



NEWFOUNDLAND AND LABRADOR
BOARD OF COMMISSIONERS OF PUBLIC UTILITIES
120 Torbay Road, P.O. Box 21040, St. John's, Newfoundland and Labrador, Canada, A1A 5B2

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2019-04-29

Ms. Shirley Walsh
Senior Regulatory Counsel
Newfoundland and Labrador Hydro
P.O. Box 12400
Hydro Place, Columbus Drive
St. John's, NL A1B 4K7

Dear Ms. Walsh:

**Re: Newfoundland and Labrador Hydro – Reliability and Resource Adequacy –
November 2018 – Requests for Information**

Enclosed are Requests for Information PUB-NLH-001 to PUB-NLH-057 regarding the above-noted application.

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

Sincerely,

Sara Kean
Assistant Board Secretary

SK/rr

Enclosure

ecc **Newfoundland & Labrador Hydro**
Mr. Geoff Young, E-mail: gyoung@nlh.nl.ca
NLH Regulatory, E-mail: NLHRegulatory@nlh.nl.ca
Newfoundland Power Inc.
Mr. Ian Kelly, Q.C., E-mail: ikelly@curtisdawe.com
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Mr. Danny Dumaresque
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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 regulations thereunder; and
7
8 **IN THE MATTER OF**
9 Newfoundland and Labrador Hydro’s
10 Reliability and Supply Adequacy Study.

**PUBLIC UTILITIES BOARD
REQUESTS FOR INFORMATION**

PUB-NLH-001 to PUB-NLH-057

Issued: April 29, 2019

- 1 **PUB-NLH-001** Please provide the 2007 and 2015 *Conservation and Demand Management*
2 *Potential Studies*.
- 3
- 4 **PUB-NLH-002** Please provide a copy of *Operations Standard Instruction BA-P-012 (T-001)*
5 *Operating Reserves*.
- 6
- 7 **PUB-NLH-003** Please provide the *High Power Operational Studies* as referenced in Volume
8 III, sec 6.1.1.
- 9
- 10 **PUB-NLH-004** Please provide *Volume III: Long-Term Resource Plan, Attachment 7: Battery*
11 *Storage Alternative, Appendix E: NL Hydro Summary Table*.
- 12
- 13 **PUB-NLH-005** Please provide a copy of material condition assessment reports for 2016-
14 2018 for the following plants:
- 15 a. Bay d’Espoir;
- 16 b. Upper Salmon;
- 17 c. Nalcor Energy Exploits;
- 18 d. Stephenville Gas Turbine;
- 19 e. Cat Arm;
- 20 f. Paradise River;
- 21 g. Happy Valley Gas Turbine;
- 22 h. Hinds Lake;
- 23 i. Muskrat Falls;
- 24 j. Hardwoods Gas Turbine;
- 25 k. Granite Canal;
- 26 l. Holyrood; and
- 27 m. Holyrood Gas Turbine
- 28
- 29 **PUB-NLH-006** Please provide a copy of equipment-related root cause or causal analyses
30 reports conducted over 2016-2018.
- 31
- 32 **PUB-NLH-007** Please provide a copy of causal analysis reports regarding human
33 performance that affected plant operations for 2016-2018.
- 34
- 35 **PUB-NLH-008** Please provide a copy of Hydro’s five year capital and operating project
36 plans for its Bay d’Espoir, Exploits, and Holyrood production assets for
37 2018.
- 38
- 39 **PUB-NLH-009** Please provide a copy of the preventative maintenance schedules for 2018
40 for both hydraulic and thermal production assets including:
- 41 a. the title of each preventative maintenance activity; and
- 42 b. whether the activity planned was a daily, monthly, annual, etc. activity.

- 1 **PUB-NLH-010** Please provide a current copy of all preventative maintenance activities for
2 both hydraulic and thermal production assets in summary form, identifying
3 each by title.
4
- 5 **PUB-NLH-011** Please provide the most recent copy of Hydro’s list of critical plant
6 equipment for both hydraulic and thermal production assets.
7
- 8 **PUB-NLH-012** Please provide a copy of Hydro’s most recent preventive maintenance
9 backlog for both hydraulic and thermal production assets broken down by
10 equipment/work order priority.
11
- 12 **PUB-NLH-013** Please provide a copy of Hydro’s most recent corrective maintenance
13 backlog for both hydraulic and thermal production assets broken out by
14 work order priority and aging of the backlog.
15
- 16 **PUB-NLH-014** Please provide a copy of Hydro’s most recent work management
17 performance measurements and their values for both hydraulic and thermal
18 production assets for 2016-2018.
19
- 20 **PUB-NLH-015** Please provide copies of Hydro’s forecasted availability measures and the
21 actual availability measures for 2016-2018 for both hydraulic and thermal
22 production assets.
23
- 24 **PUB-NLH-016** Please provide a list of any priority work that was not included in Hydro’s
25 2018 capital budget and Hydro’s mitigation measures or assessment of the
26 risk associated with not doing the work.
27
- 28 **PUB-NLH-017** Please provide a copy of Hydro’s current work management process
29 procedures which address the following:
30 a. Who is responsible for equipment maintenance?
31 b. Who is responsible for equipment reliability?
32 c. What meetings are held to address equipment reliability and corrective
33 actions?
34
- 35 **PUB-NLH-018** Please provide summary records for the maintenance outages over the
36 period of 2016-2018 detailing the work scope planned and the actual work
37 scope accomplished for both hydraulic and thermal production assets.
38
- 39 **PUB-NLH-019** Please provide the 2018 work management, maintenance, or equipment
40 reliability goals and metrics for both hydraulic and thermal production
41 assets.

- 1 **PUB-NLH-020** Please provide copies of reports or other documentation that describe the
2 latest condition of the following assets and any work completed to date
3 addressing the following issues:
4 a. Bay d’Espoir penstocks;
5 b. Hinds Lake rotor resistance;
6 c. Granite Canal control system;
7 d. Upper Salmon rotor rim cracking;
8 e. Hinds Lake bearing coolers;
9 f. Cat Arm spherical control valves;
10 g. Hardwoods combustion can failures;
11 h. Hardwoods bellows failures/cracking;
12 i. Holyrood boiler tube issue, variable frequency drive issues, air flow
13 limitations, hydraulic fluid issues;
14 j. Stephenville vibration issues;
15 k. Hardwoods combustion can failures;
16 l. Hardwoods bellows cracking issue;
17 m. All Holyrood boiler tube failure studies;
18 n. All “Quarterly Report on Performance of Generating Units” reports; and
19 o. Exploits frazil ice issues.
20
- 21 **PUB-NLH-021** **Reference: Volume 1, Attachment 7, Technical Note on the Labrador-**
22 **Island Link Reliability**
23 Please clarify whether the data for a scheme would be eliminated only for
24 the year(s) in which its availability was below 80% or from the complete
25 analysis.
26
- 27 **PUB-NLH-022** **Reference: Volume 1, Attachment 7, Technical Note on the Labrador-**
28 **Island Link Reliability**
29 Please explain why generic faults, which were the cause of many of the
30 transformer failures, can be ruled out for the LIL.
31
- 32 **PUB-NLH-023** **Reference: Volume 1, Attachment 7, Technical Note on the Labrador-**
33 **Island Link Reliability**
34 What would be the results of the analysis, as presented in the technical note,
35 if the HVDC schemes with availability of less than 80% had not been
36 omitted? In the response please include the following:
37 a. Would the overall conclusion be changed significantly?
38 b. How many more UFLS events would there be?
39 c. Would more generation be required and, if so, when and how much?
40
- 41 **PUB-NLH-024** **Reference: Volume 1, Attachment 7, Technical Note on the Labrador-**
42 **Island Link Reliability**

- 1 What would be the results of the analysis, as presented in the technical note,
 2 if the poorly performing HVDC schemes had not been omitted and the
 3 upper and lower quartiles of the Cigre reliability data had been used? In the
 4 response please include the following:
- 5 a. What would be the upper and the lower reliability values?
 - 6 b. How would each of these reliability figures change the overall reliability
 7 of the power supply?
 - 8 c. How many more UFLS events would there be if no action were taken?
 - 9 d. Would more generation be required and, if so, when and how much?
- 10
- 11 **PUB-NLH-025** **Reference: Reliability and Resource Adequacy Study, Volume III,**
 12 **Section 6.2**
 13 Apart from the study in section 6.2, has Hydro performed any other studies
 14 in which the LIL is supplying less than its full rated power? If so, please
 15 provide a copy of the studies.
- 16
- 17 **PUB-NLH-026** **Reference: Reliability and Resource Adequacy Study, Volume III,**
 18 **Section 6.2**
 19 Has Hydro considered mothballing part or all of the existing generation on
 20 the Avalon Peninsula as opposed to closing it down and levelling the
 21 associated site? Please provide any analyses conducted that considered this
 22 option.
- 23
- 24 **PUB-NLH-027** **Reference: Reliability and Resource Adequacy Study, Volume III,**
 25 **Section 6.2**
 26 What energy support to the IIS does Hydro assume could be delivered via
 27 the Maritime Link during peak load times on the IIS? Would there be any
 28 constraints on this energy supply? If so, please explain.
- 29
- 30 **PUB-NLH-028** **Reference: Reliability and Resource Adequacy Study, Volume III,**
 31 **Section 6.2**
 32 What are the options, and their costs, associated with relieving the capacity
 33 constraints on the Bay d’Espoir to Avalon corridor compared to installing
 34 additional gas turbines on the Avalon?
- 35
- 36 **PUB-NLH-029** Please provide Hydro’s *Production Availability and Asset Reliability*
 37 (“PAAR”) Triangle that provides a view to Hydro’s approach to the
 38 maintenance of plant assets and the overall reliability of the system.
- 39
- 40 **PUB-NLH-030** Please provide the following Asset Management procedures utilized by
 41 Newfoundland Hydro:

- 1 a. “*Corporate Business System - ERP Assessment Business Process*
 2 *Document Bills of Materials - Asset Management*,” December 20,
 3 2016;
 4 b. “*Corporate Business System - ERP Assessment Business Process*
 5 *Document Create and Manage Equipment Records*,” December 2016;
 6 c. “*Corporate Business System - ERP Assessment Business Process*
 7 *Document Maintenance Work Centers - Asset Management*,”
 8 December 20, 2016;
 9 d. “*Corporate Business System - ERP Assessment Business Process*
 10 *Document Planning - Asset Management*,” September 12, 2018;
 11 e. “*Corporate Business System - ERP Assessment Business Process*
 12 *Document - Asset Management Preventive Maintenance PAAR Level*
 13 *1*,” August 14, 2018;
 14 f. “*Corporate Business System - ERP Assessment Business Process*
 15 *Document Work Order Prioritization Asset Management*,” August 10,
 16 2018;
 17 g. “*Corporate Business System - ERP Assessment Business Process*
 18 *Document Scheduling - Asset Management*,” August 14, 2018;
 19 h. “*Corporate Business System - ERP Assessment Business Process*
 20 *Document WO Management- Asset Management*,” August 8, 2018
 21

22 **PUB-NLH-031** Please provide details on how the JD Edwards system facilitates Hydro’s
 23 Asset Management processes.
 24

25 **PUB-NLH-032** Please provide a copy of the *Reliability Plan for Hydraulic Production for*
 26 *2019–2021*.
 27

28 **PUB-NLH-033** Please provide a copy of the completed preventive maintenance and
 29 corrective maintenance documentation for Bay D’Espoir Unit 3 for 2018.
 30

31 **PUB-NLH-034** Please provide a copy of Hydro’s most recent *Asset Management Strategy*
 32 *Update*.
 33

34 **PUB-NLH-035** Please provide a copy of *Hydro’s Work Execution Implementation Process*
 35 *Manuel*.
 36

37 **PUB-NLH-036** Please provide the following documents:

- 38 a) *Enterprise Risk Management Framework and Procedures, Risk &*
 39 *Insurance*, July 19, 2017;
 40 b) *Enterprise Risk Management Policy*, Version 3.1, February 21, 2018;
 41 and
 42 c) *Nalcor Energy: Risk Rating Guide*.

- 1 **PUB-NLH-037** Please provide a sample Hydro final report resulting from an Enterprise Risk
2 Management assessment.
3
- 4 **PUB-NLH-038** Please provide the latest Work Order Priority, Work Order Backlog, and
5 Work Order Cancellation reports.
6
- 7 **PUB-NLH-039** Please provide Hydro's procedure for forced outage reporting and
8 subsequent investigation into the cause(s) of the forced outage.
9
- 10 **PUB-NLH-040** Please provide the ratio of management (individuals who have people
11 reporting to them) to engineers (with no people reporting to them) for
12 generation within Hydro.
13
- 14 **PUB-NLH-041** Please provide representative copies of the weekly scheduled compliance
15 reports generated by Hydro's in-house Work Schedule Generator
16 application.
17
- 18 **PUB-NLH-042** Please provide a summary of Hydro's current capacity assistance contract
19 terms for Vale and Corner Brook Pulp and Paper Limited.
20
- 21 **PUB-NLH-043** Please explain the procedure by which the use of 40 MW of capacity
22 assistance from Corner Brook Pulp and Paper can be used as spinning
23 reserve for the IIS.
24
- 25 **PUB-NLH-044** Please provide 2017-2018 annual reports summarizing capacity assistance
26 operations including when capacity assistance was requested, from whom,
27 and the costs associated with these instances of capacity assistance.
28
- 29 **PUB-NLH-045** Please provide Hydro's fuel unit conversion documentation utilized to
30 convert the prices of the various fuels used by Hydro's thermal and gas
31 turbine assets into equivalent prices for energy production (e.g., \$/MWh).
32
- 33 **PUB-NLH-046** Please provide the fixed charge rates, including operation and maintenance
34 costs, that would be used for annualizing the capital costs of the supply
35 expansion options under consideration in Volume III of the *Reliability and
36 Resource Adequacy Study*.
37
- 38 **PUB-NLH-047** Please provide the Enel X, formerly known as EnerNOC, demand response
39 presentation prepared for Hydro in May 2016 entitled *NLH DR Potential*.
40
- 41 **PUB-NLH-048** Please provide the following information for Holyrood:
42 a) description of capital needs and costs to continue operation until March
43 31, 2023;

- 1 b) annual Holyrood fixed O&M expenditures for the years from 2019 up to
2 2021, 2023, 2027, and post 2027; considering O&M cost impacts of
3 capital costs assumed in extensions of Holyrood operations under those
4 four scenarios; and
5 c) variable O&M and fuel costs for one month of full production for all three
6 units at the Holyrood Plant.
7
- 8 **PUB-NLH-049** Does Hydro have an asset management plan (including costs and schedules)
9 for the continued operation of the Holyrood Thermal Generating Station
10 (“Holyrood”) beyond the 2027 timeframe?
11 - If yes, please provide the plan.
12 - If no, please outline a cost and schedule for the preparation of such an
13 asset management plan. The asset management plan should contain
14 sufficient detail to determine the costs required to maintain Holyrood as a
15 reliable source of supply for a medium to long term timeframe, consistent
16 with life expectations based on usage to date and its role in ensuring
17 reliability in the future.
18
- 19 **PUB-NLH-050** Is Hydro aware of any likely barriers, including costs, that are significant
20 enough to rule out Holyrood as a competitive option for providing a backup
21 source supply for the medium to long term.
22 - If yes, please identify and describe them.
23 - If no, please describe the work and effort required to identify any such
24 barriers.
25
- 26 **PUB-NLH-051** Please provide a list of the major equipment, systems, and facilities expected
27 to have a primary bearing on the responses to PUB-NLH-048 through PUB-
28 NLH-050 and briefly describe any conditions or concerns known or
29 reasonably suspected to affect them.
30
- 31 **PUB-NLH-052** Please indicate the expected loading on each pole of the Labrador Island Link
32 bipole after Muskrat Falls is in full operations and the LIL is capable of being
33 fully loaded.
34
- 35 **PUB-NLH-053** Please indicate the forecast IIS peak load for 2020. Please indicate the total
36 on-island supply including Hydro’s and Newfoundland Power’s
37 hydro/thermal sources and any other sources of electrical supply available to
38 Hydro in the event of a bipole outage on the LIL during that peak load
39 timeframe.
40
- 41 **PUB-NLH-054** Please provide Hydro’s assessments for the LIL related to the possibility (e.g.,
42 low, medium, or high) for each of the events listed below to be capable of
43 causing the LIL to be non-operational for an extended period of time:
44 a) extreme weather;
45 b) line or terminal station equipment failure;
46 c) vandalism;

- d) cybersecurity attack; and
- e) other possible but likely less probable events such as an earthquake or airplane hit.
- f) Please detail the effect that different seasonal conditions could have on the restoration efforts associated with each of these outage scenarios with particular emphasis on the impact to restoration times.
- g) If no assessments have been undertaken please provide the rationale for not conducting such assessments.

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10 **PUB-NLH-055** Please provide Hydro’s *Emergency Preparedness and Restoration Plans* (or equivalent) that specifically address potential HVDC system outages.

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13 **PUB-NLH-056** Please outline in detail any issues that arose during construction related to the “Project” (i.e., Muskrat Falls generating station, LIL, and LTA) that could affect the forced outage rate for the LIL that Hydro has calculated based on industry standard values (Attachment 7, Volume 1, *Reliability and Resource Adequacy Study*). These issues may relate to any area of the Project including conductor, tower foundations, converter stations, software, synchronous condensers, and others. Please outline how Hydro intends to incorporate these issues into the forced outage rate and other reliability metrics associated with the LIL.

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23 **PUB-NLH-057** Has Hydro included the forced outage rates, or other reliability metrics, for the Muskrat Falls generating station and the Labrador Transmission Assets in its calculation of the overall reliability for the Island Interconnected system? If yes, what values were assigned to the generating station and LTA and how were those values derived? If no, why have these potential sources of failure not been included?

DATED at St. John’s, Newfoundland this 29th day of April, 2019.

BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

Per 
 Sara Kean
 Assistant Board Secretary