



# Muskrat Falls Project Oversight Committee

Quarterly Project Update

Period Ending December 31, 2018

March 15, 2019

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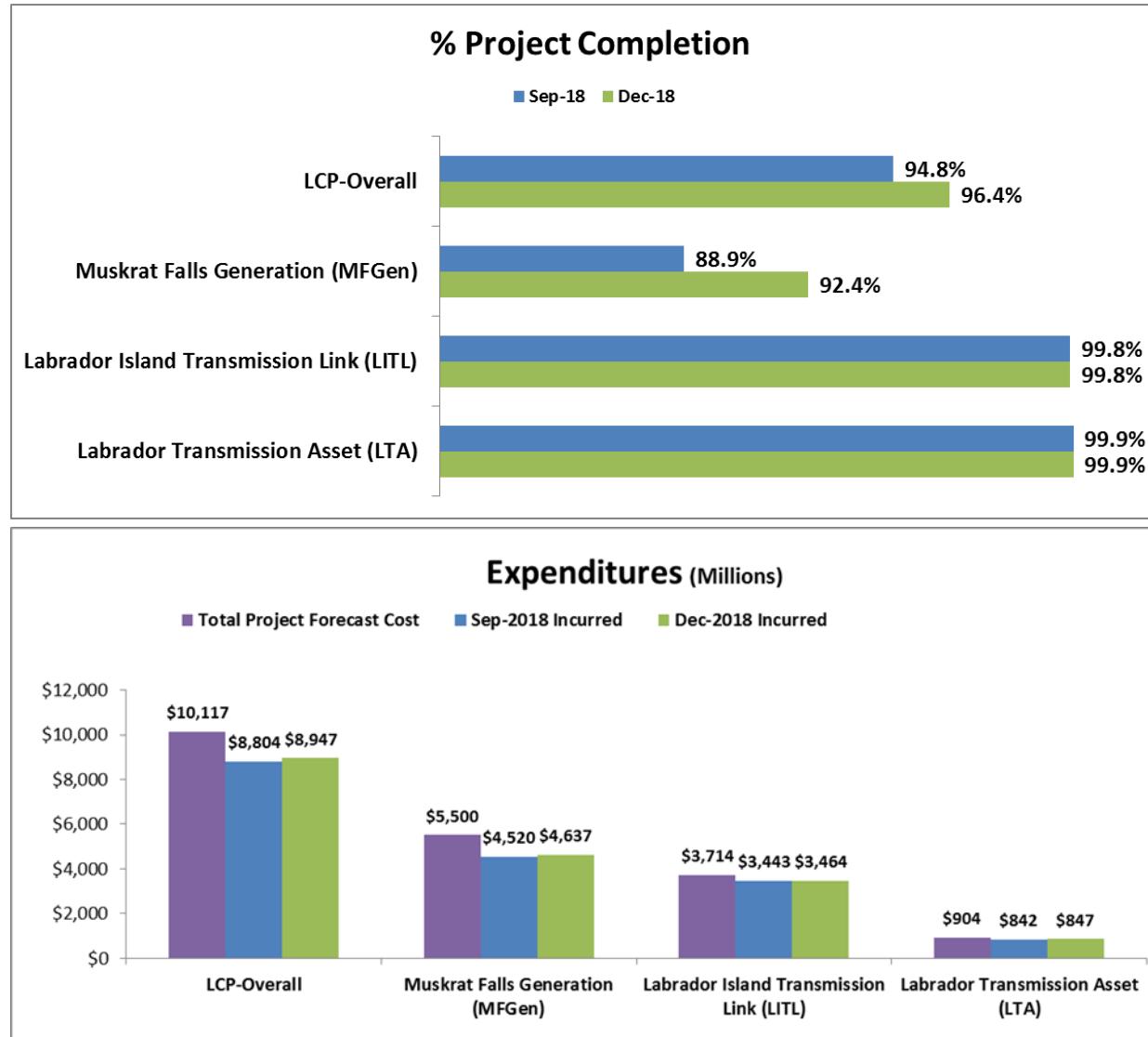
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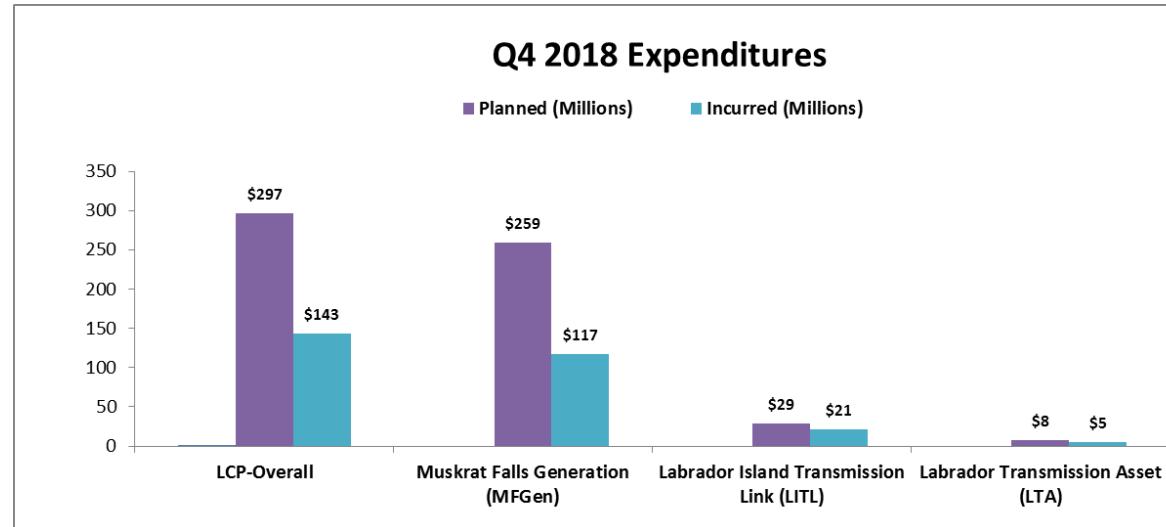
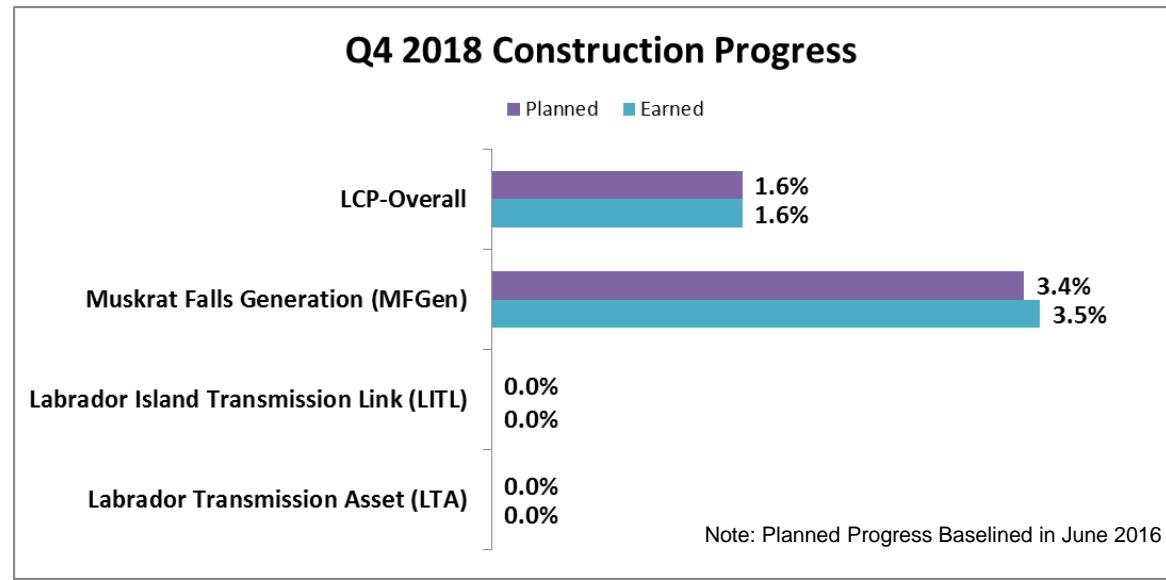
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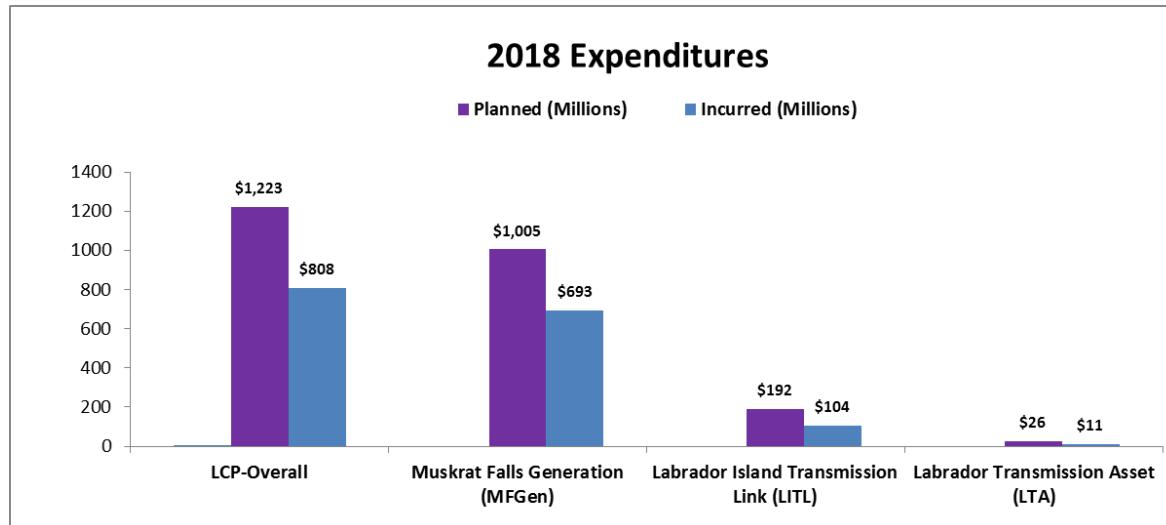
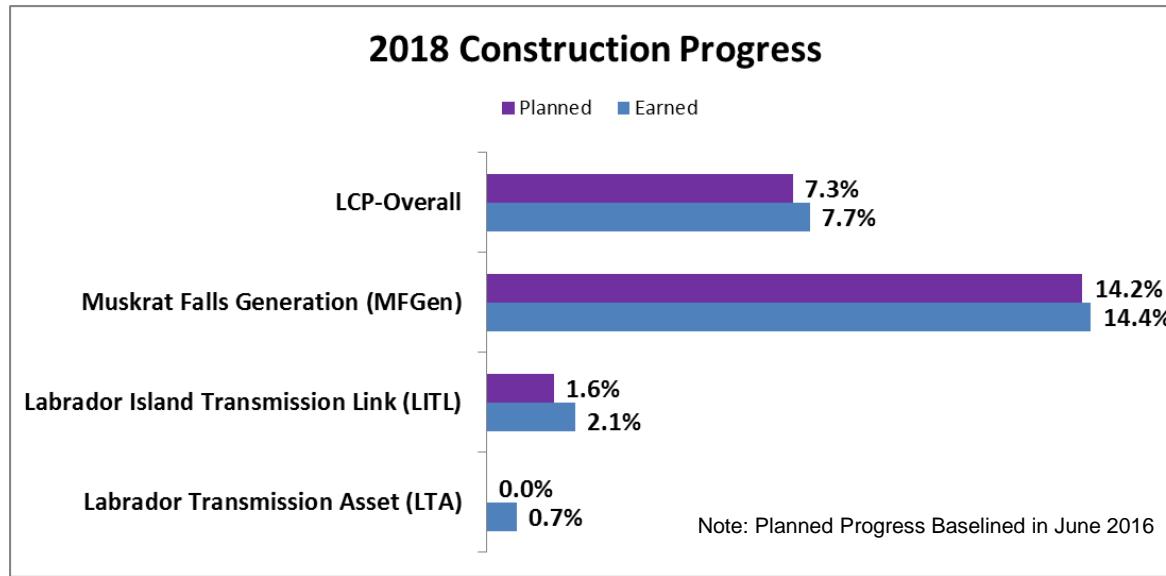
# 1. Q4 2018 Cumulative Project Progress



## 2. Q4 2018 Performance Summary



### 3. 2018 Performance Summary



## 2. 2018 Performance Summary - Power Development

Activity	Status
Powerhouse and Intake <ul style="list-style-type: none"> <li>• Turbine and Generator (T&amp;G) embedment phase</li> <li>• All mass concrete placed</li> <li>• Unit 1 T&amp;G assembly and installation commenced</li> <li>• Balance of Plant installation</li> <li>• Intake gates – Units 1 and 2 installed</li> <li>• Powerhouse</li> </ul>	Complete <sup>1</sup> Complete <sup>1</sup> 50% complete - commissioning ongoing 85 % complete 90% construction complete
Tailrace	Five transformers installed in tail race deck - Tailrace channel excavated and watered up
North Dam	Concrete placement program finished and North Dam 99% complete
Spillway/Gates	Rollways installed in 2 of 5 spillway bays 91 % construction complete
Impoundment	Expedited work ongoing for water tight Intake in Q1 2019 and spillway readiness in Q2 2019

- The project remains on budget and on schedule with the June 2017 budget.

<sup>1</sup>Construction Complete with commissioning and energization pending where applicable

## 2. 2018 Performance Summary - Power Supply

Activity	Status
Straight of Belle Isle (SOBI)	Complete <sup>1</sup>
Labrador Transmission Asset (LTA)	Complete <sup>1</sup>
Labrador – Island Transmission Link (LITL) Overhead Transmission Line	Complete <sup>1</sup>
HVdc Specialties <ul style="list-style-type: none"><li>Winter power transfer on a daily basis commenced in December 2018</li></ul>	Commissioning and energization ongoing

- The project remains on budget and on schedule with the June 2017 budget.

<sup>1</sup>Construction Complete with commissioning and energization pending where applicable



## 3.0 Oversight Committee Reporting

- 3.1 Overview
- 3.2 Committee Activities
- 3.3 Independent Engineer Activities
- 3.4 Risks and Issues Being Monitored by the Committee
- 3.5 Power Supply Project Milestone Schedule
- 3.6 Subsequent Events to Q4

## 3.1 Overview

- The Oversight Committee (Committee) receives details on project costs incurred, schedule progress, changes in costs and milestone schedule and the status of construction, manufacturing and installation contracts.
- The Committee identifies risks and issues and follows up with Nalcor to obtain more detail and explanation.
- This report covers the October 2018 to December 2018 period (Q4) and includes information on notable project activity up to the date of release of this report. It also includes summary information for the 2018 construction year.
- Section 3 of this report contains information developed by the Committee. Section 4 contains project cost and schedule information provided by Nalcor. The Annexes contain a more detailed accounting of the information provided in this report.
- The next Committee Report will cover the period January 2019 – March 2019.

## 3.2 Committee Activities

- The Committee met on two occasions during the period to receive project updates and conduct other Committee business. Committee meeting minutes and reports are available on the Committee website @ [Click here](#) and [Click here](#).
- The Committee Executive Director participated in the Independent Engineer (IE) and Natural Resources Canada (NRCan) Project Site Visits and Meetings between October 30 – November 2, 2018. These sessions included various meetings and a summary session along with site visits to Muskrat Falls and Soldiers Pond.
- Further to the October 30 – November 2 Project Site Visit and Meetings, the Committee Executive Director and Committee Chair also participated as an observer in one monthly call each on Nalcor project reporting to the IE and NRCan.
- The Committee Executive Director and Chair participated in two calls with the IE and NRCan to review Nalcor monthly project reporting and follow up on the IE's technical visit during the quarter.
- The Committee Executive Director and Chair also participated in a call with Nalcor to specifically discuss the ongoing Litigation/Arbitration between Nalcor and Astaldi and civil works restart with Pennecon Energy (Pennecon).

## 3.2 Committee Activities

- The Committee Executive Director and Chair met with Newfoundland and Labrador Hydro (NLH) to discuss project integration and operations. NLH reports positive progress, power was flowing across the LITL and that discussions between NLH and Nalcor were ongoing regarding LITL commissioning status and operations and maintenance costs.
- The Committee Executive Director and Chair reviewed Westney Consulting Quantitative Risk Assessments (QRA's) at Nalcor offices. The report was subsequently made available to the Committee.
- The Committee notes that as of December 2018, Power Supply project schedule milestone planned dates have changed compared to planned dates in the June 2017 budget including:
  - The Soldiers Pond Synchronous Condenser Ready for Operation; and
  - The Muskrat Falls and Soldiers Pond Converter Stations Bi-pole Dynamic Testing Complete.
- These forecast dates are now approaching various MFGen milestone schedule dates in the June 2017 budget.
- The Committee requested an explanation of these variances and how these date changes do not impact the overall project schedule. Nalcor's response can be found on page 19 of this report.

### 3.3 Independent Engineer Activities

- In November 2018, the IE visited the Andritz manufacturing facility in Chambly, QC where the Protection & Controls equipment and software for the MFGen plant is being developed and built. Following IE release of the report, the Committee will post it to the website for reference.
- In December 3-6, 2018 the IE held technical meetings in Nalcor St. John's offices with project teams.
- On December 19, 2018, the IE issued the LCP Project Site Visit and Meeting Report. Report highlights included:
  - Power Development
    - MFGen work is progressing well and is on schedule;
    - Possible delays to powerhouse pit free milestones due to the Astaldi situation are not expected to negatively impact the schedule for First Power and that risk of impact to the overall project schedule is being evaluated.
  - Power Supply
    - Lubricating oil contamination was found in synchronous condensers at Soldiers Pond and root cause analysis was ongoing;
    - Reported delays in the HVdc transmission system Protection and Control software development; commercial discussions with GE were ongoing; Bi-pole software was expected by end of 2019; and GE's progress reports were not consolidated enough to clearly indicate the project risks.
  - The full report can be found on the Committees website @ [Click here](#).

## 3.4 Risk and Issues being Monitored by the Committee

- In its project reporting, Nalcor identifies risks which may impact project cost and schedule. The Committee reviews these and other project information to assess project risks. These risks can be found on pages 15-18 of this report.
- Over the reporting period the Committee noted:
  - North Dam concrete placement is finished and mass concrete placement is complete;
  - North Dam foundation grouting and watering up between the cofferdam and North Dam has occurred;
  - Reservoir rim stability remained consistent over the Quarter and reservoir ice cover was achieved;
  - A Limited Notice To Proceed (LNTP) was issued in December to Pennecor to complete critical path powerhouse work following the October 2018 stop work order and termination of contract with Astaldi; the full contract for the remain scope of work was concluded in February 2019;
  - In January 2019, the Arbitration panel has removed the injunction filed by Astaldi on the Advance Payment and Performance Letters of Credit under the Astaldi contract;
  - Further Litigation and Arbitration proceedings are ongoing;
    - Astaldi is claiming up to \$800 million in damages and Nalcor is preparing a counter claim;

### 3.4 Risk and Issues being Monitored by the Committee

- Over the reporting period the Committee noted:
  - There is a new version Protection and Control (P&C) software for the HVdc system; there are no plans to install during the 2018/19 winter period; P&C software completion remains a key project risk;
  - The root cause of lube oil contamination in the Soldiers Pond synchronous condensers has been determined and remediation work continues as part of ongoing commissioning; and
  - Nalcor/NLH preparedness for interconnection and operations following Pole 1 transfer of power period and completion of Bi-pole remains a key focus area.

## 3.4 Risk and Issues being Monitored by the Committee

- The project is now largely in the installation, integration and static and dynamic commissioning phases which inherently carry associated risks.
- Risks that are being tracked by the Committee include:
  - A) Safety Performance
    - Risk associated with simultaneous operations across multiple work sites, impact on project delivery particularly in the powerhouse, energized yards and other assets. This risk will continue through construction into operations.
  - B) Contractor Management and Productivity
    - Nalcor ability to manage contractors and contractor ability to meet schedule;
    - Contractor management and performance in the powerhouse;
    - Potential commercial negotiations to settle claims; and
    - Potential for new claims as construction nears completion.

## 3.4 Risk and Issues being Monitored by the Committee

### C) Phased Commissioning

- Completion of Protection and Controls system to enhance functionality and reliability; associated warranty considerations with early asset handover during Pole 1 commissioning and completion;
- Continued milestone changes;
- Final completion and testing of HVdc system under partial and full power, in-service system reliability, and timing of contractor release and effective warranty period; and
- Reliability of system during the winter period.

### D) Astaldi

- Resumption of powerhouse and spillway work by Pennecon
- Impact on other contractors;
- Astaldi Litigation/Arbitration outcomes; and
- Impact on project costs and schedule.

## 3.4 Risk and Issues being Monitored by the Committee

### E) Synchronous Condensers

- Remediation of lube oil contamination and impact on milestone and overall project schedule for this activity.

### F) Insurance Claims and Coverage

- Claims ongoing: Synchronous condensers - investigations ongoing;
- Recently settled claims: Draft Tube 2 form work failure - final payment received; MFGen cofferdam repairs and berm protection – final payment received; Water ingress in section of LITL sub-sea cable - final payment remains pending; and
- Potential coverage: Preservation/re-preservation of Turbine and Generator parts - investigations ongoing; Powerhouse crane rail issues - investigations ongoing.

### G) Cofferdam Performance

- Risk reducing as North Dam foundation grouting program is now complete and watering up between the upstream cofferdam and North Dam has occurred.

### H) Reservoir Rim Stability

- Impact of changing water levels during interim impoundment on reservoir shoreline/slope stability.

## 3.4 Risk and Issues being Monitored by the Committee

### I) Project Integration and Operations Readiness

- Nalcor/NLH readiness to connect the Muskrat Falls Project to the Island and North American electricity grid and operate facilities effectively.

### J) Project Delivery Team Retention

- Project Team personnel departures and potential impact on project completion; and
- Departures continued to occur over the Quarter.

### K) Additional Risks (Strategic Risks)

- Protest unrest;
- Commission of Inquiry respecting the Muskrat Falls Project;
- Independent Expert Advisory Committee (IEAC) recommendations; and
- Other unforeseen directives from Government.
- Funds are not held within the June 2017 Project Budget for these risks.
- Potential impact on cost and schedule.

## 3.5 Power Supply Project Milestone Schedule

- The Project critical path is determined by the requirement for "Maximum Permitted Load Testing" which has three criteria: 1) three generating units, 2) fully functional HVdc Bi-pole power, and 3) at least two Synchronous Condensers.
- The Generation critical path is based on the Powerhouse commissioning dates, of which the three generating units must be complete for Maximum Permitted Load Testing. As of December 2018, this forecast completion date is May 2020.
- The Labrador-Island Link critical path is the Power Transmission Bi-Pole Dynamic Commissioning. The December 2018 forecast completion date for this activity is now February 2020, followed by a 60 day window to complete the trial run period ending in April 2020, which is one month in advance of the generation 3 project milestone planned date in the June 2017 Budget. Bi-Pole Dynamic Commissioning schedule changes have been primarily due to P&C software development delays. Full functionality of the Bi-pole software continues to be a risk.
- The Soldiers Pond Synchronous Condensers are not on the Project or Labrador-Island Link critical paths. Only the first two units are required for Maximum Permitted Load Testing. The December 2018 forecast completion date for all three units is now September 2019, with two units being available August 2019. Schedule change on this activity has been primarily due to lube oil system contamination during initial commissioning, and associated repairs.
- While there have been schedule milestone changes for the activities noted above, the overall Project remains on track with the June 2017 budget and schedule.

## 3.6 Subsequent Events to Q4

- On January 30, 2019 the Astaldi Litigation/Arbitration panel removed the Injunction on the Advance Payment and Performance Letters of Credit under the Astaldi Contract. The arbitration of the Astaldi claim for damages are ongoing.
- In February 2019, Nalcor finalized a completion contract with Pennecor for required powerhouse and spillway work.
- In February 2019, a new amending agreement was finalized with GE Grid for the completion of P&C software for the HVdc system.
- On February 1, 2018 Paul Carter, Executive Director of the Committee was appointed as Chair.
- Since February 5, 2019, power transfer on the LITL has been restricted due to an issue with Protection and Controls (P&C) software functionality.
- On February 15, 2019 Jim Haynes, formerly of Newfoundland and Labrador Hydro was appointed as Executive Vice President, Power Supply, Nalcor Energy.
- Nalcor's 2019 Annual General Meeting is scheduled for April 9, 2019. Further details can be found on the Nalcor website @ [Click here](#).



## 4.0 Nalcor Reporting

4.1 Summary - Quarter Ending December 2018

4.2 Project Expenditures

4.3 Contingency

4.4 Earned Progress

## 4.1 Summary – Quarter Ending December 2018

- December 2018 Summary:
  - Overall construction progress is at 96.4%;
  - \$8,947 Million in incurred costs; and
  - \$9,379 Million in committed costs.
- Overall the project is tracking in compliance with the June 2017 budget and schedule.
- As of December 2018, the June 2017 budget final forecast cost remains unchanged.
  - While the overall budget and final forecast cost remains unchanged, variances between the project budget and final forecast costs have occurred within and among expenditure categories. Most variances are related to the transfer of budget between allocations from the contingency budget to the procurement and construction budget.
  - Does not include costs for Additional Risks as reported in the September 2018, Q3 Committee Report (\$170-370 Million), or any new potential cost risk associated with the Astaldi claim - (See page 28 for further details).
- The current forecast contingency budget at December 2018 is \$110.1 Million, a decrease of \$69.8 Million from the previous Quarter. For further detail see Section 4.3.

## 4.1 Summary – Quarter Ending December 2018

### Quarterly Planned vs Incurred Cost Variances:

MFGen	
Cumulative Planned: \$4,912M	Q4 2018 Planned: \$259M
Cumulative Incurred: \$4,637M	Q4 2018 Incurred: \$117M
Variance: -\$275M (-5.6%)	Variance: -\$142M (-54.8%)

- Planned expenditure by month was set in June 2017.
- During Q4 2018, the variance in planned vs. incurred cost is primarily due to the termination of the contract for the Construction of the Intake, Powerhouse Spillway and Transition Dam (CH0007).
- See Section 4.2 and Appendix B for further detail.

## 4.1 Summary – Quarter Ending December 2018

### Quarterly Planned vs Incurred Cost Variances:

LITL	
Cumulative Planned: \$3,670M	Q4 2018 Planned: \$29M
Cumulative Incurred: \$3,464M	Q4 2018 Incurred: \$21M
Variance: -\$206M (-5.6%)	Variance: -\$8M (-27.5%)
LTA	
Cumulative Planned: \$904M	Q4 2018 Planned: \$8M
Cumulative Incurred: \$847M	Q4 2018 Incurred: \$5M
Variance: -\$57M (-6.3%)	Variance: -\$3M (-37.5%)

- The planned expenditure by month was set in June of 2017.
- During Q4 2018, contingency and package growth allowance was utilized at a slower rate than estimated. The slower rate of utilization is directly linked to the pace of progress on current contractor claims resolution.
- See Section 4.2 and Appendix B for further detail.

## 4.1 Summary – Quarter Ending December 2018

### Planned vs Earned Progress:

- MFGen
  - Cumulative progress as of end Q4 2018 was 92.4% vs. a plan of 93.3% (variance of -0.9%). Quarterly progress for Q4 2018 was 3.5% vs. a plan of 3.4% (variance of 0.1%).
  - During the Quarter, the cumulative variance was reduced from 1.0% behind plan to 0.9% behind plan. This was due to greater than planned progress in both the North Dam and the Spillway and Gates (completion of first 2 rollways) scopes of work. The current cumulative variance is entirely within the work area of the Spillway and Gates.
  - As noted in the Q2 and Q3 reports, over the past 2 years the planned timing of installation of the rollways has changed. The first two rollways were completed in 2018. The third was planned for 2018; however was not completed due to the termination of the Astaldi contract. The last 3 are planned for installation in 2019. Due to these changes, it is expected that the Spillway & Gates will continue to trend behind the baseline progress set in mid-2016 until the scope is complete.
- LTA/LITL
  - > 99% complete.
- See Section 4.2 and Appendix C for further detail.

## 4.1 Summary – Quarter Ending December 2018

### Power Development:

- The project remains on budget and on schedule with the June 2017 budget;
- Spillway and gates are 91% complete;
- Powerhouse is (95% complete)
  - Hydro-mechanical and turbine and generator (T&G) embedment work is complete; Balance of Plant (BOP) work is ongoing and is at 50% complete with commissioning commenced; BOP engineering and long lead procurement items are substantially complete;
  - A Limited Notice to Proceed (LTP) issued to Astaldi replacement contractor Penneccon in December 2018 for critical path work in the powerhouse;
  - Preparations were underway for Intake 2 (Bays 4,5,6) point and patch concrete scope;
  - Unit 1 Pit Free; and
  - Construction activities will continue to increase throughout Q1 with Penneccon mobilization.

## 4.1 Summary – Quarter Ending December 2018

- Hydro Mechanical Installation
  - Gates and hoists installed in Bays 1-7; Secondary concrete installed in Bays 1-10. Embedment work ongoing in Bays 1-12, Intake hoist electrical ongoing in Units 1 and 2;
  - Mechanical completion, static and dynamic commissioning ongoing on Intake Gates;
  - Post rollway mechanical completion and static commissioning ongoing in Bays 1 and 5; and
  - On track for upstream water tight readiness for Q1 2019.
- Turbines and Generators
  - T&G preservation work remains ongoing; shelter for T&G components is completed; and
  - Stator bar and protection and control panel manufacturing ongoing; Unit 1 stator frame alignment complete; rotor, runner and bottom ring assembly ongoing.
- North and South Dams (99% complete)
  - Grout curtain, tailrace rock plug drilling and blasting, tailrace water channel water-up and disassembly of spillway bridge complete; and completion of drainage holes is ongoing.
- Spillway Rollway Construction
  - Rollways 1 and 5 completed in October 2018; 2, 3, and 4 to be completed next season.

## 4.1 Summary – Quarter Ending December 2018

- On January 30, 2019 the Astaldi Litigation/Arbitration Panel removed the Injunction on the Advance Payment and Performance Letters of Credit under the Astaldi Contract. In total \$184 Million was received.
- With these funds, Nalcor finalized a completion contract with Pennecon for remaining work to be completed under CH0007 and is settling CH0007 Liens by prioritizing payments to critical contractors for civil work completion.
- The Litigation/Arbitration of other matters related to the Astaldi claim for damages and other securities and Liens under the CH0007 contact remains ongoing.
- Astaldi has claimed up to \$800 Million in damages and Nalcor is preparing a counter claim.
  - Funds are not held with the current June 2017 budget should net damages be awarded in Astaldi's favour.
- Focus areas for Q1 2019 include: schedule optimization; execution of remaining powerhouse work and water tight.
- The forecast expenditure for the Q1 2019 is estimated at approximately \$252.3 Million.

## 4.1 Summary – Quarter Ending December 2018

### Power Supply:

- The project remains on budget and on schedule with the June 2017 budget;
- Strait of Belle Isle (SOBI) (complete)
  - Construction complete, commercially closed and insurance claim resolved;
  - Assets energized and all 3 cables accepted; and
  - Turnover to operations.
- Overland Transmission Assets (LITL and LTA)
  - Construction complete, and insurance claim resolved;
  - Assets energized;
  - Initial power flow received; and
  - Commissioning and testing ongoing.
- HVdc Specialties (Muskrat Falls and Soldiers Pond)
  - Construction complete for Pole 1;
  - Pole1 assets energized; and
  - Commissioning and testing ongoing.

## 4.1 Summary – Quarter Ending December 2018

- HVdc Power Transfer
  - Pole1 daily power transfer of Recall Power from Churchill Falls to the Island commenced in December 2018 and is ongoing;
  - Availability in the first 20 days was 99.1% and 99.8 in the first 30 days; and
  - At peak 150 Megawatts was transferred from Churchill Falls; and
  - since February 5, 2019 power transfer levels have been fluctuating at restricted rates between 45-100 Megawatts due to an issue with P&C software. Investigation into the issue is ongoing.
- Protection and Controls (P&C)
  - Development and delivery of final Pole 1 and Bi-pole software is the largest outstanding risk for Power Supply;
  - Work to support dynamic commissioning/power transfer is ongoing at site;
  - Software development is focused on reliability, functionality and completion;
  - Pole 2 final construction and commissioning is ongoing;
  - Nalcor staff are on a continual rotation at the P&C software development site providing technical support and oversight; and
  - An Amending Agreement (Agreement) with GE Grid has been finalized which resolves all commercial issues to the end of 2018 and establishes Bi-pole deliverables for completion in 2019. The Agreement will use third parties to validate progress, functionality and completion deliverables under the contract. Costs for the Agreement are held within the June 2017 budget.

## 4.1 Summary – Quarter Ending December 2018

- **Synchronous Condensers**
  - Root cause of the lube oil contamination issue and has been determined and remediation and repair work is ongoing. The three units are now scheduled to be commissioned by end of Q3 2019.
- The focus for Q1, 2019 remains on continued completions, commissioning and integration of operations; and
- The forecast expenditure for Q1, 2019 is estimated at approximately \$92.7 Million.

## 4.2 Project Expenditures

December 2018 (\$000)	Project Budget June 2017 AFE	Cumulative \$			Cumulative %		
		Plan	Incurred	Variance	Plan	Incurred	Variance
<i>Description</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>C-B</i>	<i>D=B/A</i>	<i>E=C/A</i>	<i>E-D</i>
<b>NE-LCP Owners Team, Admin and EPCM Services</b>	\$1,115,235	\$1,000,604	\$950,204	(\$50,400)	89.7%	85.2%	-4.5%
<b>Feasibility Engineering</b>	\$37,072	\$37,072	\$35,894	(\$1,178)	100.0%	96.8%	-3.2%
<b>Environmental &amp; Regulatory Compliance</b>	\$42,669	\$41,192	\$38,410	(\$2,782)	96.5%	90.0%	-6.5%
<b>Aboriginal Affairs</b>	\$17,478	\$14,527	\$18,413	\$3,886	83.1%	105.3%	22.2%
<b>Procurement &amp; Construction</b>	\$8,475,290	\$8,323,681	\$7,837,648	(\$486,033)	98.2%	92.5%	-5.7%
<b>Commercial &amp; Legal</b>	\$90,423	\$68,652	\$66,872	(\$1,780)	75.9%	74.0%	-2.0%
<b>Contingency</b>	\$339,162	\$0	\$0	\$0	0.0%	0.0%	0.0%
<b>TOTAL</b>	\$10,117,328	\$9,485,727	\$8,947,442	(\$538,285)	93.8%	88.4%	-5.3%

December 2018 (\$000)	Project Budget June 2017 AFE	Incurred Cumulative Costs		Project Final Forecast Cost December 2018	Variance PFC from Budget
		December 2018	2018		
<i>Description</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D=A-C</i>	
<b>NE-LCP Owners Team, Admin and EPCM Services</b>	\$1,115,235	\$950,204	\$1,155,945		(\$40,710)
<b>Feasibility Engineering</b>	\$37,072	\$35,894	\$35,894		\$1,178
<b>Environmental &amp; Regulatory Compliance</b>	\$42,669	\$38,410	\$43,409		(\$740)
<b>Aboriginal Affairs</b>	\$17,478	\$18,413	\$31,451		(\$13,973)
<b>Procurement &amp; Construction</b>	\$8,475,290	\$7,837,648	\$8,640,351		(\$165,061)
<b>Commercial &amp; Legal</b>	\$90,423	\$66,872	\$100,228		(\$9,805)
<b>Contingency</b>	\$339,162	\$0	\$110,051		\$229,111
<b>TOTAL</b>	\$10,117,328	\$8,947,442	\$10,117,328		\$0

Columns in tables may not total due to rounding

## 4.3 Contingency

Q4 December 2018 (\$000)	Project Budget June 2017 AFE	March 2018 AFE Adjustment	Project Forecast Cost September 2018	Project Forecast Cost December 2018	Change from Previous Quarter	Variance PFC from Budget
	A	-	B	C	C - B	C - A
Total Project	\$339,162	\$339,162	\$179,893	\$110,051	(\$69,842)	(\$229,111)

Columns in tables may not total due to rounding

## 4.4 Earned Progress

Cumulative to end of December 2018	Weight Factor %	December 2018 Cumulative %			September 2018 Variance
		Planned	Earned	Variance	
Sub-Project	A	B	C	D = C - B	E
Muskrat Falls Generation (MFGen)	46.3%	93.3%	92.4%	-0.9%	-1.0%
Labrador Island Transmission Link (LITL)	43.9%	100.0%	99.8%	-0.2%	-0.2%
Labrador Transmission Asset (LTA)	9.8%	100.0%	99.9%	-0.1%	-0.1%
Muskrat Falls Project - Overall	100.0%	96.9%	96.4%	-0.5%	-0.5%

December 2018 Period	Weight Factor %	Period %		
		Planned	Earned	Variance
Sub-Project	A	B	C	D = C - B
Muskrat Falls Generation (MFGen)	46.3%	0.9%	0.9%	0.0%
Labrador Island Transmission Link (LITL)	43.9%	0.0%	0.0%	0.0%
Labrador Transmission Asset (LTA)	9.8%	0.0%	0.0%	0.0%
Muskrat Falls Project - Overall	100.0%	0.4%	0.4%	0.0%



## Annex A

- I. Project Capital Budget
- II. Project Milestone Schedule

Columns in tables may not total due to rounding

# I. Project Capital Budget

<b>Muskrat Falls Generating Facility (in \$ thousands)</b>		<b>June 2017 AFE</b>
<i>Expenditure Category</i>		
NE-LCP Owners Team, Admin and EPCM Services		\$655,850
Feasibility Engineering		\$17,543
Environmental & Regulatory Compliance		\$27,125
Aboriginal Affairs		\$16,395
Procurement & Construction		\$4,501,984
Commercial & Legal		\$54,760
Contingency		\$226,400
<b>Muskrat Falls Generation Total</b>		<b>\$5,500,056</b>
<b>Labrador-Island Transmission Link (in \$ thousands)</b>		<b>March 2018 AFE</b>
<i>Expenditure Category</i>		
NE-LCP Owners Team, Admin and EPCM Services		\$322,101
Feasibility Engineering		\$19,167
Environmental & Regulatory Compliance		\$14,726
Aboriginal Affairs		\$1,003
Procurement & Construction		\$3,233,690
Commercial & Legal		\$30,280
Contingency		\$92,750
<b>Labrador-Island Transmission Link Total</b>		<b>\$3,713,716</b>
<b>Labrador-Transmission Assets (in \$ thousands)</b>		<b>March 2018 AFE</b>
<i>Expenditure Category</i>		
NE-LCP Owners Team, Admin and EPCM Services		\$137,284
Feasibility Engineering		\$363
Environmental & Regulatory Compliance		\$817
Aboriginal Affairs		\$80
Procurement & Construction		\$739,617
Commercial & Legal		\$5,383
Contingency		\$20,012
<b>Labrador Transmission Assets Total</b>		<b>\$903,556</b>
<b>Muskrat Falls Capital Cost Budget Total</b>		<b>\$10,117,328</b>

<b>Contingency Budget (in \$ thousands)</b>	<b>March 2018 AFE</b>
<b>Sub-Project:</b>	
<b>Muskrat Falls Generating Facility</b>	\$226,400
<b>Labrador-Island Transmission Link</b>	\$92,750
<b>Labrador Transmission Assets</b>	\$20,012
<b>Total Project</b>	<b>\$339,162</b>

## II. Project Milestone Schedule

Muskrat Falls Generating Facility	June 2017 Planned Dates	Labrador-Island Transmission Link	June 2017 Planned Dates	Labrador Transmission Assets	June 2017 Planned Dates
North Spur Works Ready for Diversion	Oct-16	SOBI Cable Systems Ready	Dec-16	HVac Transmission Line Construction Complete	May-17
River Diversion Complete	Feb-17	Soldiers Pond Switchyard Ready to Energize	Aug-17	Churchill Falls Switchyard Ready to Energize	Nov-17
Reservoir Impoundment Complete	Nov-19	Ready for Power Transmission (LTA)	Dec-17	Muskrat Falls Switchyard Ready to Energize	Nov-17
Powerhouse Unit 1 Commissioned - Ready for Operation	Dec-19	Muskrat Falls Converter Station Ready to Energize (Pole 1)	Jun-18	Ready for Power Transmission	Dec-17
First Power from Muskrat Falls	Nov-19	HVdc Transmission Line Construction Complete	Dec-17	Commissioning Complete - Commissioning Certificate Issued	Sep-20
Powerhouse Unit 2 Commissioned - Ready for Operation	Mar-20	Soldier's Pond Converter Station Ready to Energize (Pole 1)	Jun-18		
Powerhouse Unit 3 Commissioned - Ready for Operation	Jun-20	1ST Power Transfer (Pole 1)	Jul-18		
Powerhouse Unit 4 Commissioned - Ready for Operation	Aug-20	Soldiers Pond Synchronous Condenser Ready for Operation	Jun-18		
Full Power from Muskrat Falls	Aug-20	Ready for Power Transmission (Low Load Testing Complete Pole 1)	Dec-18		
Commissioning Complete - Commissioning Certificate Issued	Sep-20	Muskrat Falls and Soldiers Pond Converter Stations - Bipole Dynamic Testing Complete	Mar-19		
		Commissioning Complete - Commissioning Certificate Issued	Sep-20		



## Annex B

### Project Expenditures

- I. Muskrat Falls Generation
- II. Labrador Island Transmission Link
- III. Labrador Transmission Assets

Columns in tables may not total due to rounding

# I. Muskrat Falls Generation

December 2018 (\$000)	Project Budget June 2017 AFE	Cumulative \$			Cumulative %		
		Planned	Incurred	Variance	Planned	Incurred	Variance
<i>Description</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>C-B</i>	<i>D=B/A</i>	<i>E=C/A</i>	<i>E-D</i>
NE-LCP Owners Team, Admin and EPCM Services	\$655,850	\$539,167	\$500,415	(\$38,752)	82.2%	76.3%	-5.9%
Feasibility Engineering	\$17,543	\$17,543	\$16,874	(\$669)	100.0%	96.2%	-3.8%
Environmental & Regulatory Compliance	\$27,125	\$26,452	\$26,020	(\$432)	97.5%	95.9%	-1.6%
Aboriginal Affairs	\$16,395	\$13,542	\$17,631	\$4,089	82.6%	107.5%	24.9%
Procurement & Construction	\$4,501,984	\$4,278,470	\$4,036,052	(\$242,418)	95.0%	89.7%	-5.4%
Commercial & Legal	\$54,760	\$36,712	\$39,648	\$2,936	67.0%	72.4%	5.4%
Contingency	\$226,400	\$0	\$0	\$0	0.0%	0.0%	0.0%
<b>TOTAL</b>	<b>\$5,500,056</b>	<b>\$4,911,887</b>	<b>\$4,636,640</b>	<b>(\$275,247)</b>	<b>89.3%</b>	<b>84.3%</b>	<b>-5.0%</b>

December 2018 (\$000)	Project Budget June 2017 AFE	Incurred Cumulative Costs December 2018	
		A	B
<i>Description</i>			
NE-LCP Owners Team, Admin and EPCM Services	\$655,850		\$500,415
Feasibility Engineering	\$17,543		\$16,874
Environmental & Regulatory Compliance	\$27,125		\$26,020
Aboriginal Affairs	\$16,395		\$17,631
Procurement & Construction	\$4,501,984		\$4,036,052
Commercial & Legal	\$54,760		\$39,648
Contingency	\$226,400		\$0
<b>TOTAL</b>	<b>\$5,500,056</b>		<b>\$4,636,640</b>

## II. Labrador Island Transmission Link

December 2018 (\$000)	Project Budget		Cumulative \$			Cumulative %		
	March 2018 AFE	Plan	Incurred	Variance	Plan	Incurred	Variance	
Description	A	B	C	C-B	D=B/A	E=C/A	E-D	
NE-LCP Owners Team, Admin and EPCM Services	\$322,101	\$321,802	\$321,010	(\$792)	99.9%	99.7%	-0.2%	
Feasibility Engineering	\$19,167	\$19,167	\$18,717	(\$450)	100.0%	97.7%	-2.3%	
Environmental & Regulatory Compliance	\$14,726	\$13,922	\$11,577	(\$2,345)	94.5%	78.6%	-15.9%	
Aboriginal Affairs	\$1,003	\$905	\$615	(\$290)	90.2%	61.3%	-28.9%	
Procurement & Construction	\$3,233,690	\$3,287,932	\$3,090,776	(\$197,156)	101.7%	95.6%	-6.1%	
Commercial & Legal	\$30,280	\$26,556	\$21,191	(\$5,365)	87.7%	70.0%	-17.7%	
Contingency	\$92,750	\$0	\$0	\$0	0.0%	0.0%	0.0%	
<b>TOTAL</b>	<b>\$3,713,716</b>	<b>\$3,670,284</b>	<b>\$3,463,886</b>	<b>(\$206,398)</b>	<b>98.8%</b>	<b>93.3%</b>	<b>-5.6%</b>	

December 2018 (\$000)	Project Budget		Incurred Costs	
	March 2018 AFE		Cumulative December 2018	
Description	A		B	
NE-LCP Owners Team, Admin and EPCM Services		\$322,101		\$321,010
Feasibility Engineering		\$19,167		\$18,717
Environmental & Regulatory Compliance		\$14,726		\$11,577
Aboriginal Affairs		\$1,003		\$615
Procurement & Construction		\$3,233,690		\$3,090,776
Commercial & Legal		\$30,280		\$21,191
Contingency		\$92,750		\$0
<b>TOTAL</b>		<b>\$3,713,716</b>		<b>\$3,463,886</b>

### III. Labrador Transmission Assets

December 2018 (\$000)	Project Budget March 2018 AFE	Cumulative \$			Cumulative %		
		Plan	Incurred	Variance	Plan	Incurred	Variance
Description	A	B	C	C-B	D=B/A	E=C/A	E-D
NE-LCP Owners Team, Admin and EPCM Services	\$137,284	\$139,634	\$128,780	(\$10,854)	101.7%	93.8%	-7.9%
Feasibility Engineering	\$363	\$363	\$303	(\$60)	100.0%	83.5%	-16.5%
Environmental & Regulatory Compliance	\$817	\$817	\$812	(\$5)	100.0%	99.4%	-0.6%
Aboriginal Affairs	\$80	\$80	\$166	\$86	100.0%	207.5%	107.5%
Procurement & Construction	\$739,617	\$757,279	\$710,820	(\$46,459)	102.4%	96.1%	-6.3%
Commercial & Legal	\$5,383	\$5,383	\$6,033	\$650	100.0%	112.1%	12.1%
Contingency	\$20,012	\$0	\$0	\$0	0.0%	0.0%	0.0%
<b>TOTAL</b>	<b>\$903,556</b>	<b>\$903,556</b>	<b>\$846,916</b>	<b>(\$56,640)</b>	<b>100.0%</b>	<b>93.7%</b>	<b>-6.3%</b>

December 2018 (\$000)	Project Budget March 2018 AFE	Incurred Costs	
		Cumulative December 2018	
Description	A	B	
NE-LCP Owners Team, Admin and EPCM Services	\$137,284	\$128,780	
Feasibility Engineering	\$363	\$303	
Environmental & Regulatory Compliance	\$817	\$812	
Aboriginal Affairs	\$80	\$166	
Procurement & Construction	\$739,617	\$710,820	
Commercial & Legal	\$5,383	\$6,033	
Contingency	\$20,012	\$0	
<b>TOTAL</b>	<b>\$903,556</b>	<b>\$846,916</b>	



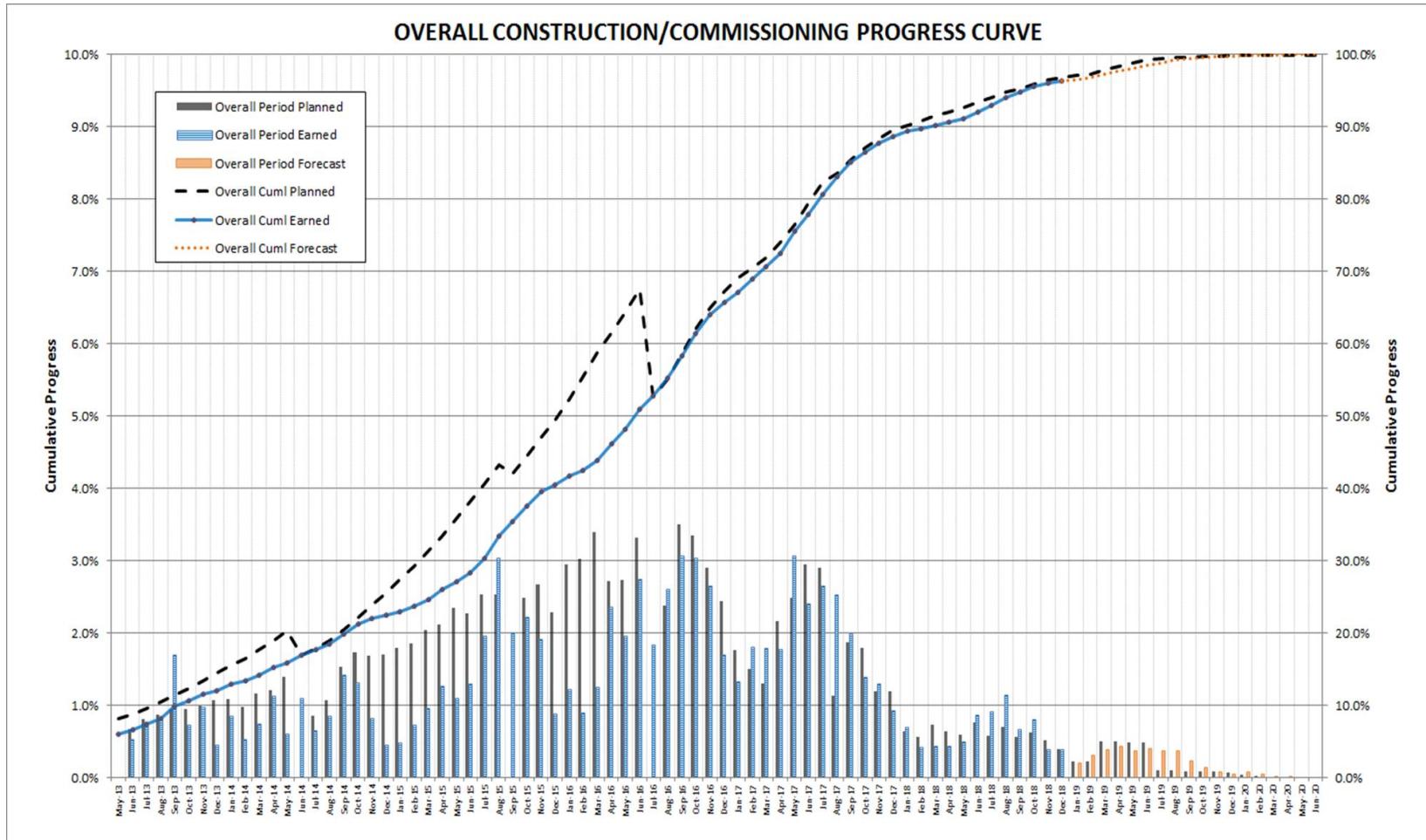
## Annex C

### Earned Progress

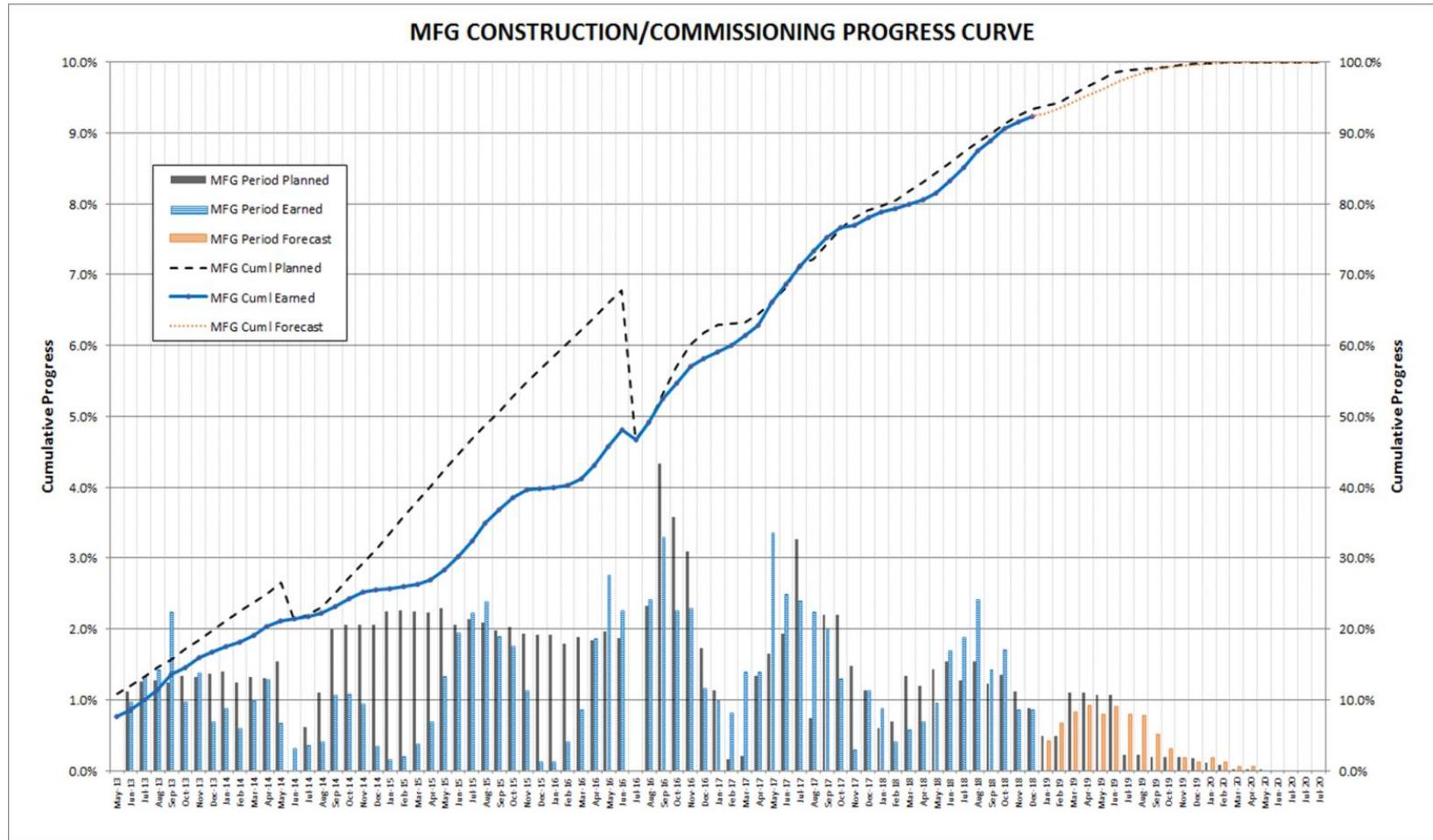
- I. Overall Construction
- II. Muskrat Falls Generation
- III. Labrador Island Transmission Link
- IV. Labrador Transmission Assets

Columns in tables may not total due to rounding

# I. Overall Construction



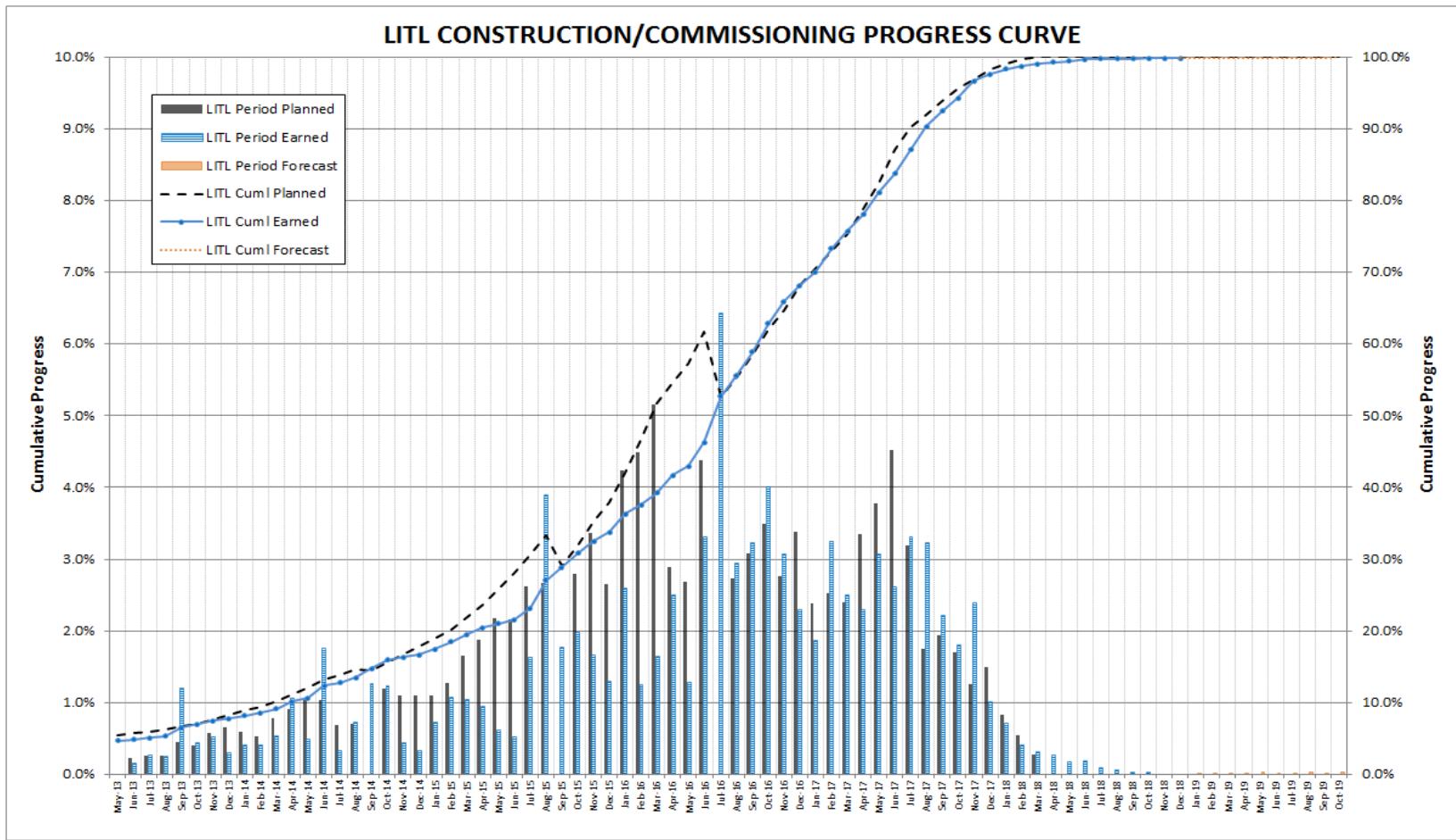
## II. Muskrat Falls Generation



## II. Muskrat Falls Generation

December 2018	Weight Factor %	December 2018 Cumulative %			September 2018
		Plan	Earned	Variance	Variance
Sub-Project	A	B	C	D = C - B	E
MFG Road/Camp/Constr. Power	8.9%	100.0%	100.0%	0.0%	0.0%
MFG Reservoir Preparation	5.8%	100.0%	100.0%	0.0%	0.0%
MFG Spillway & Gates	12.2%	100.0%	91.4%	-8.6%	-9.3%
MFG North Spur Stabilization	3.9%	100.0%	100.0%	0.0%	0.0%
MFG North Dam	5.7%	100.0%	99.0%	-1.0%	-2.0%
MFG Powerhouse & Intake	61.3%	89.2%	89.5%	0.3%	0.7%
MFG South Dam	1.1%	100.0%	100.0%	0.0%	0.0%
MFG Misc:Eng/ 315kV/Site Rest./logistic	1.1%	90.3%	89.0%	-1.3%	-11.8%
MFGen - Overall	100.0%	93.3%	92.4%	-0.9%	-1.0%
* Adjusted for MFGen rollway installation schedule		92.3%	92.4%	0.1%	

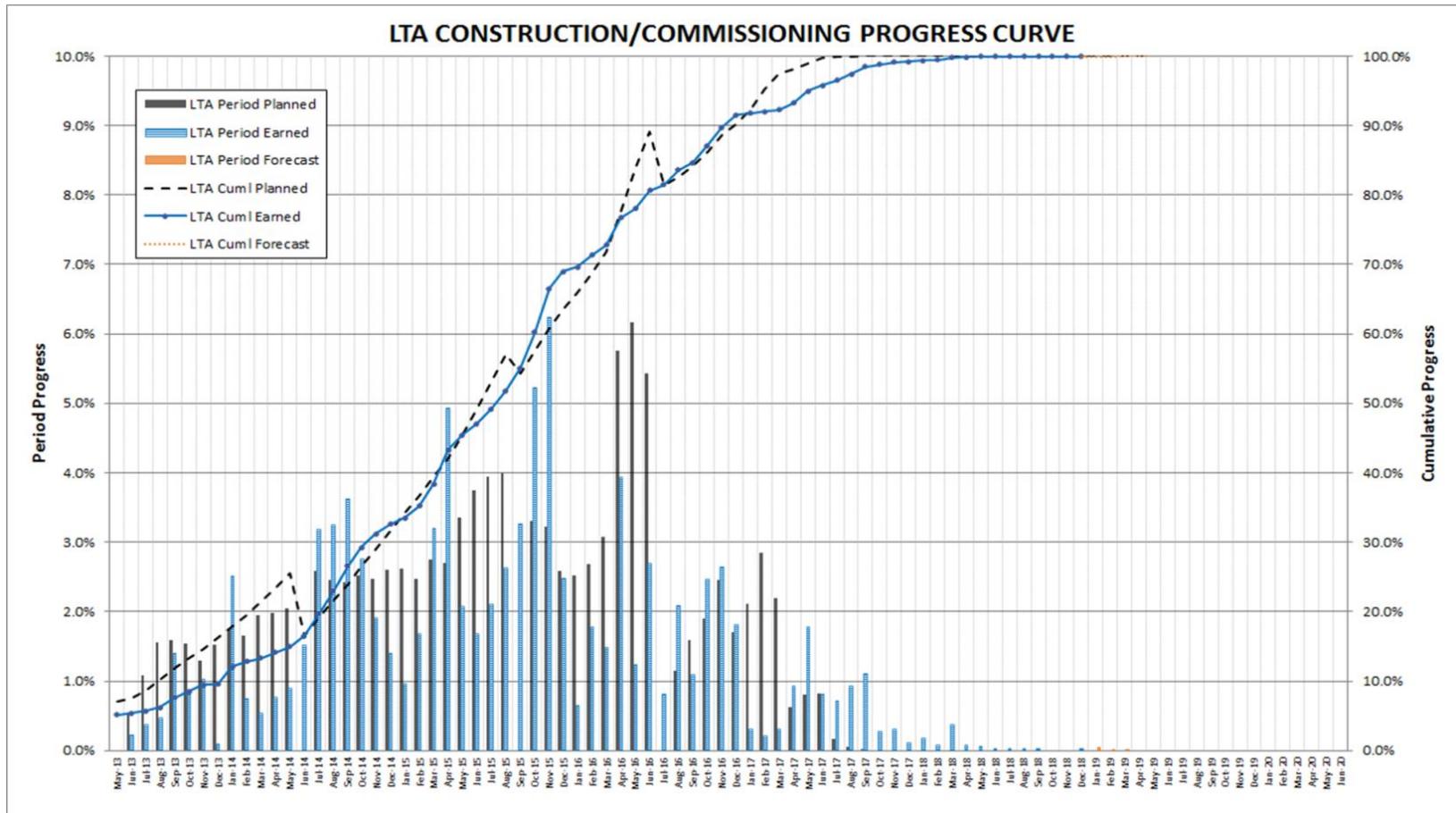
### III. Labrador Island Transmission Link



### III. Labrador Island Transmission Link

December 2018	Weight		December 2018 Cumulative %			September 2018
	Factor %		Plan	Earned	Variance	Variance
Sub-Project	A	B	C	D = C - B		E
LITL Muskrat Falls Converter	6.1%	100.0%	99.0%	-1.0%		-1.0%
LITL Soldiers Pond Converter	5.5%	100.0%	99.1%	-0.9%		-0.9%
LITL HVdc Transmission Line Seg 1/2	26.8%	100.0%	100.0%	0.0%		0.0%
LITL HVdc Transmission Line Seg 3/4/5	34.2%	100.0%	100.0%	0.0%		0.0%
LITL Electrode Sites	0.8%	100.0%	100.0%	0.0%		0.0%
LITL Transition Compounds	1.7%	100.0%	100.0%	0.0%		0.0%
LITL SOBI Cable Crossing	17.7%	100.0%	100.0%	0.0%		0.0%
LITL Soldiers Pond Switchyard	2.7%	100.0%	100.0%	0.0%		0.0%
LITL Soldiers Pond Sync. Condensors	3.1%	100.0%	99.6%	-0.4%		-0.5%
LITL Misc	1.4%	100.0%	97.1%	-2.9%		-3.2%
LITL- Overall	100.0%	100.0%	99.8%	-0.2%		-0.2%

## IV. Labrador Transmission Assets



## IV. Labrador Transmission Assets

December 2018	Weight		December 2018 Cumulative %			September 2018 Variance
	Factor %	Plan	Earned	Variance		
Sub-Project	A	B	C	D = C - B	E	
LTA HVac Transmission Line Seg1/2 - MF to CF	62.8%	100.0%	100.0%	0.0%	0.0%	
LTA Churchill Falls Switchyard	21.7%	100.0%	100.0%	0.0%	0.0%	
LTA Muskrat Falls Switchyard	13.4%	100.0%	99.9%	-0.1%	-0.1%	
LTA Misc	2.1%	100.0%	97.6%	-2.4%	-2.4%	
LTA - Overall	100.0%	100.0%	99.9%	-0.1%	-0.1%	



## Annex D

### Project Milestone Schedule Forecast

- I. Muskrat Falls Generation
- II. Labrador Island Transmission Link
- III. Labrador Transmission Assets

# I. Muskrat Falls Generation

December 2018	Planned Date June 2017	December 2018 Actual/Forecast
Project Sanction	17-Dec-12	Complete
North Spur Works Ready for Diversion	31-Oct-16	Complete
River Diversion Complete	15-Feb-17	Complete
Reservoir Impoundment Complete	1-Nov-19	14-Aug-19
Powerhouse Unit 1 Commissioned - Ready for Operation	19-Dec-19	9-Dec-19
First Power from Muskrat Falls	2-Nov-19	15-Oct-19
Powerhouse Unit 2 Commissioned - Ready for Operation	3-Mar-20	21-Feb-19
Powerhouse Unit 3 Commissioned - Ready for Operation	9-Jun-20	6-May-20
Powerhouse Unit 4 Commissioned - Ready for Operation	14-Aug-20	20-Jul-20
Full Power from Muskrat Falls	14-Aug-20	20-Jul-20
Commissioning Complete - Commissioning Certificate Issued	1-Sep-20	1-Sep-20

## II. Labrador Island Transmission Link

December 2018	Planned Date June 2017	December 2018 Actual/forecast
Project Sanction	17-Dec-12	Complete
SOBI Cable Systems Ready	9-Dec-16	Complete
Soldiers Pond Switchyard Ready to Energize	31-Aug-17	Complete
Ready for Power Transmission (LTA)	31-Dec-17	Complete
Muskrat Falls Converter Station Ready to Energize (Pole 1)	1-Jun-18	Complete
HVdc Transmission Line Construction Complete	31-Dec-17	Complete
Soldier's Pond Converter Station Ready to Energize (Pole 1)	1-Jun-18	Complete
1ST Power Transfer (Pole 1)	1-Jul-18	Completion of 45 megawatt heat run
Soldiers Pond Synchronous Condenser Ready for Operation	1-Jun-18	<sup>1</sup> 7-September-19
Ready for Power Transmission (Low Load Testing Complete Pole 1)	1-Dec-18	21-Jan-19 (Completion of low load testing for winter readiness)
Muskrat Falls and Soldiers Pond Converter Stations - Bipole Dynamic Testing Complete	31-Mar-19	<sup>2</sup> 16-February-20
Commissioning Complete - Commissioning Certificate Issued	1-Sep-20	1-Sep-20

<sup>1</sup> 4 month forecast date change due lube oil contamination issue since last reporting period.

<sup>2</sup> 3 month forecast date change since last reporting period.

### III. Labrador Transmission Assets

December 2018	June 2017 Budget Planned Date	December 2018 Actual/Forecast
Project Sanction	17-Dec-12	Complete
HVac Transmission Line Construction Complete	31-May-17	Complete: Turnover of HVac TL and all subsystems complete
Churchill Falls Switchyard Ready to Energize	30-Nov-17	Complete
Muskrat Falls Switchyard Ready to Energize	30-Nov-17	Complete
Ready for Power Transmission	31-Dec-17	Complete
Commissioning Complete - Commissioning Certificate Issued	1-Sep-20	1-Sep-20



# End of Report