

1 Q. Further to PUB-NLH-001, please explain the load limiting factors preventing Units 1
2 and 2 from being restored to maximum output of 170MW following repair of the
3 lower reheater tubes. In the response state the date that Hydro became aware of
4 this.

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7 A. In January and February 2016, Hydro first experienced failures in the boilers for
8 Units 1 and 2 in the lower reheater section of the boilers. Based on the failure
9 experience, Hydro then initiated an analysis of its historical boiler tube thickness
10 data with an aim to minimize failures and improve reliability for the coming years.

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12 Based on this analysis, Hydro is proposing a two pronged, stepped approach to
13 maintain continuous, reliable operation during the coming winter seasons. This
14 includes the proposed replacement of tubes with known risk of failure, as is
15 currently proposed in this application, and also the reduction of boiler steam
16 operating pressure to reduce the risk of failure and extend the life of those tubes
17 that are not planned to be replaced in this proposed project. Reducing steam
18 pressure will require a corresponding reduction in output in MW.

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20 Following the reheater tube failures in winter 2016, Hydro consulted with a boiler
21 consultant, AMEC NSS, and confirmed that replacing the tubes with the next
22 highest risk of failure (as is proposed in this project), as well as reducing steam
23 operating pressure for those that will not be replaced, is a prudent course of action
24 to minimize cost of replacements and maximize unit output. Alternatively,
25 replacing all tubes, would not be practical or appropriate as there are tens of
26 kilometers of tubes in the boilers. For this project, Hydro has selected the tubes at
27 highest risk of failure for replacement. As part of its routine maintenance program,

1 Hydro will continue to monitor all tubes for any that may degrade to the point a
2 repair or replacement is necessary.

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4 The load limiting factors preventing all units from operating at their nameplate
5 rating, including after tube replacements in the lower reheater on units 1 and 2
6 (subject to approval), are in the following areas of the boilers:

- 7 • Unit 1: primarily tubing in the economizer section, followed by tubing in the
8 secondary superheater section;
- 9 • Unit 2: primarily tubing in the secondary superheater, followed by tubing in the
10 economizer section; and
- 11 • Unit 3: primarily tubing in the secondary superheater, followed by tubing in the
12 economizer section.

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14 Corrosion and wall thinning has been less severe in the above noted areas when
15 compared to the lower reheater areas. However, in consultation with AMEC NSS
16 and others, Hydro believes that mitigation through reduced operating pressure is
17 prudent to extend the reliable life of the boilers for the coming years, as opposed to
18 wholesale replacement.

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20 Due to the length of tubing in a Holyrood boiler and the fact that many tube
21 sections are not accessible for inspection without removing other tubes, it is not
22 practical to measure tube wall thickness in all areas of the boiler to specifically
23 target for replacement all additional tube sections with reduced thickness. Data
24 review of historical samples of wall thickness informed the consultant and Hydro in
25 making the decision to not replace reheater tubes, but operate the units at a
26 somewhat reduced output. Reducing the steam pressure in the tubes will help
27 mitigate the risk of failure of tubes that have not been measured, in which thinning

1 could be further progressed. Hydro is planning to further reduce stress on all tubes
2 by minimizing the cycling of the load on the units and reducing stops and starts as
3 much as practical.

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5 There is no specific date that Hydro determined a potential suggested de-rating of
6 the units at Holyrood, as the analysis has been an ongoing process over the past
7 winter since the tube failures. Hydro reiterates that the ratings proposed in PUB-
8 NLH-001 will continue to be reviewed with the consultant through the annual
9 maintenance period to arrive at a final suggested maximum loading.