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Dear Applicant and Counsel:

**M12795 - Berwick Electric Commission - Factorydale Hydropower Plant
Refurbishment - \$6,000,000**

On April 8, 2026, Berwick Electric Commission (BEC) filed an application with the Nova Scotia Energy Board (Board) for approval of a capital work order application: Factorydale Hydropower Plant Refurbishment Project. The estimated project cost is \$6,000,000.

In the application, BEC noted that an incident occurred in 2023 resulting in irreversible damage to the Factorydale Hydropower Plant turbine. BEC conducted a root cause analysis based on evidence gathered on-site, laboratory analyses, and computer simulations. The likely cause of the event was a large object passing through the turbine, which damaged the entire turbine assembly, including the wicket gates, turbine runner, and scroll case, all critical

components for operating the turbine. BEC's consultant, Hysovent, conducted a comprehensive condition assessment and evaluated three options for resolving the issue:

- Option A, repairing the damaged turbine on a like-for-like replacement basis;
- Option B, fully upgrading the current generation system, including a larger turbine and generator, the balance of plant, the transformer, all associated systems, new control systems, and advanced condition-monitoring system; or,
- Option C: fully decommissioning Factorydale.

Hysovent used the Hydropower Asset Management Project (HydroAMP) framework to evaluate the condition of key components and compare the plant's condition against industry standards. HydroAMP assigned scores to the components based on statistical analysis and guided the investment decisions. Hysovent performed a Tier 1 analysis of the following Factorydale systems: turbines, generators, circuit breakers, governors, batteries, cranes, and emergency closure gates and valves, and provided the summary scoring table below.

System	Total Score	Data Quality Indicator
Turbine	0	4
Generator	7.05	7
Circuit Breakers	6.6672	0
Governor	7.34	0
Batteries	10	0
Cranes	8.133	7
Emergency Closure Gates and Valves	5	4

Hysovent concluded that "the plant is in relatively good condition, except for the turbine and its mechanical components that are destroyed." Hysovent also noted one global recommendation: "a proper maintenance program for the entire facility and its assets." In section 5 of its Condition Assessment Report, Hysovent provided additional recommendations related to operations, maintenance, rehabilitation, and upgrades.

In addition to the Hydropower evaluation of plant components, Hysovent conducted separate structural assessments of the civil aspects of the plant and noted that there were no major concerns.

In its analysis, Hysovent noted that Option B is the preferred option. According to Hysovent, Option B would provide increased overall efficiency and qualify for funding support from the federal Green Municipal Fund (GMF) Program, including a loan covering 80% of eligible project costs, and a 15% grant on the loan. In addition, with advanced monitoring and protection systems, Option B is expected to reduce future operating costs and enhance operational reliability compared with Option A. Option A would replace only the turbine, while the other components would remain the same. It would not provide the same benefits in



terms of additional energy output and enhanced efficiency, and it would not qualify for the GMF Program. Option C would require a much higher capital investment, approximately \$18.8 million, and reduce the renewable energy generation capacity within BEC's system, which is a challenge when considering the *Renewable Electricity Regulations* requirement to produce 80% renewable electricity by 2030.

Evaluation

Board staff issued Information Requests (IRs) on May 28, 2026, to which BEC responded on June 18, 2026. BEC also submitted a request for confidentiality under Rule 12 of the *Board Regulatory Rules* on June 18, 2026, requesting partial confidential treatment of its response. The Board approves BEC's request for confidentiality.

Regarding the 2023 incident, BEC explained that although a vertical trash rack with openings of less than three inches was in place to prevent objects from entering the system, objects were still able to deflect the bars and pass through. BEC noted that three-inch diameter wood pieces had been found inside the turbine in the past. Rack cleaning must be carried out manually, and BEC stated that cleaning the rack is part of its normal operating practice. BEC conducted a root-cause analysis and developed an assumption for the cause that tree root balls containing soil and rocks were blocked by the rack. When the soil and rocks were washed from the tree roots, a rock may have entered and damaged the system.

To improve the water intake protection system, BEC plans to replace the trash rack with a smaller screening device, install more durable wicket gate systems, and add a log boom. Along with the new system, BEC also proposes a revised cleaning process and operating management system to reduce the effort required for clean-up and the amount of manual labor.

Using the same cost structure as the application for Option B, BEC provided a cost estimation for Option A, like-for-like option, for comparison. The estimated cost for Option A is between \$5.21 and \$5.89 million, excluding tax. BEC further explained that the two options have similar estimated costs. However, compared with Option A, Option B would provide the following additional benefits:

...The proposed new unit provides increased capacity, improved efficiency, modern controls and protection, better monitoring capability, improved reliability, and stronger long-term asset value.

BEC noted that based on its estimate, the proposed higher-capacity 650 kW turbine could generate approximately an additional 1,145 MWh of energy per year, which is 74% more than the former 416 kW system. BEC also provided an estimated annual O&M cost comparison between the new system and the like-for-like option. Based on the RETScreen financial model, BEC noted that there could be an approximately 22% O&M cost reduction with the proposed 650 kW system.

BEC noted that the possible rate impact of this project remains uncertain:

...BEC continues to expect that it will need to file its next General Rate Application ("GRA") later in 2026. Whether or not a subsequent GRA would need to be filed to cover the costs of this project specifically would depend on the assumptions and timing of filing of the upcoming GRA and the outcome of the Board's decisions in this matter and the GRA.



In Attachment 1 of RIR-9, the 2024 Dam Safety Review Report, p. 8, BEC's consultant, Meco, noted following:

The BEC does not have any policies or procedures grouped in an operations, maintenance and surveillance (OMS) manual at Factorydale Dam. But there are standard practices that operators follow in operating the dam and in care and maintenance of the dam and these practices should be documented for training purposes, but also as a process to create a baseline operating standard with a focus on safety. ...

On p. 9, Meco noted that instead of a proper procedure supported by routine inspections and observations, BEC relies on incident-based maintenance and site observations. Meco recommended the following:

- There appears to be limited understanding of the purpose for watershed upstream controls at South River Lake, Burnt Flowage and Randall Canal. The BEC should complete a condition assessment of each control structure, document purpose and efficacy, and establish basic dimensions and operability.
- The current lake level monitoring occurs in conjunction with operating the power plant but is discontinued when the plant is not operating. Lake level monitoring is required at all times for dam safety.
- There is no monitoring for debris in the reservoir. Debris can significantly reduce spillway capacity during high-intensity flash floods and has been the cause of some recent failures. A debris boom to divert debris away from the gated structures will improve dam safety.
- The DSR did not identify defined target action response plan (TARP) levels. TARP levels establish activities such as when to remove stoplogs, when to re-install them, when to close the intake gate, etc. Pre-determined TARP levels are an effective tool for both normal operating and emergency operating environments.

In Section 4.5 of the 2024 Dam Safety Review, Meco listed observed deficiencies. Some deficiency items were identified as high or very high priority, across the categories of physical deficiencies, design adequacy deficiencies, and management deficiencies. In its conclusion, Meco noted:

Overall, Factorydale Dam and Spillway were observed to be in Fair condition. The deficiencies listed in Section 4.5 should be addressed according to their associated priorities using Table 4.6.

In response to IR-24 and IR-25, BEC noted that it will implement the recommendations in Sections 5.1, 5.2 and 5.3 of the Condition Assessment Report, and that a detailed maintenance program will be developed as part of the project deliverables.



In response to IR-26, BEC confirmed that there are no site-specific hydrology studies or historical flow records available, and that the current design flow was based on the existing plant's historical design and operating configuration. However, BEC stated that the new system would improve Factorydale's operations and performance and allow BEC to monitor and record key parameters to support future analysis of plant performance, availability, operating trends, maintenance needs, and hydrology-related assumptions.

In response to IR-35, BEC confirmed that its historical site operating records were mostly paper documents and were lost during a flood and fire. BEC stated that records for the new system will be stored in electronic format.

Conclusion

The project was evaluated under three options: Option A, a like-for-like replacement; Option B, replacement with a new, larger system and improved control and operation systems; and Option C, decommissioning the facility and purchasing supply from NS Power. Another possible option, which was not included in BEC's evaluation, would be to sell the facility to another party and purchase power from the new owner. However, this option would likely be complicated, uncertain, and time-consuming. Based on the record, the recommendation of BEC and its consultant to replace the damaged system with a higher-capacity unit is reasonable for the following reasons:

- First, decommissioning the facility and purchasing energy from NS Power would be significantly more costly than the other options and would reduce BEC's renewable generation.
- Second, Options A and B have similar estimated project costs, with Option A ranging from \$5.21 million to \$5.89 million and Option B estimated at \$6 million. However, Option B has better financing opportunities than the like-for-like option. Option B also provides better monitoring, information gathering, and operation optimization, including the potential ability to generate more power. Furthermore, when considering life-cycle costs, the available evidence indicates O&M costs will be reduced with Option B.

The Board therefore approves the application allowing BEC to proceed with Option B, replacing the existing system with a new, larger system.

A recurring theme in the materials before the Board is the need for better maintenance and record-keeping. While the Board will not engage in micro-management of the utility, given the magnitude of this project, the Board expects BEC to have a comprehensive system maintenance plan, schedule, and procedures in place after the completion of the installation and update its record-keeping methods. In addition to maintenance concerns, better operating records should provide a continuous assessment of annual water flow and



generation capacity. The Board anticipates the final financing options will be discussed in a general rate application.

Yours very truly,



Richard J. Melanson, LL.B.
Chair



Marc L. Dunning, P.Eng., LL.B.
Member



Darlene Willcott, LL.B.
Member

