



Oral Presentation

Exposé oral

**Submission from
SNC-Lavalin**

**Mémoire de
SNC-Lavalin**

In the Matter of

À l'égard de

**Ontario Power Generation Inc.,
Pickering Nuclear Generating Station**

**Ontario Power Generation Inc.,
centrale nucléaire de Pickering**

Request for a ten-year renewal of its Nuclear Power Reactor Operating Licence for the Pickering Nuclear Generating Station

Demande de renouvellement, pour une période de dix ans, de son permis d'exploitation d'un réacteur nucléaire de puissance à la centrale nucléaire de Pickering

Commission Public Hearing – Part 2

**Audience publique de la Commission –
Partie 2**

June 2018

Juin 2018

May 4, 2018

SNC-Lavalin Representation Regarding

Ref: 2018-H-06 – Renewal of the Nuclear Power Reactor Operating Licence for the Pickering
Nuclear Generating Station A and B

1. INTRODUCTION

This document constitutes SNC-Lavalin's written submission to the Canadian Nuclear Safety Commission in support of the renewal of Ontario Power Generation's Power Reactor Operating Licence (PROL) for the Pickering Nuclear Generating Stations (NGS) A and B.

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

- CANDU® reactor safety
- SNC-Lavalin's experience in working with Ontario Power Generation
- SNC-Lavalin's confidence in the robustness of the Canadian nuclear licensing process, and
- SNC-Lavalin's support for Ontario Power Generation's 10-year Licence Renewal application

2. BACKGROUND

CANDU reactor technology, designed by Atomic Energy of Canada (AECL), and exclusively licensed to Candu Energy Inc., a member of the SNC-Lavalin Group, has over 45 years of safe and reliable operating experience. Heavy water moderated reactors based on the CANDU design are in operation or under refurbishment on four continents worldwide.

The CANDU design is proven, with high reliability and an excellent safety record. Over the years, the CANDU design has evolved to further improve safety and performance, while maintaining the fundamental safety features of CANDU technology.

The six operating CANDU reactors that comprise the Pickering Nuclear Generating Stations (NGS) A and B have functioned safely, without major incident to the workers at the facility, the surrounding communities, or the environment at large, for close to five decades.

Ontario Power Generation's impressive safety record is representative of a long history of CANDU technology performance in Ontario and around the world. CANDU reactors have provided electricity to the residents of Ontario since 1968, initially through the Douglas Point nuclear generating station, a prototype commercial-scale CANDU nuclear power plant. In total, 22 full-scale CANDU reactors have been constructed in Canada, 20 of them in Ontario alone, and nine others— all with a similar record of safety.

This represents a safety record spanning approximately 800 combined CANDU reactor-years of operation worldwide, an enviable track record when compared to other energy sources.

Moreover, the multi-unit CANDU reactors operated by Ontario Power Generation have features that address potential failures of common equipment, such as those experienced at Fukushima Dai-Ichi in March 2011, including:

- Numerous methods by which cooling water, electrical power and other services can be shared and /or supplied between reactor units.
- A large pool of staffing resources, maintenance facilities & equipment, and availability of parts and spares.

- The individual containment volumes for each reactor, bolstered by the provisions of a sub-atmospheric Vacuum Building, providing added capacity to address accidents.
- Ensuring equipment and procedures are in place and incorporated into periodic drills and exercises for emergency response.

3. SNC-Lavalin

SNC-Lavalin played a pioneering role in developing the commercial nuclear industry in Canada in the 1960s, and has become the world’s top provider of refurbishment expertise for CANDU reactors. 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. Our acquisition of W.S. Atkins in 2017 deepened and broadened our commercial reactor experience.

With significant presence in Canada, the US and the UK, our combined team is involved in both nuclear steam plant (NSP) and balance of plant (BOP) 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 (M&O) capability, and a full suite of engineering and field services, project management, project controls, commercial and of plant life management for not just CANDU reactors, but also boiling water reactors (BWRs) and pressurized water reactors (PWRs). The SNC-Lavalin team has extensive design and execution experience gained during the course of our more than 60 years in the nuclear industry.

3.1 Strategic Partners

SNC-Lavalin has been a strategic partner with Ontario Power Generation to provide engineering design, emergent and planned outage support. Below is a representative list of recent projects.

- High energy line break assessments inside containment: We have observed the OPG staff to be very safety-focused during their oversight of our work on high energy line break assessments for Pickering.
- Outage support and fitness for service assessments for fuel channels and feeders: We have experienced the OPG staff at Pickering applying a questioning attitude and effective safety communications for our work to support outage activities at Pickering. OPG staff have also been prompt to seek technical support from SNC-Lavalin to help address issues during recent outage activities at the Pickering reactors.
- Updates to probabilistic safety analyses for internal hazards: OPG staff demonstrated a strong safety focus during their oversight of SNC-Lavalin’s work to update the probabilistic safety analyses for internal hazards.
- Fuel channel inspection: We have observed OPG to consistently display the 10 traits of a healthy safety culture in the planning and execution of inspection activities.

3.4 SNC-Lavalin’s Nuclear Safety Culture

SNC-Lavalin has made safety both in the workplace and in the course of execution of engineering design and technical activities a key commitment at all levels of our Nuclear organization. In 2015, we joined

INPO as supplier members. This membership has enabled SNC-Lavalin to continuously reinforce the INPO principles, including Principles for Excellence in Nuclear Supplier performance, in its work. These INPO principles are important elements of our Nuclear Culture of Excellence program. Since 2015, SNC-Lavalin has continued to improve our Culture of Excellence program to facilitate having our staff perform work at nuclear facilities such as the Pickering site. The good alignment between SNC-Lavalin's Nuclear Culture of Excellence program and OPG's Nuclear Safety Culture gives us confidence in the Pickering safety culture. This confidence has been further supported by our experience in performing work for OPG in support of the operation of Pickering Nuclear Generating Stations A and B.

4. Ontario Power Generation is an Experienced Operator

SNC-Lavalin and Ontario Power Generation have developed a strong working relationship over many decades during the various stages of the plant lifecycle, including the original design, operation and maintenance. This work has ranged from engineering support for design changes, fitness-for-service assessments, support for equipment reliability and ageing management programs, support of inspection and maintenance activities and supply of replacement parts to collaboration on Lessons Learned from Fukushima and on the development of products to support the continued safe and reliable operation of the Pickering units.

Ontario Power Generation has continued to demonstrate its commitment to safety, environmental stewardship and continuous improvement over the current licence period to extend the safety records of the Pickering units to almost five decades of safe operating experience. A testament to this is the consistent safety record with a clear focus on safety, reactivity management, and environmental performance.

Ontario Power Generation has performed a Periodic Safety Review (PSR) to support the 10-year licence period. This PSR, referred to as PSR2, confirms that the condition of Pickering NGS supports the additional years of commercial operation in consideration of new operating experience since the last assessments.

4.1 Ontario Power Generation's Cooperation and Collaboration within Canadian Nuclear Industry

Working closely with the rest of the Canadian industry, Ontario Power Generation has:

- Developed guidelines and tools for enhanced operational decision making through the use of Probabilistic Safety Analysis (PSA) modelling capability.
- Developed a methodology for performing a risk-informed analysis of its workforce to identify safety-sensitive positions for worker fatigue management.
- Routinely collected operating experience from the Canadian and international nuclear industry to improve plant safety, equipment reliability, and commercial performance through improvements to processes, procedures, training, and design.
- Steadily progressed work to re-classify the remaining Category 3 safety issues to improve safety margins.

4.2 Ontario Power Generation's Commitment to Continuous Improvement

The CANDU plant operating philosophy is based on 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 the 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 Pickering station.

Through our many various project interactions, SNC-Lavalin has found Ontario Power Generation to be a knowledgeable, responsible and qualified nuclear operator. Ontario Power Generation has taken great care to inspect its major pressure boundary components, and to analyze the information obtained to characterize the condition of these components accurately. Also, Ontario Power Generation has partnered with other industry stakeholders to engage in an extensive, multi-year research and development program to gain a deeper understanding of the long-term behaviour of its fuel channels. The results of this research, together with those of the extensive inspection program carried out by Ontario Power Generation, provide it with the necessary information to operate safely during the operating period of a renewed licence. This knowledge has also provided a technically sound basis for the extension of Pickering NGS operations past 2020 to 2024, as well as the operation of transitioning the reactors to a safe storage state by 2028.

SNC-Lavalin intends to continue to offer its full range of capabilities to support the continued safe and reliable operation of Pickering NGS A and B and Ontario Power Generation's drive for continuous improvement and believes that our robust technical relationship will extend through the upcoming operating licence renewal period.

5. Canadian Nuclear Licensing Process

SNC-Lavalin has strong confidence in the Canadian regulatory process for granting and renewing licences for nuclear facilities. The Canadian Nuclear Safety Commission is a highly respected technical organization, and performs rigorous oversight of the nuclear industry. The licensing process is founded on a policy of openness and transparency in the undertakings of the Commission. The Commission has shown that decisions to license have been 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 process in which the Commission conducts its business enables all interested parties, whether in favour of or opposed to, a licensed activity to be heard.

6. Summary

Ontario Power Generation's commitment to safety, protection of environment, and consistent high performance is exemplified by the continuation of their excellent record of safe operation of the Pickering station. Given the care and attention that Ontario Power Generation has shown in developing their plans for the operation of the Pickering NGS past 2020 to 2024, as well as the operation of

transitioning the reactors to a safe storage state by 2028, we expect that the continued operation of Pickering NGS A and B will continue the safe operating record and high performance achieved so far, and to provide safe, clean and greenhouse-gas-free energy to Ontarians for this next licence renewal period.

Based on our long-term relationship and experience in performing work for Ontario Power Generation we are convinced that Ontario Power Generation is a highly capable, experienced and responsible plant operator, with highly trained, knowledgeable, safety-focused staff and an effective organization, with a healthy safety culture, suitable for the safe and reliable operation of a large nuclear power generating station.

In conclusion, SNC-Lavalin supports Ontario Power Generation's application for renewal of the power reactor operating licence (PROL) for the Pickering nuclear generating stations (NGS) A and B and encourages the Canadian Nuclear Safety Commission to approve the application.