

1 Q. **Re: Page 12, lines 27-29 and Page 13, lines 1-22**

2 With respect to penstock issues, please describe if and to what extent they pose
3 risks to unit availability this winter and describe qualitatively and quantitatively how
4 Hydro has incorporated that risk into its analysis of generation adequacy.

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7 A. Since the rupture of Penstock 1 in 2016, substantial assessment and refurbishment
8 work has taken place on Penstocks 1, 2, and 3 in Bay d’Espoir. The assessment work
9 has included support from external penstock experts, who developed and led
10 several field studies including metallurgy and stress analysis, on-site field
11 observations, and non-destructive testing. Coinciding with the assessment work,
12 large-scale weld refurbishment has taken place on Penstocks 1, 2, and 3 in areas
13 identified as a risk, with Penstock 3 work currently ongoing and expected to be
14 completed by the end of June 2018.

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16 Hydro has undertaken significant work from 2016 through to 2018 to increase the
17 reliability of the penstocks and reduce the likelihood of penstock failure. This
18 includes the replacement of welds, changes to operation, and Preventive
19 Maintenance program improvements. Further, in 2018 Hydro will complete a
20 condition assessment of Penstocks 1, 2, and 3 to further enhance knowledge and
21 assess operational risks. Penstock 1 will undergo a follow-up inspection in Summer
22 2018, and Penstock 2 will undergo an inspection in Fall 2018 to determine the
23 effectiveness of the refurbishment that was completed in 2016 and 2017. Hydro
24 does not anticipate material findings in the inspection that would significantly
25 impact generation availability this coming winter, but this is to be confirmed upon
26 inspection.

1 The leading indicator of generation adequacy as it relates to penstock reliability is
 2 illustrated using the Derated Adjusted Forced Outage Rate (DAFOR). Table 1
 3 presents the Bay d’Espoir plant DAFOR for 2016 and 2017. Of note is the much
 4 higher DAFOR for Units 1 and 2 in 2016 due to unavailability associated with
 5 Penstock 1 repairs. Intervention on both Penstocks 1 and 2 was required in 2017.
 6 Even with these material downtime periods, the resulting DAFOR for the whole of
 7 the Bay d’Espoir plant in 2016 and 2017 was 4.06% and 3.59%, respectively.

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Table 1: 2016 and 2017 Hydraulic Unit DAFOR

Generating Unit	Maximum Continuous Unit Rating (MW)	12 months ending December 2016 (%)	12 months ending December 2017 (%)	Hydro Generation Base Planning Assumption (%)	Near-Term Planning Assumption (%)
<i>All Hydraulic Units - weighted</i>	954.4	5.51	2.29	0.90	2.60
Hydraulic Units					
Bay D’Espoir 1	76.5	30.87	9.33	0.90	3.90
Bay D’Espoir 2	76.5	33.90	14.11	0.90	3.90
Bay D’Espoir 3	76.5	0.00	0.03	0.90	3.90
Bay D’Espoir 4	76.5	0.93	0.27	0.90	3.90
Bay D’Espoir 5	76.5	0.56	0.00	0.90	3.90
Bay D’Espoir 6	76.5	0.18	1.48	0.90	3.90
Bay D’Espoir 7	154.4	0.00	1.80	0.90	3.90
Cat Arm 1	67	1.02	0.22	0.90	0.70
Cat Arm 2	67	0.00	0.09	0.90	0.70
Hinds Lake	75	0.24	0.89	0.90	0.70
Upper Salmon	84	0.06	0.81	0.90	0.70
Granite Canal	40	1.36	0.11	0.90	0.70
Paradise River	8	7.08	1.70	0.90	0.70

9 To ensure that the operational risk of unit unavailability due to penstock issues was
 10 appropriately reflected in its Near-Term Generation Adequacy assessment, Hydro
 11 assumed a plant DAFOR of 3.85% for the Bay d’Espoir plant. This assumption is
 12 lower than Hydro’s 2016 experience, reflecting the progress made to date in

- 1 increasing penstock reliability, but higher than Hydro's 2017 experience to ensure
- 2 Hydro remains conservative in its assessment.