

1 Q. Reference MHI Report, Review of the Muskrat Falls and Labrador Island HVDC Link
2 and the Isolated Island Option, October 2012, Section 2, section 2.2.2, page 28: MHI
3 mentions that there could be some advantage in providing some overload
4 capability of the LIL when in bipolar mode. Did Hydro investigate the possibility and
5 benefits of providing such overloads? If so, what conclusions were reached? If not,
6 why not?

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9 A. On page 28 of the MHI Report *“Review of the Muskrat Falls and Labrador Island*
10 *HVDC Link and the Isolated Option”* dated October 2012, MHI states:

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12 *There could be advantages to specifying some short-term overload*
13 *capability while in bipolar operation to cater for large generator*
14 *outages on the Newfoundland network.*

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16 Hydro has investigated the possibility and benefits of short-term overload capability
17 from the HVdc design when operating in bipolar mode. The limiting factor in the
18 overall HVdc system design is the Strait of Belle Isle submarine cable design. The
19 submarine cable manufacturer has indicated that the cable is designed for a rated
20 continuous current of 1286 A and 2572 A for five minutes. The cable manufacturer
21 has recommended that each time the cable current exceeds 1286 A, the cable
22 current must be limited to no more than 1286 A for 12 hours (i.e. a rest period to
23 stabilize cable temperatures). The manufacturer will not, at this stage, provide rest
24 times between successive cable loads for any temporary loading between the
25 nominal 1286 A and maximum 2572 A for five minutes. As a result, the possibility
26 of using short-term overload capability of the converter in bipolar mode must be
27 weighed against the requirement to maintain a cable loading over consecutive 12

hours periods that will ensure availability of the 2 p.u. current overload capability for sudden loss of a pole (i.e. operation of the LIL at 2572 A in monopolar mode for ten minutes until stand by generation on the Island can be started). Recall that with two cables in parallel after the first five minutes, the cable currents return to 1286 A for the remainder of the of the ten minute 2 p.u. current operation and then drop to 964.5 A or 75% of rated current during the 1.5 p.u. or 1929 A continuous monopolar operation. To this end, for normal operation the LIL will be limited to 1286 A per pole in bipolar mode of operation.

With respect to the system frequency response for large generator outages on the Island portion of the system, the combined effects of maintaining spinning reserves split between both the Island and Labrador portions of the system, the speed of response of the Labrador – Island HVdc Link to respond to frequency excursions due to generator loss and the addition of high inertia synchronous condensers, will ensure no loss of load for loss of the largest generator outage on the Island (i.e. Bay d’Espoir Unit 7 at 154 MW). MHI confirmed this approach. On page 28, Section 2, section 2.2.2 of the MHI Report “*Review of the Muskrat Falls and Labrador Island HVDC Link and the Isolated Option*” dated October 2012, MHI states:

There are no concerns with loss of additional generation with the Labrador-Island HVdc system as the minimum frequency is planned to remain above the first block of load shed trip point of 58.8 Hz with 0.1 second pickup time.