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December 13, 2019

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 of Corporate Services & Board Secretary

Dear Ms. Blundon:

Re: Reliability and Resource Adequacy Study – Enclosing The Liberty Consulting Group Comments on Hydro's November 15, 2019 Update Response and Request for Comments – Newfoundland and Labrador Hydro's Reply

Please find enclosed one original plus eight copies of Newfoundland and Labrador Hydro's ("Hydro") response to The Liberty Consulting Group's ("Liberty") comments on Hydro's "Reliability and Resource Adequacy Study – 2019 Update" ("2019 Update").

Hydro filed the "Reliability and Resource Adequacy Study" on November 16, 2018 ("2018 Filing"), addressing Hydro's long-term approach to providing continued least-cost, reliable service for its customers. The analysis focused on Hydro's proposed planning criteria and its ability to meet customer and system requirements reliably over a ten-year planning horizon (2019–2028).

Liberty completed a review of the 2018 Filing and filed its report, "Review of Newfoundland and Labrador Hydro's Reliability and Resource Adequacy Study," with the Board of Commissioners of Public Utilities ("Board") on August 19, 2019 ("Liberty's August 2019 Review"). Liberty's August 2019 Review contained 13 recommendations to Hydro based on Liberty's analysis. Hydro filed the 2019 Update with the Board on November 15, 2019. The update included Hydro's responses to, and plans arising from, Liberty's August 2019 Review recommendations.

Liberty filed its review of the 2019 Update on December 5, 2019, ("Liberty's December 2019 Review") in which it provided comments on Hydro's actions in response to Liberty's initial recommendations. The comments generally focus on the utilization of the Holyrood Thermal Generating Station ("Holyrood TGS") management of extended Labrador-Island Link ("LIL") bipole outages with distinct comments regarding the necessity of additional analysis and reporting regarding any LIL delay, and stakeholder engagement of Value of Lost Load ("VOLL"). In some cases, Liberty's comment on a specific recommendation references the discussion in another related recommendation. For that reason, Hydro's response to Liberty's December 2019 Review and the recommendations contained therein is captured in the subject matter categories that follow. Any recommendations for which Liberty did not have comments recommending further information or clarification have not been addressed in this response.

Management of Extended Labrador-Island Link Bipole Outages

Recommendations Addressed:

Recommendation 1a: LIL Outage Likelihood and Durations
Recommendation 10: Extended LIL Outages
Recommendation 11: Preparation for LIL Outage Response

Liberty recommendations 1a, 10, and 11 pertain to the management of a LIL bipole outage.

Recommendation 1a initially called for Hydro to examine the likelihood and range of consequences of an extended bipole LIL outage under extreme weather circumstances. Hydro confirmed its plans to produce a number of reports to address this recommendation. Liberty's comments in its December 2019 Review requests that Hydro confirm the engineering review being conducted by EFLA Consulting Engineers and reviewed by Haldar & Associates ("Report 2")[1] will address specific areas.

Hydro confirms that Report 2 will detail LIL as-built capabilities by specific line section and will address the full range of loading combinations. It will focus on defining LIL's design strength from a comparison perspective to existing Nalcor and Hydro line designs as well as to CSA standards. It will also help identify the high exposure areas of the line with respect to meteorological conditions and design strength. The analysis will not be able to provide further information regarding the range of potential bipole outages durations due to line failure; transmission failure is complex and relies heavily on actual structural loading combinations, terrain, section length, etc., which is unique to each line section and each meteorological loading event and is not easily quantifiable. Information regarding the range of failure scenarios was covered in the Phase II Overhead Transmission Lines Emergency Response Plan ("Report 1").[2]

Liberty further sought confirmation that Hydro will include analysis that provides LOLH,[3] LOLE,[4] and EUE[5] in Report 2 based on the structural analysis results. Hydro will perform analysis using PLEXOS to obtain the results; however, these results, as well as the influence of the Maritime Link on the LOLH, LOLE, and EUE impacts, will be provided in Report 3, planned for completion three months after Report 2; upon filing of Report 2, Hydro will confirm a date of filing for Report 3.

Liberty's commentary on Recommendation 10, regarding Hydro's completion of a detailed analysis of probabilities and restoration durations for a range of LIL bipole outages, referenced back to Recommendation 1a and the issues discussed above.

Liberty had also recommended that Hydro complete a number of remaining steps to prepare for LIL outages (Recommendation 11). Hydro advised in its 2019 Update that it has continued to develop emergency response planning and that its first report would contain operational and engineering requirements and discuss repair philosophies and solutions. In response, Liberty identified specific information for which specific dates had not been provided. Liberty recommended, as part of Report 2,

[1] Scheduled for filling on February 28, 2020.
[2] A draft version of that document was filed on November 29, 2019, in error. The correct, up to date, version of Report 1 was filed on December 12, 2019.
[3] Loss of Load Hours ("LOLH").
[4] Loss of Load Expected ("LOLE").
[5] Expected Unserved Energy ("EUE").

that a comprehensive assessment of the first report filed on November 29, 2019, along with the status of certain recommended items be completed. Liberty recommended completion of each item by the end of June 2020.

Report 2 was not intended to provide additional discussion regarding emergency response planning. As noted above, development of emergency planning response is ongoing and an updated emergency response planning report based on 2020 activity will be produced in the fourth quarter of 2020; however, Hydro is able to provide additional context regarding the list itemized in Liberty's December 2019 Review:

- Final LIL emergency material and equipment lists: Along with a full complement of spare equipment for execution of a permanent restoration, Nalcor has a temporary wood pole emergency response solution designed and available, with the required material stored in both Labrador and Newfoundland. Additional solutions will be investigated, engineered, and procured in 2020 aligning with Nalcor's capital plan. Procurement of material beyond the temporary wood pole solution, such as purpose-built emergency response structures and composite insulators components, will extend past June 2020 due to engineering timelines, testing, and procurement requirements. All planned material for 2020 will be procured by the fourth quarter of 2020 and operational training exercise will be progressing throughout the year.
- Final LIL storage and staging areas: With respect to storage locations, Nalcor is currently using Lower Churchill Project storage areas in both Labrador and Newfoundland for current spare material. The final laydown/warehousing plan is in development, but will not be completed by June 2020 as it is related to Nalcor's overall long-term warehousing plan.
- Crew response plans by specific line section: With respect to resource planning and scenario evaluation, Nalcor is planning a constructability workshop in the second quarter of 2020 with line construction representatives to identify proper resource planning and construction methods for specific failure scenarios in various line segments.
- Final LIL Emergency Restoration Plan: As noted in Report 1, emergency response planning is a continuous annual process, updated based on developments in planning and lessons learned during mock exercises. It will continue to evolve over time; however, Nalcor is prepared to respond to a failure using methods already developed and documented.
- Emergency resource-loaded LIL restoration plans for various tower locations in various winter conditions: Please see above regarding crew response plans by specific line section
- Comprehensive and resource-loaded LIL restoration procedures: Please see above regarding crew response plans by specific line section
- LIL outage response training procedures: As work progresses, the current emergency response plan will be bolstered by further operational exercises and engineering analysis to determine the response approach and engineering options available for each zone in the event of a failure.

Extended Usage of the Holyrood TGS

Recommendations Addressed:

Recommendation 1.b: Generation Options for Mitigating LIL Outage Risks
Recommendation 7: Extension of Generation at Holyrood
Recommendation 9: Short-Term LIL and Holyrood Considerations
Recommendation 12: Detailed Assessment of Major Holyrood Systems

Several of Liberty's comments in their December 5, 2019, correspondence relate to the Holyrood TGS, specifically recommendations 1.b, 7, 9, and 12. Liberty's comments on recommendations 7 and 9 referenced their comments on Recommendations 1.b and 12.

In Liberty's commentary regarding Hydro's response to Recommendation 1.b, Liberty detailed several issues it recommended Hydro address in the analysis of the indefinite operation of the Holyrood TGS beyond March 31, 2021. Those points can be summarized as follows:

- Allow Hydro's analysis of the long-term operation of Holyrood to assess the balance between the minimum recall time of a Holyrood TGS unit and the cost of implementing that response time, and determine the optimum recall time;
- Assess alternatives to the operation of the Holyrood TGS for addressing potential LIL bipole outages;
- Provide a detailed cost breakdown of maintaining the current plan for operation of the Holyrood TGS through March 31, 2021, and the incremental costs for indefinite operation of Holyrood TGS. Similar cost separation should be provided if Holyrood is extended for short-term operation, and
- Accelerate submission of the analysis report for indefinite operation from Hydro's proposed date of January 2021 to August 2020.

Hydro confirms that the analysis of the long-term operation of the Holyrood TGS will include the information described in the first three bullets immediately above.

Regarding the fourth bullet above, Hydro does not recommend an acceleration of the analysis report from January 2021 to August 2020. Liberty's Recommendation 1 in its initial August 19, 2019, review stated that Hydro ". . . should undertake a robust examination of generation options (including continued use of the Holyrood steam units) to mitigate that risk." [6] Liberty's Recommendation 12 is that Hydro should "Engage an entity with substantial experience in boiler construction and repair to conduct a detailed assessment of Holyrood's major systems."[7] As noted in Hydro's October 31, 2019, correspondence to the Board and in the 2019 Update[8] Hydro intends to engage an entity with extensive boiler experience to conduct a major systems review and life extension requirements study for the

[6] "Review of Newfoundland and Labrador Hydro's Reliability and Resource Adequacy Study," The Liberty Consulting Group, August 19, 2019, at p. 21.
[7] "Review of Newfoundland and Labrador Hydro's Reliability and Resource Adequacy Study," The Liberty Consulting Group, August 19, 2019, at p. 63.
[8] "Reliability and Resource Adequacy Study – 2019 Update," Newfoundland and Labrador Hydro, Nov. 15, 2019, Volume III, Section 5.6, and Appendix A.

Holyrood TGS. In addition, there are many other complex support systems at the Holyrood TGS that could also affect long-term reliable operation. Like Liberty, Hydro believes that a full condition assessment of all major systems components, including internal inspections, is required to make an informed decision regarding the indefinite operation of the Holyrood TGS.

Hydro will file the supplemental capital budget application for the level II condition assessment of the applicable Holyrood TGS systems. As the analysis is not all capital in nature, Hydro is continuing to advance development of the Request for Proposal ("RFP") to engage the consultant to assist in the analysis. To accomplish the internal inspections necessary to make such long-term assessments on the various Holyrood equipment, hydro must work within the 2020 generation outage schedule to ensure optimal execution. Holyrood units will be under annual maintenance from May 2020 to November 2020; therefore, in order to receive the results of the detailed internal inspection, complete a fulsome analysis including analysis of other major systems, and incorporate the results in the report, Hydro requires until January 2021 to submit a complete report. Submitting the analysis with information acquired to date by August 2020 will not allow for the completion of the detailed condition assessment and the assessment of alternatives and puts Hydro at risk of providing incorrect conclusions based on incomplete data. Hydro believes it has to maintain the schedule for provision of the analysis in January 2021 to provide a fulsome and detailed analysis for the long-term operation of the Holyrood TGS.

Although Liberty's comments were primarily focused on the long-term operation of the Holyrood TGS, Hydro remains committed to provide the Board with its decision in January 2020 regarding a short-term extension of the Holyrood TGS(i.e., one or two years) beyond the current planned end-of-steam date of March 31, 2021. Hydro notes that current plans are in place for reliable operation through the winter of 2020-2021. Hydro provided details regarding the necessary capital and operating expenses contemplated for extension of operation of the Holyrood TGS for one or two years in Appendix A of the 2019 Update; while this is subject to further refinement, Hydro can confirm that it has a good understanding of the necessary requirements for this potential one to two year operational extension.

Recommendation 2: Stakeholder Engagement on Value of Lost Load

Volume III, Section 3, of Hydro's 2019 Update notes that the VOLL study will mark Hydro's first engagement with provincial electricity customers intended to obtain quantitative results. Hydro further noted that the engagement is the first of its kind to be undertaken in the Atlantic region and that limited local knowledge exists on how to successfully complete such an undertaking.

As noted by Liberty in its comments, it is critical that the process supporting the VOLL study is appropriately scoped. This will help ensure that the results obtained by the process are informed by a robust process that is sufficiently focused. Liberty identified a subset of information that could be provided to ensure that the VOLL process is fully participative and appropriately scoped including:

- Providing a purpose and scope statement;
- Identifying and sequencing methods and activities;
- Objectively and fully stating expected results; and
- Describing process governance.

Hydro intends to issue an RFP in the first quarter 2020 to engage an organization with sufficient experience and expertise to successfully execute the VOLL study. As the purpose and scope statement, noted in the first bullet above, will inform the RFP, Hydro will share that item for review and comment by February 21, 2020.

Hydro anticipates working closely with the engaged party to develop items 2, 3, and 4 above, given that this will be Hydro's first engagement of this type with customers. Once the consultant is engaged, and these items are developed, Hydro could then share these with the Board and parties for review and comment prior to the required direct engagement with customers.

Recommendation 8: Near-Term Impacts of Labrador-Island Link Delay

In Volume III, Section 4.1.1, of Hydro's 2019 Update, Hydro provided a commitment to ensuring Holyrood TGS availability until the Muskrat Falls project was in service and proven to be reliable. To accompany the commitment, Hydro provided a view to the capital and operating and maintenance plans required to ensure Holyrood TGS availability should operation be extended by one to two years (i.e. 2022 or 2023), as the Muskrat Falls project assets are placed in-service and become fully functional. Hydro also committed to providing the Board with its decision regarding a short-term extension of Holyrood TGS in January 2020.

In its comments on Hydro's response, Liberty noted that Hydro should provide analysis of compliance with planning criteria, as well as clear, comprehensive plans for addressing any criteria violations for the next coming winter (i.e. 2020–2021 winter operating season). Hydro notes that its current plan for Holyrood TGS fully available through the 2020–2021 winter operating season. Further, Hydro provided analysis as part of its 2019 Update which addressed anticipated system reliability across the spectrum of operating scenarios from no availability of the LIL to anticipated availability of the LIL. To ensure understanding of the potential system risk, these scenarios assumed the LIL was unavailable through 2023. Given that this analysis has already been presented and that Hydro has committed to maintain operation of Holyrood TGS until the Muskrat Falls project assets are reliably in-service, Hydro believes that this information is responsive to this portion of the request.

Hydro will continue to provide any additional information regarding LIL status, including software, synchronous condenser, and other relevant parameters to the Board and stakeholders.

Should you have any questions or comments about any of the enclosed, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

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