

1 Q. Reference PUB-NLH-518: Operation with one of the stations having a connection to
2 the station ground mat would result in the risk that a temporary or permanent pole
3 fault could become a complete bipolar outage. What precautions would Hydro take
4 before operating in this mode?

5

6

7 A. Hydro acknowledges that with one of the converter neutrals being connected to the
8 station ground mat (i.e. outage to an electrode line) there is a risk that a temporary
9 or permanent pole fault would result in a complete outage to the bipole due to the
10 potentially damaging ground return current that would flow in the station ground
11 mat. Given the risk, Hydro must introduce precautionary steps in its operating
12 instructions before entering this particular mode of operation. To minimize the
13 impact on the Island Interconnected System for an outage to the bipole when
14 operating in this mode, it would be prudent for Hydro to minimize the power
15 transfer on the LIL through redispatch of available on-Island generation to the
16 extent possible based upon the system load at the time.

17

18 With respect to the electrode line planning and implementation, the electrode lines
19 are designed and will be built with two electrode line conductors per line. The loss
20 of an electrode line conductor will result in the system being able to operate in
21 monopolar ground return should it be required, but at a lower rating due to the
22 electrode line contingency (i.e. 1286 A continuous or 450 MW in monopole). To
23 this end, with one electrode conductor out of service, it would be prudent to
24 reduce the operational load on the LIL in bipolar mode to the extent possible such
25 that the requirement to move from bipole mode to monopolar mode ground return
26 has the least impact and lowest possible loss of load in that situation. Ideally, the

1 LIL load level in bipole mode would be reduced to 450 MW for the contingency, if
2 system loading conditions permit.

3

4 Following this approach, the complete loss of the electrode line while in bipole
5 mode will result in a move to balanced bipole operation (i.e. close to zero neutral
6 current), such that the neutral of the converter with the failed electrode line can be
7 connected to the station ground mat. The immediate operational step would be to
8 reduce the bipole loading through generation redispatch to minimize the impact
9 and loss of load on the Island for a subsequent loss of the bipole. This could include
10 an orderly load reduction on the LIL with start up of on Island generation and
11 imports via the Maritime Link based upon system load, market availability, etc.