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Canada

# CNSC Designated Officer Recommendations regarding Orders issued to Bruce Power and Ontario Power Generation and CNSC Staff Assessment of the Licensees' Requests for Restart

## CNSC Staff Presentation

Commission Meeting
September 10, 2021

CMD 21-H11.A

# Purpose of CMD

This CMD provides:

1. **Designated Officer** (DO) recommendations for the Commission regarding the Orders

2. **CNSC staff** assessment criteria for restart the reactors from any outages impacted by the DO Orders
3. Conclusions and recommendations of CNSC staff's assessments of Bruce Power and OPG's requests for blanket restarts

# Purpose of Designated Officer Orders

- Designated Officer Orders were issued to Bruce Power and Ontario Power Generation (OPG) under paragraph 37(2)(f) and subsection 35(1) of the *Nuclear Safety and Control Act*
  - To ensure that operating reactors remain in compliance with the licensing basis as established by the Commission following Bruce Units 3 and 6 discovery event of elevated hydrogen equivalent concentrations (Heq)

# DO Recommendation on Review of Orders

- The CNSC Designated Officer recommends that the Commission:
  - Amend the Order for OPG Pickering
  - Confirm the Orders for Bruce Power and OPG Darlington

# CNSC staff assessment criteria for Orders

- CNSC staff presented assessment criteria for restart requirements to the Commission on September 3, 2021
  - details in CMD 21-M37
- Two options for assessment criteria were developed:
  - Long term Option (a) - Heq
  - Short term Option (b) - flaws

# CNSC staff assessment criteria for Order Option (a)

- *Licensee shall demonstrate an understanding of the mechanism leading to high Hydrogen equivalent (Heq) concentration in the region of interest, and are able to conservatively model Heq concentration in this region.*

# CNSC staff assessment criteria for Order Option (b) (1/2)

1. *Sufficient inspection data shall be available for the reactor unit to justify, with a high degree of certainty, that no flaws greater than 0.15 mm in depth are present in the region of interest.*
2. *Corrective actions shall be implemented for tubes containing flaws greater than the specified depth.*

# CNSC staff assessment criteria for Order Option (b) (2/2)

To meet Option (b), Bruce Power and OPG shall:

1.a. Provide a methodology to quantify the likelihood of flaws in the CNSC defined region of interest with elevated Heq; and

1.b. Submit unit specific evaluations to demonstrate that safety analysis assumptions related to the likelihood of pressure tube failures are not invalidated based on the results generated by 1.a.

2. Implement corrective actions for units that do not satisfy 1.a. and 1.b.

# Current Status of Bruce Power and OPG responses to CNSC Staff Assessment Criteria

- Previous submissions from Bruce Power and OPG have been thoroughly reviewed by CNSC staff
  - Do not fully address CNSC staff assessment criteria for restart
  - Additional clarification provided in CMD 21-H11
- New submissions received from Bruce Power and OPG after September 3, 2021
  - CNSC staff review is in progress

# Confirming Heq in the Region of Interest

- No tubes were predicted to exceed 120 ppm near the outlet prior to Bruce Units 3 and Unit 6 events
- Cause of elevated Heq in outlet end of the Bruce Units 3 and Unit 6 tubes has not been identified
- Region of elevated Heq is localized
- Further understanding of the elevated Heq phenomenon is required to support Heq estimation

# Confirming Low Likelihood of Flaws in Region of Interest

- Criteria for Option b) does not rely on Heq estimation
  - If flaws at risk of cracking do not exist in region of interest, pressure tubes are safe to operate
- Awaiting Bruce Power and OPG estimates for likelihood of flaws in reactors in extended operation
- CNSC staff proposing slightly larger region of interest than indicated by licensees

# Recommendations on CNSC staff's assessments of Bruce Power and OPG's requests for blanket restarts

Based on CNSC staff's assessment and conclusions in slides 9 to 11, CNSC staff recommend the following:

1. If the Commission agrees and amends the Order issued to Pickering NGS, there will be no need to approve restart of Pickering NGS Units 1 or 4
2. Deny requests for blanket approval for restart of Bruce NGS A Unit 3, Bruce NGS B Units 4, 5, 7 and 8, Darlington NGS Units 1 and 4, and Pickering NGS Units 5, 6, 7 and 8 until Bruce Power and OPG have provided supplemental quantitative analyses

# CNSC Staff Conclusions on Orders issued to Bruce Power and OPG

CNSC staff conclude that:

- For Pickering Units 1 and 4:
  - CNSC staff confirm that there is a high degree of confidence that pressure tube Heq in Pickering NGS Units 1 and 4 is within OPG's licensing basis and therefore Option (a) of the Order is met
- Bruce Power and OPG must provide supplemental quantitative analyses (as outlined in CMD 21-H11 and slide 8) to support the requests for approval for restart of Bruce NGS A Unit 3, Bruce NGS B Units 4, 5, 7 and 8, Darlington NGS Units 1 and 4, and Pickering NGS Units 5, 6, 7 and 8

# Path Forward

- Short term:
  - Licensees' applications for restart authorization for units planning to come out of outage (such as Bruce A Unit 3) will be submitted to the Commission. The same applies for OPG units in extended operation.
- Long term:
  - Root cause analysis for elevated Heq in the region of interest
  - Model predictability for Heq uptakes
  - Revision of licensing basis as the new information or science becomes available

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