

Q. Reference GRK-NLH-060, Reduced Power Operation: Please explain why the 3-day outage per pole for converter maintenance has not been included in the table provided in GRK-NLH-060, when this outage was included in the report by SNC Lavalin, Reliability & Availability of the HVDC Island Link, 10 Apr-2012. Please explain why the outage rate for the converter poles in the table has been taken as the original value of 3.28 in the report by SNC Lavalin, Reliability & Availability of the HVDC Island Link, 10 Apr-2012, filed as Attachment 2 with PUB-NLH-212, rather than the higher value guaranteed by the manufacturer.

A. Table 1 below provides a comparison of the SNC-Lavalin converter failure rates and the corresponding guaranteed failure rates provided by the manufacturer.

Table 1 Comparison of SNC-Lavalin and Manufacturer Design Values for Converter Failure Rates		
Parameter	SNC-Lavalin Report	Manufacturer Design Value
Pole Forced Outage Rate	3.28 per pole per year	≤ 5.0 per pole per year
Bipole Forced Outage Rate	0.48 per bipole per year	≤ 0.1 per bipole per year
Notes SNC-Lavalin Report is Attachment 2 of PUB-NLH-212		

Table 2 below provides a comparison of the SNC-Lavalin (PUB-NLH-212, Attachment 2) and Hydro updated composite LIL bipole reliability as provided in response to GRK-NLH-060.

Table 2 Comparison of Composite LIL Bipole Reliability		
Element	PUB-NLH-212 Failure Rate (f/yr)	GRK-NLH-060 Failure Rate (f/yr)
Bipole – Muskrat Falls	0.24	0.05
Converter Pole + Converter Pole – Muskrat Falls	0.0084	0.0084
Bipole HVdc L1 (Labrador) – 388	0.074	0.074
Pole 1 + Pole 2 (submarine cables)	0.007	0.007
Bipole HVdc L2 (Island) – 680 km	0.13	0.13
Converter Pole + Converter Pole – Soldiers Pond	0.0084	0.0084
Bipole - Soldiers Pond	0.24	0.05
Total	0.7078	0.3278

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Table 3 below provides a comparison of the SNC-Lavalin (PUB-NLH-212, Attachment 2) and Hydro updated composite reduced power operation reliability as provided in response to GRK-NLH-060.

Table 3 Comparison of Composite Reduced Power Operation Reliability		
Element	PUB-NLH-212 Failure Rate (f/yr)	GRK-NLH-060 Failure Rate (f/yr)
Scheduled Maintenance	2.0	0
Converter Muskrat Falls	1.64	1.64
Pole 1	2.04	2.04
Pole 2	2.04	2.04
Converter Soldiers Pond	1.64	1.64
Total	9.36	7.36

With respect to the outage rates for reduced power capability modes, Hydro did not include the failure rate of 2.0/year for the scheduled maintenance as per the SNC-Lavalin calculation on the basis that the scheduled maintenance on the LIL would be carried out during the light load summer period at a time when there is sufficient generation on the Island Interconnected System to supply the Island load requirements. Consequently, loss of the LIL during a scheduled maintenance period will not have an adverse impact on the overall reliability of the Island Interconnected System. Recall that GRK-NLH-060 was answered in the context of the impact on reliability of the Island Interconnected System.

1 Further, the reduced power operation calculation by Hydro utilized the originally
2 calculated converter failure rate of 3.28/yr (i.e. 1.64/yr at each converter station) as
3 per the SNC-Lavalin report, for the response to GRK-NLH-060 instead of the
4 guaranteed value of ≤ 5.0 /yr (i.e. 2.5/yr at each converter). Hydro's rationale for
5 this approach is based upon the fact that the CIGRE statistics used by SNC-Lavalin in
6 their report demonstrate that the failure rates of the newer converter stations will
7 exhibit lower failure rates than the limit actually imposed on the converter
8 manufacturer for LIL. As a result, Hydro was comfortable in using the lower 3.28/yr
9 failure rate as opposed to the 5.0/yr failure rate.