NEEDS FOR AND ALTERNATIVES TO (NFAT)

Manitoba Hydro's Response to PUB Question #2

Ref. PUB/MH I-042a Revised

Confirm the following table is a reasonable extraction from PUB/MH I-042a revised of the incremental HVDC losses for dependable hydraulic energy and for average hydraulic energy minus dependable energy.

Provide another column on each of the four tables in PUB/MH I-042a revised showing the HVDC losses at maximum hydraulic generation.

HVDC
Incremental Transmission Losses (GWh)
Ref.: PUB/MH I-042a

		Dependable	Average minus Dependable	Incremental Losses Maximum minus Average
2013	Bipole I&II	7% (960/13780)	11% (740/6700)	
2019	Bipoles I/II/III w/o Keeyask	5.44% (750/13780)	8.51% (570/6700)	
2022	Bipoles I/II/III with Keeyask	5.54% (930/16780)	8.89% (720/8100)	
2029	Bipoles I/II/III with Keeyask & Conawapa	6.63% (930/16780)	10.91% (1095/10750)	

Confirm that domestic load has priority claim on dependable hydraulic generation and that only excess hydraulic generation above dependable is available for export.

Confirm the incremental losses do not include transmission losses from Dorsey or Riel to border and provide those losses under the three flow situations.

Response:

It is not confirmed that the proposed table is a reasonable extraction from PUB/MH I-042a Revised. Expected Losses and Generation are as follows:

HVDC Incremental Transmission Losses (GWh)				
		Dependable Loss/Generation (GW.h)	Average Loss/Generation (GW.h)	Maximum Loss/Generation (GW.h)
2013	Bipole I&II	6.97% 960/13780	8.30% 1700/20480	8.45% 2254/26690
2019	Bipoles I/II/III w/o Keeyask	5.44% 750/13780	6.44% 1320/20480	6.55% 1747/26690
2022	Bipoles I/II/III with Keeyask	5.54% 930/16780	6.63% 1650/24880	7.06% 2218/31430
2029	Bipoles I/II/III with Keeyask & Conawapa	6.63% 1410/21260	7.83% 2505/32010	8.34% 3434/41190

		HVDC Incremental Transmission Losses (GWh)			
		Dependable Loss/Generation (GW.h)	Average minus Dependable (GW.h)	Maximum minus Average (GW.h)	Peak Losses (MW)
2013	Bipole I&II	6.97% 960/13780	11.04% 740/6700	8.92% 554/6210	8.69% 308.9/3554
2019	Bipoles I/II/III w/o Keeyask	5.44% 750/13780	8.51% 570/6700	6.88% 427/6210	6.56% 233.2/3554
2022	Bipoles I/II/III with Keeyask	5.54% 930/16780	8.89% 720/8100	9.64% 561/5820	7.22% 305.2/4230
2029	Bipoles I/II/III with Keeyask & Conawapa	6.63% 1410/21260	10.19% 1095/10750	10.12% 929/9180	8.71% 486.2/5580

Dependable Conditions reflect annual generation and associated HVDC losses estimated for the dependable flow condition.

Average Conditions reflect the average annual generation and associated HVDC losses under the range of flow conditions.

Maximum Conditions reflect the annual generation and associated HVDC losses under the maximum historic flow condition.

Peak Losses reflects the capacity and associated losses under maximum HVDC loading conditions.

It is not confirmed that domestic load has priority claim on dependable hydraulic generation. Domestic load has a priority claim on the combined dependable energy from thermal, import, purchases and hydraulic generation. Hydraulic generation credits would be assigned as designated under export contracts.

It is confirmed that the above losses do not reflect any losses from Dorsey or Riel to the border. It is not feasible to determine what component of the HVDC generation would be transmitted to the US border from the above information, as losses on the AC system will depend on the level of generation available from generators connected to the AC system, as well as load distribution across the province. Losses on the export interface (to the border) are currently 47 MW when fully loaded at 2175 MW. For the same load (2175 MW) with a new 750 MW interconnection, losses will reduce to 31 MW. When the new interface is fully loaded (2975 MW), losses will increase, back to 52 MW.