

December 3, 2020

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: The Liberty Consulting Group Eighth Quarterly Monitoring Report on the Integration of Power Supply Facilities to the Island Interconnected System – Monthly Update

On November 21, 2019, the Board of Commissioners of Public Utilities (“Board”) requested that Newfoundland and Labrador Hydro (“Hydro”) provide further information as a result of the findings in The Liberty Consulting Group’s (“Liberty”) Eighth Quarterly Monitoring Report on the Integration of Power Supply Facilities to the Island Interconnected System. In its response, Hydro committed to providing Liberty and the Board with a monthly status update regarding the schedule for the Labrador-Island Link (“LIL”) software development and testing, updated information in response to the specific requests detailed in the Board’s November 21, 2019 correspondence, and other pertinent information with respect to the Muskrat Falls Project (“Project”). Nalcor Energy (“Nalcor”) has provided Hydro with the following information on various aspects of the Muskrat Falls Project.

COVID-19 Pandemic Effects on Muskrat Falls Project Execution

Nalcor and its contractors continue to follow all COVID-19 Health and Safety measures as per the established guidelines. Since May, significant emphasis has been placed on strictly adhering to public health guidelines at all Muskrat Falls Project worksites and locations.

As a company, Nalcor must do everything it can to keep people safe at its work sites and within the communities in which it operates. As COVID-19 cases continue to increase across Canada, the Maritime Provinces and now in Newfoundland and Labrador, Nalcor has implemented an additional layer of safety for the Muskrat Falls Project and has implemented COVID-19 testing for the project work sites.

All workers going to the Muskrat Falls site in Labrador are now tested for COVID-19 prior to going to site. Workers must receive a negative test result prior to being granted access to the Muskrat Falls site. For the Muskrat Falls and Soldiers Pond sites, Exempt Essential Workers (workers who receive permission under the Newfoundland and Labrador Special Measures Orders to work in the province) are tested prior to going to site and must receive a negative test result before being granted site access. These workers are re-tested to maintain their site access.

In addition to testing, Nalcor continues to follow the stringent safety protocols it established for its work sites. The Lower Churchill Project (“LCP”) has engaged the Department of Health and Community

Services on its testing protocols and will continue to follow its project pandemic response plan and recommendations from public health authorities.

The safety of Nalcor's workers and their families, the communities in which Nalcor operates, and the public is of utmost importance and Nalcor is taking all responsible measures to protect the health and safety of all. Nalcor has taken this precautionary and proactive approach to protect the health and safety of the workers on the project and the neighbouring communities.

Labrador-Island Link Software Development and Testing Schedule (Board Request #2)

The Board requested the schedule for LIL software development and testing and for Hydro to advise the Board on any future changes to this schedule, the reason for the change, and the implications of any delay for delivery of power and energy to the Island Interconnected System over the LIL.

GE Grid completed Factory Acceptance Testing of the Interim Bipole Software on October 23, 2020, and subsequently uploaded the software at site on October 29, 2020. Dynamic commissioning of Pole 1 with the Interim Bipole Software recommenced on November 28, 2020.

GE Grid has completed its Root Cause Analysis ("RCA") into the valve hall flashover incident and has concluded that insufficient heat curing in the factory of the primary beam supplier is the cause of the degradation of the fiberglass beams. The fiberglass beams are supposed to act as insulators, as well as a part of the physical supporting structure. The degradation of the fiberglass beams resulted in the precipitation of a substance. The presence of this substance correlated with a measured decrease in beam resistivity (indicating a loss of insulation capability) to an unacceptable level and was the cause of the flashover when the valves were energized. As a result, all beams from the primary supplier (348 in total) will be replaced as part of the Final Remediation Plan. Approximately 10% of the beams were provided by a secondary vendor; none of those beams have failed resistivity tests, therefore, none of these will be replaced. GE Grid has placed an order with the secondary vendor for the replacement beams.

In parallel with the RCA, GE Grid developed an Interim Remediation Plan to enable dynamic commissioning of the Interim Bipole Software to progress while the replacement beams are being manufactured and the Final Remediation Plan is being developed. Based on the outcome of the RCA, GE Grid confirmed that cleaning and heat curing the defective beams could increase resistivity to acceptable levels. Currently, GE Grid has removed, heat cured, and replaced all defective beams in Pole 1 with a measured resistivity less than 1G Ohms. GE Grid will continue to check the resistivity of the beams after installation and energization to ensure no degradation has occurred. As previously noted, dynamic commissioning of Pole 1 recommenced on November 28, 2020 and is ongoing. As part of the preparation to resume power transfer, a 30 second power transfer test was successfully conducted on Pole 1 on December 2, 2020. The valve halls are currently being inspected to ensure there are no beam-related issues prior to the start of power transfer, which is currently scheduled for December 4, 2020.

With respect to the Pole 2 Interim Remediation Plan, beam removal and heat curing is underway. The same procedure for removal, heat curing, replacement, and inspection will be followed for Pole 2. The schedule for dynamic commissioning of Pole 2 to recommence is January 12, 2021, followed by bipole trial operations by February 15, 2021 (no change from last month's report). As previously mentioned, the Final Remediation Plan will involve replacing all affected beams, even those that have been heat cured for the Interim Remediation Plan.

The Final Remediation Plan involves the replacement of 348 beams. Experience from the interim replacement procedure will inform the final replacement procedure and schedule. Consideration will be given to a staged replacement versus parallel replacement of the beams, and well as beam delivery options (one batch vs. multiple batches). Delivery of the replacement beams is a critical activity for determining final schedule. The Final Remediation Plan is expected from GE Grid by January 2021. It is important to note that in the event the Final Bipole Software is delivered before the final replacement beams, the interim valve hall solution will not limit dynamic commissioning of the final software or power transfer over the Labrador-Island Link.

Development of the Final Bipole Software is progressing at GE Grid’s facility in Stafford, England. Final software development is a continuation of the interim software, which means the code for interim is the basis for the final. Dynamic commissioning of interim software is not required to be concluded in order to proceed with dynamic commissioning of final software; however, the interim software is an early indicator of the performance and reliability of the functions already developed. If issues are identified during interim dynamic commissioning, and prior to final software delivery, they can be corrected during development of the final software before being released to site. Dynamic commissioning of interim software will reduce the amount of testing required for the final software and ideally reduce the number of issues discovered in the final version.

The current schedule for bipole software is as follows:

Interim Bipole Software		
GE Grid Milestones	GE Grid Schedule	LCP Schedule
Interim Software to Site	October 29, 2020	October 29, 2020
Dynamic Commissioning: Complete	February 14, 2021	February 14, 2021
Trial Operations at Low Load: Start	February 15, 2021	February 15, 2021
Final Bipole Software		
Final Software to Site	May 20, 2021	May 31, 2021
Dynamic Commissioning: Complete	June 28, 2021	July 31, 2021
Trial Operations (at available power)*	June 29, 2021	August 1, 2021

*Trial operations is complete after 30 consecutive days of power transfer without a system trip.

Synchronous Condenser Binding/Vibration (Board Request #4)

The Board referenced Liberty’s discussion of binding/vibration issues with the Soldiers Pond Synchronous Condensers (“SC”). The Board required Hydro to report on these two issues, including details of the problems and the investigation into their root causes, as well as a plan and schedule to address them.

At the Soldiers Pond Synchronous Condenser Site, GE Power is continuing dynamic commissioning of SC Unit 2 and SC Unit 3. The units have been synced to the grid and tested with hydrogen up to 120 MVAR (70% load rejection testing). Noise and vibration data is being collected during testing. The units will be tested at various loads up to 100% capacity to test performance and capture online vibration data.

With respect to the lateral vibration issue, the 100% design phase for the foundation remediation is complete and drawings have been issued for construction. GE Power’s contractor, Vector Construction, has mobilized equipment and resources to Soldiers Pond. Foundation remediation work on SC Unit 1 is

progressing in parallel with dynamic commissioning of SC Unit 3. Removal of auxiliary skids from SC Unit 1 has commenced. If the elliptical bearing in SC3 is determined not to be a viable solution to resolve the vibration issue, a decision on foundation remediation will be made. GE Power's final analysis report of the elliptical bearing performance is expected in mid- December. Lower Churchill Project and external technical experts will review the results; a final decision is expected to be made by the end of December.

Muskrat Falls Update

Unit 1

On September 22, 2020, Unit 1 was synchronized to the Labrador power grid for the first time, marking the achievement of the First Power milestone. Commissioning activities for Unit 1 and a 72-hour trial run have both been completed. Unit 1 was taken off-line in late October to complete post-commissioning inspections and preventative maintenance on the Unit 1 intake gates prior to releasing the unit for service. Unit 1 was placed online on December 3 and is undergoing final in-service checks by the Muskrat Falls commissioning team prior to being released for service.

Unit 2

In early November, Unit 2 commissioning work was halted after the generator upper cooling air shroud rubber seal failed during an overspeed test. The generator shrouds are located above the rotor and are used to contain the air circulating through the machine. The shrouds are supported off the upper bracket and have a rubber seal which presses against the air seal on the stator. Repairs are underway, and resumption of mechanical commissioning is expected prior to the holiday break. Online commissioning activities are expected to resume in late January 2021 after contractor work forces are back at the Muskrat Falls site and a required inspection of the unit is completed prior to starting online commissioning. The Lower Churchill Project is currently planning for completion of unit 2 commissioning and Ready for Operation in February 2021.

Units 3 and 4

Unit 3 assembly is ongoing. Completion of Unit 3 commissioning and Ready for Operation is forecast for May 2021.

The Unit 4 rotor piling is ongoing, with pole installation to follow. Completion of Unit 4 commissioning and Ready for Operation is forecast for September 2021.

If you have any questions, please contact the undersigned.

NEWFOUNDLAND AND LABRADOR HYDRO



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