
Nova Scotia Utility and Review Board

IN THE MATTER OF

*The Maritime Link Act, S.N.S 2012 c.9
and the
Maritime Link Cost Recovery Process Regulation, N.S. Reg. 189/2012*

NSPML Quarterly Report Q3 2021

October 15, 2021

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1 **1.0 INTRODUCTION**

2
3 This is the Q3 2021 Quarterly Report for the Maritime Link as directed by the Utility
4 and Review Board (UARB) where the UARB ordered in its Supplemental Decision:

5
6 [115]....detailed reports must be filed by NSPML on a semi-
7 annual basis, on June 15 and December 15 each year. The reports
8 shall commence December 15, 2013. Updated status reports must
9 be filed quarterly.

10
11 As per the UARB’s order in its Decision regarding the Maritime Link Interim Cost
12 Assessment (M07718), this Report now includes detail regarding the status of the
13 construction of Nalcor’s assets.

14
15 This Decision also requested that the quarterly reports include an accounting of all
16 transactions related to this project, cash flow analysis, and a reporting of the financial
17 and other benefits realized for ratepayers from the Maritime Link prior to delivery of
18 the Nova Scotia Block and Nalcor market-priced energy. Given that the benefits to
19 ratepayers prior to the Nova Scotia Block and Nalcor market-priced energy are secured
20 by Nova Scotia Power through the Maritime Link, Nova Scotia Power will report on
21 these in its Quarterly Fuel Adjustment Mechanism Report.

1 **2.0 UPDATE OF PROJECT SCHEDULE**

2
3 The Maritime Link was placed in-service on January 15, 2018.

4
5 Detail respecting the status of the Nalcor Project and Muskrat Falls is outlined in
6 Section 2.9.

7
8 **2.1 Gates and Milestones**

9
10 The Maritime Link was placed in-service January 15, 2018.

11
12 **2.2 Safety**

13
14 Safety is a fundamental core value and integral part of every aspect of NSPML’s
15 business.

16
17 In accordance with its COVID-19 Pandemic response and safe return to normal
18 operations, NSPML continues to follow local epidemiology, best available pandemic
19 protocols and jurisdictional health guidance. Where conditions allow, internal
20 workers have been returning to the traditional workplaces in a phased manner and
21 will respond to any changes in local conditions. NSPML continues to be risk-
22 focused in the assessment of all work activities ensuring that all high-risk work is
23 reviewed and evaluated both before commencement of activities and through post-
24 completion evaluations.

25
26 There have been no recordable incidents to date in 2021.

27
28 **2.3 Commercial Activities**

29
30 The key major procurement activities are presented in Table 1 with an update of the
31 status for each initiative.

1 **Table 1 Key Major Procurement Activities**

2

Commercial Activity	Background	Initiative Number	Status in October 2021
HVDC Submarine Cable Supply and Installation	The Contract was awarded to Nexans in January 2014. Substantial Completion occurred in September, 2017. Contract Final Completion Certificate signed February 5, 2018.	E11-18	Closed
Converter stations, switchyards and related structures (“converters and structures”)	The Contract was awarded to ABB Inc. in June 2014. Final System Test Completed January 15, 2018. Substantial Completion achieved on January 15, 2018.	E12-74	Final Completion achieved; internal closeout process underway.
Right of Way Clearing along Transmission Lines	Contracts were awarded to Majors Logging Limited in NL and to R. MacLean Forestry in NS in February 2014.	E13-88	Closed
Transmission Structures and Grillages	The Contract was awarded to Kalpataru Power Transmission Ltd. in September 2014 for design and delivery of Structures and Grillages.	E13-85	Closed

Commercial Activity	Background	Initiative Number	Status in October 2021
Transmission Line Conductors	<p>The Contract for the supply of conductors was awarded to Midal Cables in March 2015.</p> <p>The contract for the supply of OPGW was awarded to Composite Power Group Inc. in June 2015. This is also within the scope of the E13-87 initiative.</p>	E13-87	<p>Closed</p> <p>Closed</p>
Horizontal Directional Drill (HDD) Construction Program	<p>Contract awarded to Directional Horizontal Drilling (DHD) in January 2016.</p> <p>E13-157 was divided into two contracts.</p> <p>E13-157 A was awarded to Schlumberger in March 2016 for the supply of HDD fluids. E13-157B was awarded to Baker Hughes in April 2016 for the Supply of directional drilling services, drill bits and other materials.</p> <p>E13-158 for marine intervention services was awarded in April 2016 to DOF Marine.</p> <p>The supply of the HDD casing (E15-238) was awarded to East Coast Tubulars Limited in October</p>	<p>E13-156</p> <p>E13-157</p> <p>E13-158</p> <p>E15-238</p>	<p>Closed</p> <p>Closed</p> <p>Closed</p> <p>Closed</p>

Commercial Activity	Background	Initiative Number	Status in October 2021
	2015.		
Accommodations Operations	The contract for the accommodations operations services was awarded to East Coast Catering in April 2015.	E13-89	Closed

1
2 Note that the internal closeout process regarding the contracts noted above is expected to be
3 complete in 2021. The outstanding components of the closeout process relate strictly to
4 internal administrative matters and are not associated with determination of final cost of the
5 Project.

1 **2.3.1 Land Access Agreements**

2
3 The majority of land rights are now in place, and NSPML is in the final stages of
4 securing any outstanding rights; moving to expropriation for 54 parcels of land as
5 required where agreement could not be reached, landowners could not be found, or
6 title to a land parcel was imperfect. These easements do not impact the ability of the
7 project to complete contract closeouts or to operate according to plan.

8
9 **2.3.2 Funding**

10
11 The IE Certificates allow for Project costs to be paid from the proceeds of the
12 Maritime Link Construction Loan under the payment terms of the Material Project
13 Documents and the Maritime Link Credit Agreement. The final draw against the \$1.3
14 billion was requested in February 2020.

15
16 **2.3.3 Joint Development Agreements**

17
18 NSPML continues to work with Nalcor and NS Power to finalize the remaining
19 operational agreements arising from the Formal Agreements with Nalcor. Please refer
20 to Attachment 1 for details on the status of these Agreements, which indicate three
21 Agreements remain to be concluded.

1 **2.4 Engineering Activities**

2

3 Engineering is captured in three main categories across several Work Breakdown
4 Structures (“WBSs”):

5

6 • HVDC Submarine Cable Supply and Installation - Completed.

7

8 • HVDC Converters and Substations – Completed.

9

10 • Overland Transmission – All project as-builts completed.

11

12 **2.5 Submarine Cables**

13

14 The 2021 marine survey has been awarded and is scheduled to commence in Q4.

15

16 Discussions continue regarding a Contingency Services Agreement to support the
17 broader Cable Inspection, Maintenance and Repair framework.

18

19 **2.6 Converters and Substations**

20

21 The Construction of the Converters and Substations was completed with the
22 conclusion of system testing and the Maritime Link placed in-service on January 15,
23 2018 and all punch list items are completed.

24

25 **2.7 Transmission Lines**

26

27 The overhead transmission system continues to perform well into the fourth year of
28 operations with no significant reliability or downtime impacts experienced.

29

30 The replacement of dampers is complete, and all other required corrective work on the
31 Transmission lines has been completed.

1 NSPML continues to pursue claims for transmission repair work under the project
2 insurance. NSPML is also actively engaged in discussions with the relevant third
3 parties to resolve any uninsured costs for matters falling within those parties' warranty
4 obligations.

5

6 **2.8 Independent Engineer**

7

8 NSPML remains engaged with the Independent Engineer (IE) related to the Operations
9 phase of the Maritime Link, as per the Federal Loan Guarantee requirements.

10

11 Due to the pandemic, there have been no site visits by the Independent Engineer in
12 2020 or year-to-date in 2021. Please see Attachment 2 for the Independent Engineer's
13 Annual Report

14

15 **2.9 Status of Nalcor Project and Muskrat Falls**

16

17 **Muskrat Falls Assets**

18

19 Units 1-3 have been handed over to the Operations team. Generally, two of the three
20 units have been active and contributing to power flows since being turned over to
21 operations while Nalcor and their contractors complete punch list and identified
22 corrective work to the offline unit. Recently, Unit 2 was taken offline due to some
23 identified vibrations; however, the vendor has cleared it to resume operations
24 following some corrective work.

25

26 The fourth and final unit (Unit 4) is currently set for release to Operations by early
27 November 2021 with plans for first power in the coming weeks.

28

29 **Synchronous Condensers at Soldiers Pond**

30

31 Two of the three synchronous condensers are now complete, with the third expected to
32 be completed by the end of October 2021. The Synchronous Condensers are not on the

1 critical path for project completion; they are relevant for system stability purposes as
2 they eliminate the need for Newfoundland and Labrador Hydro to use the Holyrood
3 Generating Units for equivalent system stability reasons through the lower power
4 demand months in the summer.

5
6 **Labrador Island Link**

7
8 The interim software was released from trial-operations in the spring after
9 demonstrating stable operations at lower power levels of below 225MW.

10
11 GE started Factory Acceptance Testing (FAT) of the final software on September 13,
12 2021. The results indicated that GE's software contained bugs requiring resolution,
13 which GE is currently working to resolve. Regression testing and a further round of
14 FAT will then be required before the software can be accepted. GE is working to
15 complete the second FAT in November 2021. Nalcor now anticipates dynamic
16 commissioning in early December and will further update the schedule upon receipt of
17 GE's revised timing.

18
19 Nalcor has successfully replaced all of the faulty valve hall beams that had caused
20 flash-over issues the prior year, representing a positive resolution to a significant issue.

21
22 Nalcor has completed transmission line repair and hardening work identified during
23 heavy winter conditions last year in Labrador. Subsequently GE has successfully
24 completed their HVDC line fault testing program.

25
26 The Labrador Island Link capacity has recently been increased to 315MW with plans
27 and implementation ongoing amongst system operators to achieve the next level of
28 approximately 400MW. The increase to 315MW allowed for calibration work to be
29 completed and is another positive step towards completion.

30
31 On August 15, 2021, Nalcor's contractual commitment to deliver the NS Block
32 formally commenced pursuant to an Acceleration Agreement secured by NSPML.

1
2
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9
10

NSPML and Nalcor meet routinely to discuss completion schedules and coordinate the initiation of energy transfers across the Labrador Island Link and Maritime Link as generation is commissioned.

2.10 Status of Benefits to NS Power Customers

Customer benefits received to date are being reported by NS Power with its Quarterly Fuel Adjustment Mechanism Report.

1 **3.0 UPDATED COST SUMMARY**

2

3 As per Enerco U-31, section 6, the details below outline the DG3 forecasted costs.

4

5 Table 2 provides an updated cost summary for the Maritime Link, which includes
6 actual costs incurred as of June 30, 2021 and forecasted total costs for the remainder of
7 the Project's construction activities as detailed in the Maritime Link Project Capital
8 Cost Application filed in August 2021.

9

10 NSPML continues to track and report all costs, actual and forecast, consistent with the
11 methodologies used in the cost forecast represented in the Maritime Link Project
12 Application. Capitalized project costs include fully allocated costs for the entire
13 Project Management Team, including contractors, employees, executives dedicated to
14 the project, and NS Power seconded employees at rates in accordance with the
15 Affiliate Code of Conduct. All costs provided are in Canadian dollars.

16

17 Actual AFUDC has been tracked and recorded monthly up to December 31, 2017 and
18 totaled approximately \$209 million, which is below the \$230 million amount
19 originally estimated.

1 **Table 2 Updated Cost Summary for the Maritime Link Project**

2

Description	Actual Costs								Estimate to Completion	Total Project Estimate at Completion (A)
	2011-2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Total Project to Date		
Emera NL Project Management Costs	192,250	940	794	531	319	966	657	196,457	6,846	203,302
Nalcor Project Support Costs	16,214	-	-	-	-	-	-	16,214	2	16,216
Construction and Engineering Initiatives	1,345,574	(108)	1,225	2,304	525	2,361	950	1,352,831	(1,119)	1,351,712
Environmental Approval	18,397	-	19	-	-	-	-	18,416	1	18,417
Submarine and related	343,726	(648)	363	8	-	-	-	343,449	2	343,451
Converters, structures, and other ancillary equipment	548,260	50	35	63	73	64	13	548,558	1,520	550,078
AC and DC Transmission	435,191	490	808	2,233	452	2,297	937	442,408	(2,642)	439,766
Total	1,554,038	832	2,019	2,835	844	3,327	1,607	1,565,502	5,729	1,571,230
Contingency										
Escalation									6,124	6,124
Grand Total	1,554,038	832	2,019	2,835	844	3,327	1,607	1,565,502	11,853	1,577,354

3

4

5 Note: Total forecast for Project completion is expected to total \$1.5712B as outlined in
 6 the Maritime Link Final Capital Cost Application. Recovery of costs from third parties
 7 continue to be advanced and will be reported once finalized.

8

9 As has been reflected in Table 2, the contingency reserve has been fully utilized. The
 10 remaining escalation reserve is being used to fund remaining contingency draws.

1 **Total Actual Project Costs at end of Q2 2021 Compared to Previous Forecast**

2
3 The total actual project capital costs incurred during Q2 2021 of \$1,607,000 are
4 detailed below:

- 5
- 6 • Emera NL Project Management Costs of \$657,000: Project management costs
7 continue to be incurred as work advances relating to procuring and managing
8 corrective activities, and ensuring appropriate documentation is in place for
9 project closeout and regulatory purposes. NSPML has segregated these capital
10 costs from costs relating to operating and maintenance activities and have
11 expensed such operating and maintenance costs accordingly.

 - 12
 - 13 • Converters, structures, and other ancillary equipment of \$13,000: This reflects
14 the cost of NL Hydro and NS Power system upgrades and modifications, as
15 well as the procurement of material spares in both provinces.

 - 16
 - 17 • AC and DC Transmission of \$937,000: This reflects corrective transmission
18 activities.

19

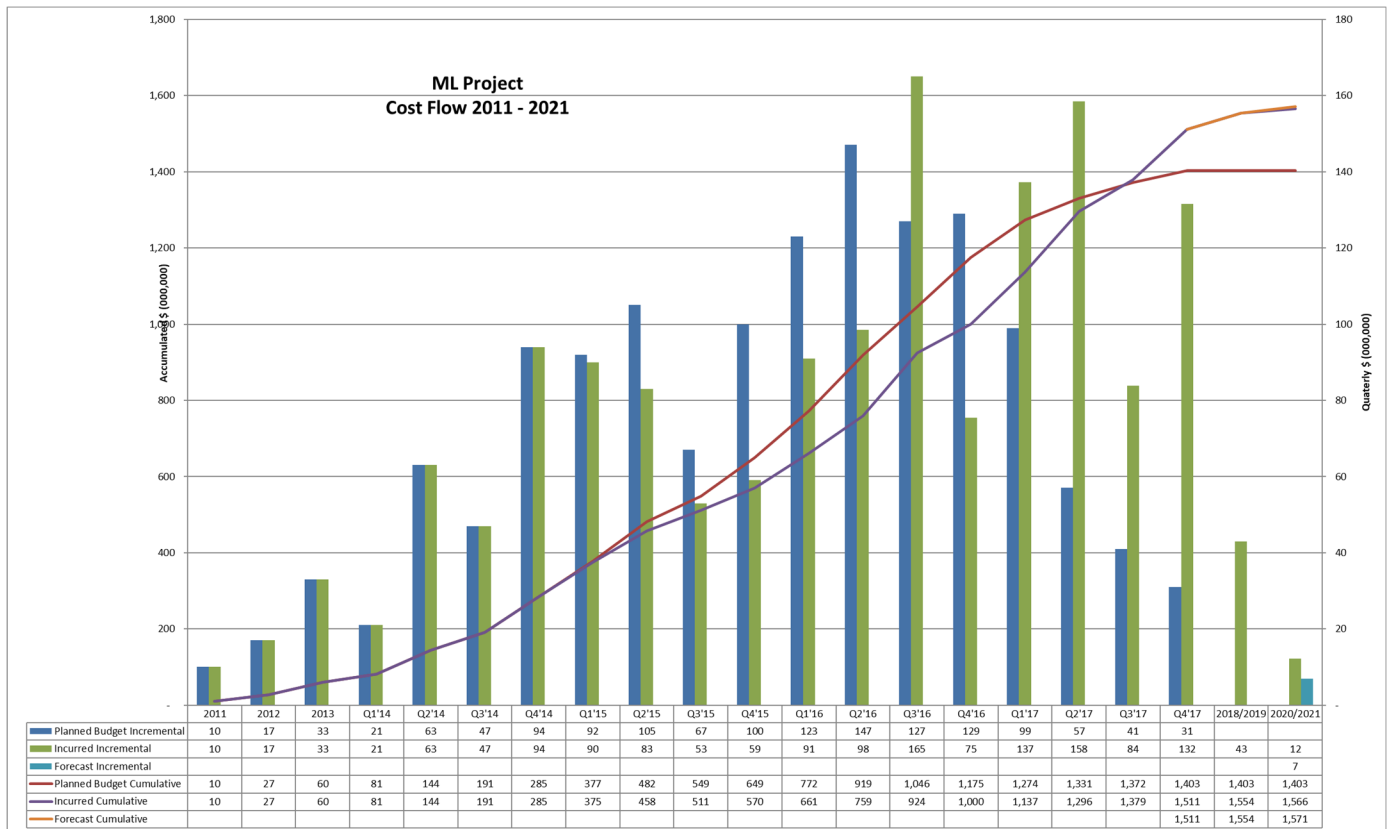
20 The Project capital cost remains within budget.

4.0 COST FLOW

As per Enerco U-31, section 2.2, please refer to Table 3 below for the cost flow of the Maritime Link. This cost flow report for the base capital spending is forecast at \$1.571 billion. While unlikely, additional contingency draws may be required depending on the timing and outcome of potential recovery of costs from third parties as noted in Section 3.0. This is not expected to impact the final cost forecast of \$1.571 billion.

The remaining budget primarily relates to the regulatory requirements relating to the construction aspect of the project and project close-out activities.

Table 3 Maritime Link Cost Flow



1 **5.0 INTERIM ASSESSMENT FINANCIAL UPDATE 2021**

2

3

With the Maritime Link placed in-service on January 15, 2018, NSPML continues to receive monthly cost recovery revenues from NS Power pursuant to the Board's orders. NSPML forecasts its 2021 operating and maintenance, debt and equity financing costs to be within the amounts budgeted for the year.

4

5

6

Operating Agreement Requirements Arising from the Formal Agreements

	Agreement	Parties	Description	Formal Agreement Source	Status
1.	Asset Interconnection Agreement (NL)	Emera, NLH	Interconnection of ML with the Island Interconnected System	ML-JDA, s. 2.1 (c)	Completed
2.	Multi-Party Pooling Agreement	Emera, NLH	NLH (SO) to have operational control of ML NLH AC Upgrades	ML-JDA, s. 2.1 (d)	Completed
3.	Transmission Operating Agreement (NL)	Emera, NLH	NLH (SO) to have operational control of ML NL HVdc Facilities	ML-JDA, s. 2.1 (e)	Completed
4.	Asset Interconnection Agreement (NS)	Emera, NSPI	Interconnection of ML with NS bulk electric transmission system	ML-JDA, s. 2.1 (f)(i)	Completed
5.	Transmission Operating Agreement (NS)	Emera, NSPI	NS SO to have general operational control of the ML	ML-JDA, s. 2.1 (f)(ii)	Completed
6.	ECA – Metering and Measuring Standards – Transmission Losses	NSPML, Nalcor	Metering and measuring standards used in the calculation of Transmission Losses	ECA, Schedule 3, s. 5	Completed
7.	Regulation Service Agreement	NS Power NLH	Nalcor’s provision of the Regulation Service with respect to the Nova Scotia Block for the Initial Term	ECA, Schedule 5	Expect completion in 2022.
8.	Metering and Measuring Standards – NS NTQ transmission losses	NSPML, Nalcor	Metering and measuring standards used in calculation of NS –NTQ Path Peak and Off-Peak Hour transmission losses	NSTUA, Schedule 3, s. 6	Completed
9.	NB Back-up Capacity Agreement	Bayside Power L.P, Nalcor	Emera’s provision of backup Capacity to NB to Nalcor until March 31, 2021	NBTUA, s. 2.1(d)	No longer required given sale of Bayside to NB Power.
10.	IOA – ML Transmission Procedures	NSPI, NLH	Rules and practices applicable to administration of transmission service over the ML	IOA, Schedule D	Completed
11.	IOA – Reserve Sharing	NSPI, NLH	Sharing of energy and reserves between the Parties to improve Reliability	IOA, Schedule A	Completed
12.	IOA – Description of Interconnection Facilities	NSPI, NLH	Description of Interconnection Facilities for which each Party is responsible	IOA, Schedule B	Completed
13.	IOA – Functional Operating Relationship	NSPI, NLH	Various matters relating to operating relationship	IOA, Schedule C	Completed

14.	IOA – Operating Procedures	NSPI, NLH	IOC to develop “operating procedures”	IOA s.7.2 and s. 7.4(a)	Completed
15.	IOA – Schedule A1.0	NSPI, NLH	Parties to prepare a plan for NLH participation in Reliability Assessment Program (“RAP”)	IOA Schedule A1.0	Completed
16.	ML TSA – ML Scheduling Process	Emera and Nalcor	Scheduling process applicable to the provision of Firm Point-to-Point Transmission Service	MLTSAs, Schedule 2	Completed
17.	Amendments to Formal Agreements	Emera, Nalcor	Amendments to Formal Agreements required by Sanction Agreement	Sanction Agreement	Completed
18.	Energy Access Agreement	Emera, Nalcor	Commitments regarding access to market priced energy	Compliance Filing, Appendix A	Completed
19.	Balancing Service Agreement	Emera, Nalcor	Nalcor commitment to provide balancing services from generation sources in NL for 25 years.	Energy Access Agreement Term Sheet, s. 7(g) and Appendix 1	Completed
20.	Assignment of Transmission Rights under ML(E)TSA	Emera, Nalcor	Assignment of Transmission Rights	ML(E)TSA, s. 3.3 (h)	Completed
21.	Assignment of Energy Access Agreement	Emera, Nalcor, NSPI and Nalcor Energy Marketing (NEM)	Assignment/assumption of Nalcor’s rights and obligations to/by NEM	EAA s. 15.1 (a)	At Nalcor’s discretion. Not a requirement of NSPML.
22.	Assignment of Nalcor Master Agreement (EAA Schedule 2)	Nalcor, NSPI and NEM	Assignment/assumption of Nalcor’s rights and obligations to/by NEM	Nalcor Master Agreement s. 10.5 (a)	At Nalcor’s discretion. Not a requirement of NSPML.
23.	JOA-Joint Operating Committee (“JOC”)	Nalcor and NSPML	Establish/Operationalize JOC	JOA s. 3.1, 3.5	Completed
24.	NS Transmission Utilization Agreement	Nalcor and Emera	Status of Emera firm Point to Point Transmission Service	NSTUA s.s.2.2 (a)-(c)	Completed

MARITIME LINK: 2020 ANNUAL O&M REPORT

Prepared for: Natural Resources Canada and EMERA

IE Team Lead: Nik Argirov

Date: June 30, 2021.

Quality Assurance Statement

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1. GENERAL

Contractor: Argirov Engineering Inc.

Company: NSP Maritime Link (EMERA)

Annual Report Purpose:

Contractor is tasked to confirm that the budgeting and maintenance of the Maritime Link Project is being conducted in accordance with Good Utility Practice.

Limitations and Exclusions:

For purposes of this Report the Contractor relied solely on the verbal and written information provided by the Company. Equipment inspections and the maintenance activities were not witnessed in person. COVID-19 pandemic travel restrictions precluded any site visit during the Report period. Individual Work Orders and records of the work done were not reviewed by the Contractor.

2. SCOPE OF THE REPORT

- (a) A summary of any material routine and unscheduled maintenance which has been carried out since the last report as well as an updated review of expected major maintenance requirements, timing, and milestones
- (b) A breakdown of costs incurred during the year covered by the applicable annual report with respect to operations and maintenance (O&M) including any variance from annual O&M budgets and a summary of any updates of O&M budgets
- (c) A summary of any staffing, training, or labor management issues
- (d) A list of changes to key personnel and the qualifications of new key personnel if any
- (e) Commentary on parts inventory and redundancy
- (f) A review of construction contractors' support and the ongoing management of post-completion technical risks
- (g) Ongoing compliance with major permits, and
- (h) A review of the state of repair of key equipment and facilities

3. DATA SOURCES

- [1] Maritime Link Operations 2020 Annual Operation & Maintenance Report Doc. No. D-000ED-0-950-05-050 dated March 31, 2021
- [2] Maritime Link Operations Annual Maintenance Plan – 2020, EMERA Doc. No. D-000ED-0-950-03-056 dated Aug 30, 2019
- [3] Maritime Link IE Update 2020 Year End Review dated May 25, 2021
- [4] Maritime Link IE Update 2020 Additional Material, Bipole Forced Outage- Update dated May 25, 2021
- [5] Maritime Link IE Update 2020 Fall Update dated Nov 3, 2020
- [6] Maritime Link Operations Pole 2 Emergency Door Open Trip- March 4, 2020, dated March 15, 2021
- [7] Annual O&M Budget for 2020 in Accordance with Article 11.5 of the ML Credit Agreement
- [8] Maritime Link IE Update 2021 Winter Update dated Feb 17, 2021
- [9] Schedule “J” Operating Report dated May 28, 2020

4. O&M DOCUMENTS AND INITIATIVES

4.1 ML 2020 ANNUAL O&M REPORT (REF. [1])

4.1.1 Introduction

The Maritime Link is owned and operated by NSP Maritime Link Inc. (NSPML), a wholly owned subsidiary of EMERA Newfoundland & Labrador (ENL) Holdings Incorporated.

Commercial operation of the Maritime Link commenced on January 15, 2018. Resource development and competency training for Operations staff is ongoing, including for new staff. In addition to Operation and Maintenance, Project close-out activities also took place during 2020.

Objective of the IE review and of this report, is to ascertain the assets are maintained in accordance with Good Utility Practice.

4.1.2 Safety

In 2020 NSPML achieved an Occupational Health and Safety Association Incident Rate (OHS-IR) of zero and a Proactive Rate (PAIR) greater than the target of 750.

NSPML implemented the first stages of COVID-19 response on March 17, 2020, resulting in new pandemic protocols and procedures being adopted for the converter station sites. Specific requirements have been put in place at all Maritime Link sites to minimize infection risk.

NSPML has continued to focus on risk assessment through a monthly Field Level Risk Assessment (FLRA) review at the team safety meeting. Recognition of excellent performance as well as identification of areas for improvement are regularly identified.

4.1.3 Environment

In comparison to previous years NSPML's overall environmental performance continues to strengthen in 2020. All environmental objectives and targets were achieved resulting in no moderate or significant environmental incidents and 3 minor environmental incidents (70% reduction) recorded in 2020. Furthermore, 65 proactive environmental reports were created in 2020 (58% increase over 2019).

Fisheries and Oceans (DFO) released NSPML's Letter of Credit associated with the Canadian Fisheries Act s.35 permit this year.

4.1.4 Performance

Availability and Reliability:

Overall, 2020 was a strong year for Maritime Link Availability with only three recordable forced outage events. Less than 1.0% of total unavailability was caused by forced outages, with the balance primarily attributable to HVDC System maintenance, Transmission Line conductor OPGW reconfiguration and conductor repair. These planned outages do

not reflect on ABB's Initial Availability Warranty Period; therefore, they have been tabulated in separate columns below. ABB achieved the Initial Availability Warranty for 2020 with an Energy Availability of 98.81%.

CIGRE TB590 Dashboard:

	Q1	Q2	Q3	Q4	Q4 (ABB)	Initial Period Guarantee
%FEU	0.01%	0.01%	0.33%	0.61%	0.00%	N/A
%SEU	0.0%	0.15%	1.62%	2.12%	1.19%	≤1.25%
%EA	99.99%	99.84%	98.05%	97.27%	98.81%	≥98%
BFO	0	0	0	0	0	=0

Legend:

FEU Forced Energy Unavailability
 SEU Scheduled Energy Unavailability
 EA Energy Availability
 BFO Bipole Forced Outage

Temporary De-rating

System conditions at the 230kV bus in Bottom Brook NL caused by low short circuit levels required the NLSO temporarily de-rate the Maritime Link on two occasions in 2020. When NL transmission lines connecting to Bottom Brook Terminal Station 2 (BBKTS2) are out of service, de-rating is expected to occur on limited basis in the future. NSPML has convened a working group (NSPSO, NLSO, NSPML, ABB-Hitachi) with a mandate to develop measures to minimize the transmission line outages impact on the transfer capability and improve the link reliability. The assessment will continue in 2021. The outcome of this work will determine any modifications required or recommended across the system protection equipment or software, de-rating levels and frequencies, and/or any related procedural protocols.

Outage Events

The Maritime Link experienced one (1) recordable event causing unavailability during Q4, 2020. In total, 3 forced outages were experienced throughout 2020:

- P2 trip at Bottom Brook occurred when 125VDC was inadvertently lost during troubleshooting of a conductor ground. Outage cause was a human factor: Procedural and signage improvements are being implemented (ref. [6]).
- P2 outage was required at Woodbine to repair valve control electronics. Ongoing hardware issue was reported in 2019.
- Ice buildup on HVDC transmission line insulators resulted in flashover and P2 trip on ground fault at Woodbine. P2 was unavailable until the equipment was de-iced. Engineering solution to eliminate icing in problem areas is being contemplated.

Utilization

Utilization of the Maritime Link was lower in 2020 compared to 2019, with most transactions scheduled in the NS to NL direction and variable in magnitude for the first half of the year.

Losses

For 2020 the average posted Maritime Link Loss Factor was 4.75%. This is a decrease from the 2019 loss factor of 5.00%. The decrease is attributed to an increase in the overall magnitude of transactions.

Operational Exceedances

Operational exceedances are defined as deviations from designed maximum and minimum operating values for major apparatus such as the cables, transformers, or valve hall components. If unmitigated, exceeding the predefined parameters may result in performance deterioration or reduction of the equipment service life. No operational exceedances have occurred since the Maritime Link entered into commercial operation in January 2018.

4.1.5 Maintenance HighlightsHVDC Converter Stations

Pole 1 and Pole 2 planned HVDC System shutdown maintenance items were completed as planned. During the year 1820 Preventive Maintenance work orders were executed for the HVDC System. Cyber security requirements have been completed, as necessary.

HVAC Substations

All preventative maintenance work orders scheduled were completed prior to the end of December 2020.

Overhead Transmission and Grounding Lines

The planned vegetation management along the HVDC Transmission and Grounding lines was completed in Q3, 2020. 100% of the planned ground-based Transmission inspections planned for 2020 were completed. Transmission tower inspections and jumper replacements initiatives in 2020 resulted in:

- Relocation of several structures along TL269 near the Southwest Brook area
- 800 Overhead Shield Wire (OHSW) and Optical Ground Wire (OPGW) bonding jumpers were replaced in NL, 314 in NS
- 40 OHSW/OPGW clamps were replaced in NL
- All 27 OPGW splice boxes in NL and 14 in NS were inspected and tested
- Two OPGW splice boxes were replaced and lowered on structure 13 on the HVDC Transmission line in NL
- In NL, four sections of conductor were cut out to repair damage caused by loose vibration dampers. In addition, one damper and four insulators were replaced along the line
- Preparation of detailed design and material list for contingency plan for transmission structure replacements

Submarine and Land Cables

ENL continued to engage the Department of Fisheries and Oceans (DFO) and the groundfish industry representatives in NS and NL.

The Cable Integrity Risk Assessment (CIRA) indicates the Maritime Link remains well protected and aligned with industry best practice. Ice risk continues to be the governing external threat to the cables, with the primary source of this risk continuing to be sea-ice over the last kilometer approaching the HDD outlet at Point Aconi. As a result of the cables burial below 400 meters, risk from anchors and fishing gear is low and the overall return periods are within industry norms.

Survey of the Maritime Link cables was completed in December 2020. This survey inspected the 118km of cables (59km each cable) that was trenched by Nexans (OEM) in the deep-water sections in 2019. There are no concerning findings from the survey and depth of cover appears to have improved overall.

Forward Planning

- Replacement of the HVDC transmission line vibration dampers has been scheduled for Q1 2021.
- 500MW test of Maritime Link and associated performance measurements is expected to occur in Q3, 2021.

4.2 ML OPERATIONS ANNUAL MAINTENANCE PLAN (REF. [2])

The plan provided an overview of all the necessary elements required to carry out 2020 annual equipment maintenance in accordance with good utility practice.

The Plan anticipated that Maintenance activities will be completed by NSPML technical staff with the support of contractors as appropriate to the activity and task. For 2020 that included NSPML primary contractors; ABB (HVDC systems), Nexans (Subsea & Land Cables), Horizon Maritime (subsea cable inspection), the two provincial utilities NLH & NSPI (AC substations and related infrastructure), as well as other local suppliers to support transmission, grounding sites and other activities across the asset footprint.

Work management system Megamation generates detailed work plans and inspection and maintenance schedules with appropriate checklists.

4.3 MARITIME LINK IE UPDATE 2021 WINTER [8]**4.3.1 Marine 2020 Survey**

- Contract was executed in November 2020
- Partial survey amounting to approx. 59km on each cable was completed by using an ROV
- Maritime Link 1 (West cable) - little change was observed to freespans and exposures
- Maritime Link 2 (East cable) – number and length of exposures and length of freespans decreased significantly
- Fraying on cable's outer serving (polypropylene yarn) at some locations was identified; further evaluation is required.

4.3.2 ABB Long Term Service Agreement (LTSA) Agreement

- In December 2020, NSPML negotiated an Amendment to the LTSA commencing March 2021
- NSPML plans to progress towards contractual independence from the HVDC OEM for non-critical / non-specialized work as the equipment exits its warranty phase

4.4 MARITIME LINK IE UPDATE 2020 YEAR END REVIEW, MAY 25, 2021 [4]**4.4.1 Emergency Diesel Generators**

June 19, 2019, failure of the Emergency Diesel generator to pick up the station service load resulted in Bipole outage at BBR. Subsequent investigation found that BBR and WB generators did not have suitable current transformer arrangements and that those generators were placed into service without thorough commissioning and operational tests. Analysis of the outage generated four action items: (i) review of all applicable ABB commissioning documentation, (ii) inclusion of bi-annual operational tests in ML preventative maintenance plans, (iii) emergency generator protection study and (iv) the requirement to replace the generators' alternators. Installation is scheduled for July 2021.

4.4.2 Bottom Brook Minimum Short Circuit Study

Re: Section 4.1.4. Temporary De-rating; With 3 Bottom Brook AC lines in service, the system will tolerate loss of the 'strongest line' (N-1) without MW transfer limitation imposed on ML. For the N-1-1 contingency of losing one additional transmission line, power transfer will be limited to one monopole at reduced load. System Studies based on ABB Model Benchmarking established the limit for loss of either TL211 or TL233 to be ± 175 MW in monopole. For loss of TL269 the transfer limit is +250MW/ - 320MW in bipole. For 2 lines out of service there can be no MW transfer. Special Protections System (SPS) is currently being designed that will allow transfer of ± 175 MW in monopole (with only TL269 in service) or +250MW/ - 320MW in bipole (for only TL211 or TL233 in service).

4.4.3 Overhead Transmission Lines

HVDC Damper work is complete in both provinces. New work planning and tracking processes were also implemented starting in Q1, 2021.

Significant maintenance activities were executed in first 4 months of 2021 with the TL climbing level inspections completed for HVDC lines. Ground level inspections are complete for NS and underway for NL.

4.5 HUMAN RESOURCES AND ORGANIZATION [4]

- The Project Management team continues to focus on Regulatory, Finance, and Project Closeout activities
- Responsibility for Marine Key Initiatives is fully embedded in the Operations team consisting of three key groups; (i) Finance & Accounting, (ii) Compliance & Commercial Affairs (including Marine), and (iii) Asset Management (including Engineering)
- Technical positions have been filled for HVDC Operation Technologists, as well as HVDC Engineer for Woodbine and EIT in Halifax into 2021.
- There are a number of temporary resources including students in place to support the work.

5. ANNUAL BUDGET FOR 2020 [9]

Costs are shown in \$1,000's.

Breakdown	Operating Budget 2020	Commentary
Labour	3,000	
General Administration	2,540	Includes shared corporate services, rent, office and travel
Maintenance:		
- HVDC and transition sites	3,700	
- AC substation	540	
- Marine	3,670	
- Overhead transmission lines	1,120	
- Other	730	Maintenance activities including vehicles and grounds
Other	770	Includes Environmental Assessment and IE
Insurance	2,600	
Legal, regulatory & compliance	2,010	
Total O&M Budget	20,680	

6. CONCLUDING REMARKS

Suitable maintenance plans are in place or under development. Those plans will consist of an umbrella long term asset management plan as well as the equipment inventory, maintenance procedure documentation and work order systems. Such an approach is consistent with good utility practice.

For the time being the scheduled maintenance is carried out according to Original Equipment Manufacturer (O&M) manuals. Service Level Agreements are in place or are being finalized. This approach is deemed to be the most appropriate during the warranty periods and it is consistent with good utility practice.

Response to deficiencies and equipment failures has been timely and appropriate. Engineering solutions have been / are being explored to find optimal solutions to transmission line hardware problems. Solution to emergency diesel generator protection has been partially carried out; replacement of the generators' alternators is pending. Bottom Brook temporary derating for loss of transmission lines has been studied, the SPS implementation is pending.