

**Background Note – Muskrat Fall Project Overview
Department of Natural Resources**

Issue: To provide a Muskrat Falls Project Summary and Update

Background and Current Status:

Project Description

- The Muskrat Falls Project includes:
 - Muskrat Falls Hydroelectric Generating Facility – 824 megawatts (MW);
 - Labrador Transmission Assets (LTA) – two 250 km 315 kV HVac transmission lines from Muskrat Falls to Churchill Falls with a capacity of 900 MW; and
 - Labrador-Island Transmission Link (LIL) – between Muskrat Falls and Soldiers Pond (1,100 km ±350 kV 900 MW HVdc bi-pole transmission line).
- In conjunction with the Muskrat Falls Project, the 500 MW Maritime Link transmission link will enable export and import of electricity between the Island and Nova Scotia. This includes approximately 350 km of overland transmission line and two subsea cables spanning 170 km beneath the Cabot Strait between the island and Nova Scotia.
- In return for building the Maritime Link and providing Nalcor with transmission service on the Maritime Link and through the Maritimes, an affiliate of Emera Inc. will receive 20% of the energy from Muskrat Falls to supply the Nova Scotia electricity system. The Maritime Link will be owned and operated by NSP Maritime Link Inc., a wholly-owned subsidiary of Emera Newfoundland and Labrador. After 35 years, ownership transfers to Nalcor.

Muskrat Falls Project Cost and Progress (June 2017 Update)

- Muskrat Falls was originally projected to cost \$6.2 billion (\$7.4 billion including financing costs). On June 23, 2017, Nalcor revised the Muskrat Falls Project baseline information, indicating the project is now forecasted to cost \$10.1 billion (\$12.7 billion including financing costs). The breakdown is as follows:

	Sanction 2012 (Cost in \$ billions)	June 2017 (Cost in \$ billions)
Labrador Transmission Assets	\$0.7	\$0.9
Labrador Island Link	\$2.6	\$3.7
Muskrat Falls Generating Facility	\$2.9	\$5.5
Projected Cost	\$6.2	\$10.1
Financing and Other	\$1.2	\$2.6
Projected Cost with Financing	\$7.4	\$12.7

- As of the end of May 2017, \$6.853 billion was spent and \$8.105 billion is committed. Expenditures include: \$3.244 billion on the Muskrat Falls Generating Facility, \$0.8 billion on LTA and \$2.809 billion on LIL.
- Nalcor anticipates the LTA will be complete by the fall of 2017 and LIL will be complete mid-2018 compared to mid-2017 anticipated at sanction. As of May 2017, Muskrat Falls Generation was 66 percent completed; the LTA was 95 percent completed; and the LIL was 81 percent completed. Altogether, 75 percent of construction had been completed on the overall project. First power from the Muskrat Falls Generating Facility is now expected in the fall of 2019 compared to the fall of 2017 anticipated at sanction. Full power is expected mid-2020 compared to mid-2018 anticipated at sanction.

- Nalcor's June 2017 update advised that in 2021, electricity rates for Island domestic customers are forecasted to rise to 22.89 cents per kilowatt hour unless Government takes action to mitigate the rate increases. At sanction, rates were estimated to be 15.12 cents by 2021.
- Government has committed to offset electricity rate increases through the sale of excess power; has directed Nalcor CEO Stan Marshall to identify other opportunities to bring rates closer to those predicted at project sanction, and secured an additional \$2.9 billion federal loan guarantee.
- As of June 23, 2017, some key areas of progress with the Muskrat Falls Project include:
 - LTA – All transmission construction in Labrador nearing completion.
 - LIL – Completed marine cable installation, road construction, and access clearing.
 - Muskrat Falls Generation – Spillway operational, river diverted and cofferdam completed; North Spur stabilization work completed; 73 percent of required concrete in place; and the North Dam work has commenced.

Industrial and Employment Benefits of the Muskrat Falls Project

- During May 2017, 5,876 people were working on the Muskrat Falls Project. Of those:
 - 5,097 were residents of NL (87 percent of total persons employed).
 - 4,583 people were working directly in Labrador.
 - 1,068 people were Labrador residents (approximately 23 percent) of which, 426 self-identified as a member of a Labrador Aboriginal group (approximately 40 percent).
 - 634 women were working on all project components, comprising approximately 11 percent of the total workforce. Of these, 590 were NL residents.
- Muskrat Falls Project expenditures totaled more than \$166 million in May 2017, including more than \$48 million to NL businesses. In addition, from January 2013 to the end of the reporting period in May 2017, over \$2 billion had been spent with NL-based companies.

Project Oversight

- Several project oversight mechanisms are in place have to provide oversight of the project and meet the conditions for the federal loan guarantee. These include:
 - Independent Engineer – MHW Canada Inc. has been retained to ensure compliance with the terms of the federal loan guarantee.
 - Nalcor Oversight – In addition to its Board of Directors, Nalcor has established an internal audit committee and expanded the role of its external independent auditor.
 - NL Government Oversight – The NL Government established the Muskrat Falls Project Oversight Committee (MFOC) comprising senior officials from Natural Resources, Finance, Justice, Executive Council and chaired by the Clerk of the Executive Council. On April 10, 2017, the Provincial Government appointed four independent members. The Committee is supported by a working group representing expertise in the areas of law, engineering, project management, accounting and auditing. Quarterly updates have been provided to the public since July 2014.
- In December 2015, the Government of Newfoundland Labrador, through the MFOC, engaged Ernst & Young, LLP (EY) to conduct an independent review of the reasonableness of the MF Project cost and schedule forecast, the key associated risks and identification of opportunities for remediation or corrective action if necessary.
- EY's Interim Report was released on April 12, 2016, and concluded that the September 2015 Muskrat Falls Project forecast was not reasonable. Government intends to action all EY recommendations including strengthening project governance and expanding oversight. EY is continuing to work on its final report on the project cost and schedule.

Astaldi Canada Contract

- Astaldi Canada is responsible for the execution of the contract for the Muskrat Falls powerhouse, intake and spillway.
- In mid-2016 Nalcor Energy negotiated a bridge agreement with Astaldi laying out firm production targets, expectations of the contractor and financial incentives over several months to continue construction progress on the powerhouse and intake at Muskrat Falls until a final commercial agreement could be reached. This occurred in December 2016 and finalized performance-based agreements while settling all prior claims. This added \$270 million to the construction costs and it was also noted that Astaldi is performing above the 2017 plan.

Maritime Link

- On July 20, 2016, Emera announced it had replaced one of the Maritime Link's major contractors, Abengoa S.A. due to ongoing global creditor protection proceedings hampering Abengoa's ability to perform its work. The two contractors selected to replace Abengoa were the Emera subsidiary Emera Utility Services and Rokstad Power, headquartered in B.C.
- Nova Scotia Power Maritime Link Inc (NSPML) released its Quarterly Report for Q2 2017 on June 16, 2017. According to NSPML, the Maritime Link remains scheduled for energization in October 2017 and for commissioning by the end of Q4 2017. It's expected to be in-service by January 1, 2018.

North Spur

- There have been concerns raised by individuals and groups in and outside Labrador regarding the stability of the North Spur. Communities such as Happy Valley – Goose Bay and Mud Lake have also expressed concerns regarding emergency flood plans in the event of a dam breach.
- The North Spur has been studied by multiple geoscience and geotechnical engineers since 1965; and Nalcor and contractor SNC Lavelin (SNC) regularly review the related engineering work and engage third-party experts to complete the external validation. Extensive field investigations have also been completed to support the engineering design and validated through independent reviews. The design solution has been addressed in more than 30 engineering studies and the geotechnical conditions are well understood by Nalcor and its engineering consultants. In 2013, a design review was completed by three different external expert panels and the design has been further validated through independent reviews by MWH Canada (the project's independent engineer) as well as Hatch Ltd.
- The Muskrat Falls facility is being built to industry standards of dam safety and construction. It will be monitored to meet the Dam Safety Guidelines as outlined by the Canadian Dam Association (CDA) and includes daily, weekly and monthly inspections, as well as ongoing monitoring and analysis of instrumentation. There is also an established Dam Safety Program for the project developed by the SNC Engineering team which is active today. In February 2017, a dam safety audit of the Dam Safety Management Plan, which is in place at the Muskrat Falls Construction Site, was performed by Hatch Ltd. The results of the audit indicated that the dam safety management program at the site, which is in compliance with the CDA guiding principles, meets and exceeds industry best practices.

Mud Lake

- In May 2017, Mud Lake, Labrador, was flooded requiring residents to evacuate the community and with many blaming Nalcor for the incident. CBC News has reported that Halifax-based lawyer Ray Wagner met with Mud Lake residents in June to discuss a potential class action lawsuit against Nalcor. In July he stated he still has to draft a claim but expects to file it before the end of summer.

- In June, Government recruited an independent expert to lead the assessment of the cause of the flooding. Karl-Erich Lindenschmidt is an associate professor at the University of Saskatchewan's school of Environment and Sustainability and Global Institute for Water Security. In July, Government contracted the services of an engineering consultant to work with him. KGS Group - Consulting Engineers (KGS) is a Winnipeg-based company that specializes in hydroelectric and water resources. The terms of reference ask that they provide an explanation of why flooding occurred, what measures are needed to prevent future flooding and how residents can get advance warning if there is a problem. Traditional knowledge of residents will also be taken into account. The report is expected to be completed by September 2017.

Methylmercury

- Methylmercury concerns about the Muskrat Falls Project have been raised by various parties since the project was announced. The Federal//Provincial Joint Review Panel was created in 2011 to ensure that the Lower Churchill Project environmental assessment satisfied their respective legislative requirements. The panel recommended that, if the Project was approved, a regionally-integrated cumulative effects assessment be done as well as the establishment of protected areas. In March 2016, F/P experts and other consultants participated in a scientific workshop to examine the science surrounding the issue.
- The Nunatsiavut Government (NG) partnered with Harvard University (Dr. Elsie Sunderland) to do their own study whose conclusions suggested higher-than-expected levels in Lake Melville, before flooding. In April 2016 they released more information suggesting that methylmercury levels could rise significantly if only partial clearing took place. Dr. Sunderland attended the above noted workshop and was in contact with government officials, however, confusion arose when Harvard stated "that's not the sort of work that Prof. Sunderland does or would do". The Minister of Environment and Climate Change reached out to Harvard to seek clarification regarding their stance on Dr. Sunderland's current and future research on methylmercury.
- In November 2015, the NG started the "Make Muskrat Right" campaign asking the province, among other things, to commit to full reservoir clearing. Since then numerous protests have taken place. In October 2016 the Premier met with Indigenous leaders resulting in an agreement for further independent assessment by establishing an Independent Expert Advisory Committee. Government created the methylmercury Monitoring Plan while Nalcor drafted the methylmercury Environmental Effects Monitoring Plan to create baselines for monitoring and mitigation.

Prepared/Approved by:
Ministerial Approval:

R. Montague/C. Snook/J. Cowan
Received from Hon. Siobhan Coady

A handwritten signature in blue ink, possibly reading 'cd', is written below the date '7/27/17'. The date is also handwritten in blue ink.

July 27, 2017