

November 26, 2018

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 Liberty Consulting Group Report – Analysis of Newfoundland Island
Interconnected System Power Supply Adequacy for the Winter of 2018-2019 –
Biweekly Update Report**

In its correspondence of September 19, 2018, the Board of Commissioners of Public Utilities (“Board”) requested that Newfoundland and Labrador Hydro (“Hydro”) provide a biweekly report on Hydro’s supply adequacy for winter 2018-2019, commencing October 1, 2018.

This biweekly report provides an update on the in-service of the Labrador-Island Link (“LIL”) and how it relates to winter 2018-2019 supply adequacy, as well as details on Hydro’s production facilities asset management.

The LIL In-Service Update

This report contains:

- an overview of the critical path tasks required for reliable operation of the LIL for winter 2018-2019;
- an overview of the highest risks being monitored and mitigated for the LIL in-service in winter 2018-2019;
- Hydro’s updated modelled assumptions for winter 2018-2019 supply adequacy planning; and
- Hydro’s proposed contingency plan to mitigate the consequences of unavailability or unreliability of the LIL for all or part of winter 2018-2019.

This report also contains meeting minutes from biweekly meetings held between Hydro, Transition to Operations (“TTO”), and Power Supply in which expectations of supply and energy

Ms. C. Blundon
Public Utilities Board

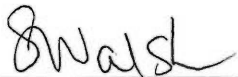
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from the LIL in advance of winter 2018-2019 are discussed. Minutes from these meetings will be provided with each biweekly update report to the Board.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO



Shirley A. Walsh
Senior Legal Counsel – Regulatory
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Enc.

cc: Gerard Hayes – Newfoundland Power
Paul Coxworthy – Stewart McKelvey
Denis J. Fleming – Cox & Palmer
ecc: Van Alexopoulos – Iron Ore Company
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Labrador-Island Link In-Service Update

November 26, 2018

A Report to the Board of Commissioners of Public Utilities



Table of Contents

1. Introduction	1
2. In-Service Activities Update	1
3. Key Risks.....	8
4. Modelled Assumptions	10
5. Contingency Plan	11
6. Conclusion.....	14

List of Attachments

Attachment 1: Meeting Minutes

1 **1. Introduction**

2 Newfoundland and Labrador Hydro (“Hydro”) closely monitors its supply-related assets and
3 issues to ensure its ability to provide reliable service to customers. The availability of power
4 over the Labrador-Island Link (“LIL”) for the upcoming winter was identified in previous reports
5 to the Board by both Hydro and Liberty as contributing to supply adequacy in advance of
6 availability of the Muskrat Falls generation supply to the Island. Hydro is working closely with
7 Nalcor’s Power Supply leadership [Transition to Operations (“TTO”), Power Supply Transmission
8 Operations, and the Lower Churchill Project (“LCP”) Transmission Project] to monitor and
9 mitigate the risks associated with the timing of the in-service of the LIL to supply off-Island
10 capacity and energy to the Island Interconnected System. In each biweekly report, Hydro will
11 also provide an update on supply adequacy for the coming winter with the most up-to-date in-
12 service assumptions of the LIL, as required. The information in this report is current as of
13 November 21, 2018. Any developments after that date will be included in the next biweekly
14 report. Note that typical commissioning issues will be occurring as commissioning continues.
15 Updates regarding those issues known to materially affect the assumptions of capacity and
16 availability for the pending winter season will be provided as they become known. Otherwise,
17 any developments occurring after the preparation of the biweekly report will be included in the
18 next biweekly report.

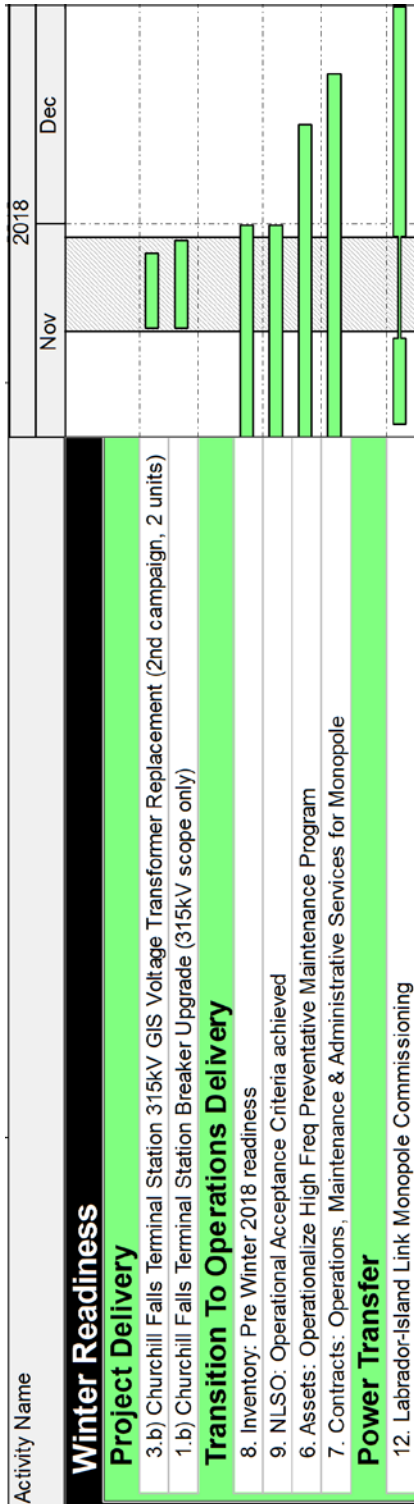
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20 **2. In-Service Activities Update**

21 The following outlines the specific critical path activities required for operation of the LIL for
22 winter 2018-2019,¹ as well as schedule or constraint information for those tasks. As this report
23 is updated on a biweekly basis, Hydro will provide information on the key activities and the
24 associated schedule to inform the Board if any potential supply issues arise from the delivery of
25 those activities.

¹ This report discusses operational readiness for winter 2018-2019. The final in-service review of the LIL is undertaken separately with the Board’s consultant, Liberty, on a quarterly basis with TTO.

- 1 Attachment 1 contains minutes from the biweekly meeting held between Hydro and Power
- 2 Supply, which included discussions on expectations of supply and energy from the LIL for winter
- 3 2018-2019, and specific issues that may affect risks of supply over the LIL for the winter.



Please note:

- 1) The following activities are complete:
 - a. Item 1.a) Churchill Falls Terminal Station Breaker Upgrade (735kV scope only)
 - b. Item 1.b) 1 of 2 diameters complete for Churchill Falls Terminal Station Breaker Upgrade (315kV scope only)
 - c. Item 2. Muskrat Falls Terminal Station 315kV GIS Voltage Transformer Replacement (1 unit)
 - d. Item 3.a) Churchill Falls Terminal Station 315kV GIS Voltage Transformer Replacement (1st campaign, 5 units)
 - e. Item 3.b) 1 of 2 units complete for CF Terminal Station 315kV GIS Voltage Transformer Replacement (2nd campaign)
 - f. Item 4. ERP/ERR: Interim Emergency Response Plan/ERR in place for all Sites/Assets
 - g. Item 5. Contracts: Support services in place & resources onboard
 - h. Item 10.a & b) People: Implement 24x7 staffing model for Muskrat Falls
 - i. Item 11. Re-Energize Labrador-Island Link on 01-Nov-2018
- 2) Outage required (~10d) mid-November for additional CHFTS2 315kV GIS VT replacement (3.b) to improve system reliability

Figure 1: The LIL In-Service Critical Path Activities

1 **Project Delivery**

2 **Activity 1 – Churchill Falls Breaker Upgrade**

3 **Status: Work has commenced.**

- 4 • The 735 kV breaker failure protection upgrade has been successfully completed.
- 5
- 6 • The planned ten-day outage commenced as planned on November 15, 2018. As of
- 7 November 21, 2018 most of the 315kV breaker failure protection upgrades had been
- 8 completed successfully. It is expected that all upgrades, including new items identified
- 9 during the re-start commissioning, will be completed prior to November 27, 2018. This
- 10 presents an extension to the planned outage duration, but will remove the earlier
- 11 expectation of needing to conclude some of the work in the second/third quarters of
- 12 2019.
- 13
- 14 • Additional background on the breaker failure upgrades: In the summer of 2017, prior to
- 15 the energization of the new 735 kV Churchill Falls Terminal Station (“CHFTS”) extension
- 16 breakers in the Churchill Falls switchyard, Hydro Quebec (“HQ”) reviewed the protection
- 17 design of CHFTS extension as well as the new Churchill Falls switchyard (“CHFTS2”).
- 18 Their review identified that there was vulnerability in the bus protection design as a
- 19 result of the “system A” and “system B” dc circuits coming together in one panel. The
- 20 concern is that both “A” and “B” dc protection circuits, that are meant to be fully
- 21 redundant, could be subject to a common failure within a single panel resulting in the
- 22 bus protection inability to satisfy HQ’s critical clearing time as dictated in their system
- 23 studies. This could result in a broader impact on the 735 kV system connecting the
- 24 Churchill Falls and HQ system as it responds to a slow clearing fault. The “system A” and
- 25 “system B” voltages were both in the bus protection “A” panel in the design as the bus
- 26 protection also incorporated the breaker failure protection.
- 27
- 28 • Changes were made in the fall of 2017 to the breaker failure protection for the new 735
- 29 kV breakers in the existing Churchill Falls switchyard to remove this vulnerability. Similar

1 changes were identified by HQ for the bus protection for the 735 kV breakers and the
2 315 kV breakers in the CHFTS2. There was insufficient time to design and implement the
3 changes for CHFTS2 prior to the 2017-2018 winter. This was mitigated by the
4 implementation of an operating restriction² to the CHFTS2 switchyard until the
5 modifications could be designed and implemented. The plan is to remove the operating
6 restriction in CHFTS2 for this coming winter by implementing the revised design that
7 removes both “A” and “B” dc protection circuits from the bus protection “A” panels.
8

9 **Activities 2 and 3 – 315 kV GIS Voltage Transformer³ Replacements⁴**

10 ***Status: Six of Seven at Churchill Falls completed. Remaining to be completed by November 27,***
11 ***2018.***

- 12 • One additional voltage transformer (“VT”) replacement for Churchill Falls (under Activity
13 3b) has been completed. The last of the seven planned VT replacements is in progress
14 and expected to be completed by November 27, 2018.

15 **Transitions to Operations Delivery**

16 **Activity 4: Emergency Response Plan (ERP)/Emergency Restoration and Recovery (ERR):**

17 **Interim ERP/ERR in place as required at all sites/assets**

18 ***Status: Completed, no further updates.***

19 **Activity 5 – Contracts: Support Services in Place and Resources on Board**

20 ***Status: Completed, no further updates.***

² The operating restriction is the implementation of procedures that results in the operation of the Labrador Transmission Assets (“LTA”), two 735/315 kV transformers, and two 315 kV transmission lines as radial feeders out of the existing Churchill Falls switchyard. This operating restriction results in a less reliable operation of CFTS2 because the failure of a single element in the station or one of the two 315 kV transmission lines will result in the removal from service of other elements in its radial line-up.

³ 315 kV instrument transformers.

⁴ During initial energization activities, some VT’s failed. A Root Cause Analysis (“RCA”) identified poor quality control during assembly, resulting in new VT’s manufactured under warranty. Existing VT’s are being replaced with new ones to mitigate identified risk of failure. The spare to be utilized at Muskrat has been checked and confirmed to not have the same quality control issue. The quality control issue that required new Voltage Transformers to be manufactured has been addressed.

1 **Activity 6 – Assets: Operationalize High Frequency Preventive Maintenance Program**

2 **Status: Moved to December 15, 2018 completion.**

- 3 • All requirements are in place for the LIL/LTA assets with the exception of the converter
4 stations. The development of high frequency maintenance requirements for the
5 converters is continuing with expected completion of the converter PM's moved to mid-
6 December 2018.

7
8 **Activity 7 – Contracts: Operations, Maintenance, and Administrative Services for Monopole**

9 **Status: Expected completion of last two remaining items moved to December.**

- 10 • Two contracts remain outstanding. The HVAC services contract tender will close to
11 bidders on November 30, 2018, with vendor selection to follow shortly thereafter. The
12 establishment of the detailed requirements for the Cranes and Hoists services contract
13 is ongoing. Although there are moderate delays in securing the final two contracts, both
14 of these remaining items are expected to be in place prior to the completion of the
15 monopole commissioning activities in December 2018.

16
17 **Activity 8 – Inventory: Pre-Winter 2018 Readiness**

18 **Status: Completion of inventory on track for November 30, 2018.**

- 19 • Completed the winter readiness spares inventory requirement for the overhead
20 transmission lines and submarine cables.
- 21
- 22 • The delivery, inspection and transfer of required HVac station spares to operations
23 continues. Deficiencies for HVac stations have now been identified and sent for
24 procurement. For HVdc assets, all spares will remain in contractors care, custody and
25 control until they are transferred to the Nalcor upon completion of bi-pole low power
26 trial operation.

1 **Activity 9 – Newfoundland and Labrador System Operator (“NLSO”): Operational Acceptance**

2 **Criteria Received**

3 **Status: On track for completion by November 30, 2018.**

- 4 • Three of the five NLSO requirements have been met. The completion/testing of
5 redundant telecom paths and documentation requirements continued and remains on
6 track for completion by November 30, 2018.

7

8 A description of the five NLSO requirements and status is as follows:

- 9 ○ Item 1: Ability to monitor the AC equipment associated with the converter stations
10 (including filter banks) remotely from the ECC for system reliability considerations.
11 **Status: Completed / Accepted.**
- 12 ○ Item 2: Asset owner contact details (to be responsive 24/7). **Status: Completed /**
13 **Accepted.**
- 14 ○ Item 3: Redundant communications paths (voice, tele-protection and SCADA)
15 between the ECC and all stations. **Status: In Progress.** The final configuration and
16 testing of the redundant communications paths is scheduled for the week of
17 November 26, 2018.
- 18 ○ Item 4: Provide a technical resource in the NLSO control room to support the
19 Energy Control Centre during the initial start-up period. **Status: Completed /**
20 **Accepted.**
- 21 ○ Item 5: Documentation including an Operational Readiness document (outlining
22 commissioning / testing activities, operating limits / restrictions, and identified
23 risks / plans for mitigation); and a completed/updated release for service form
24 outlining remaining deficiencies and expected timelines for completion. **Status: In**
25 **Progress.** As of November 21, 2018 the operational readiness document had been
26 drafted and the release for service form was in progress.

1 **Activity 10 – People: Implement Interim 24/7 Staffing Model for Muskrat Falls**

2 **Status: 24/7 staffing model in place and additional resources being recruited to support the**
3 **staffing rotation beyond January 1, 2019.**

4 • An interim staffing rotation (between November 1, 2018 and December 31, 2018) for
5 Muskrat Falls is now in place to support the 24/7 requirement for reliable operations
6 during initial start-up/operations due to software control limitations.

7
8 • The recruitment of two additional resources to support the 24/7 rotation on a longer
9 term basis has been completed, with a start date of December 3, 2018. Both
10 components of activity 10 (10a and 10b) have now been completed.

11

12 **Power Transfer**

13 **Activity 11 – Re-Energize Labrador Island Link**

14 **Status: Completed as planned on November 1, 2018.**

15 • The Labrador Island Link was re-energized on November 1, 2018 at 45 MW using the
16 existing version (version 15) of GE software. Version 16a of GE software has also been
17 delivered (to site) and factory acceptance testing (“FAT”) of the next release is ongoing
18 in Stafford. Although version 16a of the GE software is available to install, a decision has
19 been made to remain on the current version (i.e., version 15). The decision was based
20 on the limited benefit of the additional features of Version 16a and the risk to the
21 schedule of implementing a new version which would have to undergo additional
22 testing.

23

24 • The LIL is currently out of service due to a planned outage (November 15 - 27, 2018).

1 **Activity 12 – Transmission Link Monopole Commissioning**

2 **Status: Initiated November 1. Currently on hold due to planned outage.**

- 3 • Transmission Link Monopole Commissioning commenced as planned on November 1,
4 2018 and continued until November 7, 2018, at which time (at approximately 1100
5 hours) the LIL tripped on the first day of 24/7 operations with a power transfer of 60
6 MW. Upon investigation, it was determined that the cause of the trip was a glycol leak
7 in the valve hall. A valve expert from GE is currently on site to support testing. As of
8 November 21, 2018 the leak had not been replicated and testing continues to simulate
9 operating conditions and discover the source of the leak.
- 10
- 11 • Pending successful identification of the leak and its remediation, monopole
12 commissioning will recommence. If the leak cannot be replicated by simulating system
13 operating conditions, monopole commissioning will resume in order to create actual
14 operating conditions. Should the source of the leak allow for a prompt repair, the
15 opportunity remains to complete monopole commissioning by the end of December
16 2018.
- 17
- 18 • Punch list items are being addressed and closed by the project team. While punch list
19 resolution shall continue in an effort to close all outstanding work, this effort is not
20 considered critical for power transfer.
- 21

22 **3. Key Risks**

23 There has been no change in the key risks since the October 1, 2018 report. In addition to the
24 activities described in Section 2, Hydro acknowledges that the reliability of the current GE
25 software implementation has yet to be demonstrated and remains a risk to the reliable in-
26 service of the LIL. Reliability of the existing software is discussed below. The Power Supply LCP
27 transmission project team has full-time representation in Stafford, England where the upgraded
28 software is being developed and tested and daily status meetings are being held. Power Supply

1 leadership also continues to work with GE leadership in an effort to establish an agreed path
2 forward for completing the upgraded software for consideration for installation.

3

4 Dynamic commissioning with power transfer activities recommenced as scheduled on
5 November 1, 2018 with existing software. Testing continued on the upgraded version on the
6 system simulator in Stafford for future installation which is expected to occur after the winter
7 period.

8

9 An additional risk being monitored is the Maritime Link (“ML”) frequency response to the LIL
10 initiated disturbances once the LIL is in service. Should the LIL trip at a rate that causes frequent
11 disturbances on neighbouring utilities (Nova Scotia Power and New Brunswick Power), the
12 request may be made by neighbouring utilities to take frequency response out of service. If the
13 ML frequency response was turned off, the LIL contribution to the Island’s power supply would
14 be similar to a generator, and the reliability of the LIL will be the major factor in the decision on
15 loading level. The NLSO will work with Nova Scotia Power and New Brunswick Power Service
16 Operators to keep them informed of testing plans so as to understand and mitigate the risk
17 from their perspective.

18

19 Since mono-pole commissioning recommenced on November 1, 2018, there has been a number
20 of Maritime Link frequency controller activations. Although most, if not all, were unlikely to
21 cause an UFLS, the NLSO has placed a temporary restriction of 45 MW maximum delivered over
22 the LIL while commissioning continues. This temporary restriction will be lifted after ongoing
23 commissioning results are proven reliable. Table 1 contains a list of Maritime Link frequency
24 controller activations specifically due to the LIL since November 1, 2018.

Table 1: LIL Related Maritime Link Frequency Responses

	Reason	Transfer	Date	Time (hours)
1	LIL blocked ⁵	(42 MW)	11/1/2018	1905
2	LIL tripped ⁶	(42 MW)	11/2/2018	1432
3	LIL blocked	(42 MW)	11/2/2018	1901
4	LIL blocked	(42 MW)	11/3/2018	1900
5	LIL de-blocked ⁷	(42 MW)	11/4/2018	906
6	LIL blocked	(43 MW)	11/4/2018	1857
7	LIL tripped ⁸	(57 MW)	11/6/2018	958
8	LIL blocked	(45 MW)	11/6/2018	1900
9	LIL tripped ⁹	(57 MW)	11/7/2018	1111

1 **4. Modelled Assumptions**

2 There has been no change in the modelled assumptions since the October 1, 2018 report. The
 3 following analysis, conducted in the same format as that provided in Hydro’s previous response
 4 and Near-Term Generation Adequacy Report, provides insight into the expected loss of load
 5 and unserved energy for this assumption, as compared to the Conservative Supply Case from
 6 Hydro’s Near-Term Generation Adequacy Report. These results with the updated 30 percent

⁵ Blocked: represents the state in which a HVDC pole is ready to transmit power. It is a normal state when the LIL is intentionally taken offline, as it was at the end of a shift, but the loss of 45 MW knowingly causes frequency controller activation.

⁶ On November 2, 2018 the LIL tripped due to suspected misoperation of protection functions. Preliminary investigations reveal that data from the transition compounds was received as expected but the protection algorithm in the control system software may not have operated correctly. This issue is still under investigation by GE for future resolution.

⁷ De-blocked: represents the state in which a HVDC pole is either transmitting power or doing an open line test. Normally to minimize the number of frequency controller activations Hydro turns off the frequency controller during de-block. There was one case in Table 1 where Hydro did not and it caused activation when the 45 MW power transfer came online (i.e., de-blocked).

⁸ On November 6, 2018 the LIL tripped due to suspected misoperation of protection functions. Preliminary investigations reveal that data from the transition compounds was received as expected but the protection algorithm in the control system software may not have operated correctly. This issue is still under investigation by GE for future resolution.

⁹ On November 7, 2018 the LIL tripped due to a glycol leak in the valve hall. Additional detail can be found in Activity 12.

1 forced outage rate are presented in Table 2. Since the October 1, 2018 report, Hydro has load
 2 tested the Holyrood’s Unit 2 following its upgrades this maintenance season. Unit 2 was
 3 successfully tested to its capacity of 175 MW.¹⁰

Table 2: Supply Adequacy Modelling Results for Updated Assumptions

EUE^{11,12}							
HRD ¹⁵ DAFOR ¹⁶	Conservative Supply Case ¹⁷	Holyrood Full Capability ¹³			Holyrood Declining Capability ¹⁴		
		LIL = 110 MW	LIL = 55 MW	No LIL ¹⁸	LIL = 110 MW	LIL = 55 MW	No LIL
15%	37	97	139	242	142	204	364
18%	57	146	209	359	202	290	511
20%	74	185	265	453	250	359	626

LOLH¹⁹							
HRD DAFOR	Conservative Supply Case ¹⁷	Holyrood Full Capability ¹³			Holyrood Declining Capability ¹⁴		
		LIL = 110 MW	LIL = 55 MW	No LIL ¹⁸	LIL = 110 MW	LIL = 55 MW	No LIL
15%	0.69	1.64	2.36	3.95	2.55	3.66	6.33
18%	1.05	2.40	3.44	5.67	3.52	5.06	8.60
20%	1.34	3.01	4.30	7.04	4.28	6.15	10.35

4 **5. Contingency Plan**

5 In light of the new LIL winter 2018-2019 transfer assumptions, Hydro has developed a two-
 6 phased contingency plan for the coming winter that includes incremental internal and external

¹⁰ While under certain operating conditions the unit is capable of producing 175 MW (+5 MW as compared to its gross continuous unit rating), the 170 MW rating continues to be used from a planning perspective.

¹¹ Expected Unserved Energy (“EUE”).

¹² The LIL FOR is 1% for the Conservative Supply Case only, all other cases include the LIL FOR of 30%. EUE criteria is 170 MWh and LOLH criteria is 2.8.

¹³ Holyrood Full Capacity: Unit 1 – 170 MW; Unit 2 – 170 MW; and Unit 3 150 MW.

¹⁴ Holyrood declining capacity starts at full capacity in December, declining through the operating season, consistent with behaviour observed during the winter 2017-2018 Operating Season. Holyrood Unit 2 was load tested on October 11, 2018, and achieved a capacity of 175 MW. No air flow issues were observed.

¹⁵ Holyrood (“HRD”).

¹⁶ Derated Adjusted Forced Outage Rate (“DAFOR”).

¹⁷ Conservative Supply Case results are consistent with those filed in Hydro's Near-Term Generation Adequacy Assessment, filed May 22, 2018.

¹⁸ The variance of results for the no-LIL case as compared to Hydro’s Conservative Supply Case with the LIL delay, as filed in the Near-Term Generation Adequacy Report, results from seasonal reporting in this instance versus annual reporting in the previous filing.

¹⁹ Loss of Load Hours (“LOLH”).

- 1 system support. Phase I of Hydro’s contingency plan contains items that can be secured and
- 2 incorporated into Hydro’s base planning assumptions for the upcoming winter operating season.
- 3 Details and the status of items in Phase I of Hydro’s contingency plan are contained in Table 3.

Table 3: Phase I of Hydro’s Contingency Plan

Item	Description	Incremental System Benefit	Parties Involved	Status	Notes
1	Increase of Capacity Assistance from 90 MW to 105 MW ²⁰	+15 MW	Hydro, Corner Brook Pulp and Paper (“CBPP”)	Ongoing	CBPP has indicated that up to 105 MW is available. The proposed agreement was approved by the Board on November 22, 2018.
2	Re-instatement of Capacity Assistance Program	+7.6 MW	Hydro, Vale	Ongoing	Vale has indicated they are in agreement with Hydro’s proposed Capacity Assistance Agreements; one for their diesel generation (8 MW) and one for load curtailment (6 MW).
3	Re-instatement of Load Curtailment Program	+6 MW	Hydro, Vale	Ongoing	The proposed agreement was filed with the Board on November 14, 2018
4	Voltage Reduction	+20 MW	Hydro, Newfoundland Power	Complete	Hydro has confirmed that it is reasonable to assume availability of 20 MW of Peak Voltage Reduction for the coming winter season. Voltage reduction is forecast on a week-ahead basis by the NLSO.
Potential Incremental System Benefit on peak		48.6 MW			

- 4 Hydro notes that voltage reduction is not what is publically known as "brown out". Voltage
- 5 reduction is a measured and controlled process whereby there is minimal reduction in the

²⁰ Hydro has now confirmed there is 105 MW available as compared to the 110 MW reported in the previous Biweekly Report. Given the relatively small change in magnitude of the available assistance, Hydro has not run the model for this 5 MW difference. Hydro presented the full analysis of its supply adequacy for winter 2018-2019 in its November 16, 2018 filing to the Board regarding supply adequacy.

1 delivery point voltages to customers. This process, utilized by utilities across North America as a
 2 typical system management tool, has been used for peak demand management in almost every
 3 year on the Island system. Customers see no impact to their service during a period of voltage
 4 reduction (typically up to four hours) and equipment is not harmed.

5
 6 In addition to the items listed in Phase I of Hydro’s contingency plan, Hydro has also identified
 7 elements that can provide additional system benefit, but will only be enacted if absolutely
 8 required. These items form Phase II of Hydro’s contingency plan and are detailed in Table 4.

Table 4: Phase II of Hydro’s Contingency Plan

Item	Description	Incremental System Benefit	Parties Involved	Status	Notes
5	Increased output of Holyrood Gas Turbine (“GT”) beyond current base assumption	+10 MW	Hydro	Complete	The ability to increase the capability of the unit is available on a temporary basis subject to atmospheric and system conditions. The GT has been previously safely demonstrated to operate to 134 MW.
6	Temporary increased output of Holyrood Diesels	+1.5 MW	Hydro, Department of Environment	Complete	Hydro met with the Department of Municipal Affairs and Environment and provided an overview of the potential upgrading requirements.
Potential Incremental System Benefit on peak		+11.5 MW			

9 Table 5 provides the overall impact of implementation of those Items in Table 3, in addition to
 10 the items implemented as part of Phase I, as compared to the base case (provided in Table 2).

Table 5: Update of Winter 2018-2019 Supply Adequacy with Hydro’s Contingency Plan Implemented
EUE²¹

HRD DAFOR	Holyrood Full Capability ²²			Holyrood Declining Capability ²³		
	LIL = 110	LIL = 55	No LIL	LIL = 110	LIL = 55	No LIL
	MW	MW		MW	MW	
15%	33	68	121	46	97	176
18%	51	104	182	67	140	251
20%	66	133	232	85	175	311

LOLH

HRD DAFOR	Holyrood Full Capability ²²			Holyrood Declining Capability ²³		
	LIL = 110	LIL = 55	No LIL	LIL = 110	LIL = 55	No LIL
	MW	MW		MW	MW	
15%	0.60	1.21	2.09	0.88	1.80	3.19
18%	0.91	1.80	3.06	1.25	2.54	4.43
20%	1.15	2.27	3.84	1.55	3.12	5.40

1 As evident from the results, implementation of the aspects noted in Hydro’s contingency plan
 2 result in a material reduction of risk for the coming winter operating season. Hydro continues
 3 to conclude all six noted options and will provide updates on status of each as part of its
 4 biweekly updates to the Board.

5

6 **6. Conclusion**

7 Hydro is actively monitoring the availability of supply as it relates to the LIL and associated
 8 impact on reliability of the Island Interconnected System for this coming winter. Hydro’s
 9 existing and newly developed contingency plans described above are progressing in the event
 10 that the LIL does not meet the current assumed capacity and reliability parameters.

11

12 Hydro will keep the Board informed on developments related to the anticipated LIL in-service
 13 date and any material changes impacting supply adequacy for the Island Interconnected System
 14 in its biweekly report.

²¹ Includes the LIL FOR of 30%.

²² Holyrood Full Capacity: Unit 1 – 170 MW; Unit 2 – 170 MW; and Unit 3 150 MW.

²³ Holyrood declining capacity starts at full capacity in December, declining through the operating season, consistent with behaviour observed during the Winter 2017-2018 Operating Season.

Attachment 1
Meeting Minutes

Meeting Minutes

Purpose	Discuss the LIL In-Service	Date	November 16, 2018
Chair	Josh DeCoste	Time	9:30-10:00 am
Location	Hydro Place	Minutes Taker	Josh DeCoste
Attendees	Josh DeCoste (Hydro), Jan-Peter DeSouza (TTO), Shawn Hurley (Power Supply), Meghan Couves (Hydro), Ron LeBlanc (Hydro)		

Schedule of key activities included in the biweekly report as well as minutes from previous meeting were reviewed and discussed for any changes. At the time of the meeting, there were no known material risks to schedule that would change in service assumptions.

For the October 5, 2018 Meeting and future, any changes to action items will be captured in action item register below, and any new items will have new actions/items added.

If new information arises post biweekly meeting, and in time for the report to the Board, it will be captured in the subsequent biweekly report to the Board and before the next biweekly joint meeting.

Action Plan			
No.	Action Item(s)	Owner	Target Date (DD-MMM-YYYY)
1.	21-Sep/24-Sep Meeting, item 1 S. Follett and S. Hurley (Project Execution) and P. DeSouza and R. Henderson (TTO) to draft key critical path activities required to reach reliable operation for winter for inclusion in Board reporting. Format to be confirmed.	S. Follett S. Hurley P. DeSouza R. Henderson	Complete
2.	21-Sep/24-Sep Meeting, item 2 Compile minimum required Newfoundland and Labrador System Operator (“NLSO”) operational needs for inclusion in critical path activities.	J. DeCoste K. Goulding NLSO	Complete
3.	21-Sep/24-Sep Meeting, item 3 Discussion regarding software and associated reliable operation efforts. Currently commencing power transfer on 1-Nov-2018, with existing software, and continuing testing. If existing software is proven to be reliable through November 2018, Hydro and Power Supply will evaluate proceeding with software upgrade or maintaining existing software version. Upgraded software would be considered only after demonstrated reliable results from the system simulator work (RTDS). Power Supply leadership continues to work with GE leadership for continued path forward and	Hydro Power Supply	23-Nov-2018

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Meeting Minutes

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	<p>Power Supply still has full-time representation in Stafford</p> <p>2-Nov Meeting Update Stakeholders discussed the successful re-energization of the Labrador-Island Link (“LIL”) which had occurred as planned on 1-Nov-2018 at a power order of 45MW using the current release of GE software (version 15). The project team indicated that GE had also completed testing of the next iteration of the software (version 16A) and this had been received at site. In addition the project team indicated that the factory acceptance testing for version 1.0 was also in progress in Stafford, with current activities focused on regression testing.</p> <p>A discussion was held regarding release 16A and that it may be possible to implement the new version during the planned ten-day outage in Nov 2018. Continued review of the associated benefits, potential risks and available implementation timelines is ongoing and recommendations are to be developed if software should be upgraded over the next two to three weeks.</p> <p>16-Nov Meeting Update Recommendation by external HVDC consultant has been documented, findings include that there is a minimal benefit associated with version 16a, with no assurance that installation can be achieved in the ongoing planned outage without a negative impact. Based upon these findings it is not recommended to install the software in the current outage or take an additional outage to upgrade to 16a.</p>		
4.	<p>21-Sep/24-Sep Meeting, item 4 Power Supply and Hydro working together to operationalize TransGrid (“TGS”) studies on the LIL loading. These efforts will take modelled findings and test findings during commissioning for determining actual operational parameters for winter. Operational limits for the LIL from the TGS reports have been provided to the Project Delivery</p>	Power Supply and Hydro (combined group)	First meeting 25-Sep-2018 and continuing

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	<p>team.</p> <p>2-Nov Meeting Update Stakeholders noted that the work with TGS was continuing.</p>		
5.	<p>21-Sep/24-Sep Meeting, item 5 Compile assessment of risks of changing to upgraded software package in advance of decision whether to implement new software or not as described above. Will be used in evaluation discussion.</p>	S. Hurley	Complete
6.	<p>21-Sep/24-Sep Meeting, item 6 Additional risk item for winter was noted. Hydro is currently planning to utilize the LIL at 110 MW and with frequency response in service. Should the LIL trip at a rate that causes frequent disturbances on neighbouring utilities, the request may be made by neighbouring utilities to take frequency response out of service. If that were to occur, Hydro would likely then decide to limit the LIL to 50 MW deliveries to avoid Under-Frequency Load Shedding (“UFLS”). No action required at this time.</p> <p>2-Nov Meeting Update No further discussion held on this decision.</p> <p>16-Nov Meeting Update NLSO has restricted LIL transfers to 45 MW, given recent requirements for the ML frequency controller, until the LIL can operate continuously for 48 hours without a trip. The frequency controller is now being deactivated temporarily prior to LIL start-ups, which previously caused it to react.</p>	N/A	
7.	<p>21-Sep/24-Sep Meeting, item 7 NLSO will work with Nova Scotia Power Inc. System Operator (“NSPI SO”) and New Brunswick System Operator (“NBSO”) to keep them informed of testing plans so as to mitigate and understand the risk from their perspective.</p> <p>2-Nov Meeting Update No further discussion held.</p>	K. Goulding	Ongoing

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	<p>16-Nov Meeting Update NLSO has been in contact with NSPI SO and discussed the plan to impose restrictions on the LIL.</p>		
8.	<p>21-Sep/24-Sep Meeting, item 8 No additional high-level risks other than software implementation and frequency response item were noted. Critical path activities compiled per Item 1 will be documented and considered for discussion at next meeting if required.</p> <p>12-Oct Meeting Update Group confirmed that there are no additional high-level risks other than software implementation and frequency response.</p> <p>2-Nov Meeting Update No further risks identified</p>	N/A	
9.	<p>21-Sep/24-Sep Meeting, item 9 Current conservative supply assumptions of the LIL delivery for winter 110 MW at a 30% forced outage rate. Impact of this set of assumptions to be communicated to the Board in first biweekly report. No change in assumptions required based on this risk discussion.</p> <p>19-Oct Meeting Update Group confirmed that there is no information at this time to indicate a change in modelled availability.</p> <p>2-Nov Meeting Update Group re-confirmed that the current expectation is to deliver 110 MW at forced outage rate of 30%.</p> <p>16-Nov Meeting Update No changes required to date, nor expected going forward.</p>	R. Smith	Ongoing
10.	<p>21-Sep/24-Sep Meeting Undergo a risk assessment workshop with key stakeholders</p>	S. Hurley	14-Nov-2018

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	<p>from Hydro, TTO, and Project Execution to evaluate software risks and subsequent required mitigation strategies.</p> <p>19-Oct Meeting Update Group discussed that to change to upgraded software would be a minimum of a two-week outage. Further discussion to be had at risk workshop being held on the afternoon of 19-Oct-2018.</p> <p>2-Nov Meeting Update Further discussion to be held prior to the Nov 2018 outage to evaluate viability of implementing version 16A of the GE software.</p> <p>16-Nov Meeting Update Risk assessment complete, and recommendation on timing of software upgrades has been made. Refer to action item 3.</p>		
11.	<p>19-Oct Meeting Update Group confirmed that issues regarding Astaldi have no impact on this winter's planned deliveries of the LIL.</p> <p>2-Nov Meeting Update No further discussion held.</p> <p>16-Nov Meeting Update No change.</p>	N/A	
12.	<p>16-Nov Meeting Update Group discussed ongoing planned outage to facilitate breaker fail upgrades and voltage transformer replacements. Completion of all planned work is tracking on target , scheduled to end on Nov 25. In the event that not all planned work can be completed within the timeframe, it is possible to delay until Q2/Q3 2019 with no risk to LIL operation during the coming winter, other than reduced flexibility due to being required to maintain the</p>	T. Hunt	25-Nov-2018

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	<p>operating restrictions in CHFTS2.</p> <p>The glycol leak source location remains unknown. If the ongoing efforts to identify and repair the leak do not resolve the issue by re-energization on Nov 25, another outage may be required to complete repairs.</p>		

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