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September 7, 2016

The Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, NL A1A 5B2

Attention: Ms. Cheryl Blundon
Director Corporate Services & Board Secretary

Dear Ms. Blundon:

Re: The Board's Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System – Phase Two – Requests for Information on Liberty's Phase Two Report

Enclosed please find the original and twelve (12) copies of the Information Requests NLH-PUB-001 to NLH-PUB-008 regarding the above-noted matter.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Geoffery P. Young
Senior Legal Counsel

GPY/bs

cc: Gerard Hayes – Newfoundland Power
Paul Coxworthy – Stewart McKelvey Stirling Scales
ecc: Roberta Frampton Benefiel – Grand Riverkeeper Labrador
Thomas Johnson, Q.C. – Consumer Advocate
Danny Dumaresque

IN THE MATTER OF the *Electrical Power Control Act, 1994,* SNL 1994, Chapter E-5,1 (the *"EPCA")* and the *Public Utilities Act,* RSNL 1990, Chapter P-47 (the "Act"), as amended; and

IN THE MATTER OF the Board's Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System (Phase Two).

Requests for Information

From Newfoundland and Labrador Hydro

NLH-PUB-001 – NLH-PUB-008

Newfoundland and Labrador Hydro ("Hydro")
Request for Information

Liberty's Report (Phase Two) – August 19, 2016

NLH-PUB-001 Reference: *Review of Newfoundland and Labrador Hydro Power Supply Adequacy and Reliability Prior to and Post Muskrat Falls Final Report, August 19, 2016, Page 6, Section B., Paragraph 4*

> *"In its most recent analysis, Hydro introduced a third measure of supply reliability. Expected unserved energy (EUE) is the amount of energy not supplied due to supply-related emergencies. Hydro has done further analysis to equate an EUE of 300 MWh to an LOLH of 2.8 hours. The use of three measures contributes to an understanding of the dynamics of supply reliability. But inevitable inconsistencies among the measures also lead to complications. For example, Hydro has indicated that the LOLH target has rarely been threatened. Yet, if the EUE equivalent is used, Hydro has not met the target in four of the last five years, and barely met it in the fifth year (and that was due to the new CT)."*

Please confirm that the LOLH measure is a measure of generation supply adequacy and reliability to meet customer demand, and does not consider transient interruptions caused by UFLS or transmission related interruptions.

NLH-PUB-002 Reference: *Review of Newfoundland and Labrador Hydro Power Supply Adequacy and Reliability Prior to and Post Muskrat Falls Final Report, August 19, 2016, Page 7, Figure II.2 Historical Unserved Energy (MWh)*

Please confirm that the above noted chart is a measure of all unsupplied energy regardless of cause and includes UFLS events and transmission system related events.

NLH-PUB-003 Reference: *Review of Newfoundland and Labrador Hydro Power Supply Adequacy and Reliability Prior to and Post Muskrat Falls Final Report, August 19, 2016, Page 77, Conclusion IV-17*

Please confirm whether or not the referenced Cigre data of 0.24 bipole outages per year would include all the other causes listed in Points 2 and 3 of Conclusion IV-17, if they had caused a bipole outage to a Cigre reporting utility.

NLH-PUB-004 Reference: *Review of Newfoundland and Labrador Hydro Power Supply Adequacy and Reliability Prior to and Post Muskrat Falls Final Report, August 19, 2016, Page 77, Conclusion IV-17*

> *"It is likely that Hydro has underestimated the potential number of bipole outages",*

Page 35, Paragraph 5

> *"The calculations performed by manufacturers typically apply past experience, which is continuously reviewed. The manufacturers learn from their experience, which improves reliability and availability of future schemes using the same technology and building blocks", and*

Page 36, Section 2. Impact of Outages, a. Bipolar Outages, Paragraph 3

> *"Experience from other bipolar HVdc systems shows that most modern HVdc schemes do not experience bipole trips (simultaneous loss of both poles) very frequently -- only every few years."*

Please confirm whether or not the Cigre data relied upon by Liberty in Conclusion IV-17 includes older HVdc systems that do not fit the Liberty description of the "modern HVdc schemes" that "do not experience bipole trips (simultaneous loss of both poles) very frequently – only every few years".

NLH-PUB-005 Reference: *Review of Newfoundland and Labrador Hydro Power Supply Adequacy and Reliability Prior to and Post Muskrat Falls Final Report, August 19, 2016, Page 74, Paragraph 3*

> *"It is not possible to forecast the number of outages (bipolar or monopolar) with substantial accuracy. The number of equipment failures depends on the quality of the design, manufacture, and maintenance of the equipment, and on the stresses to which it is exposed. The general tendency is for a higher number of failures in the first couple of years of operation, with the number then settling down to a lower level for many years, until aging causes the number of failures to increase again."*

Please indicate whether or not the Cigre figures include bipole outages that are due to early failures that decline with ongoing operation.

NLH-PUB-006 Reference: *Review of Newfoundland and Labrador Hydro Power Supply Adequacy and Reliability Prior to and Post Muskrat Falls Final Report, August 19, 2016, Page 77, Conclusion IV-17, Points 2 and 3*

For each cause listed in Conclusion IV-17, Points 2 and 3, please confirm that each impact will meet the Cigre definition of a bipole outage.

NLH-PUB-007 Reference: *Review of Newfoundland and Labrador Hydro Power Supply Adequacy and Reliability Prior to and Post Muskrat Falls Final Report, August 19, 2016, Page 77, Conclusion IV-17, Point 2*

For Conclusion IV-17, Point 2, bullets d and f, please indicate Liberty's estimated probability per year of those types of events given Liberty's experience of other HVdc systems and its understanding of the design of the LIL converters and synchronous condensers.

NLH-PUB-008 Reference: *Review of Newfoundland and Labrador Hydro Power Supply Adequacy and Reliability Prior to and Post Muskrat Falls Final Report, August 19, 2016, Page 77, Conclusion IV-17, Point 2*

For Conclusion IV-17, Point 2, bullets a, b, c and e, please indicate Liberty's estimation of the duration for these "relatively short duration" outages and the probability per year of their occurrence.