Q. (Reference Application Schedule B, Replacement Transformers, page 42) It is stated "*The Replacement Transformers program includes the cost of replacing or refurbishing distribution system transformers that have deteriorated or failed in service*."

a) Are transformer failures random? Why were the annual Adjusted Costs of this program consistently between $3.5 and $3.9 million from 2019 to 2022?

b) Please provide the annual number of transformer replacements and refurbishments due to deterioration or failure in service since 2000.

c) In Table 1, the Adjusted Costs in 2021 and 2022 are higher than the other years. Has NP considered that they may be anomalies arising from supply-chain issues due to COVID-19 or for 2022 in particular the impact of Russian attacks on Ukraine's electrical infrastructure? Or is the historical-cost approach used solely, with no use of any other relevant information?

d) According to Table 1 this program's forecast cost is $3.345 million for 2023 and the application is requesting $3.681 million for 2024. i) Please confirm that this amounts to a 10% increase. ii) Does NP have any engineering or cost based data to suggest that a 10% increase in this program is reasonable to expect?

e) Please provide evidence that this project is consistent with providing service in an environmentally responsible manner.

f) Please advise of the anticipated timeframe between NP's order of the transformer and its receipt from the supplier.

A. a) Generally, distribution transformer failures are not random. Distribution transformers are inspected in accordance with Newfoundland Power's *Distribution Inspection and Maintenance Practices*. Transformers are inspected for rust and oil leaks. Transformers that are leaking or are rusted to the point that a leak appears imminent must be replaced. Inspections also check for other deficiencies, including broken bushings and damaged hardware. Inspections ensure deteriorated transformers and transformers at risk of failure are identified before they fail.[1]

However, major events, such as snow or ice storms, and lightning strikes can cause distribution transformers to fail. In these cases, distribution transformer failure cannot be predicted.

The Adjusted Costs for the *Replacement Transformers* program were relatively consistent from 2019 to 2022 primarily as a result of a consistent number of transformer replacements. See part b) below.

[1] See Newfoundland Power's *2024 Capital Budget Application, Schedule B*, page 44.

b) Table 1 provides the annual number of transformer replacements and refurbishments due to deterioration or failure in service since 2002. Data prior to 2002 is not available.

Table 1
Distribution Transformer Replacements

Year	Quantity Replaced
2002	2,437
2003	2,769
2004	2,347
2005	1,496
2006	1,194
2007	1,445
2008	1,031
2009	563
2010	466
2011	434
2012	604
2013	537
2014	798
2015	861
2016	742
2017	585
2018	623
2019	705
2020	608
2021	660
2022	461

c) Newfoundland Power acknowledges that its costs in 2021 and 2022 were higher than in previous years. Costs in 2021 were higher than plan but did not exceed a

variance of 10% as required for inclusion in the annual Capital Expenditure Report to the Board.[2]

Costs in 2022 were higher than plan largely due to supply chain issues resulting in material cost increases and the requirement to ensure an adequate supply of inventory.[3]

The Company continued to use the historical cost approach for the *2024 Capital Budget Application* estimate for the *Replacement Transformers* program, as there was no other relevant information available.

d) (i) It is confirmed.

(ii) The budget for the *Replacement Transformers* program is based on a historical average. Historical annual expenditures under this program over the most recent five-year period are expressed in current-year dollars ("Adjusted Costs"). The estimate for the budget year is calculated by taking the average of the Adjusted Costs ($3,607,000) and inflating it using the GDP Deflator for Canada for non-labour costs.

Table 2 shows annual expenditures for the *Replacement Transformers* program from 2019 to 2024, the Adjusted Costs and the five-year historical average.

Table 2
Replacement Transformers Program
Historical Expenditures
($000s)

Cost	2019	2020	2021	2022	2023F	Average	2024F
Total	3,019	2,983	3,356	3,873	3,345		3,681
Adjusted[1]	3,581	3,518	3,658	3,932	3,345	3,607	

[1] 2023 dollars.

The increase from the five-year average of $3,607,000 to $3,681,000 is 2.05%. This includes the GDP Deflator. Approximately 7.8% is attributable to the difference between the average of the Adjusted Costs ($3,607,000) and the 2023 forecast cost ($3,345,000).

e) The failure of an oil filled transformer can result in the release of oil into the environment. Pole-top transformers typically contain over 30 litres of oil, while pad-

[2] See the *2021 Capital Expenditure Report,* page 7.
[3] See the *2022 Capital Expenditure Report*, Appendix A, page 4. See also the response to Request for Information CA-NP-129.

mount transformers can contain approximately 2,000 litres of oil. Failure and deterioration of transformers can result in oil leaks that lead to a spill response and environmental clean-up.[4] The Company completes regular inspections of distribution transformers to identify severe rusting which ensures they are identified in time to be replaced before they begin to fail and result in environmental damage.

f) The anticipated timeframe between ordering distribution transformers and receipt from suppliers is currently six months for pole-top transformers and six months or greater for padmount transformers.

[4] See Newfoundland Power's *2024 Capital Budget Application, Schedule B,* page 44.