



# Muskrat Falls Project Oversight Committee

Quarterly Project Update

Period Ending March 31, 2019

June 27, 2019

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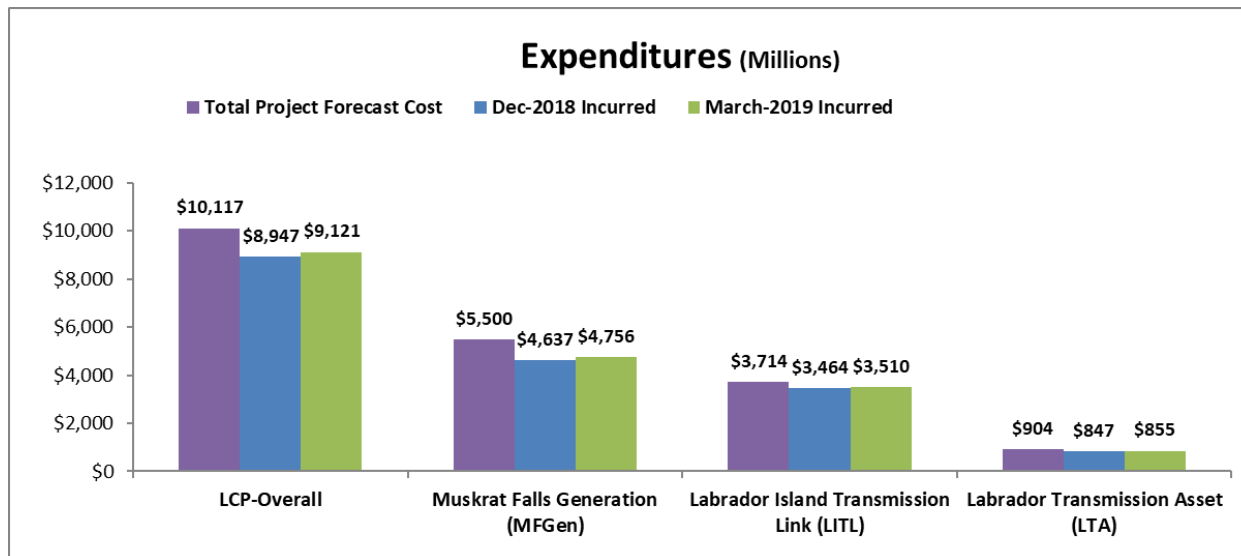
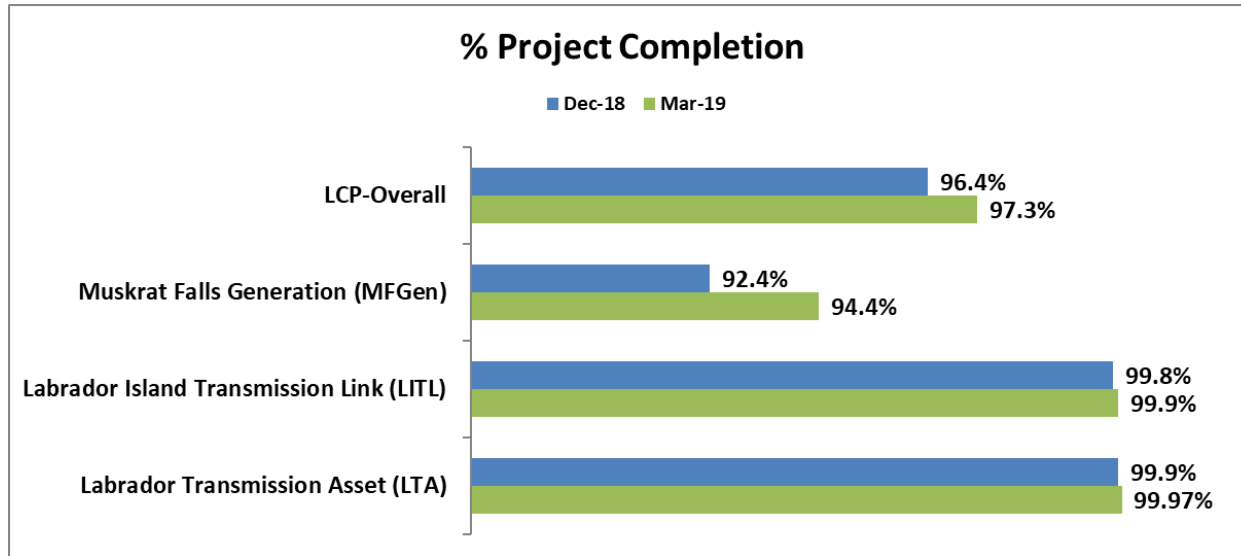
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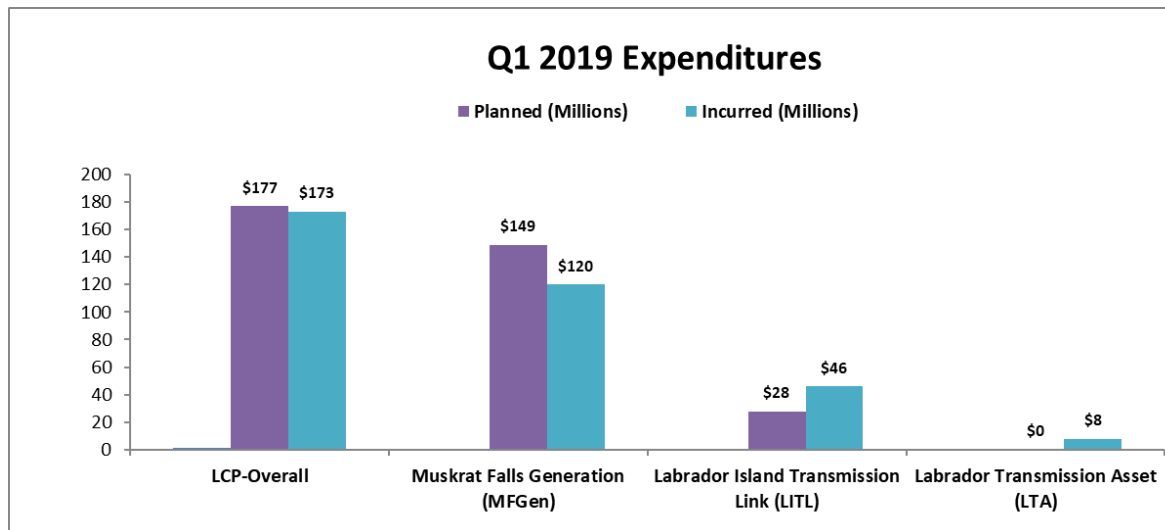
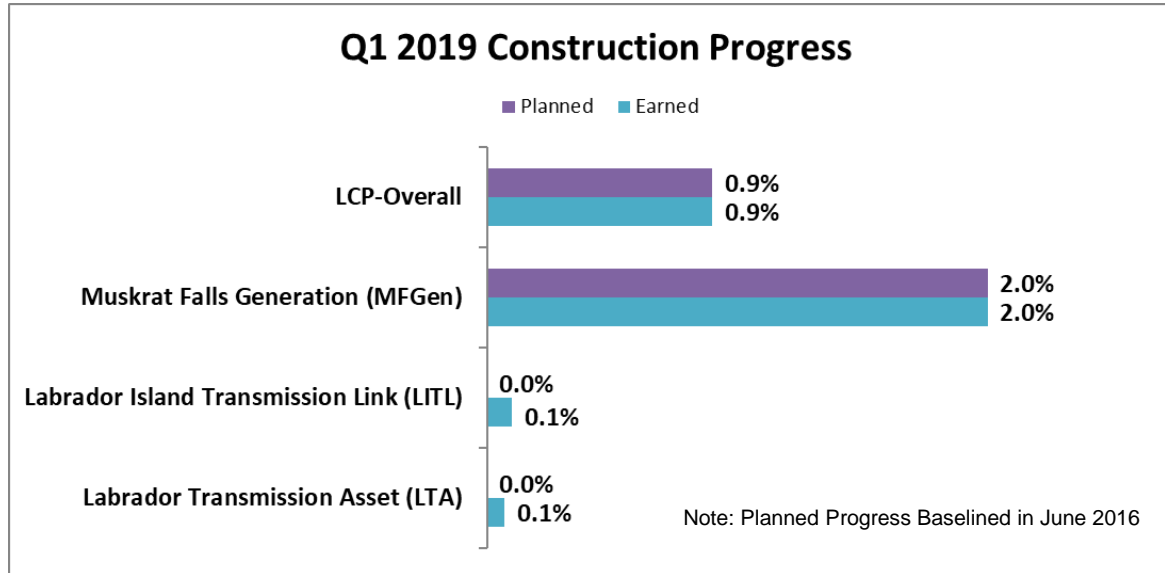
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# 1. Q1 2019 Cumulative Project Progress



## 2. Q1 2019 Performance Summary



## 3.0 Oversight Committee Reporting

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## 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 January 2019 to March 2019 period (Q1) and includes information on notable project activity up to the date of release of this report.
- 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 April 2019 – June 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 as an observer in two monthly calls on Nalcor project reporting to the IE and NRCan. The Department of Natural Resources Deputy Minister and Assistant Deputy Minister also participated in one of these calls.
- The Committee Executive Director participated in two calls with the IE and NRCan to review Nalcor monthly project reporting and ongoing and planned visits.
- On January 10, 2019 the Committee Executive Director and Committee legal representative met with Nalcor and external legal counsel discuss ongoing Litigation/Arbitration between Nalcor and Astaldi.
- On March 26, 2019 Vanessa Newhook, Independent Committee member concluded her time with the Committee. The Committee wishes to thank Ms. Newhook her volunteer effort and valuable contribution.

## 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.
- In December 3-6, 2018 the IE held technical meetings in Nalcor St. John's offices with project teams.
- Since this time, the IE has prepared a report for NRCAN and Nalcor summarizing the IE's observations from these visits. In this report, the IE has made several recommendations/suggestions primarily related to powerhouse, Protection and Controls (P&C) systems and intake bulkhead gate operation. Nalcor and the IE have advised that they are in discussion to conclude matters raised in the report.
- The Committee has requested that Nalcor provide a management response to the IE report once the IE recommendations/suggestions have been considered.
- The IE report and management response will be posted to the Committee website following finalization of discussions with the IE on the recommendations/suggestions and release of the report.



## 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 10-13 of this report.
- Over the reporting period the Committee noted:
  - North Dam physical scope is complete and is in service with demobilization of the contractor expected in June 2019;
  - Reservoir rim stability remained consistent over the Quarter;
  - Pennecon work (replacement contractor for Astaldi) in the powerhouse is progressing well;
  - Litigation and Arbitration proceedings are ongoing with Astaldi;
    - Astaldi is claiming up to \$800 million in damages and is required to submit its formal statement of claim by May 31, 2019; Nalcor is preparing a counter claim;
  - Protection and Controls (P&C) software completion for the HVdc system and schedule remains a key project risk which is now approaching the critical path for the overall project schedule;
  - Further issues have been identified in the Soldiers Pond synchronous condensers and remediation of already identified issues continues; and
  - Nalcor/NLH preparedness for interconnection and operations following Pole 1 transfer of power period and completion of bipole 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 P&C system to enhance functionality and reliability; associated warranty considerations with early asset handover during Pole 1 commissioning and completion;
- Continued LITL schedule milestone changes;
- Final completion and testing of HVdc system under low and full power, in-service system reliability, and timing of contractor release and effective warranty period; and
- P&C software completion to maintain project critical path and power delivery.

### D) Astaldi

- Completion 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, rotor lift and hydrogen system contamination and impact on milestone and overall project schedule for this activity.

### F) Insurance Claims and Coverage

- Claims ongoing: Synchronous condensers – As of June 2019, remedial work complete on unit 1 and 3 with dynamic commissioning ongoing; unit 2 assembly ongoing. Working with GE to optimize recovery through insurance coverage;
- Recently settled claims: Water ingress in section of LITL sub-sea cable - final payment received in June 2019; and
- Potential coverage: Preservation/re-preservation of Turbine and Generator parts - investigations ongoing; Powerhouse crane rail issues - investigations ongoing.

### G) Cofferdam Performance

- This risk will be retired in future reporting as the North Dam is now in service at the 25 meter supply level.

## 3.4 Risk and Issues being Monitored by the Committee

### H) Reservoir Rim Stability

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

### 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)

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

## 3.5 Subsequent Events to Q1 2019

- On April 1, 2019 The Committee Executive Director (Chair) participated in a call with Nalcor to discuss Nalcor 2018 and 2019 internal audit plans.
- On April 9, 2019 Nalcor held its 2019 Annual General Meeting. Financial statements can be found on the Nalcor website @ [Click here](#). Combined financial statements for the Lower Churchill Project Companies and Special Audit Procedures reports can be found on the Committee website @ [Click here](#) and [Click here](#).
- On April 10, 2019 The Committee Executive Director (Chair), Committee legal representative and Natural Resources Director met with Nalcor and external counsel to receive an update on the ongoing Litigation/Arbitration between Nalcor and Astaldi. The formal statement of claim from Astaldi against Nalcor was received on May 31, 2019. Obligations to Emera under the Project agreements were also discussed during this meeting.
- Committee members will be meeting with Nalcor and its external counsel on June 27, 2019 to discuss the Astaldi statement of claim and Nalcor counter claim.
- On April 24, 2019 the Committee Executive Director (Chair), Department of Natural Resources Assistant Deputy Minister and Director met with Newfoundland and Labrador Hydro (NLH) to discuss project integration and operations and HVdc Protection and Controls (P&C) and power transfer. NLH reports positive progress, however NLH is closely monitoring this progress with respect to schedule risk and asset functionality as results could impact power transfer capacity and reliability.

## 3.5 Subsequent Events to Q1 2019

- Powerhouse intake water up and cofferdam removal occurred in April 2019.
- A site visit by the dam safety review consultant (Hatch) was completed on April 15-17, 2019. The final report is pending and will be posted to the Muskrat Falls Project website once complete.
- In May 2019, Nalcor released a North Spur Stabilization Works Construction Report, Post Construction Assessment Report and follow up Addendum. These reports can be found on the Muskrat Falls Project website @ [Click here](#).
- On May 28, 2019 Nalcor released its Q1 2019 financial report. This report can be found on the Nalcor website @ [Click here](#).
- On June 19, 2019 the Minister of Natural Resources announced the appointments of new independent members Lynn Zurel CPA, CA, and Judy Morrow, QC, to fill vacancies on the Committee.
- On June 25, 2019 the Committee was advised by Power Supply that further schedule slippage of P&C bipole software delivery is anticipated. The Committee will report any changes to the schedule following review of project materials over the reporting period in preparation of the Committee's Q2, 2019 report.

## 4.0 Nalcor Reporting

- 4.1 Summary - Quarter Ending March 2019
- 4.2 Project Expenditures
- 4.3 Contingency
- 4.4 Earned Progress



## 4.1 Summary – Quarter Ending March 2019

- March 2019 Summary:
  - Overall construction progress is at 97.3%;
  - \$9,121 Million in incurred costs; and
  - \$9,383 Million in committed costs.
- Overall, the project is tracking in compliance with the June 2017 budget and schedule.
- As of March 2019, 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.
  - The June 2017 budget does not include funds for Additional Risks as reported in the December 2018, Q4 Committee Report (\$170-370 Million), or any potential cost risk associated with the Astaldi claim (up to \$800 Million - see page 21 for further details).
- The current forecast contingency budget at March 2019 is \$164.8 Million, an increase of \$54.8 Million from the previous Quarter. For further detail see Section 4.3.

## 4.1 Summary – Quarter Ending March 2019

### Quarterly Planned vs Incurred Cost Variances:

MFGen	
Cumulative Planned: \$5,061M	Q1 2019 Planned: \$149M
Cumulative Incurred: \$4,756M	Q1 2019 Incurred: \$120M
Variance: -\$305M (-6.0%)	Variance: -\$29M (-19.5%)

- Planned expenditure by month was set in June 2017.
- During Q1 2019, the variance in planned vs. incurred cost is primarily due to the recoupment of the letters of credit with respect to payment of liens under the terminated Contract for the Construction of the Intake, Powerhouse Spillway and Transition Dam (CH0007) and slower than planned expenditure related to the completion of the Balance of Plant scope.
- See Section 4.2 and Appendix B for further detail.

# 4.1 Summary – Quarter Ending March 2019

## Quarterly Planned vs Incurred Cost Variances:

LITL	
Cumulative Planned: \$3,698M	Q1 2019 Planned: \$28M
Cumulative Incurred: \$3,510M	Q1 2019 Incurred: \$46M
Variance: -\$188M (-5.1%)	Variance: \$18M (39.1%)
LTA	
Cumulative Planned: \$904M	Q1 2019 Planned: \$0M
Cumulative Incurred: \$855M	Q1 2019 Incurred: \$8M
Variance: -\$49M (-5.4%)	Variance: \$8M (100%)

- The planned expenditure by month was set in June of 2017.
- During Q1 2019, incurred was higher than planned due to extension of scope into 2019, whereas scope was planned to be substantially complete in 2018.
- See Section 4.2 and Appendix B for further detail.

## 4.1 Summary – Quarter Ending March 2019

### Planned vs Earned Progress:

- MFGen
  - Cumulative progress as of end Q1 2019 was 94.4% vs. a plan of 95.3% (variance of -0.9%). Quarterly progress for Q1 2019 was 2.0% vs. a plan of 2.0% (variance of 0%).
  - During the Quarter, the cumulative variance remained steady at 0.9% behind plan.
  - As noted in the previous 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 now 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 March 2019

### Power Development:

- The project remains on budget and on schedule with the June 2017 budget;
- Spillway and gates remain at 91% construction complete;
- Powerhouse is at (93% complete);
  - Intake 2 civil scope complete;
  - Unit 2 Pit Free achieved in February 2019;
  - Unit 3 generator slab complete; crane rail remediation scope completed in April 2019; and
  - Unit 4 pit walls complete; crane rail repairs ongoing.
- Arbitration with Astaldi continues; payment of Astaldi related liens against the project ongoing; Nalcor intends to recover any costs associated from Astaldi or the contract's securities.
- As of the end of March 2019, Astaldi has claimed up to \$800 Million in damages, Official Statement of Claim to be received by May 31, 2019.
- Funds are not held within the current June 2017 budget should net damages be awarded in Astaldi's favour.
- Power Development's March 2019 summary schedule forecast can be found on slide 24.

## 4.1 Summary – Quarter Ending March 2019

- Hydro Mechanical Installation
  - All physical work scope is completed for water tight; intake water-up commenced in April and commissioning in all 12 bays was completed in April;
  - Intake punchlist items progressing well and demobilization of intake deck ongoing;
  - Fabrication of 3<sup>rd</sup> set of spillway stop logs is ongoing; and
  - Trash cleaning machine final assembly ongoing with commissioning planned for early May.
- Turbines and Generators
  - Stator bar and protection and control panel Factory Acceptance Testing (FAT) is complete for Units 1 and 2 and ongoing for Unit 3; manufacturing ongoing for Unit 4;
  - Unit 1 preparation for rotor lift ongoing; rotor rim piling complete; outer head cover installed in pit and alignment ongoing; stator core stacking complete;
  - Unit 1 runner hub installation was delayed due to an alignment issue which has now has been resolved; however minimal float now remains against the Integrated Project Schedule (IPS);
  - Unit 1 stator bar installation is approximately 70% complete;
  - Night shift has been implement to reduce risk of schedule delays;
  - Unit 2 pit machining is ongoing (was completed in May); and
  - Units 3 and 4 are awaiting for handover from Pennecon to Andritz (both handed over in May).

## 4.1 Summary – Quarter Ending March 2019

- **Balance of Plant**
  - Cable tray and support installation is ongoing; lighting, battery installation at various powerhouse elevations continues;
  - Ongoing installation of pipes and supports for various systems and isolated phase bus (IPB) installation on Units 1 and 2;
  - Mechanical completion and commissioning continues;
  - The control room is ready for equipment installation; and
  - Priority has been given to ready to turn milestone.
- **North and South Dams**
  - All physical scope is complete; demobilization is ongoing with expected completion in June and North Dam is in service;
  - Spillway pressure relief holes work scope completed;
  - Ready for intake-water-up scope completed; and
  - Intake cofferdam removal completed in April.
- **Spillway Rollway Construction**
  - Rollways 2, 3, and 4 to be completed following spring freshette.
- Focus areas for Q2 2019 include execution of remaining powerhouse and spillway work, and preparations for reservoir impoundment.
- The forecast expenditure for the Q2 2019 is estimated at approximately \$108 Million.

# 4.1 Summary – Quarter Ending March 2019

## Power Development March 2019 Summary Schedule Forecast

Activity	2010	2011	2012	2013	2014	2015	2016	2017				2018				2019				2020				Comments
								Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Spillway		Spillway																						Spillway Complete 2016, Rollways Complete November 2019
Reservoir																								Impoundment Complete August 2019
Dams																								North RCC Dam Complete February 2019
Powerhouse: Intake																								Civil Complete October 2018, Embedments Complete March 2019, Hydromechanical Complete March 2019 Intake Channel Water Up April 2019
Powerhouse: Turbines & Generators																								Forecast in Compliance with AFE Rev 5 (P75) Planned Dates: Unit 1 Pit Free October 2018 Unit 1 Ready to Turn September 2019 1st Power (Grid Synch) October 2019 1st Commercial Power December 2019 Full Commercial Power July 2020

**Legend:** ◆ Current Forecast (March 2019) ◆ Planned Dates (June 2017 AFE Rev 5)



## 4.1 Summary – Quarter Ending March 2019

### Power Supply:

- The overall project remains on budget and on schedule with the June 2017 budget;
- Strait of Belle Isle (SOBI)
  - Construction complete (100%), commercially closed, and
  - Turned over to operations.
- Overland Transmission Assets (LITL (99.9%) and LTA (99.97%))
  - Construction complete; and
  - Commissioning and testing ongoing.
- HVdc Specialties (Churchill Falls, Muskrat Falls and Soldiers Pond)
  - Construction complete for Pole 1;
  - Pole1 assets energized;
  - Daily winter power transfer continued through March; and
  - Commissioning and energization activities ongoing.
- Power Supply's March 2019 summary schedule forecast can be found on slide 29.

## 4.1 Summary – Quarter Ending March 2019

- Pole 1 (Monopole) Status

LITL (Quarter 1 2019)	Availability
January	92%
February	72%
March	96%

- Pole 1 Power Transfer and P&C Software

- Since February 5, 2019 power transfer levels have fluctuated at restricted rates between 45-100 Megawatts due to an issue with P&C software;
  - On May 1, 2019 an updated version of P&C software (17c) was installed and commissioned over a four work period; and
  - As planned, the LITL was taken out of service in June to progress bipole completion.
- The Muskrat Falls and Soldiers Pond Converter Stations – Bipole Dynamic Commissioning Complete schedule milestone date has moved from February to March 2020.
  - For further details on schedule milestone dates see Appendix D.

## 4.1 Summary – Quarter Ending March 2018

### Bipole and P&C Software

- Following commissioning of monopole software 17c, a preliminary version of non operational bipole software will be installed in June for static checks and verification during the period June to September 2019;
- Installation and testing of hardware for bipole operation continues at Muskrat Falls and Soldiers Pond switchyards and converter stations in preparation for installation of Factory Acceptance Tested (FAT) bipole software which is scheduled to be delivered by GE at the end of August 2019;
- The August FAT bipole software is an interim version; functionality not required for low load testing is deferred to the final high power version of bipole software;
- August FAT bipole software dynamic testing at low load is planned through September and October 2019; following dynamic commissioning, the LITL will continue bipole operations until the final version is delivered;
- The final version of bipole software is expected to be delivered by GE in early 2020 followed by additional testing and trial operations period to be coordinated with NLH to ensure cost effective reliable delivery of power;
- Weekly meetings between GE and Nalcor are ongoing to discuss progress of bipole software development and Independent Third Party (ITP) reviewers are validating progress, functionality and completion deliverables under the GE amending agreement; and
- Bipole software completion and dynamic commissioning remains the largest risk for Power Supply. As of the end of March 2019, there is little if any schedule float remaining in the project schedule.

## 4.1 Summary – Quarter Ending March 2019

- **Synchronous Condensers**

- There are currently three issues with the Soldiers Pond synchronous condensers which are currently undergoing remediation and repair;
- Since the last reporting period two additional issues have been identified including an inability to achieve rotor lift on Unit 2, and hydrogen piping contamination on all units;

Issue	Status (as of April 2019)
Lube Oil Contamination	Unit 3 repair work ongoing and dynamic commissioning occurring on Units 1 and 2
Rotor Lift	Rotor lift tests successfully completed on Units 1 and 3 and Unit 3 dynamically tested; Unit 2 undergoing testing
Hydrogen Piping System	Quality issues detected in March 2019; debris discovered due to improper cleaning during assembly; inspection and remediation ongoing

- As of the end of March 2019, all three units are scheduled to be commissioned in Q3; potential for 3-6 week delay beyond this is being assessed; and
- Synchronous condensers are not on the projects critical path.
- The focus for Q2, 2019 remains on continued completions, commissioning and integration of operations; and
- The forecast expenditure for Q2, 2019 is estimated at approximately \$40 Million.

# 4.1 Summary – Quarter Ending March 2019

## Power Supply March 2019 Summary Schedule Forecast

Activity	2010	2011	2012	2013	2014	2015	2016	2017				2018				2019				2020				Comments		
								Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
Labrador Transmission Assets																									Ready for Power Transmission Achieved April 2018	
																										HVdc Transmission Line Complete December 2017
HVdc Pole 1																									- HVdc Energization Achieved June 2018 - Pole 1 Fully Energized and Power Transmission Ongoing Since December 2018	
HVdc Bipole																									- All Units Dynamically Commissioned September 2019 - Completion of BiPole Dynamic Commissioning (Ready for Power Transmission) March 2020	

**Legend:** ◆ Current Forecast (March 2019 update) ◆ Planned Dates (June 2017 AFE Rev 4)

## 4.2 Project Expenditures

March 2019 (\$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	\$1,031,392	\$970,731	(\$60,661)	92.5%	87.0%	-5.4%
<b>Feasibility Engineering</b>	\$37,072	\$37,073	\$35,847	(\$1,226)	100.0%	96.7%	-3.3%
<b>Environmental &amp; Regulatory Compliance</b>	\$42,669	\$41,821	\$38,464	(\$3,357)	97.9%	90.1%	-7.9%
<b>Aboriginal Affairs</b>	\$17,478	\$14,993	\$19,840	\$4,847	85.8%	113.5%	27.7%
<b>Procurement &amp; Construction</b>	\$8,475,290	\$8,464,547	\$7,983,902	(\$480,645)	99.9%	94.2%	-5.7%
<b>Commercial &amp; Legal</b>	\$90,423	\$73,096	\$72,113	(\$983)	80.8%	79.8%	-1.1%
<b>Contingency</b>	\$339,162	\$0	\$0	\$0	0.0%	0.0%	0.0%
<b>TOTAL</b>	\$10,117,328	\$9,662,922	\$9,120,897	(\$542,025)	95.5%	90.2%	-5.4%

March 2019 (\$000)	Project Budget June 2017 AFE	Incurred Cumulative Costs March 2019	Project Final Forecast Cost March 2019	Variance PFC from Budget
<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	\$970,731	\$1,167,700	(\$52,465)
<b>Feasibility Engineering</b>	\$37,072	\$35,847	\$35,847	\$1,225
<b>Environmental &amp; Regulatory Compliance</b>	\$42,699	\$38,464	\$41,408	\$1,291
<b>Aboriginal Affairs</b>	\$17,478	\$19,840	\$31,451	(\$13,973)
<b>Procurement &amp; Construction</b>	\$8,475,290	\$7,983,902	\$8,566,882	(\$91,592)
<b>Commercial &amp; Legal</b>	\$90,423	\$72,113	\$109,228	(\$18,805)
<b>Contingency</b>	\$339,162	\$0	\$164,811	\$174,351
<b>TOTAL</b>	\$10,117,328	\$9,120,897	\$10,117,327	0

Columns in tables may not total due to rounding

## 4.3 Contingency

Q1 March 2019 (\$000)	Project Budget June 2017 AFE	March 2018 AFE Adjustment	Project Forecast Cost December 2018	Project Forecast Cost March 2019	Change from Previous Quarter	Variance PFC from Budget
	<i>A</i>	-	<i>B</i>	<i>C</i>	<i>C - B</i>	<i>C - A</i>
Total Project	\$339,162	\$339,162	\$110,051	\$164,811	\$54,760	(\$174,351)

## 4.4 Earned Progress

Cumulative to end of March 2019	Weight Factor %	March 2019 Cumulative %			December 2018 Variance
		Planned	Earned	Variance	
<i>Sub-Project</i>	A	B	C	D = C - B	E
Muskrat Falls Generation (MFGGen)	46.3%	95.3%	94.4%	-0.9%	-0.9%
Labrador Island Transmission Link (LITL)	43.9%	100.0%	99.9%	-0.1%	-0.2%
Labrador Transmission Asset (LTA)	9.8%	100.0%	99.97%	-0.03%	0.1%
Muskrat Falls Project - Overall	100.0%	97.8%	97.3%	-0.5%	-0.5%

March 2019 Period	Weight Factor %	Period %		
		Planned	Earned	Variance
<i>Sub-Project</i>	A	B	C	D = C - B
Muskrat Falls Generation (MFGGen)	46.3%	1.1%	0.9%	-0.2%
Labrador Island Transmission Link (LITL)	43.9%	0.0%	0.0%	0.0%
Labrador Transmission Asset (LTA)	9.8%	0.0%	0.01%	0.0%
Muskrat Falls Project - Overall	100.0%	0.5%	0.4%	-0.1%



# Annex A

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

Columns in tables may not total due to rounding

# I. Project Capital Budget

Muskrat Falls Generating Facility (in \$ thousands)	June 2017 AFE
<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>
Labrador-Island Transmission Link (in \$ thousands)	March 2018 AFE
<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>
Labrador-Transmission Assets (in \$ thousands)	March 2018 AFE
<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>

Contingency Budget (in \$ thousands)	March 2018 AFE
<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
North Spur Works Ready for Diversion	Oct-16
River Diversion Complete	Feb-17
Reservoir Impoundment Complete	Nov-19
Powerhouse Unit 1 Commissioned - Ready for Operation	Dec-19
First Power from Muskrat Falls	Nov-19
Powerhouse Unit 2 Commissioned - Ready for Operation	Mar-20
Powerhouse Unit 3 Commissioned - Ready for Operation	Jun-20
Powerhouse Unit 4 Commissioned - Ready for Operation	Aug-20
Full Power from Muskrat Falls	Aug-20
Commissioning Complete - Commissioning Certificate Issued	Sep-20

Labrador-Island Transmission Link	June 2017 Planned Dates
SOBI Cable Systems Ready	Dec-16
Soldiers Pond Switchyard Ready to Energize	Aug-17
Ready for Power Transmission (LTA)	Dec-17
Muskrat Falls Converter Station Ready to Energize (Pole 1)	Jun-18
HVdc Transmission Line Construction Complete	Dec-17
Soldier's Pond Converter Station Ready to Energize (Pole 1)	Jun-18
1ST Power Transfer (Pole 1)	Jul-18
Soldiers Pond Synchronous Condenser Ready for Operation	Jun-18
Ready for Power Transmission (Low Load Testing Complete Pole 1)	Dec-18
Muskrat Falls and Soldiers Pond Converter Stations - Bipole Dynamic Testing Complete	Mar-19
Commissioning Complete - Commissioning Certificate Issued	Sep-20

Labrador Transmission Assets	June 2017 Planned Dates
HVAc Transmission Line Construction Complete	May-17
Churchill Falls Switchyard Ready to Energize	Nov-17
Muskrat Falls Switchyard Ready to Energize	Nov-17
Ready for Power Transmission	Dec-17
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

March 2019 (\$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	\$563,307	\$508,243	(\$55,064)	85.9%	77.5%	-8.4%
Feasibility Engineering	\$17,543	\$17,543	\$16,865	(\$678)	100.0%	96.1%	-3.9%
Environmental & Regulatory Compliance	\$27,125	\$26,680	\$26,063	(\$617)	98.4%	96.1%	-2.3%
Aboriginal Affairs	\$16,395	\$13,959	\$19,047	\$5,088	85.1%	116.2%	31.0%
Procurement & Construction	\$4,501,984	\$4,400,564	\$4,142,853	(\$257,711)	97.7%	92.0%	-5.7%
Commercial & Legal	\$54,760	\$39,295	\$43,172	\$3,877	71.8%	78.8%	7.1%
Contingency	\$226,400	\$0	\$0	\$0	0.0%	0.0%	0.0%
<b>TOTAL</b>	<b>\$5,500,056</b>	<b>\$5,061,346</b>	<b>\$4,756,244</b>	<b>(\$305,102)</b>	<b>92.0%</b>	<b>86.5%</b>	<b>-5.5%</b>

March 2019 (\$000)	Project Budget June 2017 AFE	Incurred Cumulative Costs March 2019
<i>Description</i>	<i>A</i>	<i>B</i>
NE-LCP Owners Team, Admin and EPCM Services	\$655,850	\$508,243
Feasibility Engineering	\$17,543	\$16,865
Environmental & Regulatory Compliance	\$27,125	\$26,063
Aboriginal Affairs	\$16,395	\$19,047
Procurement & Construction	\$4,501,984	\$4,142,853
Commercial & Legal	\$54,760	\$43,172
Contingency	\$226,400	\$0
<b>TOTAL</b>	<b>\$5,500,056</b>	<b>\$4,756,244</b>

## II. Labrador Island Transmission Link

March 2019 (\$000)	Project Budget March 2018 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>
NE-LCP Owners Team, Admin and EPCM Services	\$322,101	\$328,451	\$333,184	\$4,733	102.0%	103.4%	1.5%
Feasibility Engineering	\$19,167	\$19,167	\$18,679	(\$488)	100.0%	97.5%	-2.5%
Environmental & Regulatory Compliance	\$14,726	\$14,324	\$11,589	(\$2,735)	97.3%	78.7%	-18.6%
Aboriginal Affairs	\$1,003	\$954	\$625	(\$329)	95.1%	62.3%	-32.8%
Procurement & Construction	\$3,233,690	\$3,306,704	\$3,123,830	(\$182,874)	102.3%	96.6%	-5.7%
Commercial & Legal	\$30,280	\$28,418	\$22,239	(\$6,179)	93.9%	73.4%	-20.4%
Contingency	\$92,750	\$0	\$0	\$0	0.0%	0.0%	0.0%
<b>TOTAL</b>	<b>\$3,713,716</b>	<b>\$3,698,018</b>	<b>\$3,510,147</b>	<b>(\$187,871)</b>	<b>99.6%</b>	<b>94.5%</b>	<b>-5.1%</b>

March 2019 (\$000)	Project Budget March 2018 AFE	Incurred Costs Cumulative March 2019
<i>Description</i>	<i>A</i>	<i>B</i>
NE-LCP Owners Team, Admin and EPCM Services	\$322,101	\$333,184
Feasibility Engineering	\$19,167	\$18,679
Environmental & Regulatory Compliance	\$14,726	\$11,589
Aboriginal Affairs	\$1,003	\$625
Procurement & Construction	\$3,233,690	\$3,123,830
Commercial & Legal	\$30,280	\$22,239
Contingency	\$92,750	\$0
<b>TOTAL</b>	<b>\$3,713,716</b>	<b>\$3,510,147</b>

### III. Labrador Transmission Assets

March 2019 (\$000)	Project Budget March 2018 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>
NE-LCP Owners Team, Admin and EPCM Services	\$137,284	\$139,634	\$129,304	(\$10,330)	101.7%	94.2%	-7.5%
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	\$168	\$88	100.0%	210.0%	110.0%
Procurement & Construction	\$739,617	\$757,279	\$717,219	(\$40,060)	102.4%	97.0%	-5.4%
Commercial & Legal	\$5,383	\$5,383	\$6,702	\$1,319	100.0%	124.5%	24.5%
Contingency	\$20,012	\$0	\$0	\$0	0.0%	0.0%	0.0%
<b>TOTAL</b>	\$903,556	\$903,556	\$854,508	(\$49,048)	100.0%	94.6%	-5.4%

March 2019 (\$000)	Project Budget March 2018 AFE	Incurred Costs Cumulative March 2019
<i>Description</i>	<i>A</i>	<i>B</i>
NE-LCP Owners Team, Admin and EPCM Services	\$137,284	\$129,304
Feasibility Engineering	\$363	\$303
Environmental & Regulatory Compliance	\$817	\$812
Aboriginal Affairs	\$80	\$168
Procurement & Construction	\$739,617	\$717,219
Commercial & Legal	\$5,383	\$6,702
Contingency	\$20,012	\$0
<b>TOTAL</b>	\$903,556	\$854,508

# Annex C

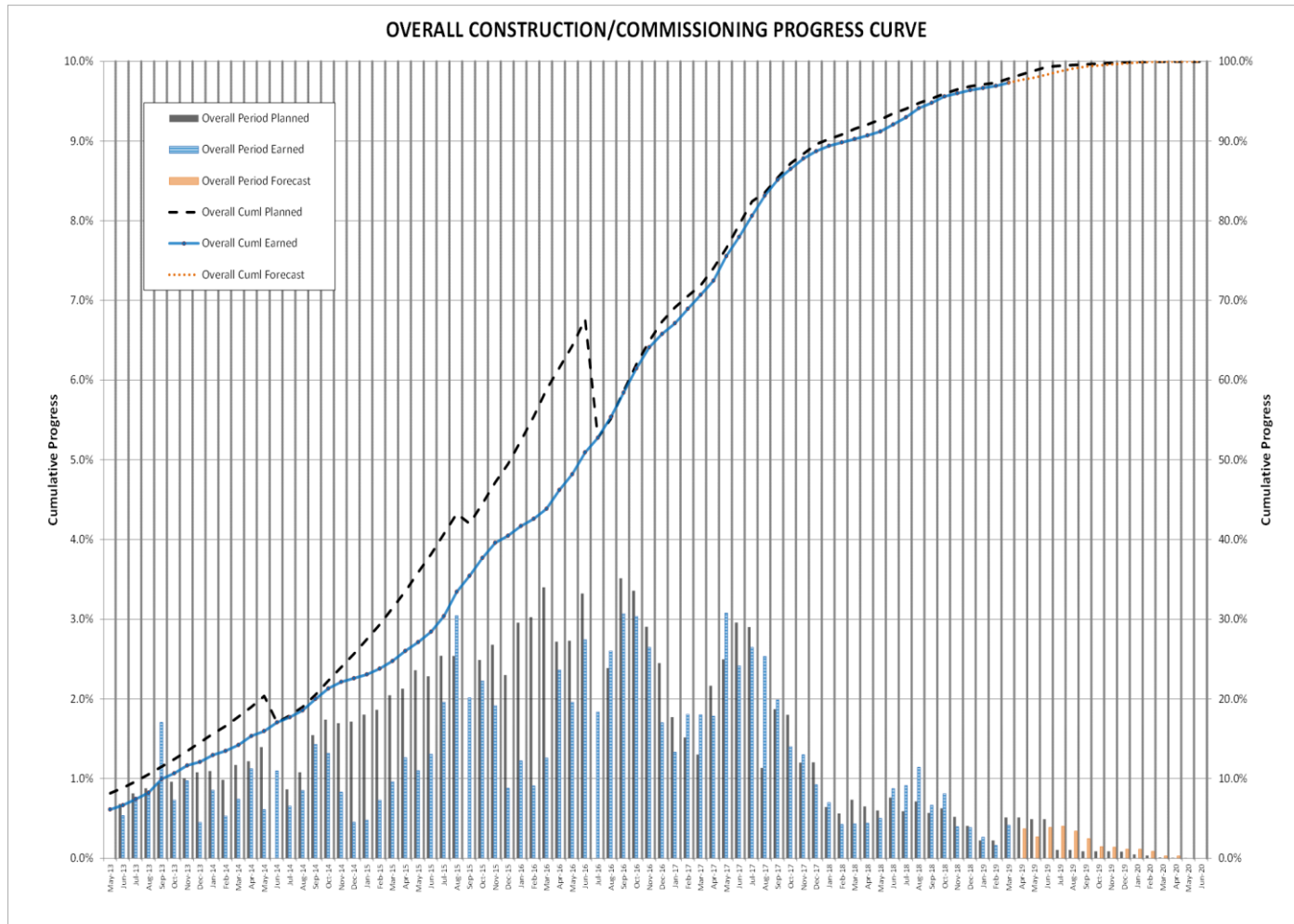
## Earned Progress

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

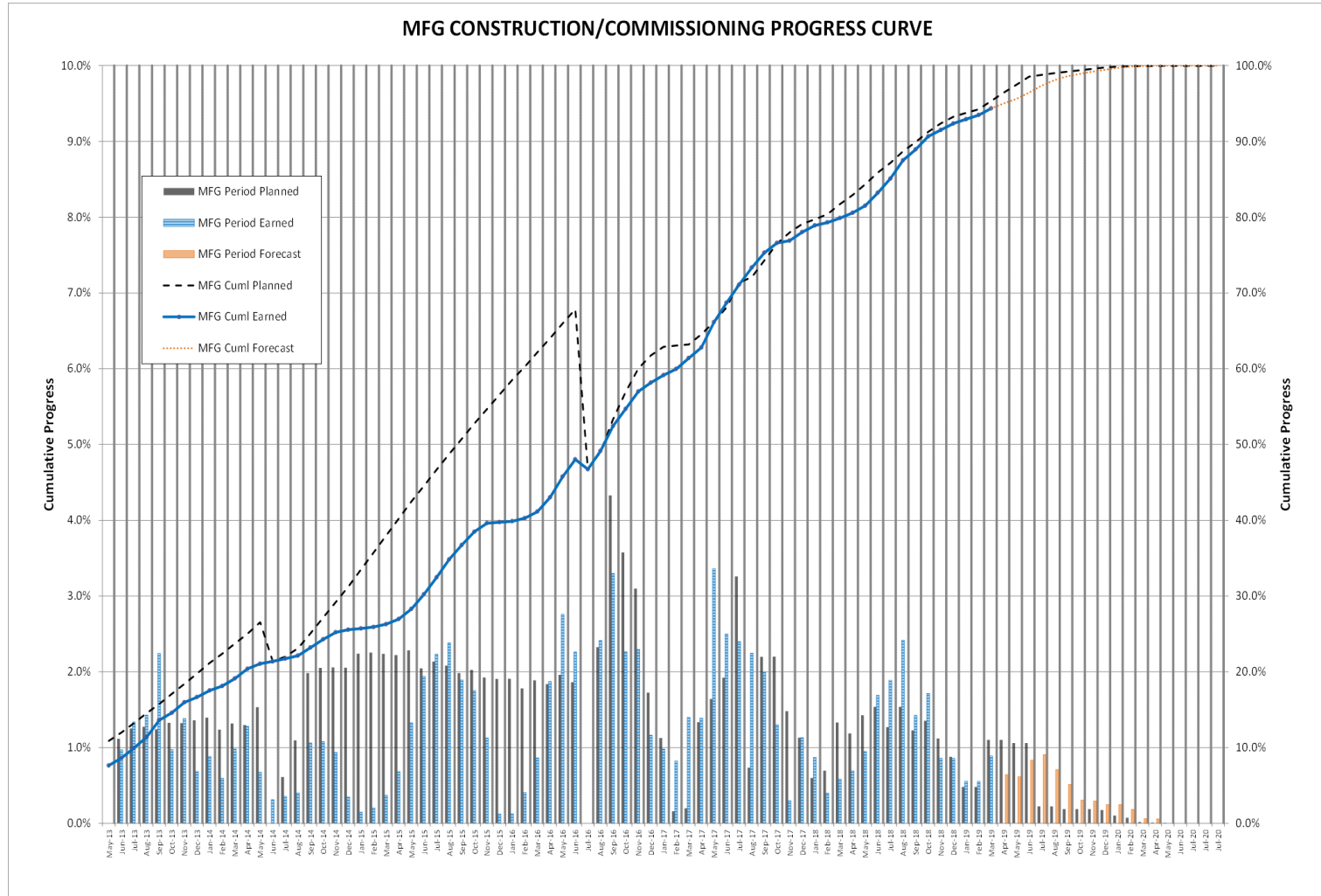
Columns in tables may not total due to rounding



# I. Overall Construction



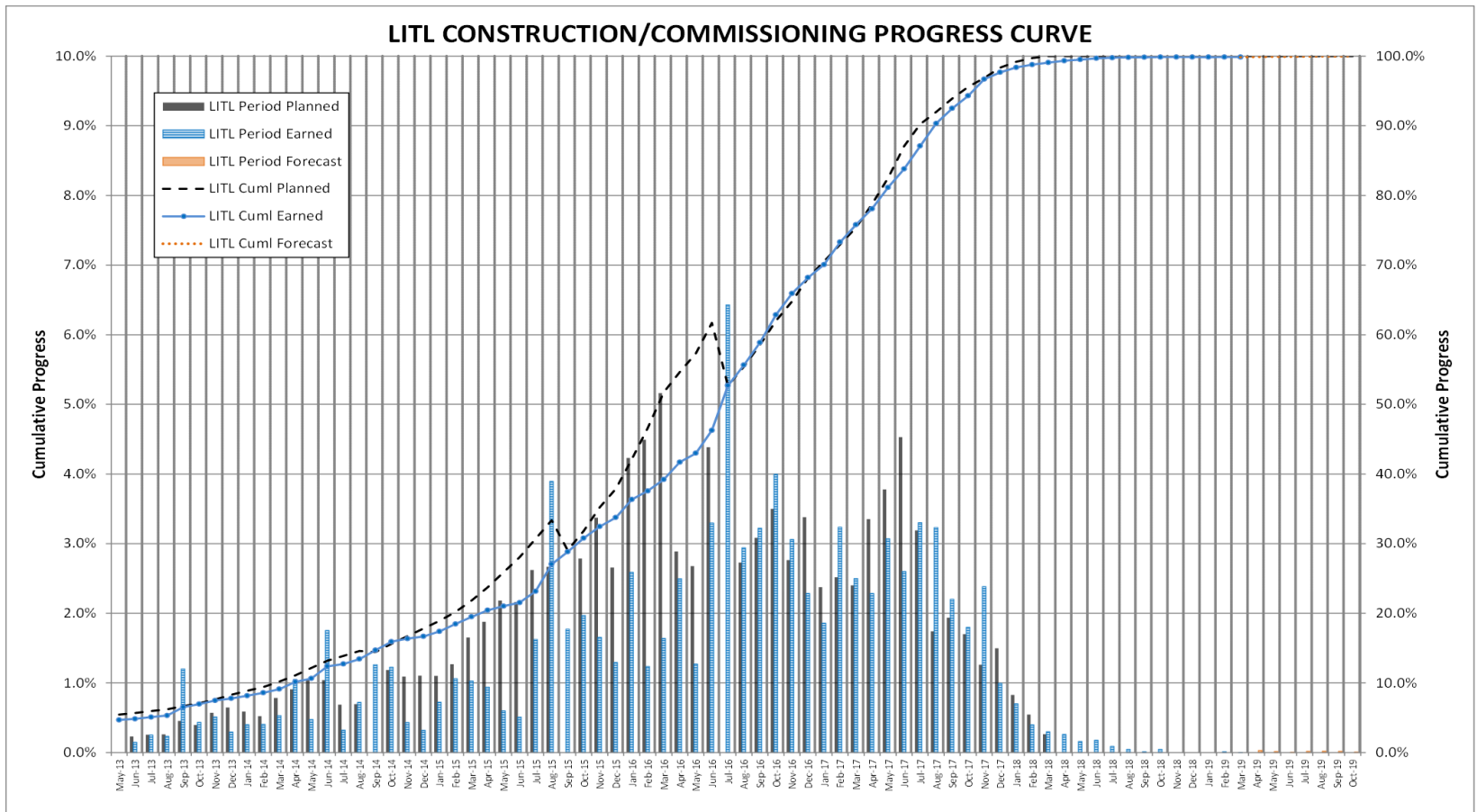
# II. Muskrat Falls Generation



## II. Muskrat Falls Generation

March 2019	Weight Factor %	March 2019 Cumulative %			December 2018
		Plan	Earned	Variance	Variance
<i>Sub-Project</i>	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%	-8.6%
MFG North Spur Stabilization	3.9%	100.0%	100.0%	0.0%	0.0%
MFG North Dam	5.7%	100.0%	100.0%	0.0%	-1.0%
MFG Powerhouse & Intake	61.3%	92.6%	92.7%	0.1%	0.3%
MFG South Dam	1.1%	100.0%	100.0%	0.0%	0.0%
MFG Misc:Eng/ 315kV/Site Rest./logistic	1.1%	90.3%	89.2%	-1.1%	-1.3%
MFGGen - Overall	100.0%	95.3%	94.4%	-0.9%	-0.9%
* Adjusted for MFGGen rollway installation schedule		94.3%	94.4%	0.1%	0.1%

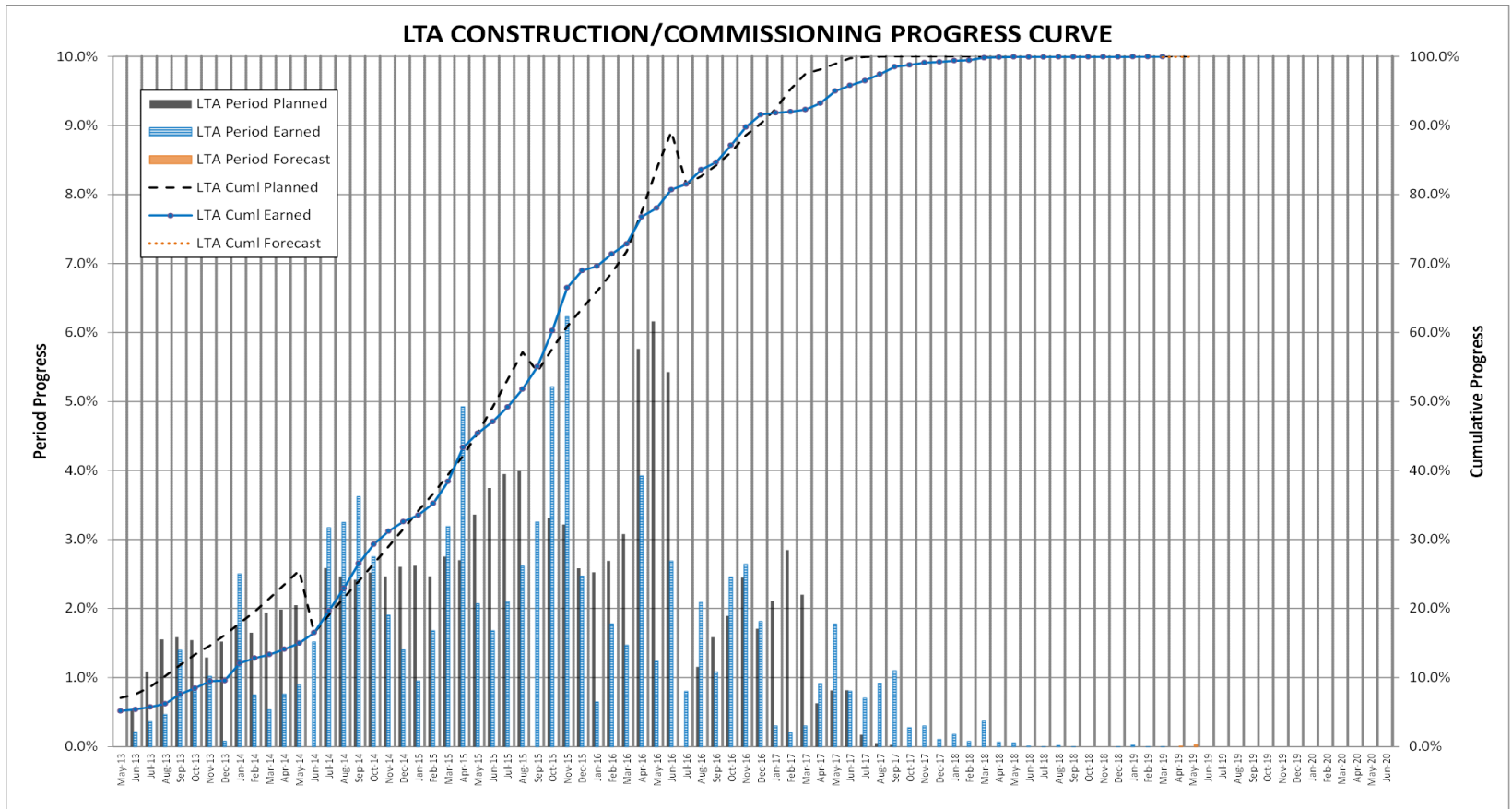
# III. Labrador Island Transmission Link



### III. Labrador Island Transmission Link

March 2019	Weight	March 2019 Cumulative %			December 2018
	Factor %	Plan	Earned	Variance	Variance
<i>Sub-Project</i>	A	B	C	D = C - B	E
LITL Muskrat Falls Converter	6.1%	100.0%	99.2%	-0.8%	-1.0%
LITL Soldiers Pond Converter	5.5%	100.0%	99.2%	-0.8%	-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. Condensers	3.1%	100.0%	99.6%	-0.4%	-0.4%
LITL Misc	1.4%	100.0%	98.1%	-1.9%	-2.9%
LITL- Overall	100.0%	100.0%	99.9%	-0.1%	-0.2%

# IV. Labrador Transmission Assets



## IV. Labrador Transmission Assets

March 2019	Weight	March 2019 Cumulative %			December
	Factor %	Plan	Earned	Variance	2018 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%	99.95%	0.05%	-0.1%
LTA Misc	2.1%	100.0%	98.6%	-1.4%	-2.4%
LTA - Overall	100.0%	100.0%	99.97%	0.03%	-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

March 2019	Planned Date June 2017	March 2019 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

March 2019	Planned Date June 2017	March 2019 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> 28-September-19
Ready for Power Transmission (Low Load Testing Complete Pole 1)	1-Dec-18	<sup>2</sup> 15-Jun-19
Muskrat Falls and Soldiers Pond Converter Stations - Bipole Dynamic Testing Complete	31-Mar-19	<sup>3</sup> 6-Mar-20
Commissioning Complete - Commissioning Certificate Issued	1-Sep-20	1-Sep-20

<sup>1</sup> < 1 month forecast date change since Q4 reporting period due to rotor lift on Unit 2 and hydrogen piping system; additional delay being assessed;

<sup>2</sup> 5 month forecast date change since Q4 2018 reporting period.

<sup>3</sup> < 1 month forecast change since Q4 2018 reporting period.

### III. Labrador Transmission Assets

March 2019	June 2017 Budget Planned Date	March 2019 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