

# Muskrat Falls Project Oversight Committee

Quarterly Project Update

Period Ending September 30, 2018

November 27, 2018

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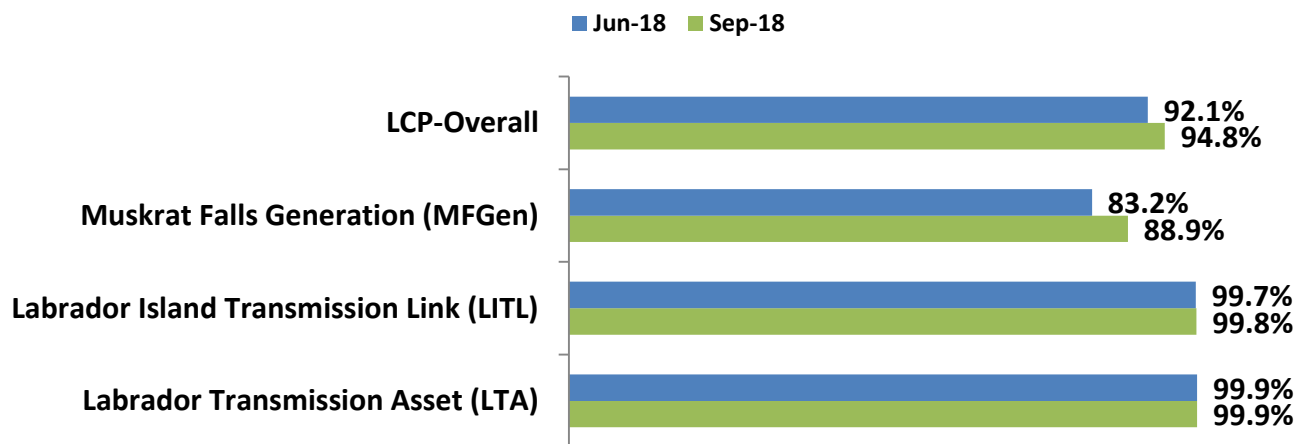
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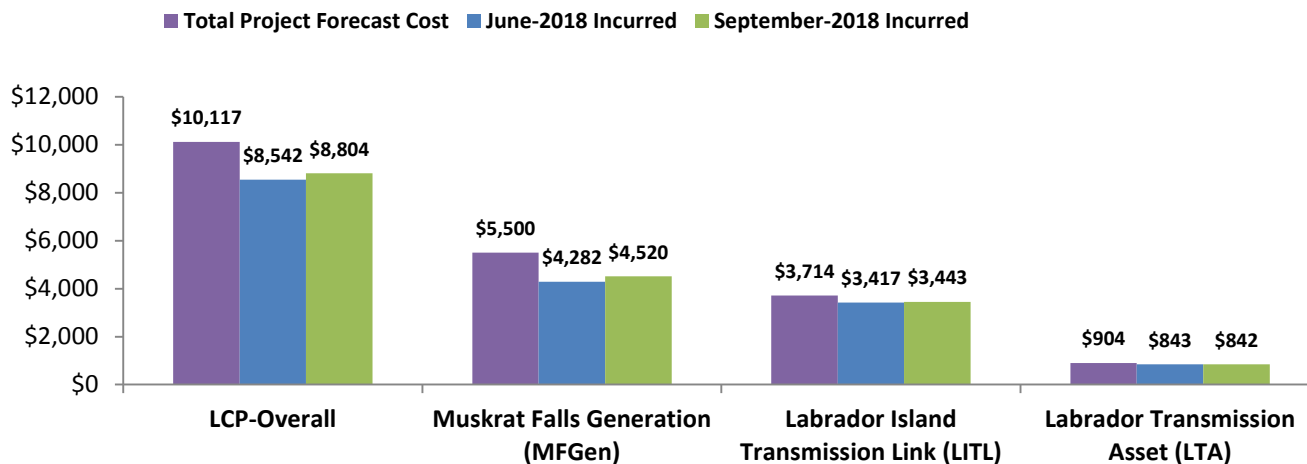
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# 1. Q3 2018 Cumulative Project Progress

## % Project Completion

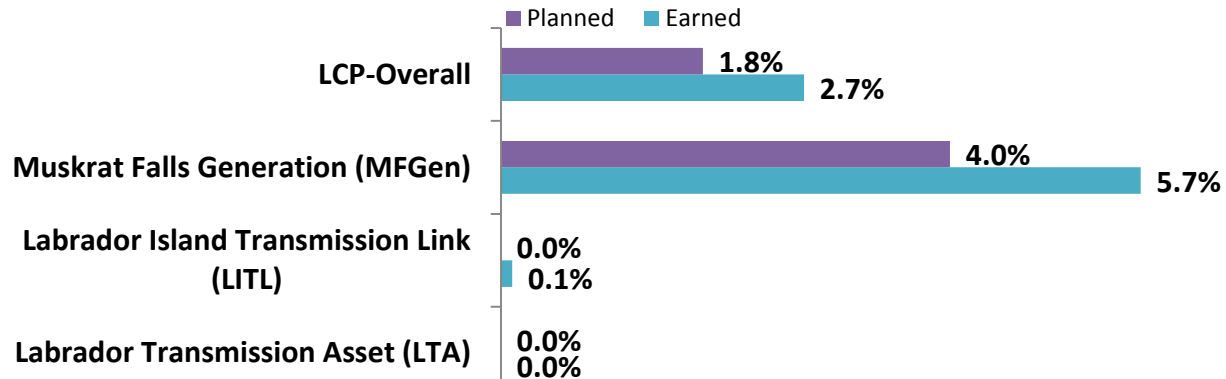


## Expenditures (Millions)



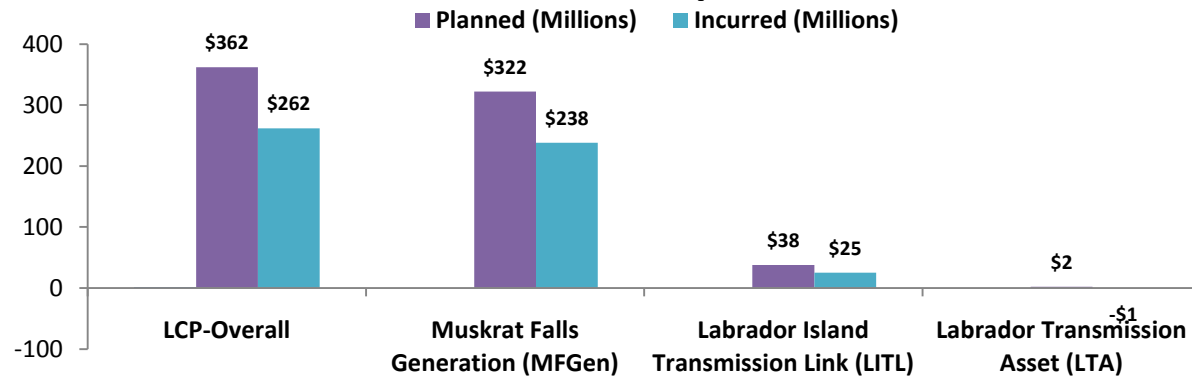
## 2. Q3 2018 Performance Summary

### Q3 2018 Construction Progress



Note: Planned Progress Baselined in June 2016

### Q3 2018 Expenditures



## 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 July 2018 to September 2018 period (Q3) 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 and includes a section on HVdc Pole 1 Schedule. 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 October 2018 – December 2018.

## 3.2 Committee Activities

- The Committee met on three 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 and the Committee Chair in one monthly call on Nalcor project reporting to the Independent Engineer (IE) and Natural Resources Canada (NRCan).
- The Committee Executive Director participated in three calls with the IE and NRCan to review Nalcor monthly project reporting and follow up on the IE's technical visits during the quarter.
- During the August 2018 Committee meeting, the Committee acknowledged the number of contractors working on the project was reducing and the commercial sensitivity of contingency reporting on a sub-project basis. A decision was taken that future Committee contingency reporting would be presented on the total project.

## 3.3 Independent Engineer Activities

- In August 2018, the IE visited the ABB Transformer Plant and the High Voltage Test Laboratory in Montreal. Five ABB manufactured GSU transformers will be installed in the Muskrat Falls generation plant (four operational plus one spare). The full IE report can be found on the Committee's website @ [Click here](#).
- In September 2018, the IE visited the Stafford Protection and Controls (P&C) software development site to review progress. The IE reported positive progress on software development, however risk remains.
- In November 2018, the IE visited the Andritz (Hemi Controls) manufacturing facility in Chambly, QC where the Protection & Controls equipment and software for the MFGGen plant is being developed and built. The IE's report once received will be posted to the Committee's website.



## 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.
- Over the reporting period the Committee noted:
  - North Dam concrete placement continued ahead of planned;
  - Reservoir rim stability has been consistent over the Quarter;
  - P&C software functionality is improving, but is not yet final;
  - Lube oil contamination in the Soldiers Pond synchronous condensers has been identified with a root cause analysis ongoing;
  - Issues that have triggered or may trigger potential for insurance coverage continue to be managed and addressed within the conditions of available insurance policies; and
  - Nalcor/NLH preparedness for interconnection and operations following Pole 1 transfer of power remains a key focus area for planning groups.

## 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

- Ability to meet aggressive Pole1 completion schedule for winter 18/19;
- Completion of Protection and Controls system to enhance functionality; associated warranty considerations with early asset handover during Pole 1 commissioning and completion;
- Resolution of commercial issues with GE;
- Testing of HVdc system under partial and full power, in-service system reliability, and timing of contractor release and effective warranty period;
- Reliability of system in advance of winter period; and
- Final completion of Protection and Controls software for Bi-Pole operation.

### D) Astaldi

- Timeliness of resumption of Astaldi scope of work including arbitration and litigation;
- Impact on other contractors; and
- Impact on project costs and schedule.

### E) Synchronous Condensers

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

## 3.4 Risk and Issues being Monitored by the Committee

### F) Insurance Claims and Coverage

- Claims ongoing: MFGen cofferdam repairs and berm protection - claim in progress;
- Recently settled claims: Draft Tube 2 form work failure - 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; synchronous condenser - investigations ongoing.

### G) Cofferdam Performance

- Risk significantly reducing as North Dam concrete placement is now complete and dam foundation grouting program ongoing.

### H) Reservoir Rim Stability

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

### I) IEAC Mitigation Recommendations to the Minister of MAE

- Potential impact on cost and schedule depending on outcomes.

### J) 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.

## 3.4 Risk and Issues being Monitored by the Committee

### K) Project Delivery Team Retention

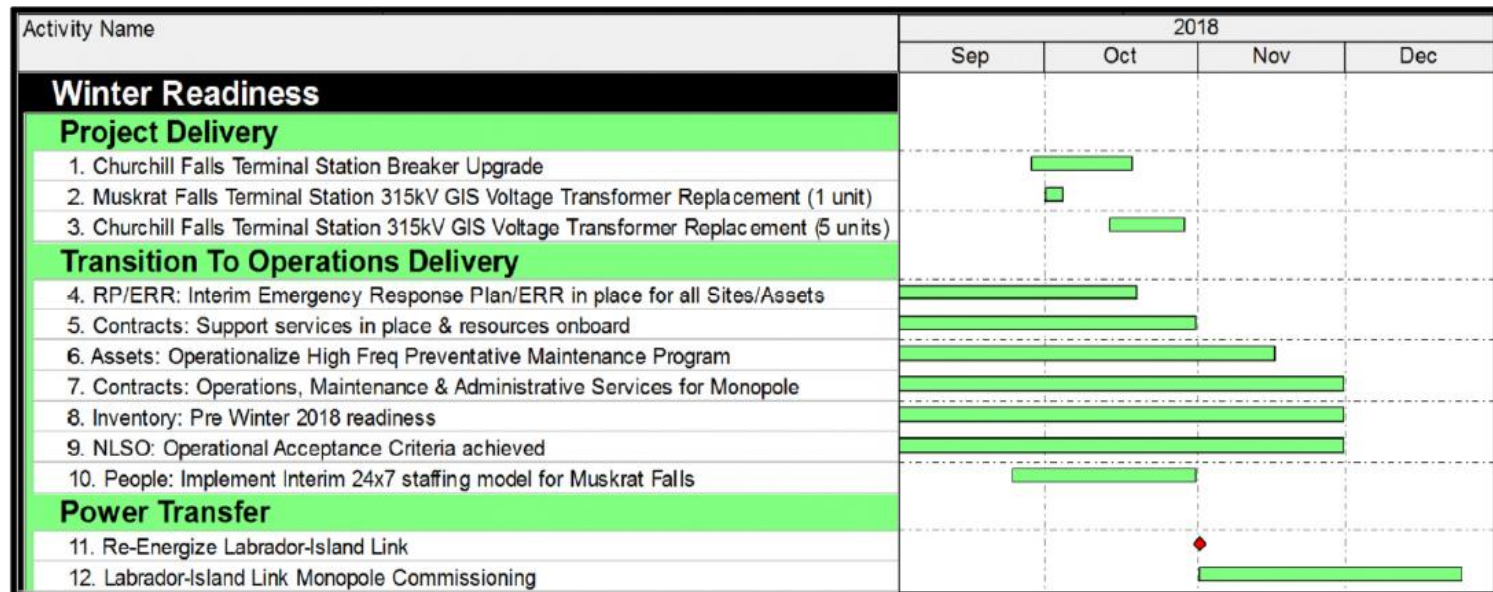
- Project Team personnel departures and potential impact on project completion; and
- Departures continued to occur over the Quarter.

### L) 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.

## 3.5 HVdc Schedule - Pole 1

- In this report, the Committee has included Nalcor's schedule for Pole 1 power transfer from Churchill Falls to the Island. This October 25, 2018 schedule identifies planned project activities that have been ongoing since taking the LITL out of service in late August 2018 and to deliver reliable power through the 18/19 winter period.



- The LITL was reenergized on November 1, 2018.
- Decision to determine power transfer load over the LITL is to be made by the Newfoundland and Labrador System Operator (NLSO).

## 3.6 Subsequent Events to Q3

- Completion of the North Dam concrete placement program occurred on October 15, 2018.
- On October 18, 2018 a Stop Work order was issued by Nalcor for Astaldi work under the Intake, Powerhouse, Spillway and Transition Dams contract. On November 8, 2018 Nalcor issued a Notice of Termination to Astaldi for the contract. Nalcor and Astaldi are currently subject to an Arbitration proceeding. Nalcor is in discussion with Pennecon Energy to complete the remaining work scope.
- The IE's June 2018 LCP Project Site Visit and Meetings Report as referenced in the June 2018 Q2 Committee Report was released in October 2018 and can be found on the Committee's website @ [Click here](#).
- Power Transfer on Pole 1 of the HVdc transmission system resumed on November 1, 2018 following upgrades to breakers and replacement of defective transformers which were identified during dynamic commissioning.
- On November 16, 2018, Nalcor released its Q3 financial results which are available on the Nalcor website @ [Click here](#).
- A Quantitative Risk Assessment (QRA) has been completed for the project. The assessment noted that the current June 2017 Project Budget is sufficient to complete the project with the exception of Additional Risks as noted on page 13 of this report. A range of \$170 - \$370 Million was provided.

## 4.0 Nalcor Reporting

- 4.1 Summary - Quarter Ending September 2018
- 4.2 Project Expenditures
- 4.3 Contingency
- 4.4 Earned Progress



## 4.1 Summary – Quarter Ending September 2018

- September 2018 Summary:
  - Overall construction progress is at 94.8%;
  - \$8,804 Million in incurred costs; and
  - \$9,291 Million in committed costs.
- The project is tracking in compliance with the June 2017 budget and schedule.
- September 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 (See page 13 for further details).
- The current forecast contingency budget at September 2018 is \$179.9 Million, a decrease of \$95.5 Million from the previous Quarter. For further detail see Section 4.3.

## 4.1 Summary – Quarter Ending September 2018

### Quarterly Planned vs Incurred Cost Variances:

| MFGGen                        |                           |
|-------------------------------|---------------------------|
| Cumulative Planned: \$4,652M  | Q3 2018 Planned: \$322M   |
| Cumulative Incurred: \$4,520M | Q3 2018 Incurred: \$238M  |
| Variance: -\$133M (-2.9%)     | Variance: -\$84M (-26.1%) |

- Planned expenditure by month was set in June 2017.
- During Q3 2018, contingency and package growth allowance was utilized at a slower rate than estimated which accounts for approximately 30% of the variance for Q3. The remaining variance is due to lower expenditures related to Nalcor project team costs and site services and slower than planned expenditures related to the Construction of the Intake, Powerhouse Spillway and Transition Dam, Installation of Turbines and Generators, Installation of Mechanical and Electrical Auxiliaries and Installation of Hydro-mechanical Equipment scopes of work; offset by higher than planned expenditures during the quarter related to the North Dam scope of work.
- See Section 4.2 and Appendix B for further detail.

## 4.1 Summary – Quarter Ending September 2018

### Quarterly Planned vs Incurred Cost Variances:

| LITL                          |                           |
|-------------------------------|---------------------------|
| Cumulative Planned: \$3,641M  | Q3 2018 Planned: \$38M    |
| Cumulative Incurred: \$3,443M | Q3 2018 Incurred: \$25M   |
| Variance: -\$198M (-5.3%)     | Variance: -\$13M (-34.2%) |
| LTA                           |                           |
| Cumulative Planned: \$896M    | Q3 2018 Planned: \$2M     |
| Cumulative Incurred: \$842M   | Q3 2018 Incurred: -\$1M   |
| Variance: -\$53M (-5.9%)      | Variance: -\$3M (-150%)   |

- The planned expenditure by month was set in June of 2017. During Q3 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.
- The project does not consider the lower than anticipated incurred as a concern/risk. Westney Consulting, Nalcor's third party risk assessment consultant, has validated that the conservative approach taken is prudent.
- The negative cost incurred for LTA during this Quarter is due to reconciliation of historical costs, and addresses the outstanding balance of HVac Transmission line reclamation work.
- See Section 4.2 and Appendix B for further detail.

## 4.1 Summary – Quarter Ending September 2018

### Planned vs Earned Progress:

- MFGGen
  - Cumulative progress as of end Q3 2018 was 88.9% vs. a plan of 89.9% (variance of -1.0%). Quarterly progress for Q3 2018 was 5.7% vs. a plan of 4.0% (variance of 1.7%).
  - During the quarter, the cumulative variance was reduced from 2.7% behind plan to 1.0% behind plan. This was due to greater than planned progress in both the North Dam and the Powerhouse & Intake scopes of work. The current cumulative variance is entirely within the work area of the Spillway and Gates.
  - As noted in the Q2 report, over the past 2 years the planned timing of installation of the rollways has changed. The first 2 rollways are nearing completion and the last 3 are planned for installation in 2019. Due to this change, 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.

## 4.1 Summary – Quarter Ending September 2018

### Power Development:

- The project remains on budget and on schedule with the June 2017 budget;
- Spillway and gates are 90% complete;
- Powerhouse is 85% complete;
  - Hydro-mechanical and turbine and generator embedment and installation and Balance of Plant work ongoing;
  - Powerhouse Concrete Placement;

|        |   |
|--------|---|
| Unit 1 | Pit Free work substantially complete in September – remaining work completed in October;                                |
| Unit 2 | Stage 7 concrete – all 5 lifts complete up to the turbine floor, pit wall poured and stripped, generator floor ongoing; |
| Unit 3 | Stage 7 Concrete – all 5 lifts complete up to the turbine floor, pit walls ongoing; and                                 |
| Unit 4 | Stage 7 concrete – lifts 1,2, and 3 complete, lifts 4 and 5 ongoing.  |

- Intake 4 civil works has been completed, handover to Andritz for guides installation was achieved in October;
- Phase 1 of T&G preservation work is complete; Phase 2 in progress since August and intended to be completed by year end;
- Stator bar and protection and control panel manufacturing ongoing; and
- Balance of Plant progressing well.

## 4.1 Summary – Quarter Ending September 2018

- North Dam
  - 94% complete as of the end of September; final concrete placement completed on October 15, 2018;
  - Last season concrete coring program complete; no issues identified to date; lab testing ongoing;
  - Drilling crest drainage holes and crusher dismantling complete; and
  - Drilling and grouting program, tailrace channel fill removal, tailrace rock plug excavation, installation of tail race rock bolts and temporary upstream bridge removal ongoing.
- Spillway rollway construction ongoing
  - Rollways 1 and 5 completed in October 2018; 2, 3, and 4 to be completed next season.
- In September, an Incentive Funding Agreement was signed with Astaldi which included bonus incentives for Pit Free required completion dates for Units 1 and 2 to enable turbine and generator installation, as well as additional advance payments. All advance payments are secured.
- In September, Amending Agreement #2 was signed with Andritz to advance the water tight date for the Powerhouse Intake. The advancement of the water tight date ensures the powerhouse is protected from potential flooding in spring 2019 and removes completion of the intakes from the project critical path.

## 4.1 Summary – Quarter Ending September 2018

- On October 18, 2018 a Stop Work order was issued by Nalcor for Astaldi work under the Intake, Powerhouse, Spillway and Transition Dams contract. On November 8, 2018 Nalcor issued a Notice of Termination to Astaldi for the contract. Nalcor and Astaldi are currently subject to an Arbitration proceeding. Nalcor is in discussion with Pennecon Energy to complete the remaining work scope.
- Focus areas for Q4 2018 include: schedule optimization; execution of 2018 powerhouse work scopes and completion of North Dam construction activities.
- The forecast expenditure for the Q4 2018 is estimated at approximately \$250 Million.

## 4.1 Summary – Quarter Ending September 2018

### Power Supply:

- The project remains on budget and on schedule with the June 2017 budget;
- Strait of Belle Isle (SOBI)
  - Handover and Turnover has been achieved.
- Labrador Transmission Asset (LTA)
  - Handover and Turnover of the HVac overhead transmission line is complete.
- Labrador Island Transmission Link (LITL)
  - Overhead Transmission Line
    - Handover from contractor completed in April; Turnover to Operations completed in May.
  - HVdc Specialties;
    - First power transfer was achieved in June 2018 with completion of 45 megawatt heat run;
    - Re-energization of the HVdc transmission system occurred on November 1, 2018; Commissioning and energization activities ongoing; early in-service planned for end of Q4, 2018; and
    - A synchronous condenser lube oil contamination issue was identified during final static commissioning. Root cause analysis is ongoing.



## 4.1 Summary – Quarter Ending September 2018

- Protection and Controls (P&C)
  - Pole 1 HVdc protection and control (P&C) system remains on the critical path for winter 18/19 reliability;
  - Development and delivery of the 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 for Pole 1 is focused on winter reliability and enhanced functionality;
  - Pole 2 final construction and commissioning ongoing;
  - Nalcor staff are on a continual rotation at the P&C software development site providing technical support and oversight; and
  - The Nalcor project team is working with GE to resolve commercial issues.

## 4.1 Summary – Quarter Ending September 2018

- Synchronous Condensers (not required for winter power transfer)
  - The Soldiers Pond Synchronous Condenser Ready for operation forecast date has been adjusted by 5 months from Quarter 2 due to a lube oil contamination issue. This 5 month schedule adjustment is subject to determining the root cause for the contamination and enacting a resolution plan;
    - Unit 1 has been disassembled to inspect internal components; and an external expert has been engaged.
- The focus for Q4, 2018 remains on continued completions, commissioning and integration of operations; and
- The forecast expenditure for Q4, 2018 is estimated at approximately \$69 Million.

## 4.2 Project Expenditures

| September 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                  | \$965,797     | \$923,669   | (\$42,128)  | 86.6%        | 82.8%        | -3.8%      |
| <b>Feasibility Engineering</b>                     | \$37,072                     | \$37,073      | \$35,894    | (\$1,179)   | 100.0%       | 96.8%        | -3.2%      |
| <b>Environmental &amp; Regulatory Compliance</b>   | \$42,699                     | \$40,458      | \$38,216    | (\$2,242)   | 94.8%        | 89.5%        | -5.3%      |
| <b>Aboriginal Affairs</b>                          | \$17,478                     | \$14,061      | \$16,983    | \$2,922     | 80.4%        | 97.2%        | 16.7%      |
| <b>Procurement &amp; Construction</b>              | \$8,475,290                  | \$8,067,309   | \$7,726,922 | (\$340,387) | 95.2%        | 91.2%        | -4.0%      |
| <b>Commercial &amp; Legal</b>                      | \$90,423                     | \$64,208      | \$62,783    | (\$1,425)   | 71.0%        | 69.4%        | -1.6%      |
| <b>Contingency</b>                                 | \$339,162                    | \$0           | \$0         | \$0         | 0.0%         | 0.0%         | 0.0%       |
| <b>TOTAL</b>                                       | \$10,117,328                 | \$9,188,906   | \$8,804,467 | (\$384,439) | 90.8%        | 87.0%        | -3.8%      |

| September 2018 (\$000)                             | Project Budget June 2017 AFE | Incurred Cumulative Costs September 2018 | Project Final Forecast Cost September 2018 | 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                  | \$923,669                                | \$1,141,310                                | (\$26,075)               |
| <b>Feasibility Engineering</b>                     | \$37,072                     | \$35,894                                 | \$35,894                                   | \$1,178                  |
| <b>Environmental &amp; Regulatory Compliance</b>   | \$42,699                     | \$38,216                                 | \$43,408                                   | (\$709)                  |
| <b>Aboriginal Affairs</b>                          | \$17,478                     | \$16,983                                 | \$31,451                                   | (\$13,973)               |
| <b>Procurement &amp; Construction</b>              | \$8,475,290                  | \$7,726,922                              | \$8,585,145                                | (\$109,855)              |
| <b>Commercial &amp; Legal</b>                      | \$90,423                     | \$62,783                                 | \$100,228                                  | (\$9,805)                |
| <b>Contingency</b>                                 | \$339,162                    | \$0                                      | \$179,892                                  | \$159,270                |
| <b>TOTAL</b>                                       | \$10,117,328                 | \$8,804,467                              | \$10,117,328                               | \$0                      |

Columns in tables may not total due to rounding

## 4.3 Contingency

| Q3 September 2018 (\$000) | Project Budget<br>June 2017 AFE | March 2018<br>AFE<br>Adjustment | Project<br>Forecast Cost<br>June 2018 | Project<br>Forecast Cost<br>September<br>2018 | Change from<br>Previous<br>Quarter | Variance PFC<br>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                       | \$275,402                             | \$179,892                                     | (\$95,510)                         | (\$159,270)                 |

## 4.4 Earned Progress

| Cumulative to end of September 2018      | Weight Factor % | September 2018 Cumulative % |        |           | June 2018 Variance |
|--|-----------------|-----------------------------|--------|-----------|--------------------|
|  |                 | Planned                     | Earned | Variance  |                    |
| <i>Sub-Project</i>                       | A               | B                           | C      | D = C - B | E                  |
| Muskrat Falls Generation (MFGGen)        | 46.3%           | 89.9%                       | 88.9%  | -1.0%     | -2.7%              |
| Labrador Island Transmission Link (LITL) | 43.9%           | 100.0%                      | 99.8%  | -0.2%     | -0.3%              |
| Labrador Transmission Asset (LTA)        | 9.8%            | 100.0%                      | 99.9%  | -0.1%     | -0.1%              |
| Muskrat Falls Project - Overall          | 100.0%          | 95.3%                       | 94.8%  | -0.5%     | -1.4%              |

| September 2018 Period                    | Weight Factor % | Period % |        |           |
|--|-----------------|----------|--------|-----------|
|  |                 | Planned  | Earned | Variance  |
| <i>Sub-Project</i>                       | A               | B        | C      | D = C - B |
| Muskrat Falls Generation (MFGGen)        | 46.3%           | 1.2%     | 1.4%   | 0.2%      |
| 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%          | 0.5%     | 0.7%   | 0.2%      |

# Annex A

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

Columns in tables may not total due to rounding

# I. Project Capital Budget

| Muskkrat 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>Muskkrat 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>\$3,723,716</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>\$893,556</b>      |
| <b>Muskkrat Falls Capital Cost Budget Total</b>            | <b>\$10,117,328</b>   |

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

### 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

| September 2018 (\$000)                      | Project Budget<br>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                       | \$515,028          | \$483,441          | (\$31,587)         | 78.5%        | 73.7%        | -4.8%        |
| Feasibility Engineering                     | \$17,543                        | \$17,543           | \$16,874           | (\$669)            | 100.0%       | 96.2%        | -3.8%        |
| Environmental & Regulatory Compliance       | \$27,125                        | \$26,122           | \$25,836           | (\$286)            | 96.3%        | 95.2%        | -1.1%        |
| Aboriginal Affairs                          | \$16,395                        | \$13,125           | \$16,198           | \$3,073            | 80.1%        | 98.8%        | 18.7%        |
| Procurement & Construction                  | \$4,501,984                     | \$4,046,484        | \$3,940,926        | (\$105,558)        | 89.9%        | 87.5%        | -2.3%        |
| Commercial & Legal                          | \$54,760                        | \$34,130           | \$36,487           | \$2,357            | 62.3%        | 66.6%        | 4.3%         |
| Contingency                                 | \$226,400                       | \$0                | \$0                | \$0                | 0.0%         | 0.0%         | 0.0%         |
| <b>TOTAL</b>                                | <b>\$5,500,056</b>              | <b>\$4,652,431</b> | <b>\$4,519,763</b> | <b>(\$132,668)</b> | <b>84.6%</b> | <b>82.2%</b> | <b>-2.4%</b> |

| September 2018 (\$000)                      | Project Budget June<br>2017 AFE | Incurred Cumulative<br>Costs<br>September 2018 |
|---|---------------------------------|--|
| <i>Description</i>                          | <i>A</i>                        | <i>B</i>                                       |
| NE-LCP Owners Team, Admin and EPCM Services | \$655,850                       | \$483,441                                      |
| Feasibility Engineering                     | \$17,543                        | \$16,874                                       |
| Environmental & Regulatory Compliance       | \$27,125                        | \$25,836                                       |
| Aboriginal Affairs                          | \$16,395                        | \$16,198                                       |
| Procurement & Construction                  | \$4,501,984                     | \$3,940,926                                    |
| Commercial & Legal                          | \$54,760                        | \$36,487                                       |
| Contingency                                 | \$226,400                       | \$0  |
| <b>TOTAL</b>                                | <b>\$5,500,056</b>              | <b>\$4,519,763</b>                             |

## II. Labrador Island Transmission Link

| September 2018 (\$000)                      | Project Budget<br>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                        | \$311,435          | \$312,131          | \$696              | 96.7%        | 96.9%        | 0.2%         |
| Feasibility Engineering                     | \$19,167                         | \$19,167           | \$18,717           | (\$450)            | 100.0%       | 97.7%        | -2.3%        |
| Environmental & Regulatory Compliance       | \$14,726                         | \$13,519           | \$11,568           | (\$1,951)          | 91.8%        | 78.6%        | -13.2%       |
| Aboriginal Affairs                          | \$1,003                          | \$856              | \$618              | (\$238)            | 85.3%        | 61.6%        | -23.7%       |
| Procurement & Construction                  | \$3,233,690                      | \$3,271,205        | \$3,078,979        | (\$192,226)        | 101.2%       | 95.2%        | -5.9%        |
| Commercial & Legal                          | \$30,280                         | \$24,695           | \$20,523           | (\$4,172)          | 81.6%        | 67.8%        | -13.8%       |
| Contingency                                 | \$92,750                         | \$0                | \$0                | \$0                | 0.0%         | 0.0%         | 0.0%         |
| <b>TOTAL</b>                                | <b>\$3,713,716</b>               | <b>\$3,640,877</b> | <b>\$3,442,536</b> | <b>(\$198,341)</b> | <b>98.0%</b> | <b>92.7%</b> | <b>-5.3%</b> |

| September 2018 (\$000)                      | Project Budget<br>March 2018 AFE | Incurred Costs<br>Cumulative September 2018 |
|---|----------------------------------|---|
|   |                                  |   |
| <i>Description</i>                          | <i>A</i>                         | <i>B</i>                                    |
| NE-LCP Owners Team, Admin and EPCM Services | \$322,101                        | \$312,131                                   |
| Feasibility Engineering                     | \$19,167                         | \$18,717                                    |
| Environmental & Regulatory Compliance       | \$14,726                         | \$11,568                                    |
| Aboriginal Affairs                          | \$1,003                          | \$618                                       |
| Procurement & Construction                  | \$3,233,690                      | \$3,078,979                                 |
| Commercial & Legal                          | \$30,280                         | \$20,523                                    |
| Contingency                                 | \$92,750                         | \$0   |
| <b>TOTAL</b>                                | <b>\$3,713,716</b>               | <b>\$3,442,536</b>                          |

### III. Labrador Transmission Assets

| September 2018 (\$000)                      | Project Budget<br>March 2018<br>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                           | \$139,334        | \$128,097        | (\$11,237)        | 101.5%       | 93.3%        | -8.2%        |
| 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             | \$167            | \$87              | 100.0%       | 208.8%       | 108.8%       |
| Procurement & Construction                  | \$739,617                           | \$749,620        | \$707,017        | (\$42,603)        | 101.4%       | 95.6%        | -5.8%        |
| Commercial & Legal                          | \$5,383                             | \$5,383          | \$5,773          | \$390             | 100.0%       | 107.2%       | 7.2%         |
| Contingency                                 | \$20,012                            | \$0              | \$0              | \$0               | 0.0%         | 0.0%         | 0.0%         |
| <b>TOTAL</b>                                | <b>\$903,556</b>                    | <b>\$895,598</b> | <b>\$842,168</b> | <b>(\$53,430)</b> | <b>99.1%</b> | <b>93.2%</b> | <b>-5.9%</b> |

| September 2018 (\$000)                      | Project Budget<br>March 2018 AFE | Incurred Costs<br>Cumulative September 2018 |
|---|----------------------------------|---|
| <i>Description</i>                          | <i>A</i>                         | <i>B</i>                                    |
| NE-LCP Owners Team, Admin and EPCM Services | \$137,284                        | \$128,097                                   |
| Feasibility Engineering                     | \$363                            | \$303                                       |
| Environmental & Regulatory Compliance       | \$817                            | \$812                                       |
| Aboriginal Affairs                          | \$80                             | \$167                                       |
| Procurement & Construction                  | \$739,617                        | \$707,017                                   |
| Commercial & Legal                          | \$5,383                          | \$5,773                                     |
| Contingency                                 | \$20,012                         | \$0   |
| <b>TOTAL</b>                                | <b>\$903,556</b>                 | <b>\$842,168</b>                            |

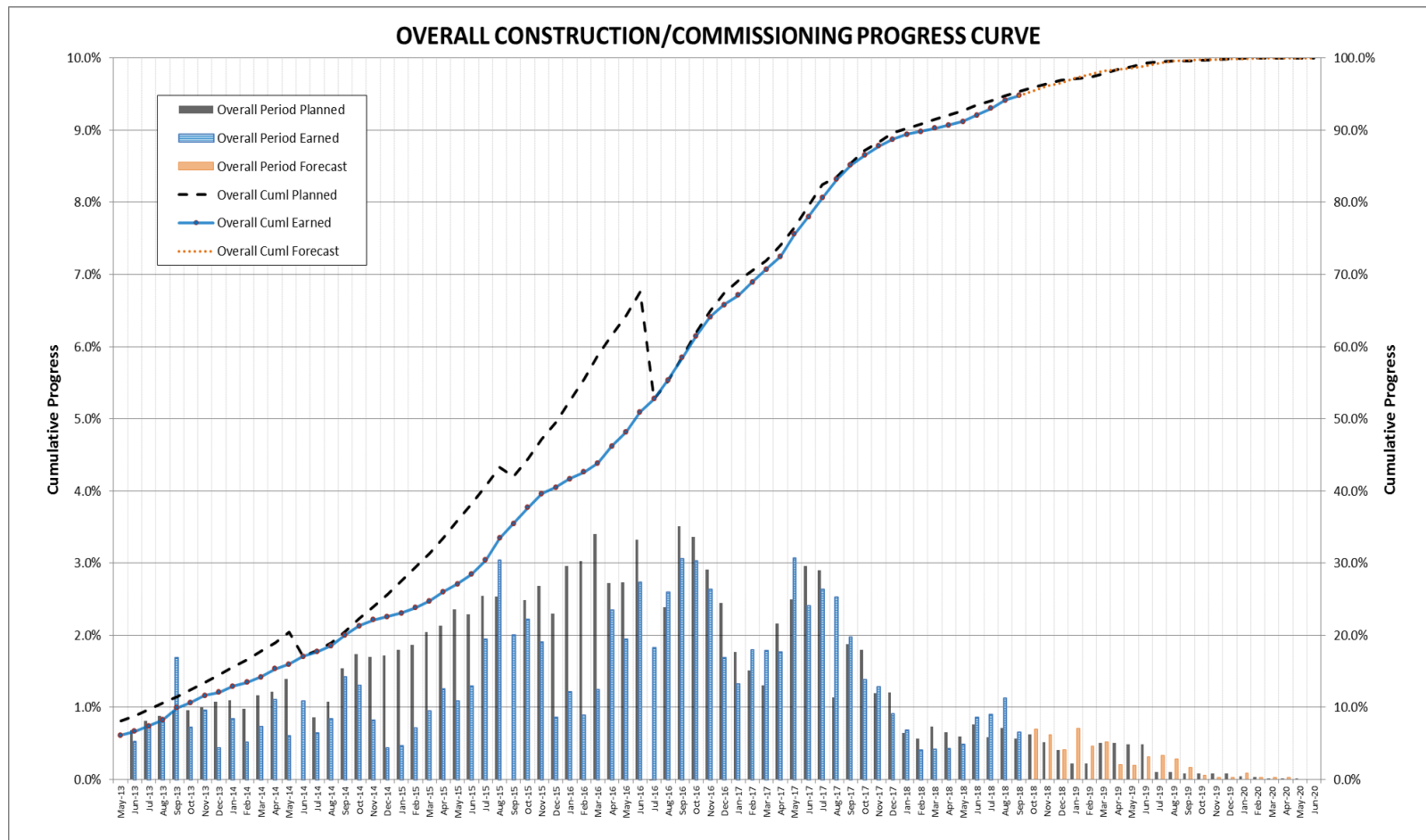
## Annex C

### Earned Progress

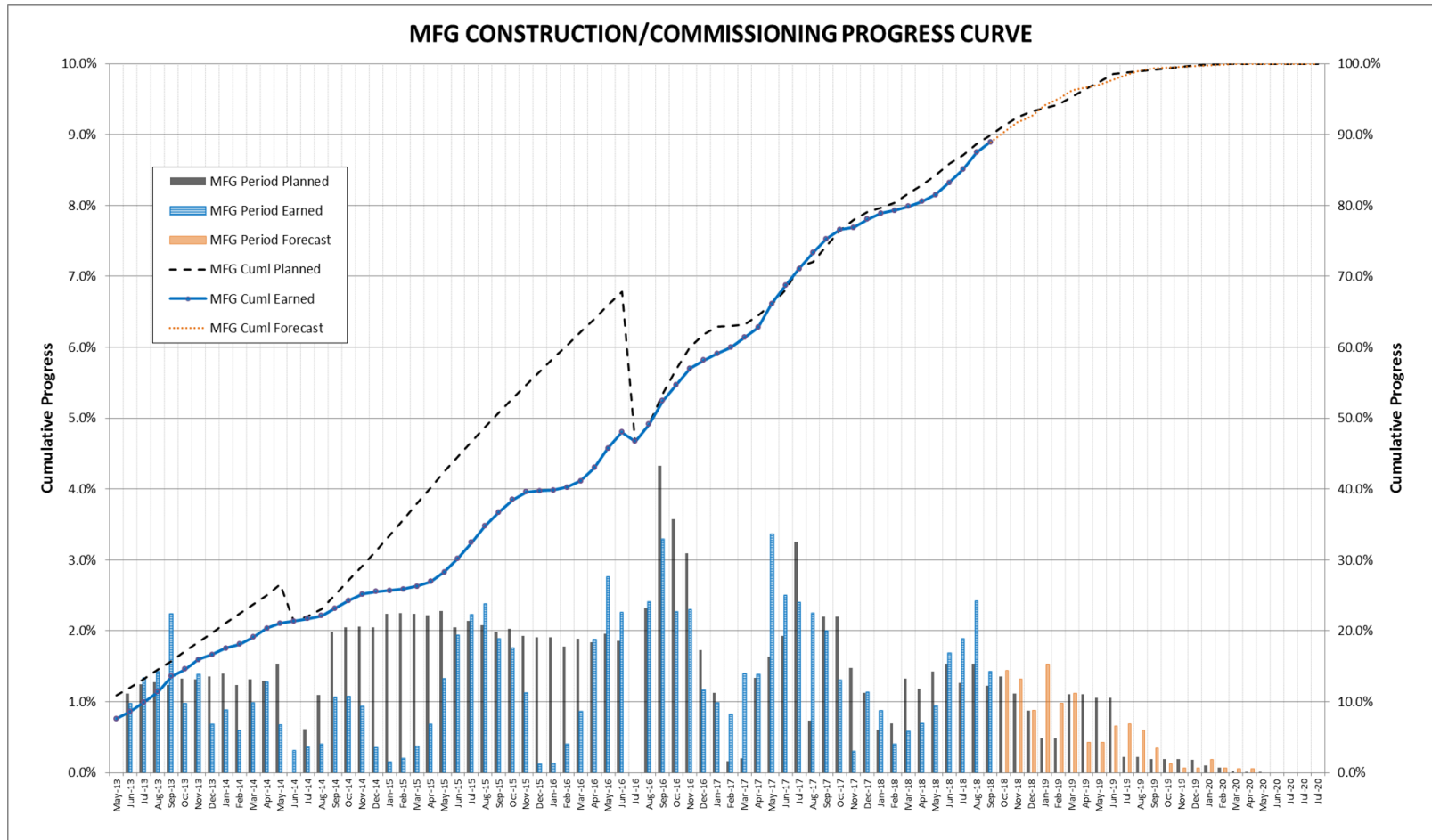
- I. Overall Construction
- II. Muskrat Falls Generation
- III. Labrador Island Transmission Link
- IV. Labrador Transmission Assets

Columns in tables may not total due to rounding

# I. Overall Construction



## II. Muskrat Falls Generation

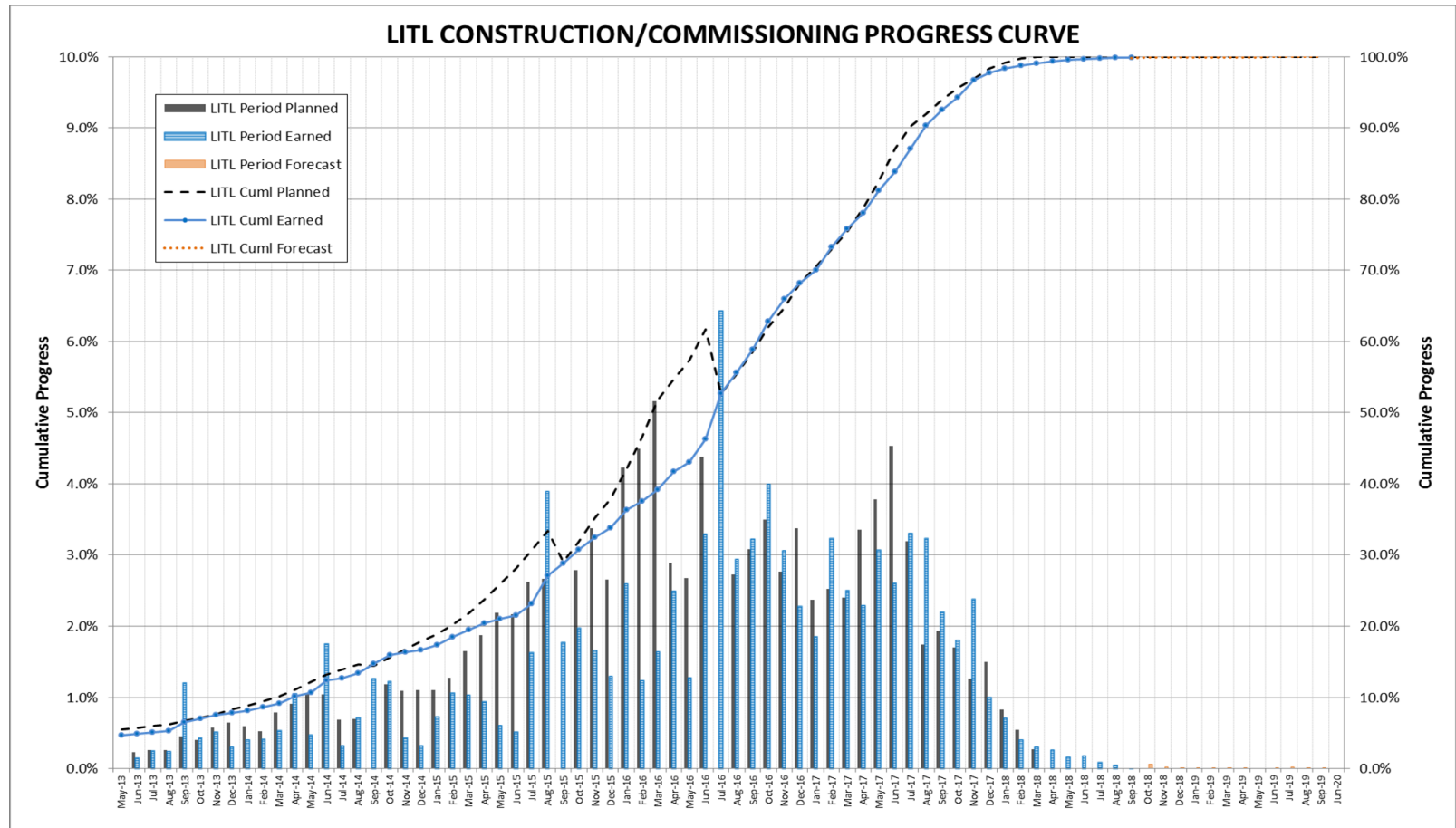


## II. Muskrat Falls Generation

| September 2018                                      | Weight Factor % | September 2018 Cumulative % |        |           | June 2018 Variance |
|---|-----------------|-----------------------------|--------|-----------|--------------------|
|   |                 | Plan                        | Earned | 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%           | 99.6%                       | 90.3%  | -9.3%     | -13.9%             |
| MFG North Spur Stabilization                        | 3.9%            | 100.0%                      | 100.0% | 0.0%      | 0.0%               |
| MFG North Dam                                       | 5.7%            | 96.4%                       | 94.4%  | -2.0%     | -6.2%              |
| MFG Powerhouse & Intake                             | 61.3%           | 84.1%                       | 84.8%  | 0.7%      | -0.9%              |
| MFG South Dam                                       | 1.1%            | 100.0%                      | 100.0% | 0.0%      | -0.8%              |
| MFG Misc:Eng/ 315kV/Site Rest./logistic             | 1.1%            | 90.3%                       | 78.5%  | -11.8%    | -6.6%              |
| MFGGen - Overall                                    | 100.0%          | 89.9%                       | 88.9%  | -1.0%     | -2.7%              |
| * Adjusted for MFGGen rollway installation schedule |                 | 88.8%                       | 88.9%  | 0.1%      |                    |



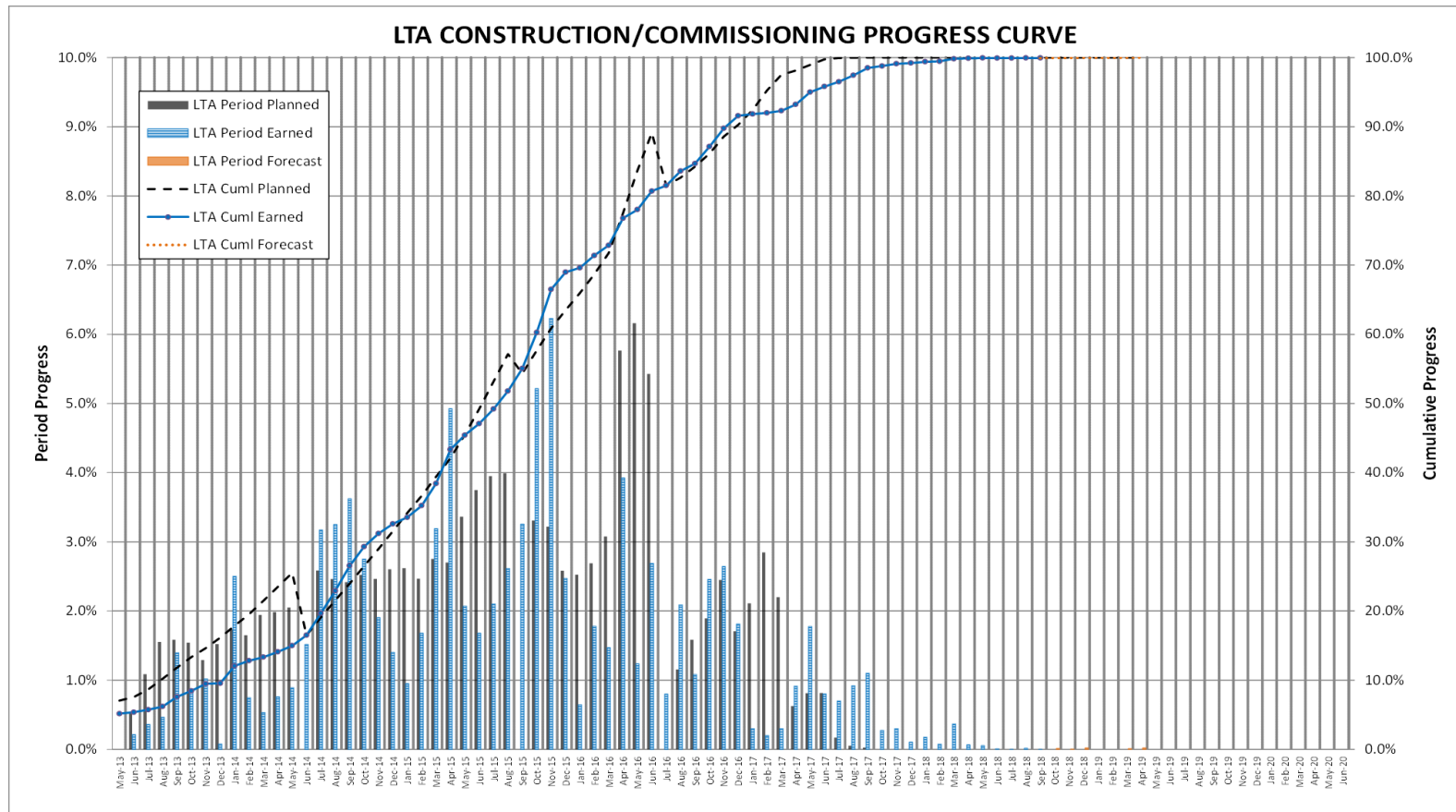
# III. Labrador Island Transmission Link



### III. Labrador Island Transmission Link

| September 2018                        | Weight   | September 2018 Cumulative % |        |           | June 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%                      | 99.0%  | -1.0%     | -1.6%     |
| LITL Soldiers Pond Converter          | 5.5%     | 100.0%                      | 99.1%  | -0.9%     | -1.0%     |
| 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%                      | 99.5%  | -0.5%     | -2.5%     |
| LITL Misc                             | 1.4%     | 100.0%                      | 96.8%  | -3.2%     | -6.4%     |
| LITL- Overall                         | 100.0%   | 100.0%                      | 99.8%  | -0.2%     | -0.3%     |

## IV. Labrador Transmission Assets



## IV. Labrador Transmission Assets

| September 2018                               | Weight   | September 2018 Cumulative % |        |           | June 2018<br>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%     | -2.6%                 |
| LTA - Overall                                | 100.0%   | 100.0%                      | 99.9%  | -0.1%     | -0.1%                 |

## Annex D

### Project Milestone Schedule

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

# I. Muskrat Falls Generation

| September 2018  | Planned Date<br>June 2017 | September 2018<br>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

| September 2018   | Planned Date<br>June 2017 | September 2018<br>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                  | *24-May-19                         |
| Ready for Power Transmission (Low Load Testing Complete Pole 1)                      | 1-Dec-18                  | 30-Nov-18                          |
| Muskrat Falls and Soldiers Pond Converter Stations - Bipole Dynamic Testing Complete | 31-Mar-19                 | 18-Nov-19                          |
| Commissioning Complete - Commissioning Certificate Issued                            | 1-Sep-20                  | 1-Sep-20                           |

\* 5 month forecast date change due lube oil contamination issue since last reporting period.

### III. Labrador Transmission Assets

| September 2018  | June 2017 Budget<br>Planned Date | September 2018<br>Actual/Forecast                            |
|---|----------------------------------|--|
| Project Sanction  | 17-Dec-12                        | Complete   |
| HVac Transmission Line Construction Complete              | 31-May-17                        | Complete: Turnover of HVac TL<br>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