Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 22-H100.A

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Supplementary submission from CNSC Staff

Renseignements supplémentaires du personnel de la CCSN

In the Matter of

À l'égard de

Request to authorize Bruce Power to restart Bruce Nuclear Generating Station (NGS) A Unit 3 to service, following future outages

Demande d'autorisation de Bruce Power à remettre en service la tranche 3 de la centrale nucléaire de Bruce (NGS) A, à la suite de futures pannes

Public Hearing - Hearing in writing based on written submissions

Audience Publique - Audience fondée sur des mémoires

February 2022

Février 2022

Canada

Please find below the responses to the EAC questions:

1. The EAC is referring to Bruce Power's document, so Bruce Power should answer this question. Even if the numbers should be switched, it does not impact the findings.

2. The region of interest (ROI) defined by CNSC is for the purpose of regulatory recommendation to ensure adequate safety margins extend beyond the localized region of interest identified by Bruce Power. CNSC staff are not only considering the justifications presented by the licensee for the limited ROI, but also the Industry's ability to predict future Heq distribution in the region. In other words, Heq migration should continue to be considered for the whole circumference until definitively ruled out.

   Based on the current information that CNSC staff have received, there is insufficient evidence to support that the region of elevated Heq will not continue to expand axially and circumferentially with continued operation. On slide 20 of Bruce Power's CMD 21-H11.2A, Bruce Power presented a theoretical evolution of Heq progression from 5 to 30 years of operation driven by temperature gradients. It is possible to observe that, while the Heq is highest at the top of the pressure tube, Heq increases in both circumferential and axial directions with time. For example, at year 20 the Heq is nominally 80 ppm at the 3:30 orientation and increases to over 100 ppm at year 30. When industry provides evidence from research activities to confirm the expected end of life extent of the region of interest for the pressure tubes, CNSC staff will re-assess the current recommendation.

   CNSC staff is satisfied that Bruce Power demonstrates a low likelihood of generating cracks in the CNSC defined region of interest. Bearing pads do not reside in the CNSC defined region of interest near the outlet rolled joint of pressure tubes during normal operation as illustrated on Slide 17 of CMD 21-H11.2A and the fuel carrier protects the pressure tube during fueling operations. Therefore, the driving mechanism for the formation of significant debris fretting flaws does not exist in the CNSC defined region of interest. When assessing the low likelihood of cracking in the region of interest, CNSC staff considered the physical factors contributing to flaw formation in conjunction with inspection findings and the results of the statistical evaluations.

3. In the previous decision by the Commission for Bruce A Unit 3 on November 10, 2021 [eDocs 6677603], the Commission authorized the limited restart of Unit 3 only from the planned A2131 outage. The decision was based on the information at the time. As more information has become available for CNSC staff to assess, CNSC staff have now concluded that Unit 3 restart conditions will be similar to Units 4, 5, 7 and 8. Unit 3 has fully met the condition of the order.

   In its record of decision the Commission was satisfied that Bruce Power met the condition of the DO Order for all units except Bruce A Unit 3 (i.e. all OPG Darlington and Pickering units in extended operation and Bruce Units 4, 5, 7 and 8). Bruce Power requested to close the Order for Unit 3 which is effectively requesting closure of the Order for all Bruce units.

4. CNSC staff have a Glossary of CNSC Terminology (see attached REGDOC-3-6) which will be revised by the next Heq related CMD and attached to CMDs going forward.