

1 Q. Further to the response to PUB-NLH-221 please discuss the impact of the limitation
2 of the cable capability (100% overload for 5 minutes, and no continuous overload
3 capability) on the overload capability of the Labrador Island Link.

4

5

6 A. The Labrador-Island HVdc Link (LIL) converter stations are being designed/built for a
7 100% overload capability for ten minutes (two per unit current for ten minutes) and
8 a continuous overload capability of 50% (i.e., 1.5 per unit current continuous). This
9 overload capability is designed to eliminate load loss on the Island Interconnected
10 System for a permanent pole fault and provide adequate time for standby
11 generation located on the Island to be started and brought on line such that the
12 load on the remaining LIL pole can be reduced from 200% (100% overload) to 150%
13 (50% overload) between minute ten and minute 20 in the permanent pole outage
14 timeline.

15

16 The Basis of Design for LIL indicates that the Strait of Belle Isle submarine cables will
17 each have an overload capability of 150% for five minutes and a continuous rating
18 of 100%. The spare submarine cable will be connected in parallel with one of the
19 pole cables during normal operation.

20

21 To assess the cable rating impact on overall LIL overload capability, assume that the
22 spare cable is parallel with the Pole 1 cable under normal operation. At rated LIL
23 output, the Pole 2 cable will carry rated LIL pole current, while the Pole 1 cable and
24 spare cable will each carry one half of the rated pole current as there are two cables
25 in parallel to share the current. For a Pole 2 permanent fault, Pole 2 is blocked and
26 Pole 1 current will increase to 200% or twice rated current. Given that there are
27 two cables connected to Pole 1, each cable will be loaded to 100% of rated current

1 during the ten minute LIL 2 per unit overload period. Once standby generation on
2 the Island is started and loaded the LIL output will be reduced to 150% of rating. At
3 this time the Pole 1 cable and the spare cable will each be loaded to 75% of rated
4 pole current. Therefore, in the case where there is a permanent pole outage on the
5 pole not containing two cables (i.e., the normal pole cable and the spare cable in
6 parallel), the two cables on the healthy pole only experience 100% of rated current
7 during the overload period.

8
9 Next, if one assumes that the spare cable is connected in parallel to the Pole 1 cable
10 and there is a permanent pole outage on Pole 1, the Pole 2 cable current will
11 increase to 200% of rating when the LIL increases to 2 per unit overload at the
12 beginning of the ten minute overload period. Given that the submarine cables have
13 an overload capability of 100% (twice rated current) for five minutes, a high speed
14 cable switching scheme will be used to transfer the spare cable from Pole 1 to Pole
15 2, thereby reducing the individual Pole 2 cable currents to no more than 100% of
16 rating within five minutes. Details of the cable-switching scheme are provided in
17 Hydro's response to PUB-NLH-235.