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March 21, 2022

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: Application for Approval of Roof Replacement for Makkovik Diesel Generating Station

Please find enclosed Newfoundland and Labrador Hydro's ("Hydro") application for approval to replace the roof on the Makkovik Diesel Generating Station. This project is required to support the safe and reliable operation of the facility. The estimated cost of this project is \$634,000.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Shirley A. Walsh
Senior Legal Counsel, Regulatory
SAW/sk

Encl.

ecc:

Board of Commissioners of Public Utilities

Jacqui H. Glynn
PUB Official Email

Consumer Advocate

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Application for Approval of Roof Replacement for Makkovik Diesel Generating Station

March 21, 2022



An application to the Board of Commissioners of Public Utilities

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

IN THE MATTER OF an application by Newfoundland and Labrador Hydro (“Hydro”) for approval of roof replacement for the Makkovik Diesel Generating Station pursuant to s 41(3) of the *Act*.

To: The Board of Commissioners of Public Utilities (“Board”)

THE APPLICATION OF NEWFOUNDLAND AND LABRADOR HYDRO STATES THAT:

A. Background

1. Hydro is a corporation continued and existing under the *Hydro Corporation Act, 2007*, is a public utility within the meaning of the *Act*, and is subject to the provisions of the *EPCA*.
2. Hydro has 23 diesel generating stations, 18 of which are prime power stations, which are not interconnected to the grid. These serve as the primary source of capacity and energy for isolated systems. The 18 prime power stations serve approximately 4,400 customers.
3. The Makkovik Diesel Generating Station was commissioned in 1980 and contains three units with a total capacity of 2,075 kW serving approximately 230 customers. The building is a steel-frame structure clad with metal roof and siding, which is original to the building.

B. Application

4. In 2020, the facility underwent a significant upgrade to extend the engine hall to house a new, larger generator; however, the portion of the original roof over the main engine hall, storage room, and porch area remained. That portion is now 42 years old and, although annual repairs have been made to prevent leaks, the roof has deteriorated to the point that it requires intervention.

5. On August 15, 2021, during a heavy rain event, water from a roof leak pooled in a manual pull station for the fire suppression system, short-circuiting the system causing the nitrogen-water mist system to discharge in the engine hall.
6. The original portion of the existing roof of the diesel generating station has exceeded its useful life and without intervention the risk of further water ingress remains high.
7. Due to long material lead times, Hydro would need to begin this project in 2022 in order to utilize the 2023 construction season to ensure the risk of further equipment damage is mitigated as soon as reasonably possible. Holding consideration of this project until the filing of Hydro's 2023 Capital Budget Application ("CBA") would delay replacement of the roof until 2024, which would present an unacceptable risk to reliability.
8. Hydro has been monitoring the condition of the Makkovik Diesel Generating Station roof and at the time of filing the 2022 CBA, Hydro believed that the degree of deterioration did not warrant replacement. As a result, Hydro did not propose the replacement in its 2022 CBA. However, the leak that occurred on August 15, 2021 indicated that the deterioration of the roof has advanced to the point that replacement is required as soon as possible which, as noted above, is 2023.
9. The supplemental report, attached as Schedule 1, describes the alternatives Hydro considered to address deterioration of the Makkovik Diesel Generating Station roof. In addition to the possibility of deferral, the alternatives considered include installation of a roof coating system and replacement of the roof. These options are evaluated in Schedule 1 to this application.
10. Hydro's conclusion, upon review of the options, is that the least-cost alternative to address the deterioration of the existing roof is replacement with a new standing seam metal roof over the main engine hall, the storage room at the rear of the facility, and the porch at the side of the facility. The storage room and porch may require some sheathing repair; however, this cannot be determined until shingles are removed. The estimated cost of the project is \$634,000.

C. Newfoundland and Labrador Hydro's Request

11. Hydro requests that the Board make an order pursuant to Section 41(3) of the *Act* approving the capital project to replace the Makkovik Diesel Generating Station roof to enable the continued supply of reliable service to Makkovik.

D. Communications

12. Communications with respect to this Application should be forwarded to Shirley A. Walsh, Senior Legal Counsel, Regulatory for Hydro.

DATED at St. John's in the Province of Newfoundland and Labrador this 21st day of March, 2022.

NEWFOUNDLAND AND LABRADOR HYDRO



Shirley A. Walsh
Counsel for the Applicant
Newfoundland and Labrador Hydro,
500 Columbus Drive, P.O. Box 12400
St. John's, NL A1B 4K7
Telephone: (709) 685-4973



Schedule 1

Makkovik Diesel Generating Station Roof Replacement Report



Makkovik Diesel Generating Station

Roof Replacement

March 21, 2022



A report to the Board of Commissioners of Public Utilities

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Appendix A: Photos

1 1.0 Introduction

2 Newfoundland and Labrador Hydro (“Hydro”) has 23 diesel generating stations, 18 of which are prime
3 power stations¹ serving approximately 4,400 customers. The Makkovik Diesel Generating Station, which
4 contains three units with a total capacity of 2,075 kW, is the sole source of generation for the
5 community of Makkovik and serves approximately 230 customers. The facility, built in 1980, is a steel-
6 frame structure, clad with metal roof and siding that is largely original to the original building footprint.

7 The Makkovik Diesel Generating Station has been in service for over 40 years and the original portion of
8 the building’s roof has exceeded its useful life. The facility is now experiencing water ingress during
9 inclement weather. Diesel generating stations house a significant amount of sensitive electrical
10 equipment that, if exposed to water, could be seriously damaged or operate inappropriately. For
11 example, on August 15, 2021, during a heavy rain event, the roof leaked and water pooled in a manual
12 pull station for the fire suppression system, short-circuiting the system. This caused the nitrogen-water
13 mist system to discharge in the engine hall. To prevent further leaks, which could cause additional
14 damage or inappropriate operation of sensitive equipment, Hydro proposes the replacement of the
15 original portion of the Makkovik Diesel Generating Station roof.

16 2.0 Background

17 2.1 Existing System

18 The Makkovik Diesel Generating Station was built in 1980. In 2020, the facility underwent a significant
19 upgrade to extend the engine hall to house a new, larger generator; however, a portion of the original
20 roof remains over the main engine hall, storage room, and porch area of the facility. This portion is now
21 42 years old. Photos of the existing roof are provided in Appendix A.

22 2.2 Operating Experience and Maintenance History

23 The condition of the Makkovik Diesel Generating Station roof has deteriorated to the point of requiring
24 replacement. Repairs have been made annually to stop and prevent leaks with little success. A coating
25 system was applied in 2010 in an attempt to prolong the life of the roof but it had minimal effect on
26 leaking. It is evident that the original portion of the existing roof is at end of life and repairs are no

¹Prime power stations are not interconnected to the grid and rely on the power supplied by the diesel generation units for capacity and energy.

1 longer feasible. A consultant was engaged in 2021 to assess the roof's condition and evaluate the viable
2 alternatives, which consist of refurbishment or replacement.

3 **3.0 Justification**

4 A secure building envelope is critical to ensuring the reliability of equipment. The existing roof is 42
5 years old and, based on persistent issues with water ingress, has reached its life expectancy. Routine
6 repair work has not been successful in preventing leaks, one of which recently caused damage to
7 sensitive electrical equipment. If the roof is not replaced, such issues are expected to continue to occur
8 and may cause outages to customers. As this generating station is the only source of supply for the
9 community, deferral of the roof replacement would present an unacceptable risk to customer reliability.

10 **4.0 Analysis**

11 **4.1 Identification of alternatives**

12 Hydro has identified the following alternatives:

- 13 • Alternative 1: Refurbish the existing roof and seal with a rubberized coating; and
- 14 • Alternative 2: Replace the existing roof with a new metal standing seam roof.

15 **4.2 Evaluation of Alternatives**

16 The current forecast in Makkovik predicts a moderate increase in load over the next 20 years.² Typical
17 roof repair and coating systems carry an anticipated service life of 10–15 years. Based on Hydro's
18 experience with coating systems and Makkovik's harsh northern climate, Hydro expects the useful life of
19 a roof coating system to be less than 10 years. Given the age of the roof, Hydro anticipates that the
20 application of the coating system will not provide a long-term life extension and will instead merely
21 serve to delay replacement of the roof system. Alternatively, a replacement roof has an expected life
22 span of 40 years.

23 Hydro completed a cost-benefit analysis to determine which of the two alternatives is the least cost over
24 a 40-year service life. The analysis considers roof replacement at the end of the coating systems service
25 life, assumed to be in year 15 of the analysis. Given the level of deterioration of the roof, further

² The diesel generating station is adequately sized after the most recent expansion project to serve the community of Makkovik for the foreseeable future.

1 recoating at that time is not considered a viable option. The roof replacement alternative was
2 determined to be the least-cost alternative, as shown in Table 1.

Table 1: Cost Benefit Analysis (\$)³

Alternative	Cumulative Net Present Value ("CPW")	CPW Difference between Alternative and the Least-Cost Alternative
Replace Metal Roofing System	602,137	-
Apply Roof Coating System	730,769	128,632

3 5.0 Project Description

4 This project will replace the 40-year old roof on the original section of the Makkovik Diesel Generating
5 Station. It includes the design, procurement, and installation of a new standing seam metal roof over the
6 main engine hall, the storage room at the rear of the building, and the porch at the side of the facility.
7 The storage room and porch may require some sheathing repair; however, this cannot be determined
8 until shingles are removed. Due to the nature of the work, it must take place during the summer months
9 with planned completion before winter 2023. Ongoing global supply chain delays prevent this work
10 scope from being completed sooner as steel roofing materials are not expected to arrive before winter
11 2022.

12 The project cost estimate and anticipated schedule are provided in Table 2 and Table 3, respectively.

Table 2: Project Estimate (\$000)⁴

Project Cost	2022	2023	Beyond	Total
Material Supply	0.0	0.0	0.0	0.0
Labour	90.2	130.0	0.0	220.2
Consultant	58.9	7.9	0.0	66.8
Contract Work	0.0	241.4	0.0	241.4
Other Direct Costs	2.9	8.4	0.0	11.3
Interest and Escalation	9.6	31.2	0.0	40.8
Contingency	15.2	38.8	0.0	54.0
Total	176.8	457.7	0.0	634.5

³ CPW to the year 2021.

⁴ Numbers may not add due to rounding.

Table 3: Project Schedule

Activity	Start Date	End Date
Planning:		
Open work order and plan and develop detailed schedules	April 2022	May 2022
Engineering:		
Complete site visit and design	June 2022	September 2022
Procurement:		
Procure required materials	April 2022	November 2022
Construction:		
Remove old roof and install new roof	July 2023	September 2023
Closeout:		
Close work order, complete all documentation, and complete lessons learned	September 2023	November 2023

1 6.0 Conclusion

2 Diesel generating stations house sensitive electrical equipment and require a weather-tight building
 3 envelope as leaks pose a significant risk to reliability of operations. The roof at the Makkovik Diesel
 4 Generating Station is at the end of useful life and requires replacement to prevent damage from roof
 5 leaks. As such, Hydro proposes replacement of the existing roof with a new standing seam metal roof
 6 with an expected life span of 40 years.

Appendix A

Photos



Figure 1: Curled and Cracked Shingles on Storage Room



Figure 2: Roof Area where Patching and Sealing has been Attempted.



Figure 3: Large Section of Roof with Rusted Panels - Patching/Sealing has been Attempted



Figure 4: Damage to Interior Insulation of the Building due to Roof Leaks



Figure 5: Roof Area where Daylight is Shining Through



Figure 6: Exhaust Fan Hood (which has been patched around), Fall Arrest System, and Ridge Vent. These Systems are No Longer Required and would be Removed, Reducing the Amount of Roof Penetrations



Affidavit

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

IN THE MATTER OF an application by Newfoundland and Labrador Hydro ("Hydro") for approval of roof replacement for the Makkovik Diesel Generating Station pursuant to s 41(3) of the Act.

AFFIDAVIT

I, Robert Collett, of St. John's in the Province of Newfoundland and Labrador, make oath and say as follows:

1. I am Vice President, Engineering and NL System Operator for Newfoundland and Labrador Hydro, the applicant named in the attached application.
2. I have read and understand the foregoing application.
3. To the best of my knowledge, information, and belief, all of the matters, facts, and things set out in this application are true.

SWORN at St. John's in the)
Province of Newfoundland and)
Labrador this 21st day of)
March, 2022, before me:)



Barrister – Newfoundland and Labrador



Robert Collett, P. Eng.