



NEWFOUNDLAND AND LABRADOR

**BOARD OF COMMISSIONERS OF PUBLIC UTILITIES**

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2014-11-24

Mr. Geoffrey Young  
Newfoundland and Labrador Hydro  
P.O. Box 12400  
St. John's, NL A1B 4K7

Dear Sir:

**Re: Newfoundland and Labrador Hydro - the Board's Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System – Requests for Information PUB-NLH-468 to PUB-NLH-499**

Enclosed are Information Requests PUB-NLH-468 to PUB-NLH-499 regarding the above-noted matter. The deadline for Responses to these Requests for Information (RFIs) will be set at a later time.

If you have any questions, please do not hesitate to contact the Board's Legal Counsel, Ms. Jacqui Glynn, by email, [jgylgn@pub.nl.ca](mailto:jgylgn@pub.nl.ca) or telephone (709) 726-6781.

Yours truly,

Cheryl Blundon  
Board Secretary

Encl.

**ecc. Newfoundland Power Inc.**

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1 **IN THE MATTER OF**  
2 the *Electrical Power Control Act, 1994*,  
3 SNL 1994, Chapter E-5.1 (the “*EPCA*”)  
4 and the *Public Utilities Act, RSNL 1990*,  
5 Chapter P-47 (the “*Act*”), as amended; and  
6

7 **IN THE MATTER OF** the Board’s Investigation  
8 and Hearing into Supply Issues and Power Outages  
9 on the Island Interconnected System.

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**PUBLIC UTILITIES BOARD  
REQUESTS FOR INFORMATION**

**PUB-NLH-468 to PUB-NLH-499**

**Issued: November 24, 2014**

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- 1 **PUB-NLH-468** Further to the response to PUB-NLH-232, state the direct current rating of  
2 each of the electrode line conductors, the overload capability of a single  
3 conductor for 10 minutes, 20 minutes and continuously for ambient  
4 temperature of 0, 20 and 30 degrees and the maximum continuous power  
5 delivery at Soldiers Pond for operation in monopole operation with a  
6 single electrode conductor from the Muskrat Falls converter station to the  
7 electrode.  
8
- 9 **PUB-NLH-469** Further to the response to PUB-NLH-235, confirm that the reconfiguration  
10 of the dc cables following a permanent pole trip can be achieved within 5  
11 minutes for all starting configurations of the dc cables.  
12
- 13 **PUB-NLH-470** Further to the response to PUB-NLH-238, explain how the pre-insertion  
14 resistor is used to discharge the dc cable prior to connection of the cable to  
15 the other pole.  
16
- 17 **PUB-NLH-471** Further to the response to PUB-NLH-239, what recommendations have  
18 been given by the cable manufacturers regarding preparedness for dc cable  
19 repairs. Has Hydro accepted all of the recommendations? If not, why not?  
20
- 21 **PUB-NLH-472** Further to the response to PUB-NLH-241, page 4, line 2, please clarify  
22 whether the reference to the breaker at Muskrat Falls is correct, or whether  
23 the reference should have been made to Soldiers Pond.  
24
- 25 **PUB-NLH-473** Further to the response to PUB-NLH-244, explain the involvement, if any,  
26 of the HVdc cable manufacturer in the specification of and/or the  
27 supervision of the actual rock dumping.  
28
- 29 **PUB-NLH-474** Further to the response to PUB-NLH-244, will the dc cable be HV tested  
30 before the rock dumping operation and again afterward?  
31
- 32 **PUB-NLH-475** Further to the response to PUB-NLH-250 and PUB-NLH-256, explain  
33 why it was decided to evaluate the guaranteed forced and guaranteed  
34 scheduled energy unavailability by the total measure of the forced and  
35 scheduled unavailability since forced outages are likely to have a higher  
36 impact on operational costs than scheduled outages.  
37
- 38 **PUB-NLH-476** Further to the response to PUB-NLH-264, which outlines that the  
39 curtailment of the Maritime Link is necessary for a wide range of faults, as  
40 described in Attachment 1, and is an essential part of limiting future load  
41 shedding to permanent bipole faults, state which part(s) of the  
42 Interconnection Operators Agreement or any other agreement confirms  
43 Nova Scotia Power Incorporated's agreement to this instantaneous  
44 curtailment of the Maritime Link and provide a copy setting out the  
45 sections of such agreement.

- 1 **PUB-NLH-477** Further to the response to PUB-NLH-264, Attachment 1, Base Cases 4  
2 and 10 results in system instability following the loss of a pole when in  
3 monopolar operation. It is accepted that the starting point may be  
4 considered to be an N-1 condition; however, please confirm that Nalcor  
5 would not operate the Labrador Island Link at high load in this condition,  
6 unless an emergency exist or unless there is sufficient spinning reserve in  
7 the Island Interconnected System to prevent load shedding. If this is not  
8 true, please explain why this operating mode is considered to be  
9 acceptable, for how long such a condition would be allowed to exist, and  
10 what measures would be taken to prevent widespread load shedding in the  
11 event of the trip of the last remaining pole.
- 12 **PUB-NLH-478** Further to the response to PUB-NLH-264, Attachment 1, which outlines  
13 that for the studied operating conditions, curtailment of the Maritime Link  
14 is necessary to avoid low ac voltage and/or instability and/or load  
15 shedding, what signal will be used to initiate curtailment or runback of the  
16 Maritime Link and what penalties will be incurred when such curtailments  
17 occur?  
18
- 19 **PUB-NLH-479** Further to PUB-NLH-481, what mitigation measures, other than  
20 curtailment of the Maritime Link, will be considered to avoid curtailment?  
21  
22
- 23 **PUB-NLH-480** Further to the response to PUB-NLH-264, what would be the cost of  
24 restricting the operation of the Maritime Link so that the fault conditions  
25 studied in the report in Attachment 1 would not require curtailment of the  
26 Maritime Link?  
27
- 28 **PUB-NLH-481** Further to the response to PUB-NLH-264, what is the impact of operating  
29 the Labrador Island Link and the generation on the Island Interconnected  
30 System so that there would be no need for load shedding as a consequence  
31 of a pole trip, when operating in monopolar condition?  
32
- 33 **PUB-NLH-482** Further to the response to PUB-NLH-264, state how frequently load  
34 shedding might happen as a consequence of trips occurring when in  
35 monopolar operation.  
36
- 37 **PUB-NLH-483** Further to the response to PUB-NLH-264, state whether load shedding  
38 will occur at a frequency higher than 58 Hz in the case of events on the  
39 Labrador Island Link or loss of generation on the Island Interconnected  
40 System or ac system faults.  
41
- 42 **PUB-NLH-484** Further to the response to PUB-NLH-264, section 5.1 of Attachment 1  
43 states that faults at Bay d'Espoir have been classified as "Exceptional  
44 Circumstances"; however, the study performed by SNC Lavalin in March  
45 2012, filed as Appendix C10 with Hydro's Application dated April 30,  
46 2014 for Approval to Upgrade the Transmission Line Corridor from Bay

- 1 d'Espoir to Western Avalon, indicated that operation with additional high  
 2 inertia synchronous condensers at Soldiers point could alleviate the  
 3 problem and avoid load shedding for some or all of these faults. Explain  
 4 why operation with additional high speed synchronous condensers at Bay  
 5 d'Espoir is no longer being considered.  
 6
- 7 **PUB-NLH-485** Further to the response to PUB-NLH-264, Attachment 1, explain why ac  
 8 system faults at Muskrat Falls were not considered in this study  
 9
- 10 **PUB-NLH-486** Further to the response to PUB-NLH-264, Attachment 1, Base Case 9  
 11 which shows that curtailment of the Maritime Link was found to be  
 12 necessary as a consequence of generation trip on the Island Interconnected  
 13 System when the Labrador Island Link was operating near rated capacity,  
 14 explain when Nalcor would expect to operate the system without reserve  
 15 on the Labrador Island Link, as earlier studies have shown that the  
 16 response of on island generation was not sufficiently fast to avoid  
 17 problems in the event of temporary outages on the Labrador Island Link.  
 18
- 19 **PUB-NLH-487** Further to the response to PUB-NLH-264, Attachment 1:  
 20 1. Figures 268 to 274 shows a growing instability. Explain why.  
 21 2. Figure 290 shows that the frequency starts to recover at about 15  
 22 seconds. Explain from where the additional power to increase the  
 23 frequency comes.  
 24 3. Figure 297 shows that the frequency starts to recover at about 10  
 25 second. Explain from where the additional power to increase the  
 26 frequency comes.  
 27 4. Figure 311 shows that the frequency suddenly starts to recover at  
 28 about 7 seconds. Explain how this happens.  
 29 5. Figure 346 shows that the frequency starts to recover at about 10  
 30 seconds. Explain from where the additional power to increase the  
 31 frequency comes.  
 32
- 33 **PUB-NLH-488** The SNC Lavalin Stability Studies dated March 2012, filed as Appendix  
 34 C10 with Hydro's Application dated April 30, 2014 for Approval to  
 35 Upgrade the Transmission Line Corridor from Bay D'Espoir to Western  
 36 Avalon, identified the potential need for 195Mvar of shunt compensation  
 37 at Bottom Brook. Is this reactive power compensation still required? If so,  
 38 please state how this will be provided. If not, please explain why the  
 39 requirement no longer exists.  
 40
- 41 **PUB-NLH-489** Further to the response to PUB-NLH-266, what actions will Hydro take if  
 42 the HVdc contractors' studies referred to in lines 17-22, page 3, of the  
 43 response, indicate that the inertia provided with two high inertia  
 44 synchronous condensers are only marginally able to keep the frequency  
 45 above the level at which load shedding would have to be performed?

- 1 **PUB-NLH-490** Further to the response to PUB-NLH-266, what mitigation would Hydro  
2 implement if early operation shows that load shedding will take place at  
3 faults other than a permanent bipole failure?  
4
- 5 **PUB-NLH-491** Further to the response to PUB-NLH-272, confirm that no load shedding  
6 had to be performed to achieve the stability outlined in the response and  
7 state the status of the Maritime Link during this study including whether  
8 or not curtailment of the Maritime Link was performed.  
9
- 10 **PUB-NLH-492** Further to the response to PUB-NLH-278, confirm that the longest start up  
11 time for the off-line generators will be taken into account when assessing  
12 performance following the permanent loss of one pole during the worst  
13 case loading of the Labrador Island Link.  
14
- 15 **PUB-NLH-493** Further to the response to PUB-NLH-280, what actions would be  
16 necessary regarding adequate generation for the Island Interconnected  
17 System if a suitable emergency support agreement with Nova Scotia  
18 Power and New Brunswick Power cannot be concluded?  
19
- 20 **PUB-NLH-494** Further to the response to PUB-NLH-281, explain what happens to the  
21 power transfer on the Maritime Link during the following events:  
22
  - Bipole temporary block
  - Single HVdc pole temporary block
  - Single HVdc pole trip
  - 3 phase faults close to the inverter
  - 3 phase fault at Bay d'Espoir
  - 3 phase fault at Muskrat Falls converter station
23  
24  
25  
26  
27  
28
- 29 **PUB-NLH-495** Further to the response to PUB-NLH-282, confirm that there would  
30 always be at least 168 MW spinning reserve (or equivalent curtailable  
31 load) in the Island Interconnected ac system.  
32
- 33 **PUB-NLH-496** Further to the response to PUB-NLH-282, which indicates that stand by  
34 generation will come on-line sometime between 10 and 20 minutes after  
35 the permanent loss of a pole which means that the converter and the dc  
36 line may have to operate with 100% overload for up to 20 minutes, rather  
37 than the 10 minutes as has been specified, explain what will be the impact  
38 on the converter station equipment and the HVDC overhead line of this  
39 extended period of operation at 100% overload.  
40
- 41 **PUB-NLH-497** The response to NP-NLH-035 states that “with respect to non-firm exports,  
42 such flows on the Maritime Link would be discontinued as necessary to  
43 address any transmission related constraints within Newfoundland and  
44 Labrador” and further “With respect to Island supply shortages involving  
45 the Labrador-Island HVac Link (LIL), the ML capacity will be curtailed  
46 during events involving the LIL including temporary and permanent pole

1 faults and bipole faults.” Does the latter statement apply to both firm and  
 2 non-firm exports? If it applies to both types of export, please identify  
 3 where the agreement to such curtailment can be found. Please also explain  
 4 the difference between “such flows would be discontinued” and “the ML  
 5 capacity will be curtailed.”  
 6

7 **PUB-NLH-498**

8 Further to the response to CA-NLH-055, state whether or not the primary  
 9 and secondary auxiliary power supplies can be impacted simultaneously by  
 10 disturbances on the ac transmission network and/or ac retail distribution  
 11 network.

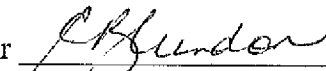
12 **PUB-NLH-499**

13 Further to the responses to CA-NLH-056 and CA-NLH-067, explain why a  
 14 trip would be necessary in the event of a low voltage condition of a  
 15 duration of more than 1 second. Does this requirement relate to low  
 16 voltage of the auxiliary power supply or of the transmission ac connection  
 17 or both? Please also state the time taken before the emergency diesel  
 18 generator has been started and is capable of delivering the power required  
 from valve cooling and other essential supplies

**DATED** at St. John’s, Newfoundland this 24<sup>th</sup> day of November 2014.

**BOARD OF COMMISSIONERS OF PUBLIC UTILITIES**

Per



Cheryl Blundon  
 Board Secretary