Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 25-H2.42

Date: 2025-05-08

Written Submission from AtkinsRéalis

Mémoire d' AtkinsRéalis

In the matter of the

À l'égard d'

Ontario Power Generation Inc.

Ontario Power Generation Inc.

Application to renew power reactor operating licence for the Darlington Nuclear Generating Station

Demande concernant le renouvellement du permis d'exploitation d'un réacteur de puissance pour la centrale nucléaire de Darlington

Commission Public Hearing Part-2

Audience publique de la Commission Partie-2

June 24-26, 2025

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Canada

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President and Commission Member
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Classification

Copyright

Subject: Renewal of the Darlington Nuclear Generating Station Power Reactor Operating License Ref. 2025-H-02

Dear President and Commission Members,

Candu Energy Inc., an AtkinsRéalis company, appreciates the opportunity to provide written feedback to the Canadian Nuclear Safety Commission (CNSC) on Ontario Power Generation's (OPG) application to renew their power reactor operating license for the Darlington Nuclear Generating Station (NGS) in advance of the public hearing scheduled for June 24-26, 2025.

As described in the attachment to this letter, Candu Energy, an AtkinsRéalis company, fully supports and recommends a 30-year renewal of OPG's Power Reactor Operating License for the Darlington Nuclear Generating Station. Based on the information provided in Ontario Power Generation's License Application as well as our extensive experience in closely collaborating with OPG on numerous and wide-ranging initiatives over several decades, Candu Energy is highly confident that OPG is qualified to:

- Carry on the licensed activities to operate a Class I nuclear facility, and
- Make adequate provisions to protect the health, safety and security of persons and the environment, and maintain national security and measures required to implement international obligations.

Sincerely,

Mohamed Dahmani, Ph.D.

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Attachment

1. INTRODUCTION

This document constitutes AtkinsRéalis' written submission to the Canadian Nuclear Safety Commission in support of the renewal of Ontario Power Generation's Power Reactor Operating License (PROL) for the Darlington Nuclear Generating Station (NGS).

In this document, some information will be summarized as follows:

- CANDU® reactor safety,
- Candu Energy's experience in working with Ontario Power Generation (OPG), and
- Candu Energy's confidence in the robustness of the Canadian nuclear licensing process.

2. BACKGROUND ON CANDU AND DARLINGTON REACTOR SAFETY

CANDU technology is a Canadian pressurized heavy-water reactor design that has over 60 years of safe and reliable operating experience that began with the operation of the Nuclear Power Demonstration (NPD), as the first Canadian prototype of the CANDU reactor design in 1962. Heavy water moderated reactors based on the CANDU design are in operation or under refurbishment on four continents worldwide, 17 in Canada, one in Argentina, two in China, three in the Republic of Korea and two in Romania.

CANDU reactor technology was originally designed by Atomic Energy of Canada (AECL), and exclusively licensed to Candu Energy, as the original equipment manufacturer (OEM) and steward of CANDU technology, is well positioned to help clients meet their Net Zero objectives. We oversee new-build nuclear power plants, major refurbishments, and life extensions, and offer specialized services in safety analysis, environmental qualification, metrology/spatial analysis, geotechnical investigations, decommissioning and waste management services.

With significant presence in Canada, the US and the UK, our team takes part in both nuclear steam plant and balance of plant projects for many reactor technologies. Our combined team of close to 3,000 nuclear power experts are part of one of the most complete nuclear services companies in the world, with full architect engineer and management & operations capability, and a full suite of engineering and field services, project management, project controls, commercial and plant life management for not just CANDU reactors but also boiling water reactors and pressurized water reactors. The Candu Energy team has extensive design and execution experience gained during our more than 65 years in the nuclear industry.

The CANDU design is proven, with high reliability and an excellent safety record with more than 1000 combined CANDU reactor-years of safe operation worldwide. Safety and operational performance of the CANDU design has continuously been improved by incorporating innovative technologies and lessons learned from operating experience. The Darlington NGS has significantly contributed to, and benefited from, this extensive and valuable knowledgebase of CANDU operating experience.

During the current and previous license periods, the four CANDU reactors that comprise the Darlington Nuclear Generating Station (NGS) have operated safely, whilst protecting the workers at the facility, the surrounding communities, and the environment at large, for more than three decades. This strong performance of the Darlington NGS is also recognized internationally, for example, by the World Association of Nuclear Operators (WANO).

The Darlington NGS is extremely robust, as evidenced by results of Probabilistic Safety Assessment (PSA) for internal and external hazards. During the current licence period OPG has made further safety and reliability improvements to the CANDU reactors at the Darlington NGS that were credited in the 2020 Darlington NGS Probabilistic Safety Assessment by installing:

- New emergency mitigating equipment and connection points,
- Shield Tank Overpressure Protection,
- Emergency Service Water make-up to the Heat transport System
- Powerhouse Steam Venting System, and
- Third Emergency Power Generator.

As such, the level of safety as indicated by the PSA results are comparable to those of new-build safety goals.

3. Candu Energy Experience with OPG during Current Operating License Period

Candu Energy operates within a Global Health Safety and Environment Management System (GHSEMS) that is designed to establish a clear framework of mandatory processes to ensure that the nuclear sector, all regions, global businesses and associated BUs meet the same level of safety in the workplace and during execution of engineering design and technical activities. The GHSEMS is well aligned with OPG's Nuclear Safety Culture.

Fundamental to the nuclear safety culture is the CANDU plant operating philosophy is the principle of continuous improvement where experience gained from the nuclear industry is shared and used to make safety-focused improvements. This approach is integrated in the plant management system and is driven by OPEX – a process that captures 'operating experience' and assists in lessons learned. OPEX sources include direct information sharing between CANDU operators, Information Bulletins issued by Candu Energy, industry meetings organized by Conexus Nuclear Inc. (previously known as CANDU Owners' Group), regulatory positions and international nuclear organizations. The collaboration between CANDU operating stations and their industry partners promotes a culture of learning to achieve excellence in safety and reliability performance and improve safety, as demonstrated by the Darlington station.

Through our many various project interactions during the current Darlington operating license period, AtkinsRéalis has found OPG to be a knowledgeable, responsible and qualified nuclear operator. The scope of work performed by Candu Energy for the Darlington NGS illustrates OPG's use of continuous improvement.

Since 2016, AtkinsRéalis has taken part in conducting the execution phase of the Darlington Retube and Feeder Replacement scope of work. This work took into consideration lessons learned from earlier CANDU retube projects and involved:

- Creating a detailed execution plan that identified the materials, parts and steps needed to successfully execute such a complex project,
- Organizing the sequence for taking each of the four CANDU reactors out of service, one at a time, to replace their fuel channels,
- Developing a tooling system to optimize the time needed to replace the fuel channels while ensuring achievement of high-quality work and safety standards.

Also, during the current Darlington operating licence period, Candu Energy has provided engineering design, safety analysis, and emergent and planned outage support services to support improvements to operation of the Darlington NGS that align with several CNSC safety and control areas, such as:

- **Safety analysis**: Updating the Darlington Loss of Flow Analysis and updating the Darlington Internal Flood Probabilistic Safety Assessment,
- **Operating performance**: Updating the Darlington instrument uncertainty calculations to support updates to the Darlington Safe Operating Envelope and reactor physics support during the Darlington Unit 1 restart,
- **Fitness for service**: Providing a fitness for service assessment for the Darlington inlet and outlet feeder stubs to support to the Retube and Feeder Replacement scope of work for Darlington Units 1, 3 and 4, and
- **Physical design**: Providing a Cobalt-60 production feasibility study and a Mo-99 activity yield assessment to support isotope production in Darlington Unit 2.

Hence, our experience in performing work for OPG under the Darlington Retube and Feeder Replacement scope of work and in support of the operation of Darlington Nuclear Generating Stations give us high confidence in OPG's safety performance. As such, Candu Energy has routinely witnessed, firsthand and across various levels of the organization, OPG's commitment to safety as the overriding consideration for all the work where we have been involved with OPG. Thus, we can firmly attest to OPG's strong safety culture and adherence to high standards.

Candu Energy intends to continue to offer its full range of capabilities to support the continued safe and reliable operation of Darlington NGS and Ontario Power Generation's drive for continuous improvement and believes that our robust technical relationship will extend through the upcoming operating license renewal period.

4. Canadian Nuclear Licensing Process

As a holder of a Nuclear Laboratory Waste Nuclear Substance License, Candu Energy has high confidence in the Canadian regulatory process for granting and renewing licenses for nuclear facilities and in the Canadian Nuclear Safety Commission staff who perform rigorous oversight of the licensed nuclear facilities. The licensing process is founded on a policy of openness and transparency in the undertakings of the Commission, where decisions to grant or renew licenses are based on due consideration of the highly technical and scientific information that demonstrates that the activity or the operation of a given facility can be carried out safely and that the environment will be protected. The Commission conducts its business with openness and transparency that enables all interested parties, whether in favor of or opposed to a licensed activity, to be heard.

5. Summary

The continuation of their excellent record of safe operation of the Darlington NGS during the current license period and the ongoing activities to extend the operating life of the Darlington Nuclear generating Station exemplifies Ontario Power Generation's commitment to safety, protection of the environment, and consistent high operating performance.

In conclusion, Candu Energy fully supports Ontario Power Generation's Application for renewal of the power reactor operating license (PROL) for the Darlington NGS, for 30 years of continued operation. We encourage the Canadian Nuclear Safety Commission to approve the License Application.