

Environmental Protection Reviews of Canadian Nuclear Facilities

Prepared for the 43rd Annual Conference of the International Association for Impact Assessment
April 24-27, 2024 in Dublin, Ireland

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Introduction

The Canadian Nuclear Safety Commission (CNSC) is Canada's sole nuclear regulator and is responsible for overseeing all nuclear facilities and activities throughout their entire lifecycle to protect health, safety, security, and the environment. The Commission's decisions are evidence-based and presented in the context of an open and transparent hearing process. The CNSC requires that the environmental effects of all nuclear facilities and activities be considered or evaluated when licensing decisions are made. Environmental reviews are conducted for all licence applications to assess and demonstrate potential interactions with the environment. The type and scale of the environmental review is determined by the location, scale, and complexity of the facility or activity and the associated environmental risks.

Depending on the nature of the facility or proposed new project, it may be subject to one of multiple of the following different types of reviews:

- integrated impact assessments under the [Impact Assessment Act](#) (IAA)
- federal lands reviews under the IAA
- federal environmental assessments under the [Canadian Environmental Assessment Act, 2012](#) (CEAA 2012)
- environmental protection reviews (EPRs) under the [Nuclear Safety and Control Act](#) (NSCA)
- environmental assessments under provincial regimes and land claim agreements

This paper will highlight the evolution of the CNSC's approach to EPRs for existing nuclear facilities and how these reviews support the CNSC's mandate to disseminate objective, scientific, technical, and regulatory information and to build trust with the public and Indigenous Nations and communities.

What is an environmental protection review?

Under the NSCA, EPRs for existing nuclear facilities document CNSC staff's technical assessment of a licensee's environmental protection measures at a nuclear facility. EPRs act as a

comprehensive repository of CNSC staff's evaluation of health, science, and environmental compliance activities for a licensed nuclear site. In addition, the assessments incorporate results from the CNSC's [Independent Environmental Monitoring Program](#) and information from other regional environmental monitoring programs.

In 2021, CNSC staff started developing EPR reports separate from specific licensing decisions. Now, EPR reports are developed based on the cyclical regulatory requirements related to a licensee's environmental risk assessment submissions, which is typically every 5 years. This change was brought about in part for the need to provide regular updates to the public and Indigenous Nations and communities in advance of licensing hearings on how nuclear facilities are implementing and maintaining the required environmental protection measures to identify, control, and monitor releases of radiological and hazardous substances and their potential effects on people and the environment.

Making technical information accessible for the public and Indigenous Nations and communities

Alongside the EPR reports, CNSC staff produce plain-language summaries that highlight key findings and information from the reports. These summaries are also posted on the CNSC's website and linked on the Open Government Portal. Social media posts on Facebook and X (formerly Twitter) also provide simplified messaging on report findings. In addition, CNSC staff have recently begun producing visual pamphlets to compliment EPR reports to help make the findings more digestible. The EPR report pamphlet for the Darlington Waste Management Facility, published in 2022, can be seen in Figure 1.

There are currently 11 stand-alone EPR reports for various types of nuclear facilities, including a nuclear generating station, nuclear processing facilities, a waste management facility, and uranium mines and mills. All reports are published on the CNSC's [environmental protection reviews web page](#) and linked on the Government of Canada's [Open Government Portal](#) in PDF and HTML formats to foster greater access to CNSC staff's technical review work and to promote openness and transparency with Canadians.

Building trust and awareness

EPR reports and the summary pamphlets are proving to be a great tool for outreach and consultation events and to answer general inquiries related to the operations of nuclear facilities. We are also seeing these reports referenced in interventions for Commission proceedings and used by licensees in their outreach and communications materials. By providing easy to understand EPR information in multiple formats, the CNSC is working to continuously foster trust, awareness, and transparency in the operation and regulation of nuclear facilities in Canada.

Always improving

Our team is always looking to build and improve upon the information provided in EPRs and how we share this information. Some of the areas we are evolving include:

- **Indigenous Knowledge** – working directly with Indigenous Nations and communities and knowledge holders on integrating their knowledge, values, land use information, environmental monitoring activities, and perspectives in the CNSC EPR reports, where appropriate and when shared with the licensee and the CNSC with their permission.

- **Climate change** – going forward, EPR reports will include an assessment of climate change considerations. They will provide an analysis of external hazards and environmental parameters, and whether a licensee has applied sufficient safety margins within their design.
- **Clear definitions of safety limits and risk** – improving how we explain how certain concepts related to safety limits and risk are established to protect the health and safety of workers, the public, and the environment near nuclear facilities.

Lastly, we want to focus on finding different opportunities for sharing these reports so that the public and Indigenous Nations and communities are aware that this information is available and easily accessible. We've established an internal EPR working group within the CNSC to address these opportunities for improvement and we welcome any feedback or suggestions for the public and Indigenous Nations and communities on our EPR reports and associated products and procedures.

French summary

Le mandat de la Commission canadienne de sûreté nucléaire (CCSN) comprend informer objectivement le public sur les plans scientifique ou technique ou en ce qui concerne la réglementation du domaine de l'énergie nucléaire et d'établir un climat de confiance avec le public et les Nations et communautés autochtones. Pour l'aider à réaliser ce mandat, le personnel de la CCSN publie des rapports d'examen de la protection de l'environnement (EPE) afin d'assurer la transparence de l'évaluation par le personnel de la question de savoir si un titulaire de permis prendra les mesures appropriées pour protéger l'environnement ainsi que la santé du public.

Les rapports d'EPE du personnel de la CCSN résument les évaluations techniques des données de surveillance environnementale d'un titulaire de permis, les évaluations des risques environnementaux et d'autres soumissions liées aux mesures et aux programmes de protection de l'environnement. Nous incluons également de l'information sur les activités de vérification indépendantes, comme le Programme indépendant de surveillance environnementale de la CCSN, les études régionales pertinentes sur la santé, les programmes de surveillance et les études sur le savoir autochtone.

Ces rapports fournissent des données et des analyses faciles à comprendre et sont disponibles sur le site Web de la CCSN et sur le Portail du gouvernement ouvert du gouvernement du Canada. Pour rendre les constatations de nos rapports d'EPE accessibles à toutes les audiences, nous avons créé des brochures pour mettre en évidence les principales constatations. Un ajout récent à nos rapports est une section sur les impacts potentiels du changement climatique sur les installations nucléaires et les mesures d'atténuation en place.

Les rapports d'EPE se sont avérés être un outil de discussion précieux lors des délibérations de la Commission, des activités de sensibilisation du public et lors de la mobilisation des Autochtones. En fournissant de l'information sur les EPE faciles à comprendre dans de multiples formats, la CCSN s'efforce continuellement de favoriser la confiance, la sensibilisation et la transparence dans l'exploitation et la réglementation des installations nucléaires au Canada.

Figure 1: Sample of an EPR pamphlet

Environmental Protection Review

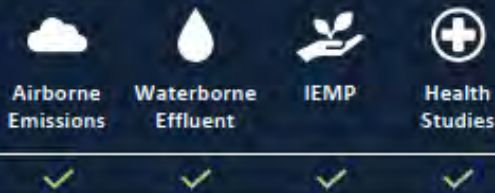
The following is a summary of the Environmental Protections Review (EPR) for the Darlington Waste Management Facility (DWMF) located in the Darlington Nuclear (DN) site in Clarington, Ontario. EPRs are an evidence-based technical assessment conducted by the Canadian Nuclear Safety Commission (CNSC) staff, as required by the *Nuclear Safety and Control Act*.

Darlington Waste Management Facility

The DWMF is in the traditional territory of the Michi Saagiig Anishinaabe people. These lands are covered by the Williams Treaty between Canada and the Mississauga and Chippewa Nations.

The DWMF consists of two in-service storage buildings, a dry storage container processing building, and the Retube Waste Storage Building (RWSB). Releases from the DWMF are significantly lower than those from the nearby Darlington Nuclear Generation Station (DNGS) and emissions from the DWMF should be considered as a small fraction of the overall emissions and releases from the DN site as a whole.

Key Findings



CNSC staff found that Ontario Power Generation (OPG) has implemented and maintained effective environmental protection measures to adequately protect the environment and the health of persons.

Scan to access the full report or find it at nuclearsafety.gc.ca



Indigenous Knowledge

The CNSC recognizes the importance of considering and including Indigenous knowledge in all aspects of the CNSC's regulatory processes, including in environmental protection reviews.

To find out more, visit the CNSC's [Indigenous Knowledge Policy Framework](#)

Effects to the Environment

CNSC staff reviewed OPG's assessment of current and predicted effects of licensed activities on the environment and health of persons in the 2020 environmental risk assessment for the DWMF.

Atmospheric Environment

OPG controls and monitors airborne emissions from the DWMF to the environment, including monitoring of both radiological and hazardous emissions. CNSC staff found that OPG's air emissions have remained below CNSC-approved licence limits and that the environment and public health remain protected.

Terrestrial and Aquatic Environment

There is no terrestrial or aquatic monitoring specific to the DWMF since releases from the DWMF are negligible. OPG has comprehensive site-wide aquatic and environmental monitoring programs that demonstrate that the terrestrial and aquatic environments around the DN site remain protected.

Human Environment

OPG monitors the environment surrounding the DN site to determine if there is an impact to human health through breathing the air, drinking and swimming in the water, and eating plants, fish, and wildlife from the area.

Annual public limit (μSv)	2017	2018	2019	2020	2021
1000	0.7	0.8	0.4	0.4	0.6

The estimated annual radiological doses shown above have remained below the regulatory annual dose limit for the public (1000 μSv). CNSC staff have found that impacts to human environment from radiological and hazardous substances released from the DWMF are negligible.

Releases to the Environment

Hazardous and radiological substances have the potential to cause negative impacts to both humans and the environment. Release limits are established to ensure releases remain at levels protective of the environment and human health.

Airborne Emissions

Under normal operating conditions, there is a negligible potential for hazardous airborne releases. However, there is a small potential for radiological airborne emissions at the DWMF resulting from welding and vacuum drying activities. The DWMF has in place high-efficiency active ventilation systems to reduce these potential releases. OPG monitors the airborne emission data weekly and it has remained **significantly below** the applicable release limits from 2016 to 2021.



Waterborne Effluent

There are negligible liquid releases from operations of the DWMF. However, stormwater and foundation drainage¹ were monitored for tritium and gross gamma. The stormwater and foundation drainage are primarily influenced by air emissions from external facilities (such as tritium washout from the nearby DNGS).

The waterborne effluent of tritium and gross gamma in annual stormwater releases remained **significantly below** the administrative limits from 2016 to 2021.



¹ OPG monitored water collected by the drainage systems located along the foundation of buildings within the DWMF.



The exposure pathway

This figure illustrates a conceptual model of the environment around a generic nuclear generating station site (including a generic radioactive waste management facility) to show the relationship between releases (airborne emissions or waterborne effluent) and human and ecological receptors or exposure pathways.



Health Studies

The CNSC reviews health studies as an important component of ensuring that the health of people living near or working in the DN site are protected.

CNSC staff review:

- ✓ International radiation epidemiology reports
- ✓ CNSC's studies and scientific publications
- ✓ Provincial and national-level studies and reports

CNSC staff have not observed and do not expect to observe any negative health outcomes connected to the DN site and the DWMF.



CNSC Independent Environmental Monitoring Program (IEMP)

The IEMP is carried out by CNSC staff in publicly accessible areas and consists of taking samples from the environment and analyzing them for harmful substances released from facilities in all areas of the nuclear fuel cycle.

The IEMP results for 2021, 2017, 2015 and 2014 confirm that the public and the environment surrounding the DN site remain **protected**.

Results are consistent with the results submitted by OPG.

Scan to view the IEMP results or find them at nuclearsafety.gc.ca

