Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

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# Written submission from Ontario Power Generation Inc.

# Mémoire d' Ontario Power Generation Inc.

In the Matter of

À l'égard de

**Bruce Power Inc.**
**Bruce Nuclear Generating Stations A and B**

**Bruce Power Inc.**
**Centrales nucléaires de Bruce-A et B**

**Application to amend the power reactor operating licence for the Bruce Nuclear Generating Stations (NGS) A and B**

**Demande visant à modifier son permis d'exploitation d'un réacteur de puissance pour les centrales nucléaires de Bruce-A et B**

Hearing in writing based on written submissions

Audience par écrit fondée sur des mémoires

**April 2023**

**Avril 2023**

Canada

ONTARIO POWER GENERATION

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**April 17, 2023**

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**Re: Support of Bruce Power's Application for Amendment of the Power Reactor Operating Licence for Bruce Nuclear Generating Stations A and B**

To the Commissioners,

Ontario Power Generation has reviewed Bruce Power's application for the amendment of the Power Reactor Operating Licence (PROL) and is in support of their request to remove Condition 15.3 from PROL 18.02/2028 and consolidate all fitness for service requirements applicable to pressure tubes under Licence Condition 6.1. Within Bruce Power's renewed licence, the Commission imposed Licence Condition 15.3, requiring approval by the Commission to operate pressure tubes with a Hydrogen Equivalent Concentration ([H]eq) in excess of 120 ppm. Based on reviewing technical documents provided by Bruce Power in submission 2022-M-05, OPG is satisfied that this request is supported by the advancements in understanding related to pressure tube behaviour and documented satisfactorily that pressure tube fracture toughness will be sufficient for safe operation beyond 120 ppm in the regions of interest near the pressure tube inlet and outlet rolled joint.

Bruce Power has demonstrated that it is safe for continued reactor operations in several ways via their submission. For the outlet [H]eq redistribution and blip, they have provided a summary of the detailed work performed and submitted to the Commission for confidence in fitness for service. For inlet rolled joint [H]eq, a defense-in-depth approach illustrates that the overall risk of a pressure tube rupture due to elevated [H]eq remains low. They have demonstrated this in two ways:

1. Performing a risk-informed fracture-protection evaluation where they demonstrate that safety factors for all service level transients as per CSA N285.8-15, "*Technical requirements for in-service evaluation of zirconium alloy pressure tubes in CANDU reactors*" were met for [H]eq up to 120 ppm, and performed a sensitivity assessment up to 200 ppm and show that safety factors are at least 1.0 for all service level transients.

2. Demonstrating via a Probabilistic Safety Assessment that it is highly unlikely that a spontaneous pressure tube leak will progress to Severe Core Damage or to a Large Release.

In addition, Bruce Power has performed a finite element analysis to examine the effects of high $[H]_{eq}$ at the inlet rolled joint blip on the hydride region at a postulated flaw tip on the pressure tube inner diameter. The conclusions of the work show that the concentration of hydrides in a blip have no effect on the hydride region at the tip of a postulated flaw, and thus a blip has no impact on the existing pressure tube fitness for service evaluations.

Based on the above, and the in-depth knowledge OPG has of Bruce Power's submission on this topic, OPG supports consolidating all fitness for service requirements within Licence Condition 6.1, with supplemental compliance verification criteria added to the supporting Section 6.1 of the Licence Condition Handbook. This proposed change would bring Bruce Power's licence conditions in line with its industry peers.

Yours sincerely,

Steve Gregoris
Chief Nuclear Officer
Ontario Power Generation