

# Office of the Consumer Advocate

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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: Hydro Application for Approval of Capital Expenditures for Section Replacement and Weld Refurbishment for Bay d'Espoir Hydroelectric Generating Facility Penstock 1**

On December 7, 2022 Newfoundland and Labrador Hydro ("Hydro") filed an Application with the Public Utilities Board (the "Board") entitled *Application for Approval of Capital Expenditures for Section Replacement and Weld Refurbishment for Bay d'Espoir Hydroelectric Generating Facility Penstock 1* (the "Application"). Hydro states in its cover letter to the Application "*This project is required for the safe and reliable operation of Penstock 1 in Bay d'Espoir. Project execution is expected to take three years with an estimated project cost of \$50,606,700.*" Hydro indicates (Schedule 1, Executive Summary, page ii) "*the timing of this expenditure is set to align with the major outages associated with future penstock life extension work, including work planned for the refurbishment of Bay d'Espoir Intake Gate and Surge Tank 1.*"

In a letter dated January 16, 2023 the Board indicates that comments from the parties are due January 31, 2023. This letter conveys the Consumer Advocate's comments on the Application.

The Consumer Advocate notes that the Application relates to a Supplemental Capital Project so is subject to the Provisional Capital Budget Application Guidelines issued by the Board in December 2021 with an effective date of January 2022.

**Project Overview**

The Bay d'Espoir 613 MW hydro facility has two powerhouses that are supplied with water by four penstocks. Powerhouse 1, which has six 76.5 MW generating units, is served by three of the penstocks, each one dedicated to two units. Penstock 1 supplies water to Powerhouse 1's Units 1 and 2.

Hydro indicates that Penstock 1 has experienced four ruptures since May 2016 resulting in significant unplanned outages and costs.<sup>1</sup> Although cracks have been found on refurbished welds,

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<sup>1</sup> Since May 2016, there have been 10 outages of Penstock 1 for a total of 31 weeks at a total cost of \$12.9 million (Schedule 1, Table 1).

there have been no ruptures on Penstock 1 since September 2019 (PUB-NLH-001). Owing to the fragility of Penstock 1, the operational flexibility of Units 1 and 2 has been limited since June 2018. However, another rupture of Penstock 1 occurred in September 2019. Hydro indicates that “*this failure developed in a previously refurbished weld, indicating that the weld refurbishment and change in operating procedures had not fully stabilized the concerns with the penstock*” (Schedule 1, page 5). Hydro concludes that the current operational status of Penstock 1 is not a viable long-term solution, and in order to ensure the safe and reliable operation of Penstock 1, proposes to replace a section of Penstock 1 and refurbish welds on the other sections of Penstock 1.

Since 2016, Hydro has employed the services of three different consulting firms to investigate Penstock 1 failures and file reports, including the following (PUB-NLH-007):

- “Crack Investigation and Repair Report – Penstock No. 1 Bay d’Espoir Hydroelectric Development,” Kleinschmidt, June 2016
- “Root Cause Analysis Report for Bay d’Espoir Penstock No. 1 Refurbishment,” Hatch Ltd., March 17, 2017
- “Final Report for the Bay d’Espoir Penstock No. 1 Stress Analyses,” Hatch Ltd., March 20, 2017
- “Final Report for Repair and Failure Investigation,” Hatch Ltd., May 17, 2018
- “Final Report for Condition Assessment and Refurbishment Options for Penstocks No. 1, 2 and 3,” Hatch Ltd., March 28, 2019 and “Final Report for Penstock No.’s 1, 2 and 3 Life Extension,” Hatch Ltd., July 26, 2019
- “Bay d’Espoir Penstock No. 1 – 2019 Failure Investigation Report,” SNC-Lavalin, March 19, 2020

Hydro’s proposed project is based on the recommendation made by Kleinschmidt. In the Application (para.7) it is stated “*Kleinschmidt ultimately determined that section replacement and weld refurbishment of Penstock 1 presents the greatest level of risk mitigation and provides the highest level of reliability of the options available. Hydro notes that this is the only option that adequately addresses the peaking and fatigue issues in the 17-foot diameter section and returns Bay d’Espoir Units 1 and 2 to normal operation.*” Further, Hydro states (NP-NLH-010) that the proposed project provides a significant life extension of 30 to 50 years, so “*recommending higher-cost options with the potential for greater life extension was not appropriate at this time.*”

It is stated in the Application (para. 5) “*In 2021, Kleinschmidt performed a comprehensive review of four life extension options for Penstocks 1, 2, and 3.*” This Application relates only to the refurbishment of Bay d’Espoir Penstock 1. It is understood that Hydro is studying life extension of Penstocks 2 and 3, but the timing of investments has not yet been determined. Hydro anticipates that projects arising from these studies will be proposed in the capital budget applications corresponding to the commencement of the projects (NP-NLH-012).

### Comments

The Application relates to a Supplemental Capital Project, so it should be reviewed for consistency with the requirements set out in the Provisional Capital Budget Application Guidelines effective January 2022.

As noted in our November 25, 2022 submission on Hydro's 2023 Capital Budget Application, Hydro does not yet have the capability to meet the requirements set out in the Provisional Capital Budget Application Guidelines. Hydro is unable to quantify the impact that a project has on reliability, or quantify the risk of project deferral. Hydro proposes to improve *"its asset management by increasing the alignment of its Asset Management System with ISO 55001:2014 and will be implementing related near- and long-term asset management improvements"* (CA-NLH-047 relating to Hydro's 2023 Capital Budget Application). It is hopeful that a new asset management system will enable Hydro to meet the requirements set out in the provisional guidelines and reduce the overwhelming information asymmetry that the utilities now enjoy.

It seems that Hydro is making a concerted effort to manage its spending in light of the extraordinary high cost and uncertainty brought on by the Muskrat Falls Project (see Reliability and Resource Adequacy Study (RRAS) – 2022 Update). As pointed out in our November 25, 2022 submission on Hydro's 2023 Capital Budget Application, the costs associated with Muskrat Falls, Holyrood TGS, Bay d'Espoir Unit 8, the 5-year capital plans of Hydro and Newfoundland Power, and the amounts owed by customers in Hydro's various deferral accounts could approach \$16,521,300,000 over the next 7 years. This is an extraordinary amount of money on a system that serves about 280,000 electricity customers, and dictates that only those projects that cannot be deferred should be pursued. Now, Hydro is seeking an additional \$50.6 million for Bay d'Espoir Penstock 1 and that amount is a AACE Class 3 estimate, which allows for up to 30% higher cost (PUB-NLH-011). While the application (Schedule 1, page 24) suggests that the impact of this project on retail customers may be modest, a 0.4% increase, but concern remains about the cumulative effect of all these capital expenditures on customer rates.

According to the RRAS – 2022 Update, there could soon become an issue with electricity supply adequacy in the province owing to a shortage of generation capacity. Hydro indicates that Holyrood might be relied upon for support during an outage of Bay d'Espoir Units 1 and 2, but it would be an expensive proposition, costing about \$252/MWh, and this is judged to be the lowest cost option available in such circumstance (NP-NLH-002). The only other potential lower cost option would be imports over the Maritime Link but contracts are not currently in place so costs and availability are unknown. We understand that Holyrood is not a viable long-term solution as it is scheduled for retirement in 2030 (RRAS – 2022 Update). According to PUB-NLH-009 the Penstock 1 replacement and refurbishment is *"the least cost option to supply 153 MW to the Island Interconnected System"*. The *"next least-cost, new resource expansion option has historically been the addition of Bay d'Espoir Unit 8 at an estimated cost of \$522.0 million."* Bay d'Espoir Unit 8 will have a capacity of 154 MW, comparable to the combined capacity of 153 MW from Bay d'Espoir Units 1 and 2 (RRAS – 2022 Update).

We accept Hydro's view that the Bay d'Espoir facility is critical to the reliable operation of the Island Interconnected System, and refurbishment of Bay d'Espoir Penstock 1 appears to be the lowest cost capacity option available. The RRAS - 2022 Update indicates that new capacity

additions are needed. It would make little sense to add new capacity in lieu of maximizing the use of existing, operational facilities. The importance of proper and timely maintenance of existing facilities was a hard lesson learned during Dark NL.

It seems clear that the Penstock 1 life extension project is needed. The fact that Hydro has employed the services of three different consulting firms with expertise in this area lends confidence to the recommendation (PUB-NLH-006). Hydro employed the third consultant, SNC-Lavalin, “to provide a “cold eyes” review of the work completed on Penstock 1 to date, as well as an independent assessment of the most recent rupture” (PUB-NLH-007). Hydro notes (PUB-NLH-007) “SNC-Lavalin reached the same conclusion as Hatch regarding the root cause of the penstock ruptures.” This lends further confidence that the project is needed.

However, it is unclear how this project fits with the overall life extension work at Bay d’Espoir and the expansion plan for meeting the province’s electricity supply needs going forward, and more specifically, the potential addition of Bay d’Espoir Unit 8. We note that since the program of annual inspections and operating restrictions on Bay d’Espoir Units 1 and 2 was employed in September 2018, there has been only one rupture over a period spanning 4+ years. The annual cost of maintenance on Penstock 1 has averaged about \$266,000 (total cost of \$1,066,000 over 4 years, Schedule 1, Table 1). In fact, the cost of an annual inspections for Penstocks 1, 2 and 3 of \$180,000 has been included in this calculation. If the annual inspections for Penstocks 2 and 3 are removed, the annual maintenance cost for Penstock 1 alone is about \$146,000. This compares to annual interest on a \$50.6 million expenditure at 5.4% of \$2.7 million.<sup>2</sup>

We note that Hydro’s risk mitigation analysis (Schedule 1, Section 4.2) of the 4 options applies more or less equally whether the project is carried out now, or three years from now. A risk is not assigned to Option 1, the Status Quo, so we do not know the cost or risk of project deferral. The Status Quo option was recommended by Hatch in December 2018 to serve until a life extension strategy could be implemented (Schedule 1, page 7). In July 2019, Hatch recommended comprehensive weld refurbishment and application of an internal coating because “the weld refurbishments and change in operating procedures appeared to have been successful in stabilizing the weld failures. Work was recommended for completion within the next five years.” (Schedule 1, pages 7 and 8). However, in March 2020, Hatch altered its recommendation in light of the September 2019 Penstock 1 rupture to the option proposed in the Application with section replacement of the 17-foot diameter portion of the penstock and weld refurbishment and application of an internal coating for the remainder of Penstock 1 (Schedule 1, pages 7 and 8). It is good fortune that Hydro did not proceed with Hatch’s recommendation in July 2019.

There is a concern that the outage necessary for Penstock 1 refurbishment might take longer than forecast, extending the outage of Bay d’Espoir Units 1 and 2 into the 2025/26 peak winter season. In its response to NP-NLH-005, Hydro indicates that it will put in place a schedule risk management program, and if in spite of this risk management program the outage extends into the winter of 2025/26, Hydro will avail of Holyrood TGS for capacity support, or capacity imports over the Maritime Link if available and cost effective. Therefore, Holyrood TGS is a viable

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<sup>2</sup> Hydro’s Annual Financial Statement indicates that its rate of return on rate base is 5.4% (P.U. 30 (2019); see <https://www.gov.nl.ca/iet/files/NLHydroTAA2021AnnualReport.pdf>).

capacity supply option if the project is delayed and a prolonged outage of Penstock 1 occurs in the winter peak period.

Hydro states (NP-NLH-010) that it “*strives for an investment level with an appropriate balance between cost and reliability while remaining cognizant of the rate impact of capital investments on customers.*” Striking this “*balance*” between cost and reliability has often been lacking in this jurisdiction, with the utilities falling back on the statement that projects are necessary to “*deliver reliable service to customers at the lowest possible cost*”. Service reliability can always be improved at a cost. It is important that the utilities promote projects that provide service reliability improvements commensurate with the *value* customers place on the improvement.

In summary, Hydro has not met the requirements set out in the Board’s Provisional Capital Budget Application Guidelines, specifically, Hydro has not properly quantified the risk or cost of project deferral and continuing with the status quo. On the other hand, Hydro has provided convincing evidence that Penstock 1 needs refurbishment, and the proposed option to replace a section of the penstock and weld refurbishment on the remaining sections appears to be the preferred option. Further, the proposed project schedule aligns with other major outages associated with refurbishment of Bay d’Espoir intake gate and Surge Tank 1. By proceeding with this project now rather than later, Hydro may be in a better position to manage the significant workload envisioned in the RRAS-2022 Update and the life extension work at Bay d’Espoir, although at this point in time we simply do not have enough information to make such a determination.

We do not oppose the Application, but note that it heightens our concern over the growing burdens that will have to be borne by ratepayers. In this regard, we urge the Board to take the following actions:

1. Finalize the Provisional Capital Budget Application Guidelines including a plan obliging the utilities to meet the requirements in a timely manner.
2. Electrification efforts proposed by the utilities remain an issue. Electrification at the present time is highly questionable in light of Hydro’s ongoing reliability challenges from the LIL and now Bay d’Espoir.
3. Initiate proceedings/hearings on the Reliability and Resource Adequacy Study without any further delay.
4. Order a technical conference relating to life extension work at Bay d’Espoir so that intervenors and the Board and the public have a better understanding of how future capital projects fit with other work planned at the site; e.g., life extension work on the penstocks, Bay d’Espoir Unit 8, etc. Such a conference should be open to the public.
5. Direct Hydro to incorporate projects such as this in the Capital Budget Application process. The Board, rather than Hydro, should decide if a project should be treated as a separate undertaking. By including all projects in the Capital Budget Application process intervenors and the Board will have a better understanding of how capital projects fit together and how rates will be impacted.

If there are any questions with respect to our comments, please contact the undersigned.

Yours truly,



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