NEWFOUNDLAND AND LABRADOR
BOARD OF COMMISSIONERS OF PUBLIC UTILITIES
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2023-01-11

Ms. Shirley Walsh
Senior Legal Counsel, Regulatory
Newfoundland and Labrador Hydro
P.O. Box 12400
Hydro Place, Columbus Drive
St. John's, NL A1B 4K7

Dear Ms. Walsh:

Re: Newfoundland and Labrador Hydro - 2022 Capital Budget Supplemental Application Approval of Section Replacement and Weld Refurbishment of Penstock 1 at the Bay d'Espoir Hydroelectric Generating Facility - To NLH - Requests for Information

Enclosed are Requests for Information PUB-NLH-001 to PUB-NLH-022 regarding the above-noted application.

If you have any questions, please do not hesitate to contact the Board's Legal Counsel, Ms. Jacqui Glynn, by email, jglynn@pub.nl.ca or telephone (709) 726-6781.

Sincerely,

Cheryl Blundon
Board Secretary

CB/cj
Enclosure

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IN THE MATTER OF
the **Electrical Power Control Act**, 1994,
SNL 1994, Chapter E-5.1 (the "**EPCA**")
and the **Public Utilities Act***,* RSNL 1990,
Chapter P-47 (the "**Act**"), as amended, and
regulations thereunder; and

IN THE MATTER OF an application by
Newfoundland and Labrador Hydro for approval
of capital expenditures for section replacement
and weld refurbishment of Penstock 1 at the Bay
d'Espoir Hydroelectric Generating Facility, pursuant
to subsection 41(3) of the **Act**.

PUBLIC UTILITIES BOARD
REQUESTS FOR INFORMATION

PUB-NLH-001 to PUB-NLH-022

Issued: January 11, 2023

PUB-NLH-001 Please confirm that while there have been cracks found in the refurbished welds, no ruptures have occurred in Penstock 1 since September 2019.

PUB-NLH-002 Please confirm that no circumferential welds have been refurbished to date on Penstock 1?

PUB-NLH-003 Please provide, in tabular form, the penstock can diameter and thickness and thickness to diameter ratio in all three penstocks both for the existing state and proposed alternative?

PUB-NLH-004 What cumulative effect does the refurbishment of the welds have on the heat affected zone and what impact, if any, does this have on the probability of future failure?

PUB-NLH-005 Operation in the rough zone has been noted as a contributing cause of the weld failures and has caused Hydro to implement procedures that limit the operation of units 1 and 2. Hydro states that the proposed replacement of the 17' diameter penstock will remove the operating restrictions.

(a) Does Hydro propose to operate the units in the rough zone other than when passing through the zone while the unit is being powered to its desired level of output outside of the rough zone?

(b) If not, does that mean that even with the replacement of the 17' diameter penstock the units would continue to operate as they do now?

Schedule 1 – Upgrade *Report – Penstock 1 Life Extension – Bay d'Espoir.*

PUB-NLH-006 Hydro states on page i, lines 14-16, that "Since 2016, Hydro has engaged three engineering consultants - Hatch Ltd. ("Hatch"), SNC-Lavalin Group Inc. ("SNC-Lavalin"), and Kleinschmidt Associates ("Kleinschmidt") - to support failure investigations, condition assessments, life extension options analyses, and front-end engineering and design ("FEED")." Please outline the expertise that the three consultants who have been involved in the penstock analysis bring to the project and why three consultants were engaged.

PUB-NLH-007 Please detail the progression of findings as to the cause of the failures starting with the first failure in 2016 and ending with the conclusion as stated on page i, lines 18-19, "the root cause of the cracking found in the penstocks was high stresses in the longitudinal weld seams due to "peaking", which is further exacerbated by corrosion and cyclic stresses."

PUB-NLH-008 The Application states on page i, lines 20-25, that "During the investigation of the most recent failure that occurred in 2019, it was determined that the failure had developed in a previously refurbished weld, indicating that the weld repairs in this section of penstock are not reliable. This was confirmed following the 2021 and 2022 annual inspections of Penstock 1, which found that additional cracks had formed in the longitudinal welds of the 17-foot

diameter section, which had been previously repaired. Therefore, Hydro believes that capital investment is required to address the ongoing risk of penstock failure." Is Hydro satisfied that there has been enough investigation to dismiss inadequate initial refurbishment of the welds as the primary reason for their subsequent failure?

PUB-NLH-009 Hydro states on page 10, lines 2-6, that it "conducted additional analysis using an expansion planning model to identify which resource, or resources, provided the requisite level of reliability at the least cost. The analysis concluded that the replacement and refurbishment of Penstock 1 was the least-cost option to supply 153 MW to the system, ensuring reliable penstock availability and bringing Hydro's expected level of reliability back within acceptable parameters." Please provide the additional analysis that led to that conclusion.

PUB-NLH-010 The Application states on page 14, lines 17-19, that Option 3 "…would see operational constraints lifted and Units 1 and 2 return to normal operation, thus increasing operational flexibility of the plant. Annual inspections could be reduced to every three to five years." Are the impacts of this increased flexibility and reduction in inspections accounted for in the revenue requirement and customer rate impact included on page 24, lines 5-6? If not, please provide savings estimates and any impact on revenue requirements or customer rates.

PUB-NLH-011 Table 7 on page 23 outlines the project's overall $50,606,700 capital cost estimate. Lines 3-8 of the same page states that the estimate includes Kleinschmidt's construction costs from the perspective of a general contractor operating under a fixed-priced contract as well as Hydro's estimates for its own project management, project engineering, detailed design engineering, site representatives, and speciality QA/QC testing related activities.

(a) Please confirm that Kleinschmidt's construction cost estimate is $33,990,000 as detailed within Appendix M, page 55 of 219, Table 3.3.

(b) Please detail the primary reasons that Hydro's overall estimate is lower than Kleinschmidt's estimate of $52,354,600 (2021 dollars) as detailed within Appendix K, page 19 of 187, Table 3.1.

(c) Kleinschmidt acknowledges in Appendix K, page 21 of 187, the high demand for contractors within the current large-scale construction industry as well as the recent price increases in steel, concrete and timber yet, for the purposes of determining the costs for this project, has assumed to be in a market with historically adequate contractor supply and standard profit margins. Has Hydro made the same assumptions as Kleinschmidt in deriving its $50,606,700 estimate?

(d) Does Hydro anticipate any difficulty in securing a general contractor under a fixed-priced contract as described by Kleinschmidt in Appendix M, page 24 of 219, to complete this project? Please explain.

(e) What alternatives, and their estimated costs to implement, are available to Hydro in the event that Hydro is unable to secure a general contractor operating under a fixed-price contract to complete this project?

PUB-NLH-012 The Application states in Appendix A, page 8 of 43, item 6, that Kleinschmidt "advised that the soil backfill was not required for the structural integrity of the penstock in this location." What is the present position of Hydro on the requirement of backfill for Penstock 1 given the input from Hydro's three consultants?

PUB-NLH-013 Appendix K, page 58 of 187, states that the effort required for inspections, maintenance and repairs associated with the proposed Option 3 is expected to be half of that associated with refurbishment Options 2 and 4. Please detail how the 50% reduction figure was determined.

PUB-NLH-014 Appendix K, page 78 of 187, notes that Kleinschmidt reviewed and considered NL Hydro's Enterprise Risk Management Framework and Procedures for use but determined it to be less appropriate for comparing risk profiles for the four options. What within Hydro's Enterprise Risk Management Framework and Procedures did Kleinschmidt find 'less appropriate' than the framework that Kleinschmidt ultimately employed?

PUB-NLH-015 In its discussion of Option 1 in Appendix K, page 81/82 of 187, Kleinschmidt notes that they were unable to quantify the economic impact of not operating in the rough zone.

(a) What is Hydro's estimate of the economic impact?
(b) If the economic impact is not substantial, would Hydro's recommendation of Option C be impacted?

PUB-NLH-016 The Application states in Appendix K, page 86 of 187, that the condition of the drainage system is largely unknown? Is the drainage system a critical component of the support for the penstocks? If so, does Hydro plan to undertake more investigation on the condition of this system?

PUB-NLH-017 Appendix M, page 14 of 219, states that the governing length of the penstock sections for transportation is 15 metres (49.4 feet) and Appendix B, page 8 of 157, states that the average can length is currently 9 feet.

(a) Please confirm the existing can length and the proposed can length for the replacement portion of Penstock 1.
(b) Given the increased length and corresponding weight of the sections, does Hydro anticipate any delivery or installation issues that could impede or prevent the use of the larger sections? If so, please identify the possible issues. If not, please explain why no issues are anticipated?

PUB-NLH-018 Appendix M, page 20 of 219, Item i, states that "A primary constructability objective of the penstock replacement work is, to the extent practical,

eliminate field welding." Is Hydro able to quantify the risk associated with field welding in joining the cans and repairing welds in the lower penstock? If so, what is the quantified risk advantage in eliminating the field welds wherever possible?

PUB-NLH-019 Appendix M, page 29 of 219, states "LGL has advised that with the current proposed thickness of plate, they normally would not trim this flat/uncurved length."

(a) Is Hydro of the opinion that this uncurved piece is a contributor to the peaking problem? If yes, please reconcile why an experienced hydromechanical fabricator, as described by Kleinschmidt on page 28 of 219 in Appendix M, such as Le Groupe Lar would not normally remove the uncurved length while Hydro views the uncurved length as negatively affecting the operation of the penstock.

(b) What is the estimated dollar cost to trim the uncurved length of the new cans should Hydro decide to do so during the final design stage of the project?

PUB-NLH-020 Appendix M, page 47 of 219, states "One planned hatch (the 5th) is located immediately upstream of the powerhouse, between the powerhouse and the switchyard. The scope of work for this activity includes providing access to the penstock spring line in the vicinity of the hatch (which will require vacuum truck style excavation means and methods and a temporary support of excavation installation)." Please elaborate on the need for vacuum truck style excavation means and methods and describe the proposed process.

PUB-NLH-021 Appendix M, page 53 of 219, states "No repairs to the steel plate are contemplated."

(a) Please provide the basis for assumption that no repairs to the steel plate will be required.

(b) Does Hydro have contingencies in place in the event that such repairs are required.

PUB-NLH-022 The Application discusses in Appendix M, page 66 of 219, two weld procedures for full penetration welds; one for a repair and the other for the new 17' replacement portion of Penstock 1. The first involves backgouging while the second uses a backing plate. Please explain why the two methods are employed?

DATED at St. John's, Newfoundland and Labrador, this 11th day of January, 2023.

BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

Per

Cheryl Blundon
Board Secretary