

Q. (Reference 2.2 – Substation Power Transformer Strategy-Appendix B)

Regarding the proposed LBK-T1 Power Transformer Replacement:

- a) Page B-8 indicates that this substation work is being advanced from 2032 to 2027 due to the condition of the power transformer. Where the transformer has only required minimal maintenance in 1996 and in 2009 (Attachment B), please explain how its condition has deteriorated so much since the 2024 Capital Budget Application that advancement by 5 years is required.**
- b) The Normal Degradation Index for LBK-T1 is 0.29 (page B-2), which is only slightly greater than the 0.25 level that suggests further scrutiny and substantially below the crucial threshold of 0.60 and below the values for the other proposed power transformer replacements at 0.58, 0.65 and 0.57 for LAU-T1, HAR-T1, and RRD-T3, respectively. According to this metric, are not the other three more urgent?**
- c) Page B-8 indicates that an updated lifecycle cost analysis of the Lookout Brook hydro plant has been completed and justifies this project. Please provide a copy of that analysis.**
- d) Please provide a table showing the annual capital, operation and maintenance, and other expenditures on the Lookout Brook hydro plant, including the LBK substation and related infrastructure for 2015 to 2025 with forecasts for 2026 to 2030.**
- e) It is indicated that if LBK-T1 failed then the Lookout Brook plant would not be able to supply its 5.889 MVA during system peak.
 - i. For each of the past five years, how much capacity has the plant supplied at system peaks?**
 - ii. For how long can the plant operate at its maximum capacity?****
- f) How many customers are served by the LBK substation and where are they located?**
- g) Is the sole purpose of the LBK substation to serve the Lookout Brook hydro plant?**
- h) Is the Flat Bay Brook Road to the Lookout Brook hydro plant a public access road or a Hydro owned road?**
- i) Is the bridge owned by NP and is it used by any other parties or is it solely for NP's use?**
- j) Page 117 indicates that the bridge replacement is needed because the current one is not sufficient for the load associated with delivery of the proposed replacement power transformer for the plant's substation. If the LBK-T1 Power Transformer Replacement project were not approved then would there be any need for this bridge replacement?**
- k) Why was not this bridge replacement included with the LBK-T1 power transformer as a single project?**

A. a) The requirement for a power transformer to replace the existing unit at the Lookout Brook Plant was initially identified as a future capital expenditure to be in service in 2032 as part of the lifecycle analysis completed for the 2024 refurbishment of the Lookout Brook Hydro Plant.¹ Given the persistently long lead times associated with the delivery of power transformers, ranging from 24 to 36 months, the procurement of the replacement transformer will begin in 2027, with installation and commissioning in 2029. As a result, the replacement of the Lookout Brook Plant transformer is advanced from being in service in 2032 to 2029.

See the response to Request for Information PUB-NP-009 for additional information on the advanced deterioration and condition of LBK-T1.

b) See the response to Request for Information PUB-NP-012 parts b) and c) for information on how Normal Degradation Index is one input used as part of a broader condition assessment process. In addition to the Normal Degradation Index, key considerations for the 64-year-old LBK-T1 relate primarily to widespread physical deterioration affecting multiple major transformer components, including radiators, the main tank, bushings, and sealing system.

Collectively, these conditions indicate widespread deterioration affecting multiple major transformer components. Addressing these issues would require refurbishment or replacement of radiators, bushings, coatings, seals, and associated equipment on a 64-year-old transformer.

c) Table 1 provides the results of the updated lifecycle cost analysis.

Table 1 Lookout Brook Updated Lifecycle Cost Analysis Results		
	50 Year Levelized Value (¢/kWh)	Net Benefit (¢/kWh)
Lifecycle Cost of the Development	6.27	
Cost of Replacement Production (Run-of-River)	12.73	6.47
Cost of Replacement Production (Fully Dispatchable)	14.56	8.29

¹ See the *2024 Capital Budget Application*, report *4.1 Lookout Brook Hydro Plant Refurbishment*, Appendix A, Attachment A.

The results of the updated lifecycle cost analysis show that the continued operation of the Lookout Brook Plant, including the replacement of power transformer LBK-T1 and bridge, provides an economic benefit to customers of between 6.47 and 8.29 ¢/kWh.

- d) Table 2 provides the capital investment and operating and maintenance expenses for Lookout Brook.

Table 2 Lookout Brook Expenditures (\$000s)		
Year	Capital Investment	Operating and Maintenance ²
2015	-	103
2016	10	185
2017	75	147
2018	11	163
2019	72	206
2020	2	191
2021	2	181
2022	249	201
2023	23	194
2024	517	166
2025	1,436	138
2026F	-	140
2027F	685	143
2028F	708	146
2029F	3,763	148
2030F	-	151

² Operating and maintenance expenditures only include those relating to the Lookout Brook Plant. Newfoundland Power does not forecast maintenance cost data for its substation assets in a format that permits reporting in the requested format, therefore the information is not available.

- e) i) Table 3 provides the output of the Lookout Brook Plant during system peak each year from 2021 to 2025.

Table 3 Lookout Brook Output at System Peak	
Year	Output at System Peak (MW)
2021	4.61
2022	4.97
2023	5.12
2024	4.87
2025	4.55

- ii) The Lookout Brook Plant has a nameplate capacity of 5.60 MW. Storage within the system totals 4,064 MWh. If the upstream reservoirs in Lookout Brook were at capacity and new inflows into the watershed were zero, the Lookout Brook Plant could operate continuously for approximately 30 days.
- f) There are no customers served by the Lookout Brook Substation.
- g) Yes, the sole purpose of the Lookout Brook Substation is to serve the Lookout Brook Plant.
- h) The road is publicly accessible until it reaches Newfoundland Power's real property, at which point access is restricted.
- i) Newfoundland Power confirms that it owns the bridge. As stated in part h), the road and associated bridges are publicly accessible until the road reaches Newfoundland Power's real property, at which point access is restricted.
- j) Newfoundland Power confirms the bridge replacement is justified based on the requirement to complete the *LBK-T1 Transformer Replacement* project. If the *LBK-T1 Power Transformer Replacement* project were not approved, bridge replacement would not be required at this time.
- k) The proposed bridge is accounted for as a hydro plant asset and is therefore submitted for approval under the Hydro Generation asset class of the *2027 Capital Budget Application*. Power transformer LBK-T1 is accounted for as a substation asset and is applied for approval under the Substations asset class of the *2027 Capital Budget Application*. All associated components of the hydro plant, including the proposed transformer and bridge replacements, were assessed as part of the lifecycle cost analysis of the Lookout Brook Plant, and has been demonstrated to provide economic benefit to customers as shown above in part c).