



Oral Presentation

Exposé oral

Submission from SNC-Lavalin

Mémoire de SNC-Lavalin

In the Matter of

À l'égard de

Bruce Power Inc. – Bruce A and B Nuclear Generating Station

Bruce Power Inc. - Centrale nucléaire de Bruce A et Bruce B

Request for a ten-year renewal of its Nuclear Power Reactor Operating Licence for the Bruce A and B 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 Bruce A et Bruce B

Commission Public Hearing – Part 2

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

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SNC-Lavalin Representation Regarding

Ref: 2018-H-02 – Renewal of the Nuclear Power Reactor Operating Licence for the Bruce
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 Bruce Power's Power Reactor Operating Licence (PROL) for the Bruce Nuclear Generating Stations (NGS) A and B.

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

- CANDU® reactor safety
- An introduction to SNC-Lavalin, including our nuclear safety culture, local presence in Port Elgin, and our community engagement that has contributed to building public confidence
- SNC-Lavalin's work with local Indigenous communities in conjunction with Bruce Power
- Our confidence in Bruce Power as a good community member
- SNC-Lavalin's experience in working with Bruce Power
- SNC-Lavalin's confidence in the robustness of the Canadian nuclear licensing process, and
- SNC-Lavalin's support for Bruce Power'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 eight CANDU reactors that comprise the Bruce 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 four decades.

Bruce Power'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 Bruce Power 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 large interconnected containment volume, bolstered by the provisions of a sub-atmospheric Vacuum Building, providing added capacity to address accidents.

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 New Port Elgin Office

On October 24, 2017, SNC-Lavalin opened a new Port Elgin office to provide a local base to support Bruce Power's Major Component Replacement (MCR) program that includes both the life extension of six CANDU® reactor units and the operation of these units to 2064. This local office builds on our strong long-term relationship with Bruce Power and the Bruce County community, and allows more localized work from our base of operations to support the important work at Bruce Power.

The office supports work stemming from various engineering contracts with Bruce Power in Asset management, capital, and MCR projects. Local economic development benefits naturally from the local office business and from our employees establishing their families in the community.

3.2 Indigenous Initiative

SNC-Lavalin has a solid reputation and track record in helping clients engage and partner with Indigenous communities in a fair and inclusive way. This has served to strengthen the Canadian Indigenous business community and the economies of communities where we do projects. Over the last 20 years, SNC-Lavalin has developed best practices in Indigenous employment and procurement.

SNC-Lavalin and its partners are currently working actively with Bruce Power and the Organization of Canadian Nuclear Industries, and Bruce Power's Indigenous Relations Supplier Network to develop Indigenous Inclusion Opportunities for nuclear generation projects. Key principles behind this strategy will be scheduled reports that track the following Performance Indicators:

- Number of direct hires from the Indigenous community;
- Number of Contracts and Sub-Contracts awarded to Indigenous-owned businesses;
- Contribute to strategies for increased training activities for local Indigenous community members;
- Recruitment events; community events; sponsorships;

- Willingness to work with local Indigenous Business Operators in preparation of bids and identification of partnering opportunities.

3.3 Strategic Partners

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

- Fuel channel inspection and maintenance campaigns
- Calandria tube / LISS nozzle gap inspections
- Major Component Replacements (MCR) design projects
 - Fuel channel component conceptual, preliminary and detailed design
 - Feeder, supports, and tubing conceptual, preliminary and detailed design
 - Detube /Retube Tooling conceptual, preliminary and detailed design
 - Calandria inspection tooling conceptual, preliminary and detailed design,
 - Component qualification testing for annulus spacer and bellows
 - Various tooling and mock up support activities
 - Installation and inspection tooling detailed design, manufacturing, and testing
- Various engineering service type of projects for various engineering systems including conceptual, preliminary, and detailed designs, Design Change Package (DCP), and Design Change Notice (DCN) for multi-disciplinary engineering

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 business approach. 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 by aligning our human performance tools with Bruce Power's human performance tools. This alignment has facilitated having our staff perform work on the Bruce Power site, by already being familiar with the Bruce Power safety culture program and processes. This alignment between our Culture of Excellence program and Bruce Power's safety culture program is also a demonstration of our confidence in Bruce Power's commitment to safety.

4. Bruce Power is an Experienced Operator

SNC-Lavalin and Bruce Power 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 Bruce units. During the current licence period, the SNC-Lavalin and Bruce Power relationship has grown even stronger through our support for the Major Component Replacement projects, and for the operation of the Bruce units.

Bruce Power 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 Bruce units to almost four decades of safe operating experience. A testament to this is the consistent best-in-class safety record with a clear focus on safety, reactivity management, environmental performance with no major or moderate environmental spill since 2016.

4.1 Bruce Power's Cooperation and Collaboration within Canadian Nuclear Industry

Working closely with the rest of the Canadian industry, Bruce Power 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; and
- Steadily progressed work to re-classify the remaining Category 3 safety issues to improve safety margins.

4.2 Bruce Power'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 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, as demonstrated by the Bruce station.

Through our many various project interactions, SNC-Lavalin has found Bruce Power to be a knowledgeable, responsible and qualified nuclear operator. Bruce Power 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, Bruce Power 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 Bruce Power, 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 Major Components Replacement Project, which is planned to be completed in Life Extension Outages that will begin in 2020 with Bruce Unit 6.

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

4.3 Bruce Power's Commitment to the Community

Through our long relationship, SNC-Lavalin has observed Bruce Power and its employees as important and valued members of the local community. In addition to their work with Indigenous communities and their environmental policy, Bruce Power maintains an active community involvement program, donating over \$1.6 million every year to community organizations and events. They actively participate through what they believe is their social responsibility to engage, assist and champion the needs and causes close to home, with the intent to support the great work that is being done to improve lives, protect the environment, celebrate culture, encourage education and build healthy communities in Bruce, Grey and Huron counties.

Bruce Power actively encourages its suppliers who are working with them to participate and contribute to many of these worthy causes. SNC-Lavalin is happy to do so, and in support of the community and Bruce Power, we sponsored and participated in several events in 2017.

In 2018, SNC-Lavalin will continue to support Bruce Power initiatives including:

- United Way Campaign
- Saugeen Ojibway Nation's Youth Leaders in Training Dinner
- Bruce Power charity golf tournament
- Handbags for Hospice
- Swing, Shoot & Liv Golf
- Warriors Gala
- Rebuilding Lives Golf

In addition, SNC-Lavalin has just been announced as a platinum sponsor of the inaugural Grand Fondo, in support of the Saugeen Memorial Hospital Foundation

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

Bruce Power'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 Bruce station. Given the care and attention that Bruce Power has shown in developing their plans for the Major Component Replacement projects, we expect that the continued operation of Bruce NGS A and B will continue the safe operating record and high performance achieved so far, and to provide safe, clean and CO₂-free energy to Ontarians for this next licence renewal period.

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

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