertinent, germane, or essential that it could affect the decision of a consumer to purchase the product." However, applying such a narrow interpretation of "material" – one that applies only to consumer transactions – would ignore the harm from deceptive claims that unfairly promote other types of business interests. There are many business interests (not just consumer transactions) that are relevant to a company's success in the marketplace.

The CNA is attempting to obtain social acceptance and support from the public for the expansion of nuclear power in Canada, providing the necessary foundation for utilities to fund new nuclear power plants, providing the financial support necessary for nuclear to compete with renewables and other low-carbon sources of energy. The unfair promotion of this business interest can undermine competition in the electricity marketplace and harm consumers. Therefore, the consideration of whether a representation is material should consider whether it "is so important, pertinent, germane, or essential that it could affect" any of a CNA's business interests.

The materiality of the CNA's misrepresentations is demonstrated by the following factors:

1. The evidence that the public wants clean and emissions-free electricity to help address climate change and climate impacts;
2. The magnitude of the CNA's misrepresentations about nuclear energy being "clean" and "non-emitting"; and
3. The limited ability of the public to assess the accuracy of the CNA's representations.

These factors are discussed in turn below.

Canadians, consumers and their utilities want sources of energy that are good for the environment and their health. In 2021, the federal government representing Canadians promised to achieve a 100% net-zero GHG emission electricity system by 2035 as a way to help reduce GHG emissions in Canada and address climate change.[41] Further, Canadians overwhelmingly prefer power from clean energy sources. A 2023 poll demonstrates that 90% of

[41] Office of the Prime Minister (2021) *Mandate letter to Minister Guilbeault,* https://www.pm.gc.ca/en/mandate-letters/2021/12/16/minister-environment-and-climate-change-mandate-letter, accessed Oct. 13, 2024 online.

Canadians think that clean energy is important to the Canadian economy.[42] When asked about the kinds of power generation they support, types of power generation that are traditionally (and accurately) considered "clean" received support from a majority of Canadians: 74% for solar, 68% for wind, and 67% for hydropower.[43] Polluting types of power generation received only minority support; nuclear only received 34% support.

The CNA's description of "clean" and "non-emitting" is a stark and unqualified contrast to the reality of nuclear power. The CNA's representations claim that nuclear power is clean and does not emit any emissions, of any kind. This is not a minor distortion of the fact but the complete opposite of the truth. Nuclear energy emits a wide range of radioactive emissions that are capable of great harm to human health, and produces waste that is harmful for thousands of years. The magnitude of CNA's misrepresentations is significant.

Nuclear energy is highly technical and complex and most politicians and the public do not understand the environmental and health impacts of this industry. Government reports that state the emissions from nuclear plants, such as the *Canadian National Report for the Convention on Nuclear Safety – 8th Report*, are available online, but they are not well known to the public nor are they easy to read and understand. As such, the public has a limited ability to assess the accuracy of the CNA's representations and generally must rely on the CNA to provide truthful representations.

Therefore, the false and misleading representations of the CNA are pertinent, germane, or essential to decisions by governments and the public in accepting and expanding the role of nuclear energy in Canada's electric energy supply.

The value of the electricity supply market is in the hundreds of billions of dollars and continues to grow; the yearly supply of electricity in Canada in 2022 alone was valued at $48.9 billion.[44]

[42] Abacus Data (2023) *Perceptions of the Clean Energy Sector in Canadians*, https://cleanenergycanada.org/wp-content/uploads/2023/11/Full-Survey-Results-Oct-2023.pdf ("*Perceptions of Clean Energy in Canadians*"), p.28, accessed Oct. 13, 2024 online.
[43] Ibid, p.17.
[44] Statistics Canada (2023) *Electricity Supply and Disposition*, https://www150.statcan.gc.ca/n1/daily-quotidien/231030/dq231030d-eng.htm, accessed Oct. 13, 2024 online.

Part 4 – Conclusion

The CNA has made public representations that nuclear power is “clean” and “non-emitting”. However, as this complaint has demonstrated, these representations are false and misleading because the nuclear industry is neither clean nor non-emitting. As reported by federal annual reports on the Canadian nuclear industry, nuclear power produces toxic and radioactive emissions on an ongoing basis during routine operations and when mining, milling and refining uranium to fuel the process. It also produces highly radioactive toxic waste on a continual basis as a result of routine operations, for which there is no long-term safe storage or disposal method.

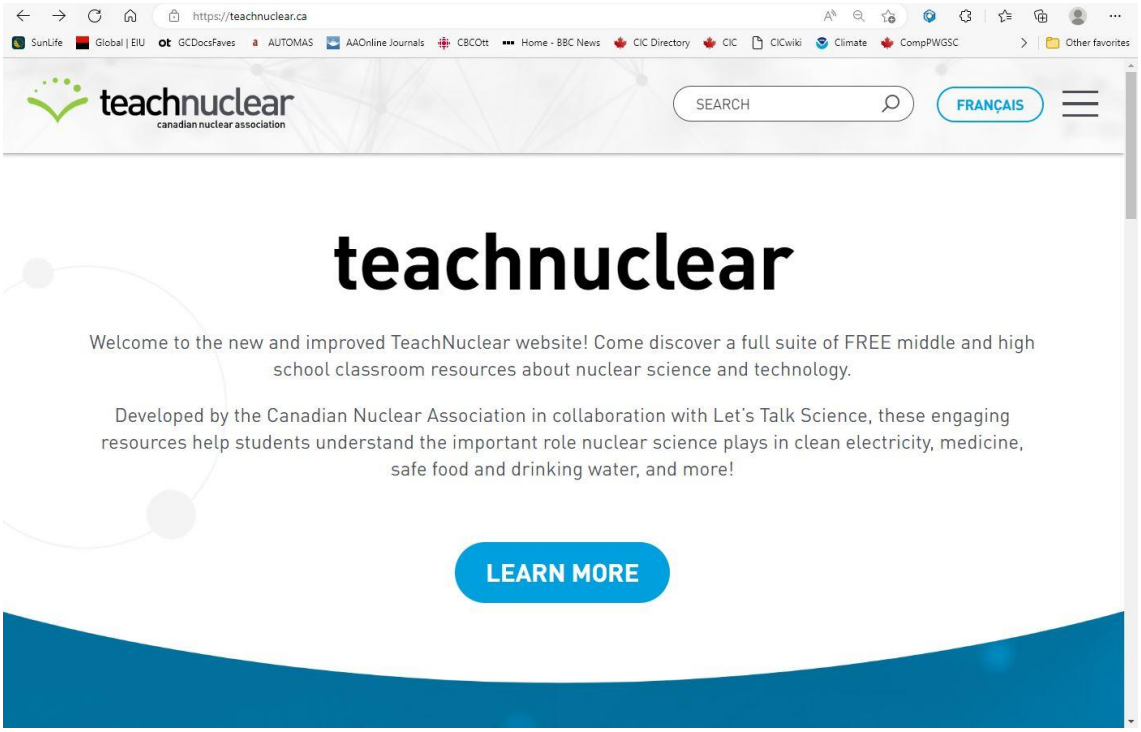
These representations have been made to promote the business interests of the CNA and its members, in order to generate public support for nuclear power and to secure a share in the growing electricity supply market. This support is necessary for the industry to compete with other low-carbon sources of energy, such as wind and solar, which are much cleaner and less expensive than nuclear power. The unfair allocation of consumer, ratepayer and taxpayer dollars to the nuclear industry gives it an undeserved advantage over clean non-emitting electricity companies that are competing for the same utility and energy market share and associated public funds that support that market and consumer positioning. This constitutes anti-competitive behaviour as it also reduces opportunities for companies that can provide clean energy.

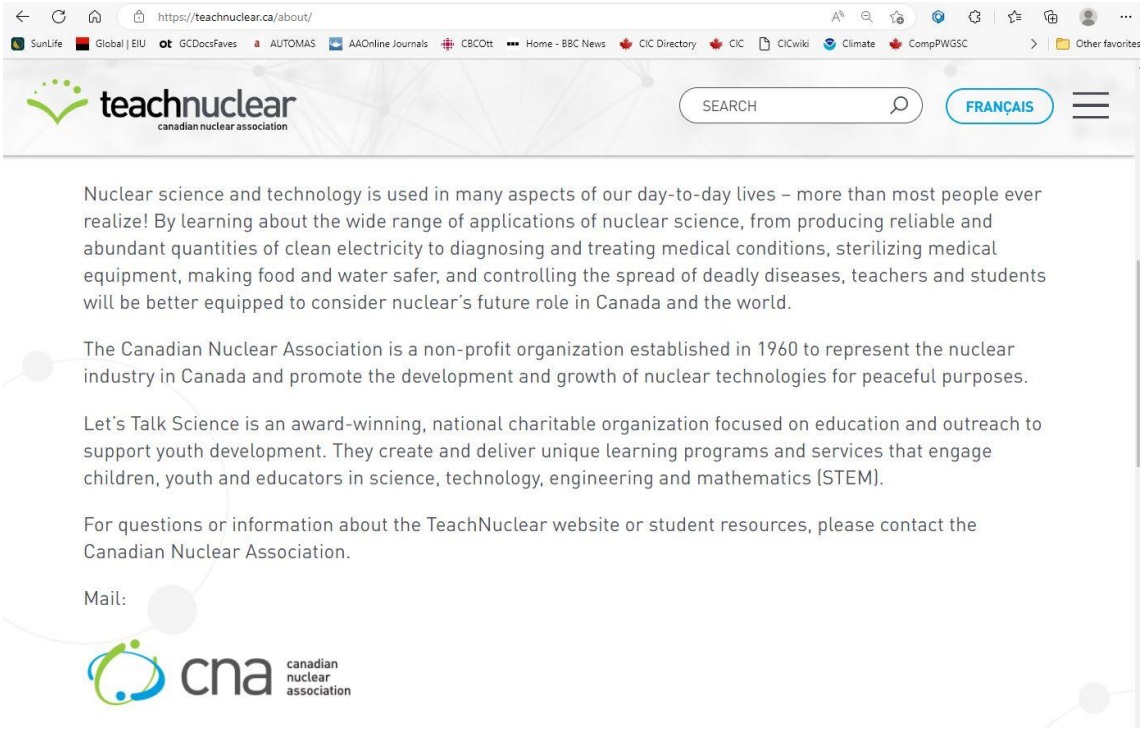
These misrepresentations are material because they portray nuclear power as being aligned with what Canadians and consumers want from their energy sources, they are the opposite of the truth, and it is difficult for the public to assess their accuracy.

The Applicants request that the Competition Bureau investigate the CNA's false and misleading representations. We urge the Bureau to act swiftly as the construction, contractual and financial decisions made on the basis of such claims could be irreversible, as are the emissions and production of radioactive contamination and waste.

Appendix 1: screenshots of CNA representations

Home page of teachnuclear website - https://teachnuclear.ca/





Facebook ads Feb. – Mar. 2021

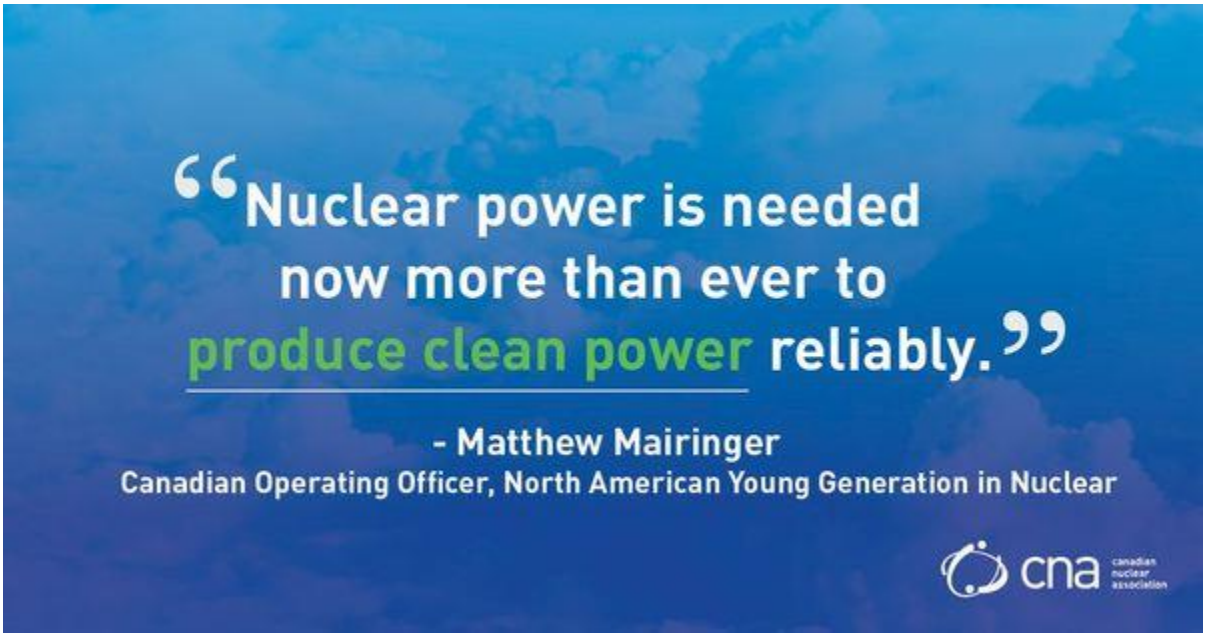
https://www.facebook.com/ads/library/?active_status=all&ad_type=all&country=CA&view_all_page_id=177709632266504&search_type=page&media_type=all

More than half of Canadians think an increased reliance on nuclear as a clean energy source is an important solution in fighting climate change. Let's get to #NetZero2050 and be a model for the world!

Clean nuclear technology must be part of the dynamic energy mix to fight climate change.

More than half of Canadians believe it is important that Canada increase its reliance on nuclear as a clean energy source.

Did you know nuclear technology like small modular reactors helps replace carbon-based fuels with clean electricity?


"Nuclear power is needed now more than ever to produce clean power reliably."
- Matthew Mairinger
Canadian Operating Officer, North American Young Generation in Nuclear
cna
canadian nuclear association

Appendix 2: Synopsis of Pembina Institute document on nuclear waste streams

Nuclear energy production waste streams - a synopsis (excerpt from Pembina Institute publication "Nuclear Power in Canada: An Examination of Risks, Impacts and Sustainability" - Dec. 14, 2006 – by Mark S. Winfield, Rich Wong, Paulina Czajkowski, Alison Cretney, pages 6 and 7, https://www.pembina.org/reports/Nuclear_web.pdf)

(Please note that this document was published in 2006, so the numbers that represent cumulative amounts are out of date. However it is an excellent descriptive synopsis of the waste and pollution produced by the nuclear fuel chain that remains generally unchanged to this date).

Solid and Liquid Wastes

Uranium mining and milling

• An estimated 575,000 tonnes of tailings per year, of which 90–100,000 tonnes can be attributed to uranium production for domestic energy purposes. Uranium mill tailings are acidic or potentially acid generating, and contain a range of long-lived radionuclides, heavy metals and other contaminants. Tailings generation would increase proportionally with the use of lower grade uranium ores, as larger amounts of ore would have to be processed to produce the same amount of uranium concentrate.

• Up to 18 million tonnes of waste rock, which may also contain radionuclides, heavy metals, and be acid generating. Of this total, up to 2.9 million tonnes can be attributed to uranium mining for domestic energy purposes.

• It is estimated that there are more than 213 million tonnes of uranium mine tailings in storage facilities in Canada, and 109 million tonnes of waste rock.

Refining and conversion operations

• It is estimated that nearly 1,000 tonnes of solid wastes and 9,000 m3 of liquid wastes are produced per year as a result of uranium refining, conversion and fuel production for domestic energy generation purposes. Information on the precise character and fate of these wastes could not be obtained.

Power Plant operation

• Approximately 85,000 waste fuel bundles are generated by Canadian nuclear reactors each year. As of 2003, 1.7 million bundles were in storage at reactor sites. It is estimated that these

wastes will have to be secured for approximately one million years for safety, environmental and security reasons.

• Approximately 6,000 cubic metres of lower-level radioactive wastes are generated each year in Ontario as a result of power plant operations, maintenance, and refurbishment.

• Power plant maintenance and refurbishment also result in the generation of substantial amounts of additional hazardous wastes, including heavy metals and asbestos.

• Very large amounts of low, intermediate and high-level radioactive wastes will be produced as a result of the eventual decommissioning of refining, conversion and fabrication facilities as well as power plants.

Water

• Severe contamination of groundwater with radionuclides, heavy metals, and other contaminants has occurred at tailings management facilities and waste rock storage areas.

• Uranium mining and milling facility surface water discharges have resulted in the contamination of the receiving environment with radionuclides and heavy metals. Effluent from historic and operating uranium mines and mills, particularly uranium discharges, have been determined to be toxic for the purposes of the Canadian Environmental Protection Act.

• Uranium mining operations are associated with the extensive removal of groundwater (in excess of 16 billion litres per year).

• Routine and accidental releases of radionuclides to surface waters occur in the course of power plant operations, with tritium oxide and carbon14 being key radioactive pollutants of concern. Groundwater contamination with tritium has occurred at the Pickering generating facility in Ontario.

• Ontario's nuclear power plants are found to be the leading source of discharges of hydrazine, an extremely hazardous pollutant, to surface waters in Canada. Nuclear generating facilities have also been sources of discharges of metals (copper, zinc, and chromium) and ammonia to surface waters.

• Nuclear power is a major consumer of water. Uranium mining operations involve extensive dewatering, in the range of at least 16–17 billion litres per year, with the implication of impacts on groundwater and surface water storage and flows.

• Generating facilities require large amounts of cooling water. The Darlington and Pickering facilities in Ontario are alone estimated to use approximately 8.9 trillion litres of water for cooling purposes per year — more than 19 times the annual water consumption of the City of Toronto. Adverse thermal impacts of cooling water discharges on fish populations in the vicinity of nuclear power plants have been observed.

Air

• Atmospheric releases of a range of radionuclides occur at all stages of nuclear power production. Atmospheric releases of radon gas result from mining and milling operations and from tailings management facilities. Windblown dust from mine sites and tailings management facilities (TMFs) contains a range of radionuclides. Atmospheric releases (principally uranium) also arise from refining and conversion activities.

• Routine and accidental releases of radiation and radionuclides occur from power plant operations, including tritium oxide, carbon-14, noble gases, iodine-131, radioactive particulate and elemental tritium.

• The incineration of low and intermediate-level radioactive wastes from power plant operations and maintenance in Ontario has resulted in further atmospheric releases of radionuclides, particularly tritium. A wide range of hazardous air pollutants have been released by the Bruce Western Waste Management facility. A new incinerator installed in 2003 has reduced emissions of hazardous, but not of radiological, pollutants.

• Windblown dust from mine sites and TMFs contains a range of heavy metals. In addition, releases of a number of hazardous air pollutants, including dioxins and furans, hexachlorobenzene, heavy metals (principally lead) ammonia and hydrogen fluoride arise from uranium refining and conversion operations.

• Ontario nuclear power plants are the only National Pollutant Release Inventory reported source of releases of hydrazine to the air in Canada.

• Uranium mining and milling operations are found to be significant sources of releases of sulphur dioxide (SO2), volatile organic compounds (VOCs) and nitrogen oxides (NOx). Releases of NOx, particulate matter (PM) and sulphuric acid arise from refining and conversion activities.

• The road transportation of uranium from mill sites in northern Saskatchewan to the Blind River refinery in Northern Ontario and then on to the Port Hope conversion facility in Southern Ontario produces additional releases of NOx and PM. Further transportation related releases of criteria air pollutants would arise from the long-term management of waste nuclear fuel and other radioactive wastes arising from facility operations, maintenance and decommissioning, particularly if the management strategies for these materials require the movement of wastes from reactor sites to centralized facilities.

Appendix 3 – Radioactive Emissions from Nuclear Plants

1) From the Government of Canada website http://open.canada.ca/data/en/dataset/6ed50cd9-0d8c-471b-a5f6-26088298870e

The Canadian Nuclear Safety Commission (the Federal Government agency that oversees the nuclear industry) publishes annual data of the total releases of radionuclides directly to the environment from nuclear facilities in Canada from 2011 to 2022, on a Government of Canada website.[45] These facilities include power plants, processing facilities, uranium mines and mills, and Canadian Nuclear Laboratories facilities. On this website there are different data sets for different types of facilities, and these are classed as either direct discharge or emissions from the stacks of the facilities (these are accessible through the links on the website under *Similar Records*). These are annual releases, and some of the radionuclides have extremely long half-lives, so even small discharges will accumulate and be harmful for many years. They include, to name a few, tritium, iodine 131, carbon 14, xenon 135, radium 222, cobalt 60, polonium, lead 210 and thorium. All of these are radioactive and toxic.

See the table below, for an example of the many lists on this website of radionuclides that are emitted from all nuclear facilities across Canada annually. The list below shows releases of stack emissions of radioactive iodine, tritium, carbon and particulates, from all of the nuclear power plants in Canada, for 2011 to 2022. The website has similar spreadsheets for all years as far back as 2011, for different types of emissions, and for the different processing facilities, uranium mines and mills, and Canadian Nuclear Laboratories.

[45] http://open.canada.ca/data/en/dataset/6ed50cd9-0d8c-471b-a5f6-26088298870e, Government of Canada (2023) *Radionuclide Release Datasets*, accessed Oct. 13, 2024.

Year | Année	NPRI ID | I	Company I	Facility Na	City | Ville	CSD | SDR	CA or CMA	Economic	Province |	Latitude |	Longitude	Substance	Substance	Units | Unités		Stack Emissions | Émi		Direct Disc
2022	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		3.20E+13		5.23E+13
2022	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		4.38E+09		2.71E+07
2022	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		NRM | NRS		NRM | NRS
2022	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS
2022	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		3.17E+05		8.70E+06
2022	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estim	mSv/a		0.001		NRM | NRS
2022	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		2.16E+14		4.28E+14
2022	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		1.63E+11		8.87E+08
2022	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		2.66E+13		NRM | NRS
2022	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq		1.05E+09		1.73E+07
2022	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		2.94E+07		1.55E+08
2022	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		1.95E+07
2022	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estim	mSv/a		0.0011		NRM | NRS
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		1.70E+15		2.80E+14
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		2.50E+12		6.90E+08
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		8.10E+13		NRM | NRS
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		6.80E+08		NRM | NRS
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.60E+06		1.70E+09
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.10E+04		<LD
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		3.70E+14		5.70E+14
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		8.60E+11		9.00E+08
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		4.10E+13		NRM | NRS
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		4.00E+06		NRM | NRS
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		6.30E+06		1.50E+09
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		7.50E+04		<LD
2022	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estim	mSv/a		0.0024		NRM | NRS
2022	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		9.30E+13		NRM | NRS
2022	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		2.20E+14		2.10E+14
2022	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		1.20E+12		9.70E+08
2022	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		2.20E+13		NRM | NRS
2022	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.40E+08		NRM | NRS
2022	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		2.90E+07		9.30E+09
2022	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		6.90E+05		8.70E+05
2022	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estim	mSv/a		0.0006		NRM | NRS
2022	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		4.90E+14		5.00E+14
2022	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		2.40E+12		1.40E+09
2022	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.00E+14		NRM | NRS
2022	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		1.10E+07		NRM | NRS
2022	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		1.10E+07		2.00E+10
2022	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq	<	1.90E+04		1.70E+06
2022	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estim	mSv/a		0.0019		NRM | NRS
2021	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		4.43E+13		1.56E+14
2021	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		6.17E+09		6.07E+07
2021	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		NRM | NRS		NRM | NRS
2021	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS
2021	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		5.11E+05		7.11E+07
2021	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estim	mSv/a		0.001		NRM | NRS
2021	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		2.70E+14		8.20E+13
2021	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		1.60E+11		2.10E+09
2021	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		4.24E+13		NRM | NRS
2021	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq		3.40E+08		2.50E+06
2021	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		7.80E+06		2.60E+07
2021	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		4.00E+06
2021	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estim	mSv/a		0.00128		NRM | NRS
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		8.10E+14		2.80E+14
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.70E+12		6.90E+08
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		8.60E+13		NRM | NRS
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		3.10E+05		NRM | NRS
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.90E+06		2.70E+09
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.70E+04	<	LD
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		4.20E+14		9.10E+14
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		9.50E+11		2.60E+09
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		3.40E+13		NRM | NRS
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		0.00E+00		NRM | NRS
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		5.70E+06		2.10E+09
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		3.50E+04	<	LD
2021	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estim	mSv/a		0.0016		NRM | NRS
2021	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		1.70E+13		NRM | NRS
2021	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		2.60E+14		1.90E+14
2021	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		1.20E+12		1.90E+09
2021	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		2.70E+13		NRM | NRS
2021	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.50E+08		NRM | NRS
2021	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		2.00E+07		1.60E+10
2021	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		1.20E+06		8.60E+05
2021	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estim	mSv/a		0.0006		NRM | NRS
2021	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		5.20E+14		4.80E+14
2021	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		2.60E+12		4.60E+09
2021	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.40E+14		NRM | NRS
2021	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		9.70E+06		NRM | NRS
2021	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		1.10E+07		1.20E+11
2021	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq	<	2.00E+04		1.10E+06
2021	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estim	mSv/a		0.002		NRM | NRS

2020	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		8.11E+13		1.97E+13
2020	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		8.19E+09		4.92E+07
2020	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		NRM | NRS		NRM | NRS
2020	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS
2020	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		4.47E+05		1.65E+08
2020	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estim	mSv/a		0.001		NRM | NR
2020	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		2.87E+14		4.61E+14
2020	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		1.60E+11		1.01E+09
2020	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		3.21E+13		NRM | NRS
2020	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq		7.09E+06		1.42E+06
2020	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		2.00E+06		3.83E+07
2020	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		7.10E+06
2020	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estim	mSv/a		0.0013		NRM | NR
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		3.40E+14		2.50E+14
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.60E+12		1.10E+09
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		7.80E+13		NRM | NRS
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		2.20E+07		NRM | NRS
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.90E+06		7.70E+08
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		3.00E+04	<	LD
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		3.10E+14		5.70E+14
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		9.90E+11		1.80E+09
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		2.60E+13		NRM | NRS
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		2.90E+06		NRM | NRS
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		6.40E+06		2.30E+09
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		4.30E+04	<	LD
2020	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estim	mSv/a		0.0018		NRM | NR
2020	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		1.50E+13		NRM | NRS
2020	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		1.90E+14		1.20E+14
2020	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		8.30E+11		3.80E+08
2020	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		2.40E+13		NRM | NRS
2020	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.50E+08		NRM | NRS
2020	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		3.10E+07		2.50E+10
2020	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		1.30E+06		6.50E+05
2020	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estim	mSv/a		0.0004		NRM | NR
2020	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		6.50E+14		4.30E+14
2020	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		2.30E+12		1.80E+09
2020	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		4.50E+13		NRM | NRS
2020	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		1.00E+07		NRM | NRS
2020	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		5.80E+06		3.20E+11
2020	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq	<	1.00E+06		2.40E+06
2020	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estim	mSv/a		0.0012		NRM | NR
2019	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		7.21E+13		8.22E+13
2019	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		2.70E+10		1.90E+08
2019	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		NRM | NRS		NRM | NRS
2019	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS
2019	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		9.49E+05		3.47E+07
2019	1445	Hydro-Qué	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estim	mSv/a		0.003		NRM | NR
2019	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		2.46E+14		3.40E+14
2019	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		2.77E+11		7.60E+09
2019	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		2.85E+13		NRM | NRS
2019	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq		2.73E+07		NRM | NRS
2019	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq	<	2.20E+06		8.40E+07
2019	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		1.30E+07
2019	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estim	mSv/a		0.0012		NRM | NR
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		4.62E+14		2.03E+14
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.34E+12		8.17E+08
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		7.06E+13		NRM | NRS
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		4.18E+07		NRM | NRS
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.97E+06		2.13E+09
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.42E+04	<	LD
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		3.29E+14		8.82E+14
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.08E+12		4.68E+08
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		3.30E+13		NRM | NRS
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		4.40E+05		NRM | NRS
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		4.77E+06		2.26E+09
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.62E+04	<	LD
2019	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estim	mSv/a		0.0015		NRM | NR
2019	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		2.50E+13		NRM | NRS
2019	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		2.00E+14		1.00E+14
2019	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		9.70E+11		3.80E+08
2019	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		5.00E+13		NRM | NRS
2019	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.40E+08		NRM | NRS
2019	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		2.60E+07		2.30E+10
2019	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		1.30E+06		5.40E+05
2019	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estim	mSv/a		0.0004		NRM | NR
2019	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		5.60E+14		4.30E+14
2019	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		2.60E+12		3.50E+09
2019	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.30E+14		NRM | NRS
2019	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		1.40E+07		NRM | NRS
2019	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		5.70E+06		7.80E+10
2019	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		1.10E+06		2.30E+06
2019	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estim	mSv/a		0.0017		NRM | NR

2018	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		9.17E+13		5.46E+13		
2018	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		4.63E+10		1.71E+08		
2018	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		NRM | NRS		NRM | NRS		
2018	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS		
2018	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		2.15E+06		2.51E+07		
2018	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estin	mSv/a		0.009		NRM | NR		
2018	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		1.40E+14		2.40E+14		
2018	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		3.30E+11		4.90E+09		
2018	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		2.50E+13		NRM | NRS		
2018	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq		1.30E+06		NRM | NRS		
2018	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq	<	2.20E+06		9.70E+07		
2018	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		1.70E+07		
2018	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estin	mSv/a		0.0007		NRM | NR		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		6.08E+14		1.96E+14		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.14E+12		9.73E+08		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		8.46E+13		NRM | NRS		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		6.57E+06		NRM | NRS		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.28E+06		1.20E+09		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.10E+04	<	LD		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		3.86E+14		5.60E+14		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.13E+12		1.38E+09		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		4.24E+13		NRM | NRS		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		3.43E+06		NRM | NRS		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.21E+06		2.55E+09		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.37E+04	<	LD		
2018	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estin	mSv/a		0.0017		NRM | NR		
2018	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		4.70E+13		NRM | NRS		
2018	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		2.10E+14		2.20E+14		
2018	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		8.40E+11		1.20E+09		
2018	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		4.70E+13		NRM | NRS		
2018	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.40E+08		NRM | NRS		
2018	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		2.50E+07		2.60E+10		
2018	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		1.00E+06	<	3.50E+05		
2018	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estin	mSv/a		0.0008		NRM | NR		
2018	3161	Ontario Po	Pickering	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		3.00E+14		1.40E+14		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		2.30E+12		NRM | NRS		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.20E+14		NRM | NRS		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		7.00E+06		NRM | NRS		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		4.20E+06		9.30E+09		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		4.30E+05		NRM | NRS		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		3.20E+14		2.80E+14		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		1.40E+12		1.10E+09		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		5.00E+12		NRM | NRS		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		4.70E+06		NRM | NRS		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		3.50E+06		3.40E+10		
2018	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		7.50E+05		1.80E+06		
2018	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estin	mSv/a		0.0021		NRM | NR		
2017	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		7.32E+13		2.17E+14		
2017	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		4.47E+11		2.79E+11		
2017	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		NRM | NRS		NRM | NRS		
2017	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS		
2017	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		8.32E+06		3.27E+08		
2017	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estin	mSv/a		0.007		NRM | NR		
2017	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		1.50E+14		1.20E+14		
2017	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		3.10E+11		1.80E+09		
2017	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		4.60E+13		NRM | NRS		
2017	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq	<	5.20E+05		NRM | NRS		
2017	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq	<	2.20E+06		7.80E+07		
2017	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		7.90E+06		
2017	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estin	mSv/a		0.0007		NRM | NR		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		7.32E+14		2.26E+14		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.89E+12		9.13E+08		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		9.48E+13		NRM | NRS		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		2.06E+07		NRM | NRS		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		4.39E+05		1.08E+09		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		4.08E+03	<	LD		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		7.14E+14		7.15E+14		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.23E+12		2.39E+09		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		4.82E+13		NRM | NRS		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		1.41E+06		NRM | NRS		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.34E+06		2.04E+09		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		3.70E+03	<	LD		
2017	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estin	mSv/a		0.0021		NRM | NR		
2017	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		1.40E+14		NRM | NRS		
2017	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		2.40E+14		5.60E+14		
2017	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		1.40E+12		1.70E+09		
2017	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		1.50E+13		NRM | NRS		
2017	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq	<	1.50E+08		NRM | NRS		
2017	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		2.60E+07		2.60E+10		
2017	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		1.80E+06	<	1.00E+06		
2017	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estin	mSv/a		0.0007		NRM | NR		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		3.10E+14		1.10E+14		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		1.30E+12		NRM | NRS		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.50E+14		NRM | NRS		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		9.60E+06		NRM | NRS		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		6.90E+06		6.60E+09		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		4.70E+05		NRM | NRS		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		3.80E+14		2.70E+14		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		1.30E+12		1.90E+09		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		3.50E+12		NRM | NRS		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		4.30E+06		NRM | NRS		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		2.00E+08		2.00E+10		
2017	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		8.10E+05	<	2.50E+06		
2017	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estin	mSv/a		0.0018		NRM | NR		

2016	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		7.32E+13		3.83E+13
2016	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		3.79E+11		5.64E+10
2016	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		NRM | NRS		NRM | NRS
2016	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS
2016	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		5.17E+05		1.33E+08
2016	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estim	mSv/a		0.001		NRM | NRS
2016	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		1.50E+14		1.80E+14
2016	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		1.10E+11		2.90E+09
2016	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		9.50E+13		NRM | NRS
2016	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq		5.20E+05		NRM | NRS
2016	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq	<	2.20E+06		7.80E+07
2016	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		7.90E+06
2016	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estim	mSv/a		0.0009		NRM | NRS
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		5.66E+14		2.36E+14
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.69E+12		1.66E+09
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		5.63E+13		NRM | NRS
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		4.40E+06		NRM | NRS
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		3.14E+05		9.96E+08
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.46E+06		6.96E+04
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		5.70E+14		5.07E+14
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.13E+12		1.76E+09
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		5.25E+13		NRM | NRS
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq	<	LD		NRM | NRS
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.13E+06		1.42E+09
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.85E+03	<	LD
2016	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estim	mSv/a		0.0016		NRM | NRS
2016	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		1.70E+13		NRM | NRS
2016	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		1.80E+14		3.50E+14
2016	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		1.60E+12		2.20E+09
2016	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		1.60E+13		NRM | NRS
2016	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.40E+08		NRM | NRS
2016	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		3.20E+07		4.90E+10
2016	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq	<	5.00E+06		1.20E+06
2016	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estim	mSv/a		0.0006		NRM | NRS
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		2.20E+14		1.10E+14
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		1.20E+12		NRM | NRS
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.10E+14		NRM | NRS
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		9.90E+06		NRM | NRS
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		5.50E+06		6.80E+09
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		3.70E+05		NRM | NRS
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		4.60E+14		2.10E+14
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		1.20E+12		4.70E+09
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		5.80E+12		NRM | NRS
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		4.10E+06		NRM | NRS
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		2.40E+07		5.10E+10
2016	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		6.20E+05	<	3.70E+06
2016	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estim	mSv/a		0.0015		NRM | NRS
2015	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		1.12E+14		1.51E+14
2015	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		4.10E+11		3.00E+11
2015	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		NRM | NRS		NRM | NRS
2015	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS
2015	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		1.35E+06		5.28E+08
2015	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estim	mSv/a		0.001		NRM | NRS
2015	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		1.40E+14		1.40E+14
2015	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		7.10E+10		1.00E+10
2015	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		5.90E+12		NRM | NRS
2015	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq	<	5.00E+05		NRM | NRS
2015	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq	<	8.10E+06		5.50E+07
2015	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		6.70E+06
2015	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estim	mSv/a		0.0006		NRM | NRS
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		7.05E+14		2.20E+14
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		3.15E+12		2.45E+09
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		5.62E+13		NRM | NRS
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		5.15E+07		NRM | NRS
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.06E+07		9.17E+08
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.23E+06		1.31E+06
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		3.74E+14		6.72E+14
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.16E+12		9.07E+09
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		5.25E+13		NRM | NRS
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		4.01E+07		NRM | NRS
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.63E+07		1.53E+09
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.34E+06		1.40E+06
2015	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estim	mSv/a		0.0029		NRM | NRS
2015	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		1.70E+13		NRM | NRS
2015	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		2.50E+14		2.40E+14
2015	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		1.30E+12		7.30E+09
2015	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		2.20E+13		NRM | NRS
2015	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.40E+08		NRM | NRS
2015	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		3.50E+07		4.90E+10
2015	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq	<	6.40E+06		2.30E+06
2015	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estim	mSv/a		0.0005		NRM | NRS
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		2.40E+14		9.90E+13
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		1.00E+12		NRM | NRS
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		9.30E+13		NRM | NRS
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		1.40E+07		NRM | NRS
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		5.30E+06		4.90E+09
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		4.50E+05		NRM | NRS
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		3.00E+14		2.70E+14
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		1.00E+12		2.80E+09
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.60E+13		NRM | NRS
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		4.60E+06		NRM | NRS
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		1.50E+07		1.70E+10
2015	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		6.10E+05		5.40E+06
2015	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estim	mSv/a		0.0012		NRM | NRS

2014	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		1.19E+14		3.56E+14		
2014	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		4.83E+11		5.28E+10		
2014	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		3.15E+09		NRM | NRS		
2014	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq	<	LD		NRM | NR		<LD = 0
2014	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		2.92E+05		2.86E+08		
2014	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estin	mSv/a		0.004		NRM | NR		Estimated
2014	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		6.60E+13		3.20E+14		
2014	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		8.40E+10		6.60E+09		
2014	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		3.80E+12		NRM | NRS		
2014	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS		
2014	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		1.00E+07		
2014	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		8.30E+07		
2014	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estin	mSv/a		0.0003		NRM | NR		Estimated
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		7.51E+14		1.94E+14		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.64E+12		1.13E+09		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		5.30E+13		NRM | NRS		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		3.94E+08		NRM | NRS		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		3.13E+06		9.57E+08		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		8.02E+05		1.77E+06		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		4.13E+14		6.42E+14		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.26E+12		8.06E+09		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		5.25E+13		NRM | NRS		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		4.02E+07		NRM | NRS		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.53E+07		1.99E+09		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		2.26E+06		1.49E+06		
2014	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estin	mSv/a		0.002		NRM | NR		Includes th
2014	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		5.20E+13		NRM | NRS		
2014	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		2.70E+14		1.70E+14		
2014	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		1.30E+12		5.50E+09		
2014	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		4.60E+13		NRM | NRS		
2014	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.60E+08		NRM | NRS		
2014	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		3.10E+07		3.00E+10		
2014	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq	<	6.40E+06		1.80E+06		
2014	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estin	mSv/a		0.0006		NRM | NR		Estimated
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		2.50E+14		1.00E+14		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		9.10E+11		NRM | NRS		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.10E+14		NRM | NRS		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		1.00E+07		NRM | NRS		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		4.10E+06		9.00E+09		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		3.40E+05		NRM | NRS		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		2.80E+14		2.40E+14		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		9.10E+11		1.50E+09		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.10E+13		NRM | NRS		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		5.20E+06		NRM | NRS		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		3.80E+06		2.30E+10		
2014	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		5.20E+05		3.20E+06		
2014	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estin	mSv/a		0.0012		NRM | NR		Estimated
2013	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		1.14E+14		2.15E+14		
2013	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		7.49E+11		1.15E+10		
2013	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		6.96E+08		NRM | NRS		
2013	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq	<	LD		NRM | NR		<LD = 0
2013	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		8.64E+05		1.84E+09		
2013	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estin	mSv/a		0.005		NRM | NR		Estimated
2013	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		9.10E+13		2.90E+14		
2013	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		8.00E+10		4.30E+09		
2013	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		4.60E+12		NRM | NRS		
2013	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS		
2013	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		1.50E+08		
2013	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		8.60E+06		
2013	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estin	mSv/a		0.0004		NRM | NR		Estimated
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		5.09E+14		1.96E+14		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		2.53E+12		9.95E+08		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		6.66E+13		NRM | NRS		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq	<	4.94E+07		NRM | NRS		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq	<	4.84E+06		9.08E+08		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq	<	6.67E+05		2.12E+06		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		2.63E+14		4.19E+14		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.10E+12		4.90E+09		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		3.71E+12		NRM | NRS		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq	<	4.04E+07		NRM | NRS		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq	<	1.86E+07		3.95E+09		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq	<	2.51E+06		8.91E+06		
2013	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estin	mSv/a		0.0013		NRM | NR		Includes th
2013	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		1.80E+13		NRM | NRS		
2013	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		2.10E+14		1.10E+14		
2013	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		1.00E+12		3.20E+09		
2013	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		3.20E+13		NRM | NRS		
2013	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.40E+08		NRM | NRS		
2013	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		2.90E+07		2.80E+10		
2013	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq	<	6.20E+06		8.50E+05		
2013	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estin	mSv/a		0.0006		NRM | NR		Estimated
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		1.20E+14		1.80E+14		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		7.80E+11		NRM | NRS		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.10E+14		NRM | NRS		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		8.40E+06		NRM | NRS		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		3.70E+06		6.70E+09		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		4.40E+05		NRM | NRS		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		2.40E+14		1.90E+14		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		9.10E+11		1.70E+09		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		6.50E+12		NRM | NRS		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		4.40E+06		NRM | NRS		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		5.00E+06		2.60E+10		
2013	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		5.80E+05		1.30E+07		
2013	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estin	mSv/a		0.0011		NRM | NR		Estimated

2012	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		2.09E+14		3.52E+14
2012	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		4.41E+11		2.88E+10
2012	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		3.87E+11		NRM | NRS
2012	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq		8.32E+06		NRM | NRS
2012	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		1.79E+06		1.09E+09
2012	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estin	mSv/a		0.005		NRM | NRS
2012	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		1.40E+14		7.80E+14
2012	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		3.70E+10		1.40E+10
2012	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		8.00E+11		NRM | NRS
2012	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS
2012	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		7.20E+07
2012	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		6.50E+06
2012	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estin	mSv/a		0.0006		NRM | NRS
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		4.50E+14		1.40E+14
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		2.30E+12		5.37E+08
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		6.82E+13		NRM | NRS
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		2.18E+08		NRM | NRS
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq	<	7.45E+06		5.79E+08
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq	<	6.40E+05		1.60E+06
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		3.26E+14		1.14E+15
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.16E+12		4.63E+09
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		3.64E+12		NRM | NRS
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		4.13E+07		NRM | NRS
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.80E+07		3.35E+09
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq	<	4.38E+05		1.11E+06
2012	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estin	mSv/a		0.0012		NRM | NRS
2012	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		2.60E+13		NRM | NRS
2012	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		1.30E+14		1.30E+14
2012	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		1.00E+12		6.30E+09
2012	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		1.90E+13		NRM | NRS
2012	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.40E+08		NRM | NRS
2012	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		3.40E+07		3.00E+10
2012	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		NRM | NRS		9.00E+05
2012	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estin	mSv/a		0.0006		NRM | NRS
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		2.60E+14		1.10E+14
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		8.80E+11		NRM | NRS
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.10E+14		NRM | NRS
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		1.10E+07		NRM | NRS
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		4.50E+06		1.10E+10
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		NRM | NRS		NRM | NRS
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		2.80E+14		1.80E+14
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		9.40E+11		1.10E+10
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		1.90E+13		NRM | NRS
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		6.60E+06		NRM | NRS
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		3.60E+06		1.90E+10
2012	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		NRM | NRS		7.70E+06
2012	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estin	mSv/a		0.0011		NRM | NRS
2011	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Tritium (H	Tritium (Ea	Bq		1.90E+14		2.44E+14
2011	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Carbon-14	Carbone-1	Bq		2.71E+11		1.88E+10
2011	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Total nobl	Total des g	Bq-MeV		1.16E+11		NRM | NRS
2011	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Iodine-131	Iode-131	Bq	<	LD		NRM | NRS
2011	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Particulate	Particules	Bq		9.13E+05		5.34E+09
2011	1445	Hydro-Que	Gentilly-2	Bécancour				QC	46.3958	-72.3569	Estimated	Dose estin	mSv/a		0.0015		NRM | NRS
2011	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Tritium (H	Tritium (Ea	Bq		4.50E+13		3.40E+13
2011	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Carbon-14	Carbone-1	Bq		2.80E+10		3.80E+07
2011	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Total nobl	Total des g	Bq-MeV		NRM | NRS		NRM | NRS
2011	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Iodine-131	Iode-131	Bq		NRM | NRS		NRM | NRS
2011	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		8.20E+07
2011	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Particulate	Particules	Bq		NRM | NRS		5.80E+06
2011	1710	New Bruns	Point Lepr	Maces Bay	Musquash	Saint John	Saint John	NB	45.069	-66.4556	Estimated	Dose estin	mSv/a		0.0003		NRM | NRS
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		6.00E+14		2.95E+14
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.36E+12		1.70E+09
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		6.68E+13		NRM | NRS
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		3.58E+07		NRM | NRS
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq	<	7.06E+06		6.29E+08
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq	<	5.99E+05		1.01E+06
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Tritium (H	Tritium (Ea	Bq		7.17E+14		5.10E+14
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Carbon-14	Carbone-1	Bq		1.44E+12		2.82E+09
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Total nobl	Total des g	Bq-MeV		3.64E+12		NRM | NRS
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Iodine-131	Iode-131	Bq		4.19E+07		NRM | NRS
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		5.07E+07		2.38E+09
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Particulate	Particules	Bq		1.78E+07		1.48E+06
2011	7041	Bruce Pow	Bruce Pow	Tiverton	Kincardine		Stratford--	ON	44.3289	-81.5916	Estimated	Dose estin	mSv/a		0.0011		NRM | NRS
2011	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Elemental	Tritium élé	Bq		8.80E+13		NRM | NRS
2011	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Tritium (H	Tritium (Ea	Bq		1.40E+14		1.10E+14
2011	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Carbon-14	Carbone-1	Bq		1.00E+12		1.90E+09
2011	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Total nobl	Total des g	Bq-MeV		2.20E+13		NRM | NRS
2011	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Iodine-131	Iode-131	Bq		1.50E+08		NRM | NRS
2011	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		4.00E+07		3.10E+10
2011	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Particulate	Particules	Bq		NRM | NRS		1.10E+06
2011	3163	Ontario Po	Darlington	Bowmanvi	Clarington	Oshawa	Toronto	ON	43.8681	-78.725	Estimated	Dose estin	mSv/a		0.0006		NRM | NRS
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		2.10E+14		1.20E+14
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		1.00E+12		NRM | NRS
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		9.90E+13		NRM | NRS
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		1.50E+07		NRM | NRS
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		8.20E+06		5.10E+09
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		NRM | NRS		NRM | NRS
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Tritium (H	Tritium (Ea	Bq		3.40E+14		2.00E+14
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Carbon-14	Carbone-1	Bq		7.70E+11		2.20E+09
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Total nobl	Total des g	Bq-MeV		8.40E+13		NRM | NRS
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Iodine-131	Iode-131	Bq		8.80E+06		NRM | NRS
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		3.60E+06		1.40E+10
2011	3161	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Particulate	Particules	Bq		NRM | NRS		4.80E+07
2011	3163	Ontario Po	Pickering N	Pickering	Pickering	Toronto	Toronto	ON	43.8104	-79.0676	Estimated	Dose estin	mSv/a		0.0009		NRM | NRS

2) From the *Canadian National Report for the Convention on Nuclear Safety, 8th Report*

The Government of Canada publishes data about the release of radioactive materials from nuclear power plants (NPPs) in its *Canadian National Report for the Convention on Nuclear Safety*, a report that is released every three years under the international *Convention on Nuclear Safety*. The report states that "All NPPs [Nuclear Power Plants] release small quantities of radioactive materials, in a controlled manner, into both the atmosphere (as gaseous emissions) and adjoining water bodies (as liquid effluents)," and reports the magnitude of these releases for each NPP in Canada for the years 2016 to 2018.[46] See two tables below for gaseous and liquid emissions.

[46] https://www.iaea.org/sites/default/files/cns_8th_national_report_-_final_canada.pdf, pp.257-258. Government of Canada (2019) *Canadian National Report for the Convention on Nuclear Safety – Eighth Report*, accessed Oct. 13, 2024 online.

Gaseous emissions released from Canadian NPPs, 2016–2018

Year	Tritium oxide (TBq)	Carbon-14 (TBq)	Noble gases (TBq-MeV)	Iodine-131 (TBq)	Particulates (TBq)
Bruce A					
DRL	1.98E+05	6.34E+02	1.12E+05	1.14E+00	1.73E+00
2016	5.66E+02	1.69E+00	5.63E+01	4.40E-06	3.14E-07
2017	7.32E+02	1.89E+00	9.40E+01	2.06E-05	4.39E-07
2018	6.08E+02	1.14E+00	8.46E+01	6.57E-06	1.28E-06
Bruce B					
DRL	3.16E+05	7.56E+02	2.17E+05	1.35E+00	3.61E+00
2016	5.70E+02	1.13E+00	5.25E+01	<LD[a]	1.13E-06
2017	7.14E+02	1.23E+00	4.82E+01	1.41E-06	2.34E-06
2018	3.86E+02	1.13E+00	4.24E+01	3.43E-06	2.21E-06
Darlington					
DRL	5.9E+04	3.5E+02	4.5E+04	1.4E+00	6.7E-01
2016	1.8E+02	1.6E+00	1.6E+01	1.4E-04	3.2E-05
2017	2.4E+02	1.4E+00	1.5E+01	1.5E-04	2.6E-05
2018	2.1E+02	8.4E-01	4.7E+01	1.4E-04	2.5E-05
Gentilly-2					
DRL	1.7E+05	1.2E+03	NA[1]	NA[1]	8.0E-01
2016	7.31E+01	3.79E-01	NA[1]	NA[1]	5.17E-07
2017	7.31E+01	4.47E-01	NA[1]	NA[1]	8.32E-06
2018	9.17E+01	4.63E-02	NA[1]	NA[1]	2.15E-06
Pickering Units 1–4					
DRL	1.2E+05	2.2E+03	3.2E+04	9.8E+00	4.9E-01
2016	2.2E+02	1.2E+00	1.1E+02	9.9E-06	5.5E-06
2017	3.1E+02	1.3E+00	1.5E+02	9.6E-06	6.9E-06
2018	3.0E+02	2.3E+00	1.2E+02	7.0E-06	4.2E-06
Pickering Units 5–8					
DRL	1.9E+05	2.0E+03	4.7E+04	8.9E+00	7.2E-01
2016	4.6E+02	1.2E+00	5.8E+00	4.1E-06	2.4E-05
2017	3.8E+02	1.3E+00	3.5E+00	4.3E-06	2.0E-04
2018	3.2E+02	1.4E+00	5.0E+00	4.7E-06	3.5E-06
Point Lepreau					
DRL	2.8E+05	6.8E+03	a	6.0E+01	a
2016	1.5E+02	1.1E-01	9.5E+01	5.2E-07	<2.2E-06
2017	1.5E+02	3.1E-01	4.6E+01	<5.2E-07	<2.2E-06
2018	1.4E+02	3.3E-01	2.5E+01	1.3E-06	<2.2E-06

<LD[a] = less than analytical detection limit
NA[1] = not applicable as facility is in safe shutdown

From the Canadian National Report on for the Convention on Nuclear Safety – 8th Report: Gaseous radiological emissions from all Canadian nuclear power plants 2016 to 2018[47].

[47] Ibid, p. 257

Liquid effluent released from Canadian NPPs, 2016–2018

Year	Tritium oxide (TBq)	Gross beta-gamma (TBq)	Carbon-14 (TBq)
Bruce A			
DRL	2.30E+06	4.58E+01	1.03E+03
2016	2.36E+02	9.96E-04	1.66E-03
2017	2.26E+02	1.08E-03	9.13E-04
2018	1.96E+02	1.20E-03	9.73E-04
Bruce B			
DRL	1.84E+06	5.17E+01	1.16E+03
2016	5.07E+02	1.42E-03	1.76E-03
2017	7.15E+02	2.04E-03	2.39E-04
2018	5.60E+02	2.55E-03	1.38E-03
Darlington			
DRL	5.3E+06	7.1E+01	9.7E+02
2016	3.5E+02	4.9E-02	2.2E-03
2017	5.6E+02	2.6E-02	1.7E-03
2018	2.2E+02	2.6E-02	1.2E-03
Gentilly-2			
DRL, 2013-2014 Since 2015	1.1E+07	5.3E+01	7.3E+02
2016	3.83E+01	1.33E-04	5.64E-02
2017	2.17E+02	3.28E-04	2.79E-01
2018	5.45E+01	2.51E-05	1.71E-04
Pickering Units 1–4			
DRL	3.7E+05	1.7E+00	3.2E+01
2016	1.1E+02	6.8E-03	Note 3
2017	1.1E+02	6.6E-03	Note 3
2018	1.4E+02	9.3E-03	Note 3
Pickering Units 5–8			
DRL	7.0E+05	3.2E+00	6.0E+01
2016	2.1E+02	5.1E-02	4.7E-03
2017	2.7E+02	2.0E-02	1.9E-03
2018	2.8E+02	3.4E-02	1.1E-03
Point Lepreau			
DRL	4.6E+07	a	3.3E+02
2016	1.8E+02	7.8E-05	2.9E-03
2017	1.2E+02	7.8E-05	1.8E-03
2018	2.4E+02	9.7E-05	4.9E-03

Note 1: The carbon-14 releases in liquid effluent from Pickering Units 1–4 are reported in the carbon-14 releases in liquid effluent from Pickering Units 5–8

Fig. 6 From the Canadian National Report on for the Convention on Nuclear Safety – 8th Report: Liquid radiological emissions from all Canadian nuclear power plants 2016 to 2018[48].

[48] Ibid, p. 258

3) Atomic Energy of Canada Limited document

The document below shows that there are many highly radioactive substances in the spent fuel bundles from CANDU reactors. This is just part of one page out of many so is by no means complete.[49]

Standard Chemical Symbol	Common Name of element	Atomic Mass Number	F.P. Fission Product	F.I.A.P. Activation Product	Z.A.P. Activation Product	Actinide (includes progeny)
In	Indium	113m			¥	
In	Indium	114	¥	¥	¥	
In	Indium	114m			¥	
In	Indium	115			¥	
Sn	Tin	113			¥	
Sn	Tin	117m	¥	¥	¥	
Sn	Tin	119m	¥ ¥ ¥		¥ ¥ ¥	
Sn	Tin	121m	¥		¥ ¥ ¥	
Sn	Tin	123	¥		¥	
Sn	Tin	125	¥ ¥ ¥		¥	
Sn	Tin	126				
Sb	Antimony	124	¥		¥	
Sb	Antimony	125	¥ ¥ ¥		¥ ¥ ¥	
Sb	Antimony	126	¥		¥	
Sb	Antimony	126m	¥ ¥ ¥			
Te	Tellurium	123	¥		¥	
Te	Tellurium	123m	¥		¥	
Te	Tellurium	125m	¥ ¥ ¥		¥ ¥ ¥	
Te	Tellurium	127	¥		¥	
Te	Tellurium	127m	¥		¥	
I	Iodine	129	¥		¥	
Cs	Cesium	134	¥			
Cs	Cesium	135	¥ ¥ ¥			
Cs	Cesium	137	¥ ¥ ¥			
Ba	Barium	137m	¥ ¥ ¥			
La	Lanthanum	138	¥			
Ce	Cerium	142	¥			
Ce	Cerium	144	¥ ¥ ¥			
Pr	Praseodymium	144	¥ ¥ ¥			
Pr	Praseodymium	144m	¥ ¥ ¥			

Fig. 7 AECL-9881, J.C. Tait, I.C. Gould, G.B. Wilkin. Derivation of Initial Radionuclide Inventories for the Safety Assessment of the Disposal of Used CANDU Fuel. AECL Whiteshell Nuclear Research Establishment, Aug. 1989. Excerpt.

[49] AECL-9881, J.C. Tait, I.C. Gould, G.B. Wilkin. Derivation of Initial Radionuclide Inventories for the Safety Assessment of the Disposal of Used CANDU Fuel. AECL Whiteshell Nuclear Research Establishment, Aug. 1989.