



Muskrat Falls Project Oversight Committee

Quarterly Project Update

Period Ending December 31, 2019

February 26, 2020

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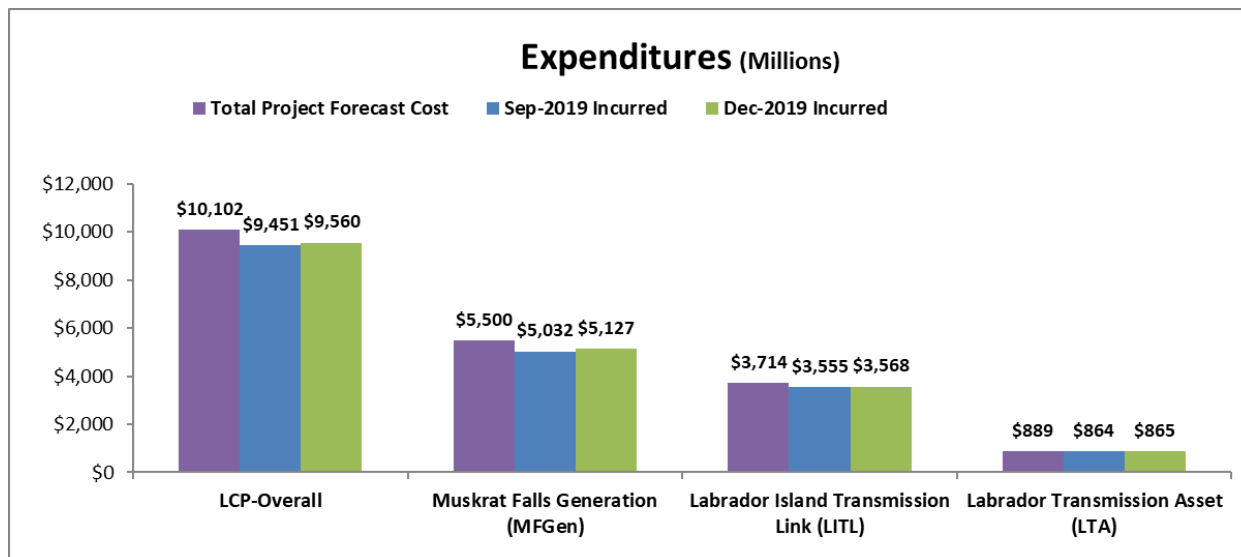
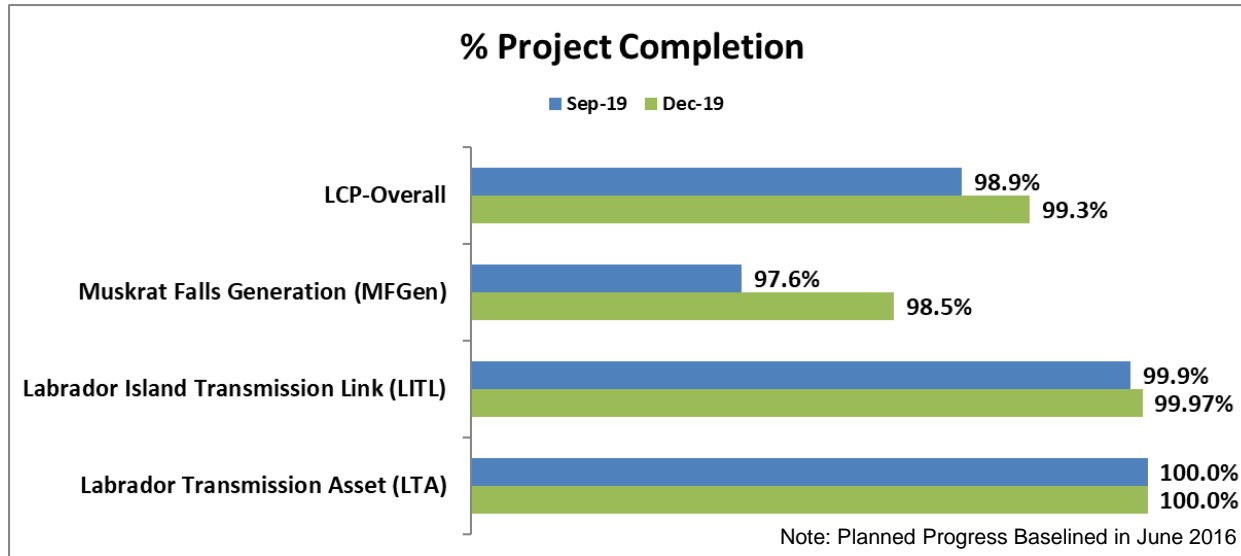
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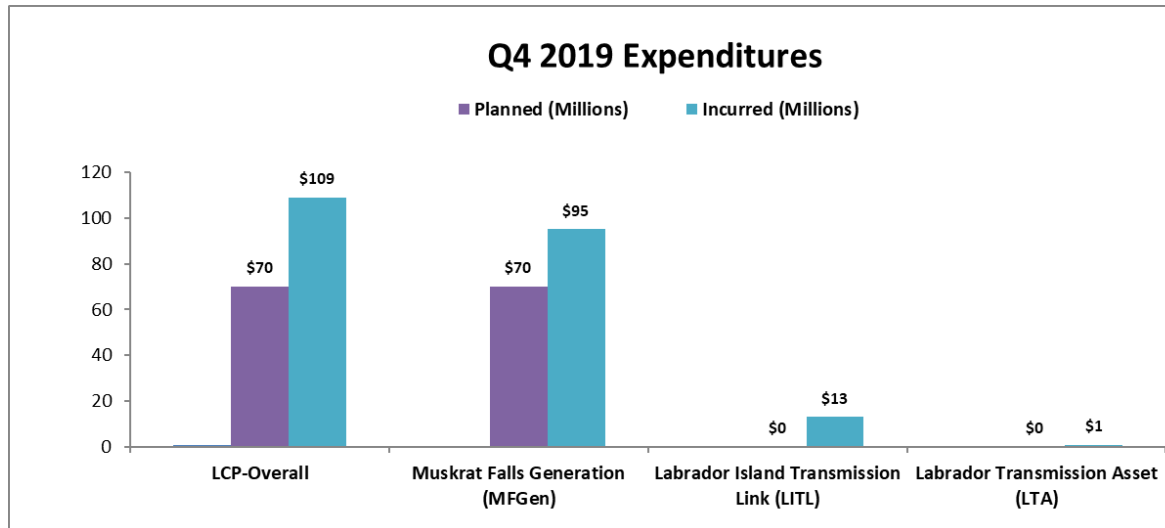
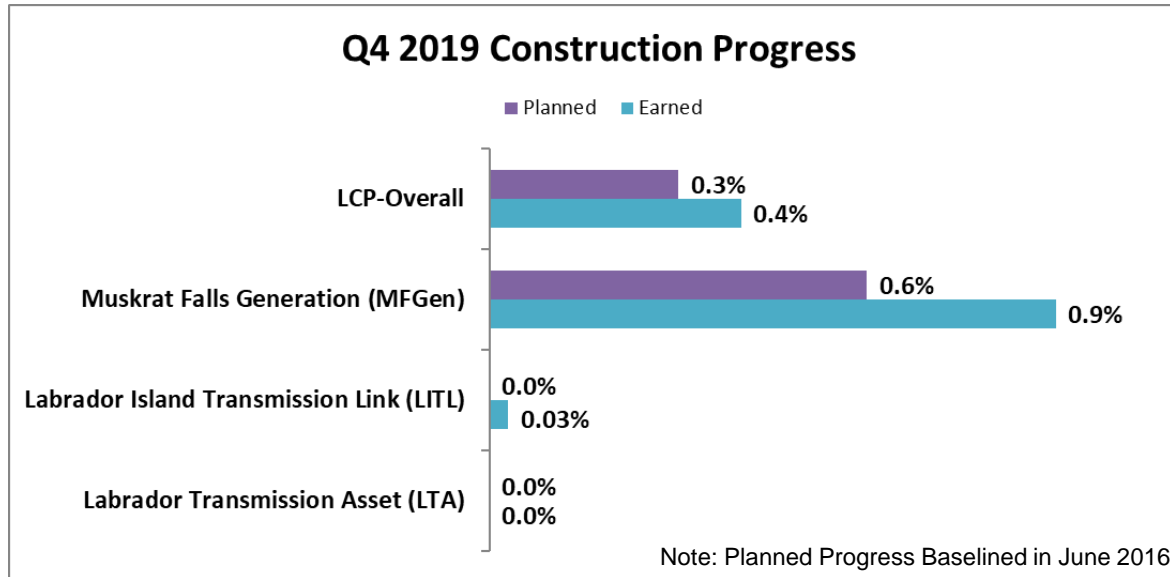
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1. Q4 2019 Cumulative Project Progress

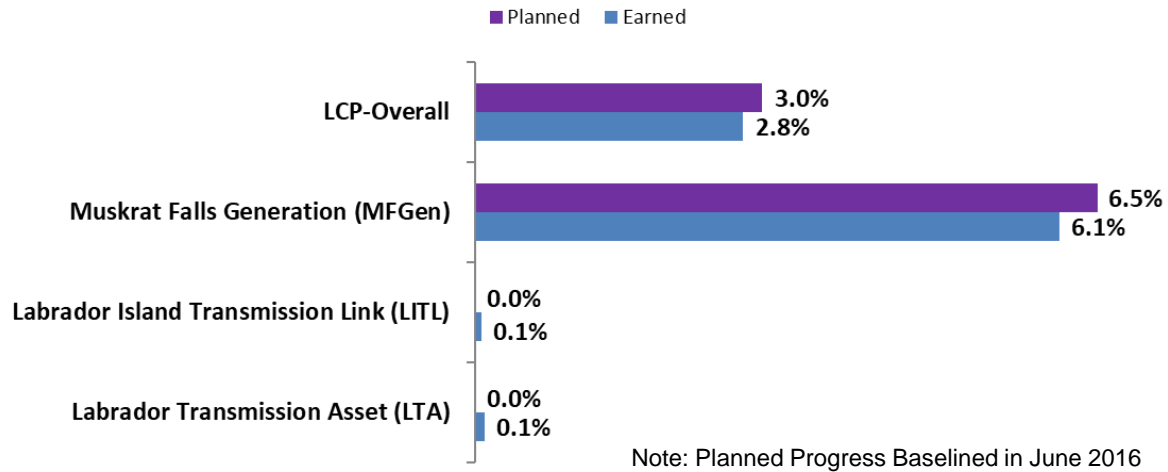


2. Q4 2019 Performance Summary

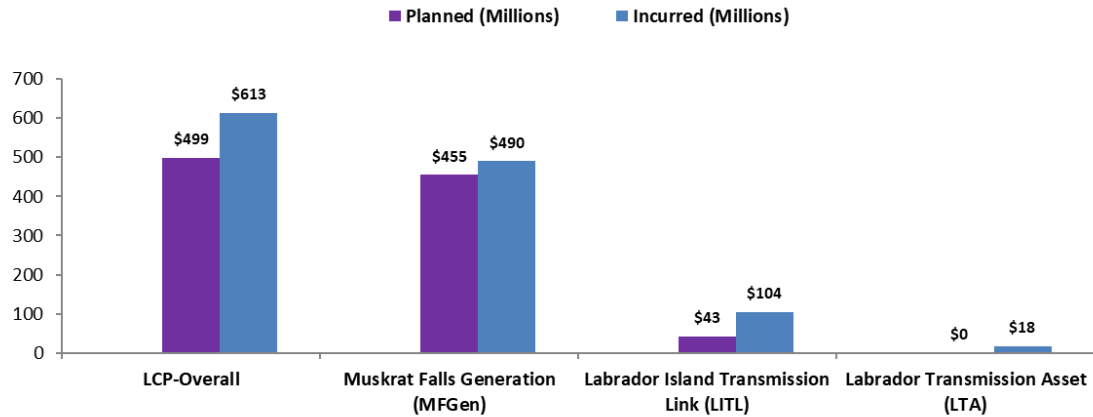


3. 2019 Performance Summary

2019 Construction Progress



2019 Expenditures



2. 2019 Performance Summary - Power Development

Activity	Status
<u>Powerhouse and Intake</u> <ul style="list-style-type: none"> • Turbine and Generator (T&G) • Units 1 - 4 • Balance of Plant Installation • Intake Gates 	<p style="text-align: right;">Reached Pit Free by May 2019</p> <p style="text-align: center;">Assembly and installation ongoing; Unit 1 assembly complete; Ready for operation expected in Q1 2020</p> <p style="text-align: center;">Approximately 90% complete; commissioning ongoing; systems to support Unit 1 Ready to Turn complete</p> <p style="text-align: right;">Complete and intake impounded</p>
Civil Scope	Base scope substantially complete in powerhouse and spillway
Impoundment	Impoundment to full supply level completed on September 4, 2019

2. 2019 Performance Summary - Power Supply

Activity	Status
<p><u>Labrador Island Transmission Link</u></p> <ul style="list-style-type: none"> Overland Transmission Line and Strait of Belle Isle Cable Crossing HVdc Specialties – Muskrat Falls and Soldiers Pond Converters HVdc Specialties – Soldiers Pond Synchronous Condensers Energization and Power Transfer 	<p>Assets turned over and under the control of Power Supply since 2018</p> <p>Pole 1 complete in 2018; Only remaining work on Pole 2 is installation of interface transformers at Soldiers Pond for electrode line fault locator</p> <p>Rotor lift, lube oil contamination and hydrogen piping contamination complete in July 2019; dynamic commissioning and root cause investigations into vibrations and binding ongoing</p> <p>Pole 1 power transfer commenced in December 2018; commissioning and energization of monopole concluded in June 2019; static versions of bipole software released to site in 2019 to advance static commissioning</p>
<p>Labrador Transmission Asset (LTA)</p>	<p>Construction and commissioning 100% complete and turned over to Power Supply in June 2019</p>

3.0 Oversight Committee Reporting

- 3.1 Overview
- 3.2 Committee Activities
- 3.3 Independent Engineer Activities
- 3.4 Risks and Issues Being Monitored by the Committee
- 3.5 Subsequent Events to Q4

3.1 Overview

- The Oversight Committee (Committee) receives details on project costs incurred, schedule progress, changes in costs and milestone schedule, the status of construction, and manufacturing and installation contracts.
- The Committee identifies risks and issues and follows up with Nalcor to obtain more detail and explanation.
- This report covers the October to December 2019 period (Q4) and includes information on other notable project activity up to the date of drafting 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 January 2020 – March 2020.

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 Department of Natural Resources Associate Deputy Minister and Director participated in site project visits and meeting with the Independent Engineer (IE) and Natural Resources Canada (NRCan) during November 19-21, 2019.
- The Committee Chair participated as an observer in two monthly calls on Nalcor project reporting to the IE and NRCan and one call with the IE and NRCan to discuss Nalcor monthly project reporting and site visits. The Department of Natural Resources Director also participated in two calls with the IE and NRCan.

3.3 Independent Engineer Activities

- The IE and NRCan held project site visits and meetings during September and November 2019 and visited GE Grid's Stafford, UK HVdc protection and controls software development site in December 2019. Reports from these visits can be found on the Committee's website @ [Click here](#).
- In these reports:
- **September 15-18, 2019 Site Visits and Meetings**
 - Status update. No concluding comments.
- **November 2019 Project Site Visits and Meetings**
 - **Action Items and Recommendations**
 - With respect to delays in Unit #1 commissioning, IE request more details on the issues facing the Andritz team.
 - IE request a copy of Andritz NCR (non-compliance report) for the Unit #4 elevation anomaly.
 - IE request a copy of updated Unit #1 Ready-To-Turn scope document.
 - HVAC line faults on the rectifier side may cause loss of HVDC power loss; HVAC faults on the inverter side may cause commutation failure and loss of power flow. Nalcor may wish to verify capability of LIL converters to ride through AC faults by staged 'close-in' fault tests on the parallel HVAC lines.
 - Regarding design of programming sequences for operation in 'Overload' mode, failed monopole power may be replaced from other sources such as the Maritime Link. If that is acceptable, S/W design for operation in 'Overload' may be temporarily deferred to free up design resources.
 - Completion team appears to have all the requisite specialties and chain of command. Respective site responsibilities, sign off process, overall responsibility for the Commissioning and Acceptance, and final approval process for the ITP's (Inspection and Test Plans) merit clarification and further discussion.

3.3 Independent Engineer Activities

- **December 2019 Stafford, UK Visit**
 - **Comments and Conclusions**
 - There is a cautious optimism that overall quality is improving.
 - While the plan still shows expected completion of the factory acceptance tests (FAT) by June 9th, 2020, there is little confidence that the target will be met. Progress velocity remains in risk category 'red'.
 - If available, addition of qualified resource with knowledge of coding and the HVDC/ electric utility industry is recommended.
 - Number of outstanding bugs that will be identified/ remedied at later stages presents an unknown risk to Project schedule and S/W performance.
 - GE's project plan does not include full regression testing of the completed software release or provides time allowance for bug fixes between the project phases. That raises a question if that approach will ensure full functionality of this critical component.
 - NALCOR and Amplitude site representatives monitor and provide helpful feedback to both NALCOR and GE.
- The IE is planning to visit the Muskrat Falls powerhouse in Q1 2020.

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 14-17 of this report.
- Over the reporting period the Committee noted:
 - Reservoir rim stability remained consistent over the Quarter;
 - Pennecon (replacement contractor for Astaldi) has largely demobilized from the powerhouse and spillway as work is largely complete;
 - Litigation and Arbitration proceedings are ongoing with Astaldi;
 - Document discovery ongoing;
 - Protection and Controls (P&C) software completion for the HVdc system and schedule remains a key project risk. P&C software completion has placed the LITL on the critical path for the overall project schedule and there continues to be schedule milestone adjustments;
 - Soldiers Pond synchronous condensers vibration and binding issues root cause and remediation activities are ongoing. Schedule milestone changes are continuing to occur;
 - Forecast completion of key milestones under Power Development changed during the period; Nalcor has reported little improvement in Andritz Hydro's productivity; and
 - Nalcor/NLH preparedness for interconnection and operations following transfer of power and final 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 commissioning and completion;
- 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 delivery and final commissioning completion to maintain project critical path and power delivery.

D) Astaldi

- Astaldi arbitration/litigation outcomes and potential impact on project costs.

E) Synchronous Condensers

- Remediation of vibration (Unit 3) and binding (Units 1 and 2) issues and potential impact on project schedule.

3.4 Risk and Issues being Monitored by the Committee

F) Insurance Claims and Coverage

- Coverage: Lube oil contamination within the Synchronous Condensers – As of December 2019, remedial work complete on all three units and eligible GE and Nalcor costs has been recovered.
- Potential coverage: Preservation/re-preservation of Turbine and Generator parts - investigations ongoing.
- Potential coverage: Spillway secondary concrete and gate guide heater tubulars repairs – investigations ongoing and repair work suspended until after winter 2019-2020.

G) Powerhouse Commissioning

- Commissioning of powerhouse generation Units 1 through 4 within the project schedule.

H) Reservoir Rim Stability

- Impact of reservoir full supply level 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.

3.4 Risk and Issues being Monitored by the Committee

J) Project Delivery Team Retention

- Project Team personnel departures and potential impact on project completion.

K) Additional Risks (above the June 2017 Project Budget)

- Astaldi arbitration/litigation; and
- Alternate HVdc P&C software development.
- Funds are not held within the June 2017 Project Budget for these additional risks.

3.5 Subsequent Events to Q4 2019

- In Nalcor's February 6, 2019 reporting update which included the January 2020 reporting period under development, Nalcor advised:
 - Power Supply (Transmission)
 - Is expecting at least a six week delay to Factory Acceptance Tested (FAT) interim bipole software being delivered to site and corresponding impact on subsequent milestones at a minimum.
 - Given the status of bipole software development, a new delivery schedule from GE Grid is required; discussion are ongoing and new schedule is expected in the coming weeks; and
 - Based on GE Grid's historical and current performance, Nalcor is assessing all options to mitigate further schedule slippage to low power and high power versions of software.
 - Power Development (Generation)
 - In January 2020, a generator and rotor torque key issue was identified during Unit 2 installation. Fabrication of new keys and change out is ongoing on Units 2, 3 and 4. Repairs to Unit 1, including manufacturing of replacement parts, delivery, and installation, will require 4 to 6 weeks to conclude. Other commissioning on Unit 1 is still proceeding. This repair will impact Unit 1 first power milestone dates by at least 4-6 weeks; and
 - Progress on Units 2,3, and 4 continues to trend behind plan and Andritz Hydro's performance is lagging behind their estimates. An overall consolidated recovery plan as of February 6, 2020, has not been received by Nalcor. Andritz Hydro's schedule dates for Units 2, 3 and 4 are uncertain. Nalcor is developing revised schedule dates which will be reflected in its January 2020 project reports. Looking forward it is very likely that Units 3 and 4 may not be commissioned by September 1, 2020.
- Collectively, project teams are focused on delivery of quality assets rather than advancing with possible asset deficiencies in order to meet schedule milestone dates. Objectives at this time include delivering necessary power to Newfoundland and Labrador Hydro under the Power Purchase Agreement (PPA) to offset oil-fired generation from Holyrood and pass on savings to ratepayers and meeting electricity commitments to Emera under the project agreements by September 1, 2020. Nalcor will be engaging project stakeholders to advise accordingly.

3.5 Subsequent Events to Q4 2019

- On February 20, 2020 Nalcor provided Construction Reports for the period ending January 2020 and including recent events up to February 20, 2020. In these reports Nalcor advised:
 - Power Supply (Transmission)
 - Contractual dates as agreed with GE Grid in the November 2019 8th Amending Agreement for the LITL Protection and Controls software delivery remain in effect, however Nalcor had adjusted the project's Integrated Project Schedule (IPS) to reflect GE Grid's slower than planned progress. The new schedule forecast is as follows:

Milestone	Date
Interim Bipole Software release to site	April 20, 2020
Interim Low Load Dynamic Commissioning Complete	May 30, 2020
Final Software release to site	July 29, 2020
Dynamic Commissioning Complete	August 31, 2020

- Risk for further Interim FAT Software release to site milestone change is high and has potential to impact the Final Software Delivery schedule.
- Due to GE Power's synchronous condenser vibration and binding root cause investigations and ongoing remediation, commissioning of all three synchronous condenser units is now forecasted for May-June-August for Units 3,2, and 1 respectively. Pending the outcome of root cause investigations and the resolution, there is a risk that schedule may extend beyond August 2020.

3.5 Subsequent Events to Q4 2019

- Power Development (Generation)
 - Unit 1 First Power from Muskrat Falls is now forecasted for March 15, 2020.
 - Progress on Units 2,3, and 4 continues to trend behind plan as Andritz Hydro's performance is lagging behind their estimates. Nalcor has updated the remaining Muskrat Falls generation milestone dates based on its assessment of Andritz Hydro's demonstrated performance to date and potential for parallel work on Units 3 and 4. The new schedule forecast is as follows:

Milestone	Date
First Power from Muskrat Falls	March 15, 2020
Powerhouse Unit 1 Commissioned – Ready for Operation	April 15, 2020
Powerhouse Unit 2 Commissioned – Ready for Operation	June 20, 2020
Powerhouse Unit 3 Commissioned – Ready for Operation	September 17, 2020
Powerhouse Unit 4 Commissioned – Ready for Operation	November 18, 2020
Full Power from Muskrat Falls	November 18, 2020
Commissioning Complete – Commissioning Certificate Issued	September 1, 2020 - Under Review
Date Certain	February 28, 2021

- Overall, the estimated Commissioning Date of September 1, 2020, set forth in the Labrador Island Transmission Link and Muskrat Falls Project Schedule is under review, however Nalcor does not anticipated it to extend past Date Certain (February 28, 2021).
- The Committee will report any changes to schedule and risk in reference to slides 18-20, following review of project materials over the reporting period in preparation of the Committee's Q1, 2020 report.

4.0 Nalcor Reporting

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

4.1 Summary – Quarter Ending December 2019

- December 2019 Summary:
 - Overall construction progress is at 99.3%;
 - \$9,560 Million in incurred costs; and
 - \$9,626 Million in committed costs.
- Overall, the project is tracking in compliance with the June 2017 budget and schedule, however there have been continued schedule milestone adjustments for Power Supply and Power Development.
- As of December 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. As well, there are transfers of unused budget from procurement and construction to the contingency budget to be used in other areas of the project.
 - Does not include costs for Additional Risks as reported on slide 17, which at the end of December 2019 totaled approximately \$550 Million.
- The current forecast contingency budget at December 2019 is \$134.7 Million, a decrease of \$18.1 Million from the previous Quarter. For further detail see Section 4.3.
- In the November 2019 reporting period, the LTA contingency budget was reduced by \$15 Million and funds were reallocated to the Project's Other Costs - Transition to Operations (TTO) Category. With this adjustment the project capital budget is now reset to \$10,102 Million. See Annex A for the project capital budget.

4.1 Summary – Quarter Ending December 2019

Quarterly Planned vs Incurred Cost Variances:

MFGGen	
Cumulative Planned: \$5,367M	Q4 2019 Planned: \$70M
Cumulative Incurred: \$5,127M	Q4 2019 Incurred: \$95M
Variance: -\$240M (-4.5%)	Variance: \$25M (35.7%)

- Planned expenditure by month was set in June 2017.
- During Q4 2019, the variance in planned vs. incurred cost is primarily due to more than planned expenditure under Contract CH0031 for the Supply and Install Mechanical and Electrical Auxiliaries, Contracts CH0007/CH0011-002 for the Intake, Powerhouse, Transition Dams and Spillway, and Supply and Installation of Hydro-Mechanical Equipment under Contract CH0032.
- See Section 4.2 and Annex B for further detail.

4.1 Summary – Quarter Ending December 2019

Quarterly Planned vs Incurred Cost Variances:

LITL	
Cumulative Planned: \$3,714M	Q4 2019 Planned: \$0M
Cumulative Incurred: \$3,568M	Q4 2019 Incurred: \$13M
Variance: -\$146M (-3.9%)	Variance: \$13M
LTA	
Cumulative Planned: \$889M	Q4 2019 Planned: \$0M
Cumulative Incurred: \$865M	Q4 2019 Incurred: \$1M
Variance: -\$24M (-2.7%)	Variance: \$1M

- The planned expenditure by month was set in June of 2017.
- During Q4 2019, incurred was higher than planned due to extension of work scope into 2019, whereas work scope was planned to be substantially complete in 2018.
- See Section 4.2 and Annex B for further detail.

4.1 Summary – Quarter Ending December 2019

Planned vs Earned Progress:

- MFGGen
 - Cumulative progress as of end Q4 2019 was 98.5% vs. a plan of 99.8% (variance of -1.3%). Quarterly progress for Q4 2019 was 0.9% vs. a plan of 0.6% (variance of 0.3%).
 - During the Quarter, the cumulative variance decreased from 1.6% to 1.3% behind plan.
 - As noted above, progress was higher than planned during the Quarter. Rollways were completed, and progress on the Turbine and Generator units are progressing, however trending behind plan.
- LITL
 - > 99% complete.
- LTA
 - Complete.
- See Section 4.2 and Annex C for further detail.

4.1 Summary – Quarter Ending December 2019

Power Development:

- Overall, the project is tracking in compliance with the June 2017 budget and schedule.
- Power Development's project milestone schedule dates remain the same as reported in the Committee's Q3 2019 reporting Subsequent Events section. See Annex D for further detail.
- As of January 24, 2019 Andritz Hydro's progress continues to trend behind plan and a full recovery plan has not been received by Nalcor.
- Power Development has not provided a December 2019 summary schedule forecast as it is developing and finalizing a new forecast schedule for Units 2, 3, and 4 which will be included in period ending January 2020 Construction Reports.
- Arbitration with Astaldi continues; payment of Astaldi related liens against the project continues; Nalcor intends to recover any costs associated from Astaldi or the contract's securities; responses to statements of claims and counterclaims and document discovery ongoing.
- Other project residual contingency, funds are not held within the June 2017 budget should net damages be awarded in Astaldi's favour.

4.1 Summary – Quarter Ending December 2019

- Intake Powerhouse Transition Dams and Spillway - Remaining Construction
 - Finalization of handover documentation ongoing;
 - Demobilization ongoing throughout January 2020; and
 - Reviewing remaining punch list scope to be completed in Summer 2020.
- Hydro Mechanical Installation
 - Base Spillway scope is complete;
 - Previously reported repair work associated with spillway guide and spillway secondary concrete defects are on hold for the winter season;
 - Work necessary to enable spillway operation during the spring freshet 2020 is to be completed prior to April 1, 2020; and
 - Remaining work and repair to be completed post the spring freshet.
- Balance of Plant
 - Mechanic completion and commissioning activities ongoing;
 - Systems to support Ready to Turn Unit 2 ongoing as work fronts from Andritz Hydro are made available; and
 - As of the end of January 2020, overall work scope is approximately 90%.

4.1 Summary – Quarter Ending December 2019

- Turbines and Generators

Unit	% Complete (December 2019)	Status
1	96%	Water Up is complete; wet commissioning commenced January 28, 2020 and Powerhouse Unit 1 Commissioned - Ready for Operation is forecasted for March 2020.
2	78%	Upper bracket assembly; installation of servo manifolds, and fabrication/installation of oil head piping ongoing.
3	56%	Rotor and runner assembly; installation of rim plates and measurement of rotor and preparing for runner flip ongoing.
4	28%	Stator piling complete; commenced installation of stator winding and runner assembly; installation of filler strips and wedging on stator ongoing.

- Focus areas for Q1 2020 include commissioning of Unit 1 and ongoing installation of Units 2-4. Forecast expenditure for Q1, 2020 is estimated at approximately \$81.7 Million.

4.1 Summary – Quarter Ending December 2019

Power Supply:

- Overall, the project remains on budget; however further schedule milestone adjustments have occurred. The LITL Protection and Controls (P&C) bipole software remains critical path for the overall project schedule.
- Protection and Controls (P&C) Transmission Bipole Software Status
 - Software development is currently in the Factory System Test (FST) Phase;
 - GE Grid started FST on December 9, 2019; as of end of January 2020 approximately only 60% of test cases have passed;
 - Factory Acceptance Test (FAT) for interim bipole software scheduled for February 2, 2020 has been delayed as a result of the FST outcome as GE Grid is currently fixing outstanding software bugs;
 - Power Supply see further schedule slippage risk as high based on historical and current performance of GE Grid;
 - Progress at the Stafford software development site is slower than GE Grid planned putting pressure on schedule milestone dates;
 - GE Grid has indicated that schedule for final bipole software will slip due to resource constraints; and
 - Power Supply has a continuous presence in Stafford overseeing GE Grid's work.
 - Power Supply has not provided a December 2019 summary schedule forecast or software milestone dates due to uncertainties in bipole software delivery schedule. Power Supply is in discussion with GE Grid on a revised software and commissioning schedule. This schedule will be included in period ending January Construction Reports. Existing project schedule milestone dates can be found in Annex D.

4.1 Summary – Quarter Ending December 2019

Synchronous Condensers (SC)

- Vibration Root Cause Investigation
 - Ontario Power Generation (OPG) concluded their Operation Deflection Shape (ODS) test in December 2019;
 - FZA (GE Power consultant) concluded their Soil Structure Interaction Analysis in December 2019;
 - Final reports are pending and GE Power will determine path forward based on final results;
 - Early observations from consultants indicated axial vibration is associated with the Unit's half-moon support and lateral vibration is associated with the Unit's foundation;
 - A half-moon stiffener platform for Unit 3 has been installed; GE Power is running the machine to test vibration levels at various start-up and operating regimes; and
 - Conceptual design for resolution of lateral vibration related to foundation is expected in early February and includes possible attachment of the existing synchronous foundation to the base floor slab of the synchronous condenser building.

4.1 Summary – Quarter Ending December 2019

Synchronous Condensers (SC)

- Binding Root Cause Investigation
 - Lift Oil Twin Orifice Design
 - Manufacturer refused to modify lift oil orifice design of SC bearing. The manufacturer's opinion is that the design is sound; and
 - A spare bearing has been redesigned from a twin oil orifice to a single oil pocket; installation of the spare bearing is pending the outcome of Unit 2 testing with the modified bearing housing circumferential slot as referenced in paragraph below.
 - Bearing/Housing Apex Point
 - Bearing housing for Unit 2 has been modified to include a circumferential slot; re-installation is underway; testing planned for February 2020; and
 - Bearing modification for Unit 1 is complete; installation subsequent to installation and testing of Unit 2.
 - Schedule
 - Commissioning of all three units has moved out by a month; November schedule was March and May 2020, current schedule is March, April and June 2020; correspondingly the Soldiers Pond Synchronous Condenser Ready for Operation schedule milestone has moved from May to June 2020 since the last quarterly reporting period; and
 - Synchronous Condensers are not currently on the critical path and not required for low power commissioning, however further schedule slippage remains a risk.
- For further details on schedule milestone dates see Annex D.
- The focus for Q1 2020 remains on continued completions, commissioning and integration of operations; and the forecast expenditure for Q1 2020 is estimated at approximately \$34.2 Million.

4.2 Project Expenditures

December 2019 (\$000)	Project Budget June 2017 AFE amended November 2019	Cumulative \$			Cumulative %		
		Plan	Incurred	Variance	Plan	Incurred	Variance
<i>Description</i>	A	B	C	C-B	D=B/A	E=C/A	E-D
NE-LCP Owners Team, Admin and EPCM Services	\$1,115,235	\$1,109,460	\$1,035,990	(\$73,470)	99.5%	92.9%	-6.6%
Feasibility Engineering	\$37,072	\$37,072	\$35,846	(\$1,226)	100.0%	96.7%	-3.3%
Environmental & Regulatory Compliance	\$42,699	\$42,509	\$39,198	(\$3,311)	99.6%	91.8%	-7.8%
Aboriginal Affairs	\$17,478	\$16,642	\$44,553	\$27,911	95.2%	254.9%	159.7%
Procurement & Construction	\$8,475,290	\$8,681,018	\$8,326,263	(\$354,755)	102.4%	98.2%	-4.2%
Commercial & Legal	\$90,423	\$82,706	\$78,165	(\$4,541)	91.5%	86.4%	-5.0%
Contingency	\$324,162	\$0	\$0	\$0	0.0%	0.0%	0.0%
TOTAL	\$10,102,328	\$9,969,406	\$9,560,015	(\$409,391)	98.7%	94.6%	-4.1%

December 2019 (\$000)	Project Budget June 2017 AFE amended November 2019	Incurred Cumulative Costs December 2019	Project Final Forecast Cost December 2019	Variance PFC from Budget
<i>Description</i>	A	B	C	D=A-C
NE-LCP Owners Team, Admin and EPCM Services	\$1,115,235	\$1,035,990	\$1,164,522	(\$49,287)
Feasibility Engineering	\$37,072	\$35,846	\$35,847	\$1,225
Environmental & Regulatory Compliance	\$42,699	\$39,198	\$40,409	\$2,290
Aboriginal Affairs	\$17,478	\$44,553	\$50,960	(\$33,482)
Procurement & Construction	\$8,475,290	\$8,326,263	\$8,567,460	(\$92,170)
Commercial & Legal	\$90,423	\$78,165	\$108,452	(\$18,029)
Contingency	\$324,162	\$0	\$134,679	\$189,483
TOTAL	\$10,102,328	\$9,560,015	\$10,102,328	\$0

Columns in tables may not total due to rounding

4.3 Contingency

Q4 December 2019 (\$000)	Project Budget June 2017 AFE	March 2018 AFE Adjustment	March 2018 AFE Adjustment	Project Forecast Cost September 2019	Project Forecast Cost December 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	\$324,162	\$152,733	\$134,679	(\$18,054)*	(\$189,483)

* (Includes \$15 Million contingency adjustment to LTA as noted on slide 22)

4.4 Earned Progress

Cumulative to end of December 2019	Weight Factor %	December 2019 Cumulative %			September 2019 Variance
		Planned	Earned	Variance	
<i>Sub-Project</i>	A	B	C	D = C - B	E
Muskrat Falls Generation (MFGGen)	46.3%	99.8%	98.5%	-1.3%	-1.6%
Labrador Island Transmission Link (LITL)	43.9%	100.0%	99.97%	-0.03%	-0.1%
Labrador Transmission Asset (LTA)	9.8%	100.0%	100.0%	0.0%	0.0%
Muskrat Falls Project - Overall	100.0%	99.9%	99.3%	-0.6%	-0.7%

December 2019 Period	Weight Factor %	Period %		
		Planned	Earned	Variance
<i>Sub-Project</i>	A	B	C	D = C - B
Muskrat Falls Generation (MFGGen)	46.3%	0.2%	0.0%	-0.2%
Labrador Island Transmission Link (LITL)	43.9%	0.0%	0.03%	0.03%
Labrador Transmission Asset (LTA)	9.8%	0.0%	0.0%	0.0%
Muskrat Falls Project - Overall	100.0%	0.1%	0.0%	-0.1%

Columns in tables may not total due to rounding

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
Muskkrat Falls Generation Total	\$5,500,056
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
Labrador-Island Transmission Link Total	\$3,713,716
Labrador-Transmission Assets (in \$ thousands)	November 2019 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	\$5,012
Labrador Transmission Assets Total	\$888,556
Muskkrat Falls Capital Cost Budget Total	\$10,102,328

Contingency Budget (in \$ thousands)	November 2019 AFE
Sub-Project:	
Muskkrat Falls Generating Facility	\$226,400
Labrador-Island Transmission Link	\$92,750
Labrador Transmission Assets	\$5,012
Total Project	\$324,162

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

December 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	\$637,725	\$551,983	(\$85,742)	97.2%	84.2%	-13.1%
Feasibility Engineering	\$17,543	\$17,543	\$16,865	(\$678)	100.0%	96.1%	-3.9%
Environmental & Regulatory Compliance	\$27,125	\$26,965	\$26,828	(\$137)	99.4%	98.9%	-0.5%
Aboriginal Affairs	\$16,395	\$15,559	\$43,759	\$28,200	94.9%	266.9%	172.0%
Procurement & Construction	\$4,501,984	\$4,622,299	\$4,438,831	(\$183,468)	102.7%	98.6%	-4.1%
Commercial & Legal	\$54,760	\$47,043	\$48,846	\$1,803	85.9%	89.2%	3.3%
Contingency	\$226,400	\$0	\$0	\$0	0.0%	0.0%	0.0%
TOTAL	\$5,500,056	\$5,367,134	\$5,127,113	(\$240,021)	97.6%	93.2%	-4.4%

December 2019 (\$000)	Project Budget June 2017 AFE	Incurred Cumulative Costs December 2019
<i>Description</i>	<i>A</i>	<i>B</i>
NE-LCP Owners Team, Admin and EPCM Services	\$655,850	\$551,983
Feasibility Engineering	\$17,543	\$16,865
Environmental & Regulatory Compliance	\$27,125	\$26,828
Aboriginal Affairs	\$16,395	\$43,759
Procurement & Construction	\$4,501,984	\$4,438,831
Commercial & Legal	\$54,760	\$48,846
Contingency	\$226,400	\$0
TOTAL	\$5,500,056	\$5,127,113

II. Labrador Island Transmission Link

December 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	\$332,101	\$353,243	\$21,142	103.1%	109.7%	6.6%
Feasibility Engineering	\$19,167	\$19,167	\$18,679	(\$488)	100.0%	97.5%	-2.5%
Environmental & Regulatory Compliance	\$14,726	\$14,726	\$11,557	(\$3,169)	100.0%	78.5%	-21.5%
Aboriginal Affairs	\$1,003	\$1,003	\$625	(\$378)	100.0%	62.3%	-37.7%
Procurement & Construction	\$3,233,690	\$3,316,440	\$3,160,924	(\$155,516)	102.6%	97.7%	-4.8%
Commercial & Legal	\$30,280	\$30,280	\$22,748	(\$7,532)	100.0%	75.1%	-24.9%
Contingency	\$92,750	\$0	\$0	\$0	0.0%	0.0%	0.0%
TOTAL	\$3,713,716	\$3,713,716	\$3,567,777	(\$145,939)	100.0%	96.1%	-3.9%

December 2019 (\$000)	Project Budget March 2018 AFE	Incurred Costs Cumulative December 2019
<i>Description</i>	<i>A</i>	<i>B</i>
NE-LCP Owners Team, Admin and EPCM Services	\$322,101	\$353,243
Feasibility Engineering	\$19,167	\$18,679
Environmental & Regulatory Compliance	\$14,726	\$11,557
Aboriginal Affairs	\$1,003	\$625
Procurement & Construction	\$3,233,690	\$3,160,924
Commercial & Legal	\$30,280	\$22,748
Contingency	\$92,750	\$0
TOTAL	\$3,713,716	\$3,567,777

III. Labrador Transmission Assets

December 2019 (\$000)	Project Budget November 2019 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	\$130,764	(\$8,870)	101.7%	95.3%	-6.5%
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%	209.7%	109.7%
Procurement & Construction	\$739,617	\$742,279	\$726,508	(\$15,771)	100.4%	98.2%	-2.1%
Commercial & Legal	\$5,383	\$5,383	\$6,571	\$1,188	100.0%	122.1%	22.1%
Contingency	\$5,012	\$0	\$0	\$0	0.0%	0.0%	0.0%
TOTAL	\$888,556	\$888,556	\$865,126	(\$23,430)	100.0%	97.4%	-2.6%

December 2019 (\$000)	Project Budget November 2019 AFE	Incurred Costs Cumulative December 2019
<i>Description</i>	<i>A</i>	<i>B</i>
NE-LCP Owners Team, Admin and EPCM Services	\$137,284	\$130,764
Feasibility Engineering	\$363	\$303
Environmental & Regulatory Compliance	\$817	\$812
Aboriginal Affairs	\$80	\$168
Procurement & Construction	\$739,617	\$726,508
Commercial & Legal	\$5,383	\$6,571
Contingency	\$5,012	\$0
TOTAL	\$888,556	\$865,126

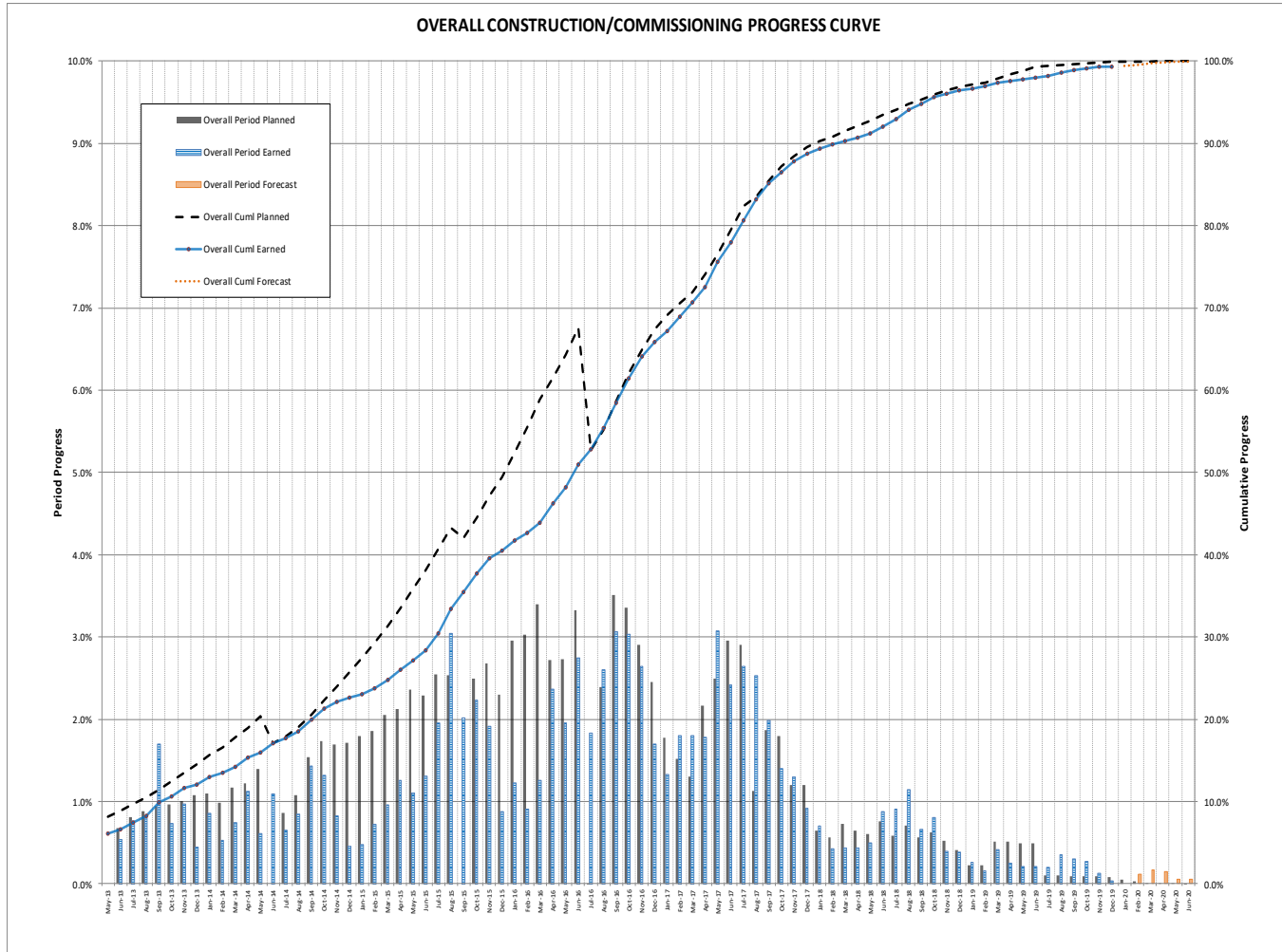
Annex C

Earned Progress

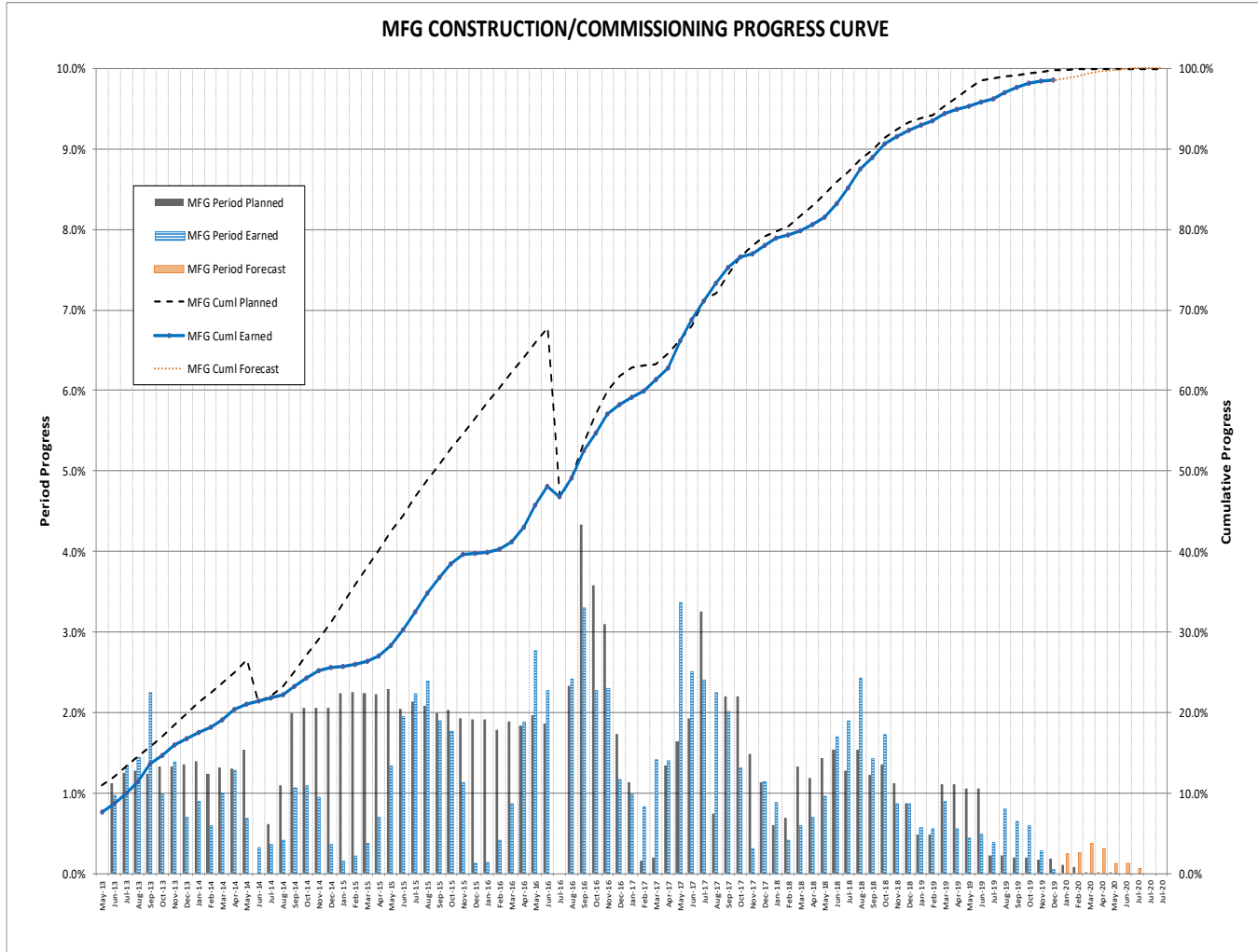
- I. Overall Construction
- II. Muskrat Falls Generation
- III. Labrador Island Transmission Link
- IV. Labrador Transmission Assets

Columns in tables may not total due to rounding

I. Overall Construction



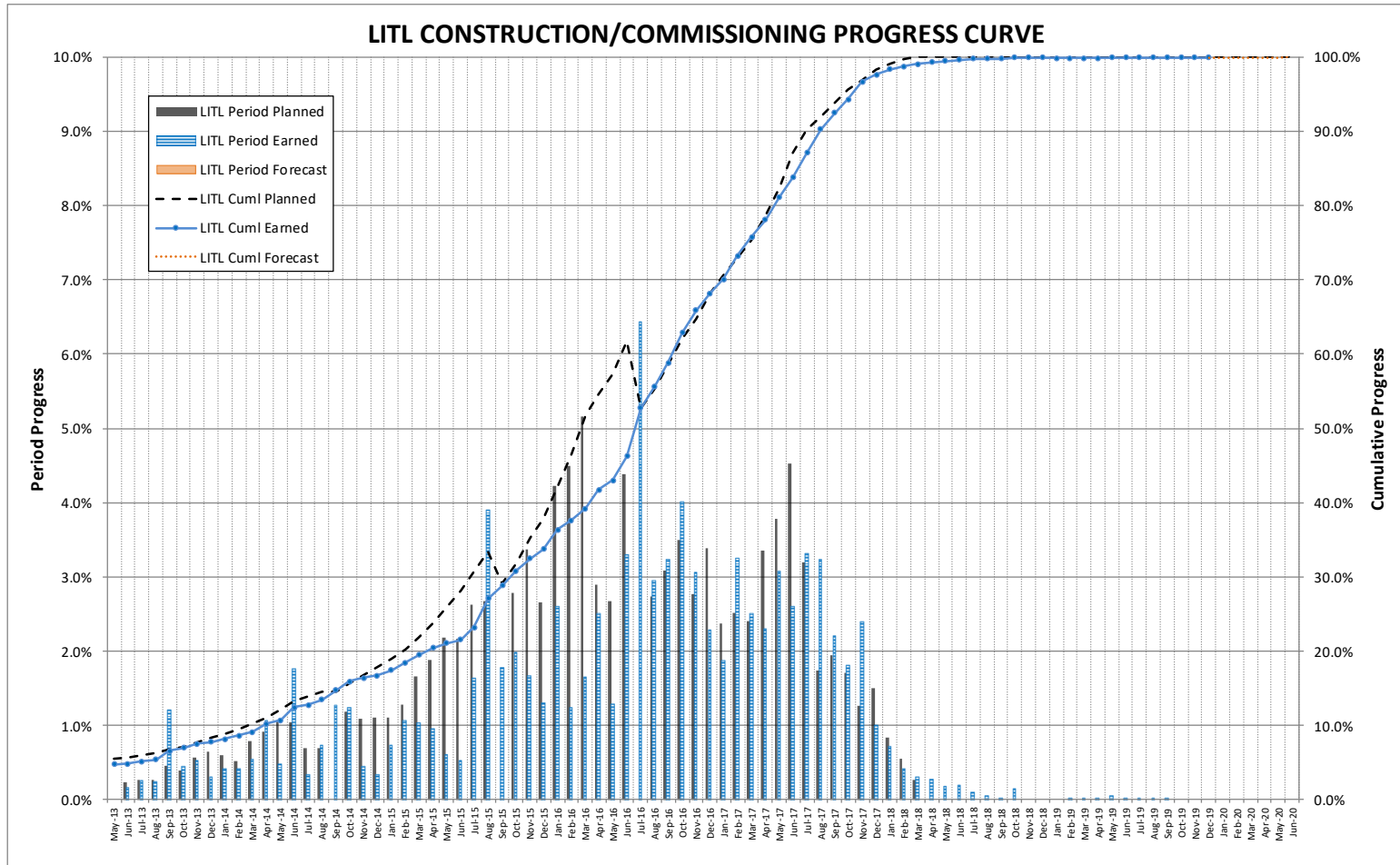
II. Muskrat Falls Generation



II. Muskrat Falls Generation

December 2019	Weight Factor %	December 2019 Cumulative %			September 2019
		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%	100.0%	0.0%	-1.8%
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%	0.0%
MFG Powerhouse & Intake	61.3%	99.7%	97.6%	-2.1%	-2.1%
MFG South Dam	1.1%	100.0%	100.0%	0.0%	0.0%
MFG Misc:Eng/ 315kV/Site Rest./logistic	1.1%	97.0%	99.1%	2.1%	-4.3%
MFGGen - Overall	100.0%	99.8%	98.5%	-1.3%	-1.6%
* Adjusted for MFGGen rollway installation schedule		N/A	N/A	N/A	N/A

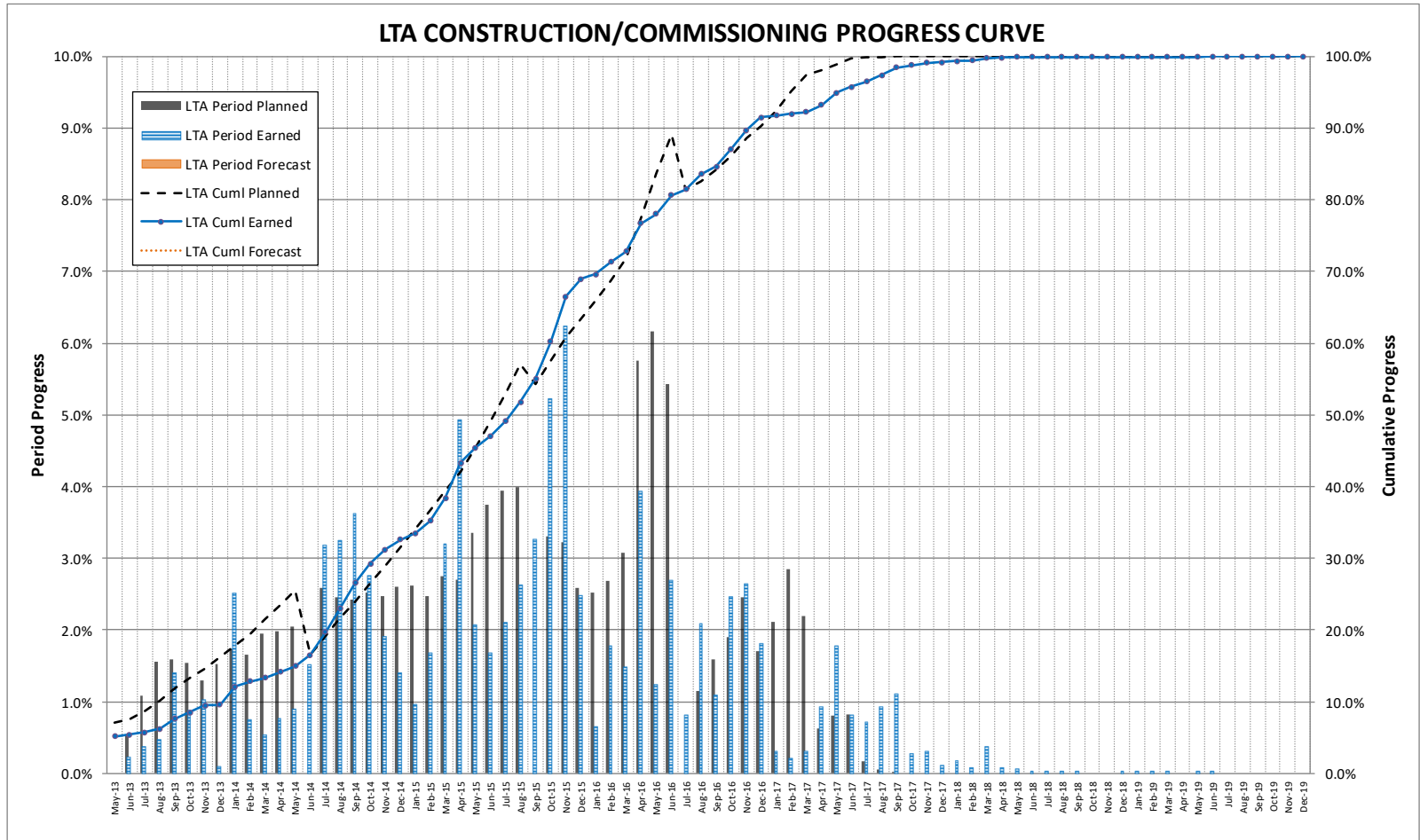
III. Labrador Island Transmission Link



III. Labrador Island Transmission Link

December 2019	Weight	December 2019 Cumulative %			September 2019
	Factor %	Plan	Earned	Variance	Variance
<i>Sub-Project</i>	A	B	C	D = C - B	E
LITL Muskrat Falls Converter	6.1%	100.0%	99.9%	-0.1%	-0.3%
LITL Soldiers Pond Converter	5.5%	100.0%	99.6%	-0.4%	-0.6%
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%	99.9%	-0.1%	-0.1%
LITL Misc	1.4%	100.0%	100.0%	0.0%	0.0%
LITL- Overall	100.0%	100.0%	99.97%	-0.03%	-0.06%

IV. Labrador Transmission Assets



IV. Labrador Transmission Assets

December 2019	Weight	December 2019 Cumulative %			September
	Factor %	Plan	Earned	Variance	2019 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%	100.0%	0.0%	0.0%
LTA Misc	2.1%	100.0%	100.0%	0.0%	0.0%
LTA - Overall	100.0%	100.0%	100.0%	0.0%	0.0%

Annex D

Project Milestone Schedule Forecast

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

I. Muskrat Falls Generation

December 2019	Planned Date June 2017	December 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	Complete
Powerhouse Unit 1 Commissioned - Ready for Operation	19-Dec-19	² 15-Mar-2020
First Power from Muskrat Falls	2-Nov-19	¹ 15-Feb-20
Powerhouse Unit 2 Commissioned - Ready for Operation	3-Mar-20	³ 16-April-2020
Powerhouse Unit 3 Commissioned - Ready for Operation	9-Jun-20	9-Jun-20
Powerhouse Unit 4 Commissioned - Ready for Operation	14-Aug-20	14-Aug-20
Full Power from Muskrat Falls	14-Aug-20	14-Aug-20
Commissioning Complete - Commissioning Certificate Issued	1-Sep-20	1-Sep-20

¹ > 3 month forecast date adjustment beyond the June 2017 planned date as reported in Committee Q3 2019 reporting Subsequent Events.

² < 3 month forecast date adjustment beyond the June 2017 planned date as reported in Committee Q3 2019 reporting Subsequent Events.

³ > 1 month forecast date adjustment beyond the June 2017 planned date as reported in Committee Q3 2019 reporting Subsequent Events.

II. Labrador Island Transmission Link

December 2019	Planned Date June 2017	December 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	¹ 30-June-2020
Ready for Power Transmission (Low Load Testing Complete Pole 1)	1-Dec-18	Complete
Muskrat Falls and Soldiers Pond Converter Stations - Bipole Dynamic Testing Complete	31-Mar-19	² 15-July-20
Commissioning Complete - Commissioning Certificate Issued	1-Sep-20	1-Sep-20

¹ = 1 month forecast date adjustment since Committee Q3 2019 reporting Subsequent Events.

² < 1 month forecast date adjustment as reported in Committee Q3 2019 reporting Subsequent Events.

III. Labrador Transmission Assets

December 2019	June 2017 Budget Planned Date	December 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