March 21, 2022

BP-CORR-00531-01841

Mr. D. Saumure
Commission Registrar
Canadian Nuclear Safety Commission
P.O. Box 1046
280 Slater Street
Ottawa, Ontario
K1P 5S9

Mr. L. Sigouin
Director, Bruce Regulatory Program
Canadian Nuclear Safety Commission
P.O. Box 1046
280 Slater Street
Ottawa, Ontario
K1P 5S9

Dear Mr. Saumure & Mr. Sigouin:

Notice of Intent to Seek Amendment of the
Power Reactor Operating Licence, PROL 18.02/2028

The purpose of this letter is to notify the Commission and CNSC staff that Bruce Power will seek an amendment to applicable Licence Conditions of the Power Reactor Operating Licence 18.02/2028 as planned and stated in the 2018 License Renewal process related to Pressure Tube integrity; informed by the ongoing program and developments over the last year.

This notice of intent is being used as a pro-active approach to engage early and openly on this important topic with a step-by-step plan including the License Amendment process itself, technical submissions and reviews and public engagement.

Safety is Bruce Power's number one value and we remain committed to maintaining defence in depth for the safe operation of our Units overall including Pressure Tube integrity by demonstrating continued fitness for service of these components. The Licence Amendment application will reflect updated results that continue to demonstrate Fitness for Service of Pressure Tubes based on additional testing, verification and lessons learned combined with additional defence in depth enhancements.

When the company applied to the Commission for a 10 Year renewal to its operating Licence in 2018, Bruce Power indicated at that time it would be carrying-out ongoing inspections, additional analysis of its Pressure Tubes, along with industry surveillance and testing activities and stated this information would be brought forward once completed for consideration related to further updates to the Licensing Basis through the Commission.

Since the 2018 10-year Licence renewal request where the current Licensing Basis was established, Bruce Power has carried-out a historic volume of Pressure Tube inspections to demonstrate fitness for service, fracture protection and this has further informed the behaviour of these components. Bruce Power has continued to demonstrate Safety and Pressure Tube integrity throughout.

Bruce Power Maury Burton, Chief Regulatory Officer
P.O. Box 1540 B10 2nd Floor E, Tiverton ON N0G 2T0
Telephone 519-361-5291
maury.burton@brucepower.com

This demonstration of fitness for service has also been further confirmed through industry surveillance and laboratory testing where Pressure Tube material can be exposed to conditions they are unlikely to experience in an operating reactor. Through this work, enhanced models have been developed to ensure greater predictability and to verify the hydrogen equivalent concentration, [H]eq, in Pressure Tube material. This work continues to under-go additional validation.

In support of advancing Industry and CNSC staff knowledge on elevated [H]eq behaviour, Industry is hosting a technical workshop in the near future to discuss the recent observations, share operating experience (OPEX), and discuss planned research and development activities to be undertaken. The topics to be discussed at the workshop will include:

- Additional defence in depth measurers introduced and being implemented on all Bruce Power Units.
- OPEX from scrape campaigns, surveillance pressure tubes, and removed pressure tubes that support the inlet and outlet.
- Scope, status, and scheduling for work programs related to further [H]eq modelling refinements, the acquisition of test data, and measurement of data.
- Use of models to study pressure tube [H]eq behaviour related to temperature gradients and distribution and areas of elevated localized concentrations.

Supplementary information on the Defence in Depth approach has been provided to CNSC staff in Reference 1 to address a potential adverse scenario including:

- Probabilistic Safety Analysis (PSA) calculations performed to take into account the unlikely event of pressure tube leaks and failures.
- A risk-informed deterministic fracture protection evaluation of a postulated through-wall flaw in the inlet rolled joint region with elevated [H]eq demonstrating the required safety factors as per CSA N285.8.
- Test results of the elevated [H]eq Delayed Hydride Crack (DHC) initiation tests completed to-date.
- Recent burst test results at elevated [H]eq supporting the continued validity of the fracture toughness models.
- A plan for Finite Element Analysis (FEA) to investigate hydrogen diffusion and the interaction of elevated [H]eq and a postulated flaw in the IRJ region.

Bruce Power will seek a Licence Amendment that reflects an approach ensuring pressure tube integrity is maintained by demonstrating fitness for service in all areas of the Pressure Tube, including inlet and outlet regions, building on all of the work that was provided to staff related to the August, 2021 Designated Officer's Order for all Bruce Power Units.

In addition, it will also reflect the importance of the Defence in Depth approach where plant modifications have been put in place to build additional safety margin, and will be further supported by the ongoing research and development activities of the CANDU Industry.

Bruce Power plans to advance this process in the following three steps:

- Step #1 (Q2-2022 to Q3/4-2022): Notice of intention (completed through this correspondence), stakeholder and public engagement while committed technical activities, analysis and industry work is completed. This will also include public engagement through Bruce Power's Public Information Program.

- Step #2 (Q3/4-2022): Based on feedback and inputs, Bruce Power to file Licence Amendment application to the Commission and technical supporting documentation to CNSC Staff for review. This will also include public engagement through Bruce Power's Public Information Program.

- Step #3: Following CNSC Staff review of technical submissions and public engagement, a recommendation would be made to the Commission through a Commission Member Document from CNSC Staff.

Bruce Power will be seeking the opportunity to update the Commission as it progresses through these steps. The company will work with CNSC Staff to establish specific dates and expectations related to these key deliverables. Bruce Power is committed to engaging the public as part of this process through its Public Information Program.

If you require further information or have any questions regarding this submission, please contact Ms. Lisa Clarke, Director, Regulatory Affairs, at (519)361-2673 extension 16144, or lisa.clarke@brucepower.com.

Yours truly,

Maury Burton
Chief Regulatory Officer,
Bruce Power
2022.03.21 14:44:39 -04'00'

Maury Burton
Chief Regulatory Officer
Bruce Power

cc: CNSC Bruce Site Office

Reference:

1. Letter, M. Burton to L. Sigouin, "Bruce A and B: Defense-in-Depth Approach for Addressing Elevated Hydrogen Equivalent Concentration ([H]eq) in the Inlet Rolled Joint", March 11, 2022, BP-CORR-00531-02589.