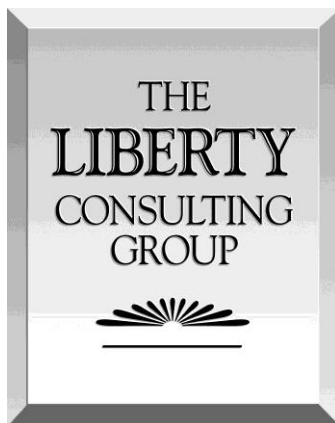


**Reliability and Resource Adequacy Study:
Comments on November 15, 2019
Update Response to
Liberty's Recommendations**

**Presented to:
The Board of Commissioners of Public Utilities
Newfoundland and Labrador**

Presented by:



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Liberty filed in August 2019 a Review and Analysis of Newfoundland and Labrador Hydro's ("Hydro") 2018 Reliability and Resource Adequacy Study ("RRAS"). Hydro updated that study in November 2019; it included Hydro's response to and plans regarding 13 recommendations made in our August 2019 report. This report summarizes the initial views of The Liberty Consulting Group ("Liberty") on the overall sufficiency and schedules for Hydro actions in response to those recommendations.

Recommendation 1.a: LIL Outage Likelihood and Durations

Recommendation

This recommendation called for a Hydro examination of the likelihood and range of consequences of an extended bipole LIL outage under extreme weather circumstances.

Hydro's Response

Hydro plans to produce a number of reports, with the first filed with the Board on November 29, 2019, and covering:

1. Operational and engineering requirements with respect to proper emergency response planning for the LIL and various repair philosophies/solutions for consideration.
2. Previous risk analyses and studies completed and priority-based recommended work scopes.
3. Progress to date for specific emergency response planning activities and planned future activities.

Comments on Hydro's Response

Activities

The second report, scheduled for filing on February 28, 2020, will address the results of an engineering review conducted by EFLA Consulting Engineers ("EFLA") and a review of those results by Hadler & Associates. That review will address the as-built structural capabilities of specific segments of the LIL's overhead line length, considering extreme weather conditions.

The second report appears designed to serve the recommendation's purposes directly, provided that it determines as-built capabilities by specific line sector, that it considers weather conditions as they differ across the LIL's length, and that it addresses the full range of failure types and magnitudes based on as-built capabilities and weather by sector. Doing so by February 28, 2020 appears to set a sufficiently short schedule for filing with the Board. Hydro should confirm that the second report will specifically address the following matters in detail:

- Identification of all significant LIL structure failure modes based on segment-specific as-built installation and weather conditions
- Probable outage frequencies (return periods) for each type of significant single and multiple structural failure mode
- Expected range of bipole outage durations for each significant failure mode during worst case weather conditions, at the most remote locations (including preparation, travel, and work times)

- LOLE, LOLH, and EUE impacts of bipole outages across these identified time ranges, when occurring during peak load conditions
- The dimensions of reliance on the Maritime Link during extended bipole outage durations to maintain service.

The first and third subjects of the first report (see the above numbered list) will, as described, have utility in examining the results of the second (EFLA/Hadler/Hydro) report, but that second report may have material implications for the response requirements and planning. Therefore, it should be clear that the second report will evaluate the consequences its findings have for the previously-filed first report's treatment of response requirement and planning. It is not clear how the second subject of the first report (previous risk analyses and studies) will bear on the recommendation, which does not question or revisit the basis of prior work, but calls for re-examination if and as required by the results of the second report. Therefore, the second report should address the implications its analyses, results, and recommendations have for prior work.

Hydro has also allowed for a third report, which would present the results of any additional PLEXOS modeling that may be done if indicated by the findings of Report 2, to be filed within three months of Report 2, as an addendum to the 2019 RRAS report.

Schedule

Completion of the second report by February 28, 2020 sets a reasonable schedule for completion of the work Hydro plans. However, avoiding delay to this schedule will be critical, given its importance to remaining activities.

Recommendation 1.b: Generation Options for Mitigating LIL Outage Risks

Recommendation

This recommendation called for a robust examination of generation options (including continued use of Holyrood) to mitigate LIL outage risks of extended duration during peak load conditions.

Hydro's Response

Hydro cited its plans for all three Holyrood steam units to remain available until March 31, 2021, after which:

- Units 1 & 2 are to be shut down and decommissioned.
- Unit 3 is to be converted to synchronous condenser service.

Hydro also stated that it is developing contingency plans that would enable indefinite operation of units at Holyrood. Hydro plans to file by January 29, 2021 a report on those plans. That report will employ the results of its completion of a detailed condition assessment considering these options:

- Units 1 and 2 remain offline but capable of generating 170 MW each
- Unit 3 operates as a synchronous condenser capable of being converted to generation mode at 150 MW
- Target recall times for Units 1 and 2 of 24 and 48 hours.

Hydro plans to make an early 2020 request to the Board for funding this detailed assessment.

Comments on Hydro's Response

Activities

The examination of Holyrood addresses the recommendation fully, provided that it should not begin from the premise that 24 hours comprises the minimum recall time. The study should determine what changes and costs would be associated with a range of minimum recall times (recognizing that costs to minimize response time could become so clearly prohibitive as to rule out detailed study). The goal is to present results that compare fast response times with costs to achieve them. It may well be that producing faster than 24 hours response times is either infeasible or prohibitively expensive, but the study should prove (not assume) so.

Moreover, the recommendation does not recognize Holyrood as the only option for addressing LIL outages, but rather only one. Hydro should present conceptual alternatives and cost estimates for such alternatives, bearing in mind other work addressing the potential for collapse of the Avalon transmission system under certain contingencies.

Finally, it should be clear that the study will distinctly address:

- The costs required to enable Holyrood generation through March 31, 2021
- Costs incremental to those, as required to enable indefinite continuation of Holyrood generation.

Distinctly identifying these costs is necessary to ensure that indefinite use of Holyrood can be placed on an equal analytical footing with other alternatives.

Finally, it appears no longer clear that “temporary” continuation of Holyrood through early 2021 will be sufficient, given major unresolved issues associated with getting the LIL into a sustainable state of reliable operation. It should be clear that the study will examine this temporary period robustly, and separate costs for enabling Holyrood generation through whatever period is required to permit sustained LIL operation from those incremental ones needed to enable indefinite continuation following such LIL operation.

Schedule

We found the proposed, nearly 13-month duration for completing the required study surprising. We understood Hydro to be proceeding with study design, potential contractor identification, and required regulatory filings even prior to the completion of our August 19, 2019 report to which Hydro has now responded. The results of the study will not determine a course of action; it will only enable stakeholder and Board review of alternative courses. With some alternative potentially requiring multiple years to execute (after Board review and approval), delaying the report to a time roughly commensurate with the end of the current planned period of continued generation at Holyrood is troubling.

We urge all possible dispatch in securing any required Board approval of the study plan. Given the circumstances, it would be appropriate, if permissible, for both an abbreviated filing and an expedited approval process. Assuming a study start before the end of January 2020, we believe that the schedule for completion should target the end of August 2020, and place highest priority on completion by that time. We recommend this schedule as both achievable and necessary to

provide an opportunity for the Board and stakeholder reviews that should happen in a manner and on a schedule that leaves sufficient time for execution of even longer-duration options that may have merit in addressing extended LIL outages

Recommendation 2: Stakeholder Engagement on VOLL

Recommendation

We recommended that Hydro promptly commence a stakeholder engagement process to address Value of Lost Load (“VOLL”) considering the results of assessments of extended bipole outage risk and options, including generation at Holyrood, for mitigating that risk.

Hydro’s Response

Hydro plans to engage a consultant to conduct a VOLL study, which management observes will be the first of which it is aware to address:

- The Atlantic region
- Prolonged outages.

Hydro plans to include the results, including cost-benefit analysis of incremental resources, in the 2020 RRAS update.

Comments on Hydro’s Response

Activities

Administratively, the process as generally described by Hydro is appropriate, but it will be critical to ensure that the process is fully participative and appropriately scoped. Therefore, we believe that Hydro should provide a purpose and scope statement, identify and sequence methods and activities, objectively and fully state expected results, and describe process governance.

Substantively, we agree that the particular circumstances here will require more time than ordinarily required.

Schedule

Documentation of the administrative matters addressed above should be filed for review and comment by the end of the second week in January

A two-phase process should be adopted to:

- Minimize total duration
- Provide interim guidance to other activities, such as those involving options for addressing LIL outages.

The first phase should incorporate educational and broad level discussion of parameters and other factors derived, with assistance from Hydro’s selected consultant. These efforts will both: (a) prepare stakeholders for what is expected of them and what is to come, and (b) allow adjustment by Hydro to the circumstances it acknowledges as unique here. As soon as possible, the second phase should begin, using broadly-based assessments of outage risks and mitigation costs. These

discussions will frame the issues early enough to permit more focused and refined stakeholder input as work in addressing risks and mitigation alternatives progresses. Then, as quantification of risks and mitigation alternatives and costs mature sufficiently, the stakeholder group should be prepared to address them promptly.

This approach does not necessarily contemplate a final report of the VOLL stakeholder process, but rather focuses on permitting robust input shortly following the completion of the work covered in Recommendation 1.b.

Recommendation 3: P50/P90 Weather Conditions

Recommendation

We recommended that Hydro continue to reflect both P50 and P90 weather conditions in assessing system reliability and economy.

Hydro's Response

Hydro has proposed to continue to use P50 as the basis of its modelling exercises, with the P50 peak demand forecast the baseline for its planning analysis. Hydro has also proposed to provide analysis using the P90 peak demand forecast to provide a framework for permitting stakeholders to assess the incremental risks created by extreme weather. Hydro also plans to track and report on the frequency of weather conditions that occur between P50 and P90 expectations and above P90 to monitor when or whether changes are necessary.

Comments on Hydro's Response

Activities

We found Hydro's plans responsive to the recommendation.

Schedule

Not applicable.

Recommendation 4: Planning and Operating Reserve Margins

Recommendation

We recommended that Hydro verify that its means for addressing the relationship between planning and operating reserve margins does not introduce significant error.

Hydro's Response

Hydro has implemented the minimum operating reserve of 70 MW in its Reliability Model, and proposes a minimum operating reserve of 35 MW when the LIL frequency controller is in service. Hydro proposes an island-system minimum reserve of 70 MW when the LIL is out of service.

Comments on Hydro's Response

Activities

We do not see a need to challenge these values at present, but we assume that coming studies, analyses, stakeholder engagement, and Board review will address their foundations and values.

Schedule

The Board's ultimate decisions with respect to long-range reliability will effectively resolve this and other issues.

Recommendation 5: Comparative Canadian Hydro Fleets

Recommendation

We recommended that Hydro analyze whether differences in its system versus those of other provinces have implications for benchmarking reserve margins.

Hydro's Response

Hydro explained that it presented other utilities' numbers for the sake of information, not benchmarking. Rather, Hydro used detailed modeling of its system in examining its planning reserve margin.

Comments on Hydro's Response

Activities

We agree that planning based on modeling of Hydro's system comprises the proper approach.

Schedule

Not applicable.

Recommendation 6: Re-Analysis of Long-Term Reliability

Recommendation

We recommended a plan and schedule for a re-analysis of future needs under a robust range of circumstances and scenarios.

Hydro's Response

Hydro stated that basing supply planning decisions on the P50 forecast provides an appropriate balance of costs and risks, observing that the P50 forecast requires resource additions in the late 2020s in 2 of 12 scenarios, and the P90 forecast requires additions in the mid-2020s. Hydro notes that three variables contribute to the majority of the differences between the 2018 and 2019 resource plans:

- Forecasted peak demand associated with the provincial government's commitment to rate mitigation
- The difference between P90 versus P50 peak demand forecasts
- Mitigating unserved energy during extended LIL outages at peak periods.

Comments on Hydro's Response

Activities

The response addresses issues to be resolved as part of the pending review of reliability, and connects them to the need for resolution of reliability issues to consider the impacts of rate increases with and without mitigation. To the extent that Hydro is pointing out the need for robust consideration of such issues, among others, we agree.

Schedule

The issues raised by Hydro's comments are clearly among those requiring resolution following the completion of the activities addressed by all of the recommendations, stakeholder engagement, and Board decision.

Recommendation 7: Extension of Generation at Holyrood

Recommendation

We recommended that Hydro conduct analyses necessary for assessing short-term and indefinite extension of Holyrood as a source of supply.

Hydro's Response

Hydro cited existing capital plan projects to facilitate:

- Steam generation from all three Holyrood steam units to March 31, 2021
- Conversion of Unit 3 to a dedicated synchronous condensing unit.

Hydro noted that it would, by the end of this year have more information regarding extension of generation at Holyrood past March 31, 2021, and provided a list of capital and O&M activities needed to extend generation by one to two years. Hydro cited plans to submit a capital budget application for additional condition assessment work at Holyrood.

Comments on Hydro's Response

See the discussion under Recommendations 1.b and 12.

Recommendation 8: Near-Term Impacts of LIL Delay

Recommendation

We recommended that Hydro conduct a detailed assessment of the impacts of a delay in LIL operation into and past the coming winter.

Hydro's Response

Hydro noted that it has analyzed eight scenarios, which cover two different assumptions regarding LIL availability and other resource assumptions. Hydro has shown that it will not meet its LOLE criterion in every year and scenario in which the LIL is not available for commercial operation in the winter months.

Comments on Hydro's Response

Our last quarterly monitoring report on LCP transition to operations raised substantially increased concern about the date by which the LIL will enter and remain in reliable operation on a sustained basis. Prior to the end of the first quarter of 2020, Hydro should, using then-current information about LIL completion status, including software, synchronous condenser, and other relevant parameters, provide a risk-based, assessment of likely dates for LIL operation on a reliable sustained basis. That analysis should also reassess compliance with planning criteria. It should also present clear, comprehensive plans for addressing any criteria violations for the next coming winter.

Recommendation 9: Short-Term LIL and Holyrood Considerations

Recommendations

We recommended continuing focus on LIL availability issues and short-term consideration of Holyrood.

Hydro's Response

See discussion under Recommendation 7.

Comments on Hydro's Response

See discussion under Recommendation 7.

Recommendation 10: Extended LIL Outages.

Recommendation

We recommended that Hydro conduct a detailed analysis of probabilities and restoration durations for a robust range of bipole LIL outages.

Hydro's Response

See discussion under Recommendation 1.a.

Comments on Hydro's Response

See discussion under Recommendation 1.a.

Recommendation 11: Preparation for LIL Outage Response

Recommendation

We recommended that Hydro complete remaining steps to prepare for LIL outages as soon as possible.

Hydro's Response

Hydro stated that it has continued to develop emergency response planning and that its first report described under Recommendation 1 will “highlight” operational and engineering requirements, and discuss repair philosophies and solutions.

Comments on Hydro's Response

We are reviewing the November 29, 2019 first report (referenced in the discussion of Recommendation 1.a). It does not appear definitive, the foundations underlying restoration times are not clear, the feasibility of securing the resources needed to effectuate restoration are not described, and the assessment of as-built conditions and weather ranges by segment are not detailed. It appears, or at least is hoped, that the second report will revisit all aspects of the November 29, 2019 report, addressing them after careful and quantitative analysis.

We will continue to review the November 29, 2019 report, but our preliminary review suggests that detailed response to the sufficiency of Hydro's addressing of this recommendation should await the second report, unless Hydro is prepared at present to state that there are aspects of the November 29, 2019 report that will not be re-examined as part of the second, report scheduled for submission at the end of February 2020.

Moreover, Hydro has not specified dates by which it will provide specific itemizations we recommended:

- Final LIL emergency material and equipment lists
- Final LIL storage and staging areas
- Crew response plans by specific line section
- Final LIL Emergency Restoration Plan
- Emergency resource-loaded LIL restoration plans for various tower locations in various weather conditions
- Comprehensive and resource-loaded LIL restoration procedures
- LIL outage response training procedures.

Schedule

The February 28, 2020 report should provide a comprehensive assessment of the November 29, 2019 contents and revise them where appropriate, based on the re-examination and review planned. The February 28, 2020 report should also provide detailed descriptions of status of the six items noted in the preceding list of bullets, describe management's best available thinking about how each need from that list will be met (substantively, not administratively), and provide a schedule for finalizing each. These schedules should call for completion by the end of June 2020, in order to provide an assessment of their suitability for supporting LIL operation in the ensuing winter.

Recommendation 12: Detailed Assessment of Major Holyrood Systems

Recommendation

In order to support a soundly-based assessment of the short- and long-term utility of Holyrood as a supply source, we recommended that Hydro engage a suitable experienced entity to conduct a detailed assessment of the major Holyrood systems that have substantial bearing on such continued functionality. This recommendation provided a foundational element for considering the Recommendation 1.b call for a robust examination of future generation options.

Hydro's Response

As described above, Hydro will make a request to the Board for funding this detailed assessment. Assuming its approval, Hydro has a study to be filed by the end of January 2021.

Hydro noted that for the short-term, it could operate all three units, whether online or in a hot standby mode of operation, with the ability to call upon them within four to eight hours when in hot standby mode. Without committing to it, Hydro has observed that it can continue this mode of operation to March 31, 2023, depending upon LIL reliability. Hydro proposes to provide to the Board firm plans about a short-term Holyrood extension in January 2020, with an assessment of work to be done to ensure the units would remain now underway.

Comments on Hydro's Response

Activities

Hydro should complete short-term analyses on or before the scheduled date, in order to ensure an opportunity for stakeholder and Board review and execution of all required work for ensuring reliable Holyrood operation for the 2020-2021 winter.

The success of the longer-term analyses to be performed will depend on the capabilities of the firm and the scope of the work contracted. The work scope proposed in the capital budget filing should be examined for sufficient breadth and depth. Given, as described earlier, our understanding that work on planning the study was underway for some time, management should already have a sound understanding of needed scope and available, qualified contractors.

Schedule

Completion and submission to the Board of the results of short-term used of Holyrood should not slip. The schedule for the major systems study is well longer than necessary or appropriate. As described in the discussion under Recommendation 1.b., an abbreviated filing for approval should be filed immediately, and, assuming expedited Board decision on the filing permits work start in January 2020, the study should be filed with the board by the end of August 2020.

Recommendation 13: Managing Generation Assets

Recommendation

We recommended that Hydro enhance several elements of the process of managing generation assets.

Hydro's Response

Hydro's response consisted of the following:

Hydro appreciates Liberty's suggestions for further enhancements to its asset management processes. Hydro is considering items noted by Liberty for inclusion in its asset maintenance program.

Comments on Hydro's Response

Activities

The response did not provide sufficient detail to permit meaningful response.

Schedule

Not applicable.