

# Muskrat Falls Project Oversight Committee

Committee Report – December 2014





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# Introduction

The Muskrat Falls Oversight Committee was established by the Government of Newfoundland and Labrador in March 2014 to strengthen the existing oversight of the Muskrat Falls Project (the Project). The Committee's mandate focuses on cost, schedule and risk management for the construction phase of the Project. Reports of the Committee can be located at [www.gov.nl.ca/mfoversight](http://www.gov.nl.ca/mfoversight).

The capital construction cost estimates for the Project are \$6.99 billion<sup>1</sup>. At the end of December 2014 the incurred costs<sup>2</sup> to date were \$2.14 billion (exclusive of interest and other financing costs) and the committed costs<sup>3</sup> totaled \$5.39 billion.

This report details the Committee's observations and summarizes the progress reported for the Project to the end of December 2014.

1 Total Project costs include construction costs of \$6.99 billion plus interest and other financing costs of \$1.3 billion that will be incurred during construction, for an estimated total of \$8.29 billion.

2 Incurred Costs: Represents the total estimated cumulative value of all goods and services provided to the Project up to this point in time regardless of whether it was paid during the current period or will be paid at some future point in time.

3 Committed Costs: The estimated value of an obligation made by the Project for the provision of goods or services, represented by a Financial Commitment. Committed costs are captured when a Financial Commitment is made and its value is based upon the original estimate for that Financial Commitment. A Financial Commitment is a legal agreement between Nalcor Energy – Lower Churchill Project (NE-LCP) and a third party which authorizes NE-LCP to proceed with the award/instruction to the third party to provide goods and/or services for an agreed price or in accordance with an agreed pricing structure. The value of the Financial Commitment is represented by the cumulative value of the original amount and any approved variation orders to the contracts or change orders to the purchase order (which may or may not be a Project scope change).



Muskrat Falls Construction Site – Powerhouse and Spillway - August 2014

# Project Performance

The Committee reports quarterly on the Muskrat Falls Project performance on both an overall Project basis and for each of the following three sub-projects:

- Muskrat Falls Generating Facility;
- Labrador-Island Transmission Link; and,
- Labrador Transmission Assets.

The Project cost and schedule performance is reported in two ways:

1. Long-term costs and schedule (to Project completion)
  - a. Project budget is compared to Project forecast cost
  - b. Project milestone schedule is monitored for change
2. Current costs and schedule (cumulative to date)
  - a. Incurred costs to date are compared to planned costs
  - b. Actual schedule progress is compared to planned schedule progress

These two time horizons provide the reader with both the projected long-term performance and the current performance for the overall Project and for each of the sub-projects based on the Project plans and schedule.

# Long-term Cost and Schedule

## Committee Observations at December 2014

- Project capital budget of \$6.99 billion remains unchanged
- No significant variances between Project Budget and Project Forecast Cost
- Contingency budget at December 2014 is \$199.9 million
  - Approximately \$36 million (net) of the Contingency budget has been drawn upon in current quarter
  - Two major contracts remain unawarded
- Critical path to first power for December 2017 remains unchanged
- No changes to the forecast Milestone Dates or planned Milestone Schedule in the current quarter
- Schedule pressures are being experienced
  - Production improvements will be required at the Muskrat Falls Generating Facility in order to maintain the critical path and Milestone Schedule
  - Mitigation actions are being implemented to address the schedule pressures

## Long Term Costs

The total Project construction budget of \$6.99 billion is allocated among the three sub-projects as illustrated in Table 1 below. Total incurred costs to the end of December 2014 are \$2.143 billion or 30.7 per cent of the total budget.

Table 1  
**Budget and Incurred Costs by Sub-Project** (in \$ thousands)

Muskrat Falls Project: Sub-Project	Percentage of Total Project Budget	Project Capital Budget at June 2014	Incurred Costs as of December 2014	Percentage of Budget Incurred
Muskrat Falls Generating Facility	48.2%	\$3,371,988	\$1,263,431	37.5%
Labrador-Island Transmission Link	39.9%	\$2,786,481	\$575,669	20.7%
Labrador Transmission Assets	11.9%	\$831,945	\$304,130	36.6%
Total	100.0%	\$6,990,414	\$2,143,230	30.7%

Table 2 shows the Project incurred costs to the end of December 2014 by expenditure category for each of the sub-projects. This table also includes the Project Capital Budget, as approved by the Nalcor Energy Board of Directors in June 2014, compared to the Project Forecast Cost, which is the Project cost based on current incurred costs and schedule performance. The Overall Project Forecast Cost at December 2014 is \$6.99 billion and remains consistent with the current approved Project Capital Budget.

Table 2

**Summary of Project Budget vs. Project Forecast Cost** (\$ thousands)

<b>Muskrat Falls Generating Facility</b>	<b>Project Budget at June 2014</b>	<b>Incurred Costs at Dec. 2014</b>	<b>Project Forecast Cost at Dec. 2014</b>	<b>Variance PFC from Budget</b>
Expenditure Category	A	B	C	D=A-C
NE-LCP Owners Team, Admin and EPCM Services	\$382,811	\$249,810	\$387,723	(\$4,912)
Feasibility Engineering	\$17,949	\$17,949	\$17,949	\$0
Environmental & Regulatory Compliance	\$24,312	\$17,738	\$25,062	(\$750)
Aboriginal Affairs	\$13,314	\$5,821	\$13,314	\$0
Procurement & Construction	\$2,786,766	\$957,931	\$2,801,525	(\$14,759)
Commercial & Legal	\$25,989	\$14,182	\$25,239	\$750
Contingency	\$120,847	\$0	\$101,176	\$19,671
Total for Sub-project	\$3,371,988	\$1,263,431	\$3,371,988	\$0
<b>Labrador-Island Transmission Link</b>	<b>Project Budget at June 2014</b>	<b>Incurred Costs at Dec. 2014</b>	<b>Project Forecast Cost at Dec. 2014</b>	<b>Variance PFC from Budget</b>
Expenditure Category	A	B	C	D=A-C
NE-LCP Owners Team, Admin and EPCM Services	\$225,814	\$110,329	\$221,239	\$4,575
Feasibility Engineering	\$21,252	\$21,252	\$21,252	\$0
Environmental & Regulatory Compliance	\$22,306	\$8,791	\$18,306	\$4,000
Aboriginal Affairs	\$2,244	\$450	\$2,244	\$0
Procurement & Construction	\$2,426,095	\$422,509	\$2,441,617	(\$15,522)
Commercial & Legal	\$16,490	\$12,338	\$16,490	\$0
Contingency	\$72,280	\$0	\$65,332	\$6,948
Total for Sub-project	\$2,786,481	\$575,669	\$2,786,480	\$0
<b>Labrador Transmission Assets</b>	<b>Project Budget at June 2014</b>	<b>Incurred Costs at Dec. 2014</b>	<b>Project Forecast Cost at Dec. 2014</b>	<b>Variance PFC from Budget</b>
Expenditure Category	A	B	C	D=A-C
NE-LCP Owners Team, Admin and EPCM Services	\$99,973	\$69,259	\$99,951	\$22
Feasibility Engineering	\$220	\$220	\$220	\$0
Environmental & Regulatory Compliance	\$710	\$657	\$699	\$11
Aboriginal Affairs	\$188	\$0	\$188	\$0
Procurement & Construction	\$696,322	\$231,857	\$694,324	\$1,998
Commercial & Legal	\$3,141	\$2,137	\$3,141	\$0
Contingency	\$31,391	\$0	\$33,421	(\$2,030)
Total for Sub-project	\$831,945	\$304,130	\$831,944	\$0
Total Project	\$6,990,414	\$2,143,230	\$6,990,412	\$0



While the overall Project Budget remains unchanged, variances between the Project Budget and the Project Forecast Costs have occurred within and among the expenditure categories (refer to Appendix A for a description of these categories). As noted in the September 2014 Committee Report, variances occur for a number of reasons as a normal part of project management and will continue as the Project moves forward. The Committee monitors these variances on a monthly basis and obtains explanations from Nalcor as required. Most variances reported by Nalcor between the Project Budget and the Project Forecast Costs at the end of December 2014 related to the transfer of budget allocations from the Contingency budget to the Procurement and Construction budget. The reasons for these variances are discussed below.

The available Contingency budget for the Muskrat Falls Project has been reduced from \$235.5 million for the quarter ended September 2014 to \$199.9 million for the quarter ended December 2014, a reduction of \$35.6 million. Table 3 below outlines the changes in Contingency by sub-project.

Table 3

**Summary of Change in Project Forecast Contingency** (in \$ thousands)

Contingency	Project Forecast at Sep 2014	Project Forecast at Dec 2014	Variance
Sub-Project	A	B	B-A
Muskrat Falls Generating Facility	\$129,911	\$101,176	(\$28,735)
Labrador-Island Transmission Link	\$59,995	\$65,332	\$5,338
Labrador Transmission Asset	\$45,614	\$33,421	(\$12,192)
Total	\$235,520	\$199,929	(\$35,591)

**For the Muskrat Falls Generating Facility**, the primary reasons for the draw down on the Contingency budget were; increases in costs related to the installation of the McKenzie River Bridge; additional costs relating to the storage of turbine and generator components as these components are not yet required for installation; and, a contract price for the North Spur Stabilization Works higher than budgeted for this scope of work. These cost increases were partially offset by savings relating to the decision to undertake the provision of surveying services internally and savings associated with a reduction in the amount of concrete and rebar required for the discharge channel at the Spillway. The net effect was a reduction of \$28.7 million in the available Contingency budget.

**For the Labrador-Island Transmission Link**, the primary reasons for the increase in the available Contingency budget were savings relating to the contract for the supply of steel towers; savings from reduced financing charges incurred by a sub-contractor; and savings recognized on regulatory and compliance costs. These savings were partially offset by increased costs due to a weight increase for foundations relating to the steel towers for the transmission line. The net effect of was an increase of \$5.3 million in the available Contingency budget.

**For the Labrador Transmission Assets**, the primary reasons for the drawdown of available Contingency were increases in costs related to a requirement for additional anchors on the transmission line; an increase of final quantities on the earthworks at the Churchill Falls Switchyard; and additional quantities of imported backfill required for the foundations of some transmission towers. The net effect was a reduction of \$12.2 million in the available Contingency budget.

## Long-term Schedule

There have been no changes reported to the planned Milestone Schedule or the forecast Milestone Dates since the September 2014 Committee Report. Table 4 summarizes these Milestone Dates, with first power from Muskrat Falls still forecast for December 2017 and full power from Muskrat Falls forecast for May 2018 as planned.

The Committee has observed that schedule performance measures for the Muskrat Falls Generating Facility, as well as comments from the Independent Engineer from their report for their site visit of November 24 to 27, 2014, indicate schedule pressures are being encountered due to further slippage in schedule progress at the Muskrat Falls site. This slippage relates primarily to progress on the Powerhouse & Spillway.

Nalcor and the civil contractor for the Muskrat Falls Generating Facility are actively undertaking mitigation measures to implement production improvements in order to address this slippage on schedule progress at the Muskrat Falls site. Nalcor has advised that although the timelines may change for the individual work within the project, the slippage on schedule progress to date does not impact the key Project milestones or the critical path for first power in December 2017.

Table 4

**Milestone Schedule**

<b>Muskrat Falls Generating Facility</b>	<b>Planned Date September 2014</b>	<b>Actual/Forecast December 2014</b>	<b>Status</b>
Project Sanction	December 2012	December 2012	Complete
North Spur Works Ready for Diversion	September 2016	September 2016	No change
River Diversion Complete	November 2016	November 2016	No change
Reservoir Impoundment Complete	November 2017	November 2017	No change
Powerhouse Unit 1 Commissioned - Ready for Operation	December 2017	December 2017	No change
First Power from Muskrat Falls	December 2017	December 2017	No change
Powerhouse Unit 2 Commissioned - Ready for Operation	February 2018	February 2018	No change
Powerhouse Unit 3 Commissioned - Ready for Operation	April 2018	April 2018	No change
Powerhouse Unit 4 Commissioned - Ready for Operation	May 2018	May 2018	No change
Full Power from Muskrat Falls	May 2018	May 2018	No change
Commissioning Complete - Commissioning Certificate Issued	June 2018	June 2018	No change
<b>Labrador Island Transmission Link</b>	<b>Planned Date September 2014</b>	<b>Actual/Forecast December 2014</b>	<b>Status</b>
Project Sanction	December 2012	December 2012	Complete
Strait of Belle Isle Cable Systems Ready	October 2016	October 2016	No change
MF Switchyard and Converter Station Ready for Operation	February 2017	February 2017	No change
HVdc Transmission Line Construction Complete and Connected	June 2017	June 2017	No change
Soldier's Pond Switchyard & Converter Station Ready for Operation	October 2017	October 2017	No change
Ready for Power Transmission	October 2017	October 2017	No change
Soldier's Pond Synchronous Condenser Ready for Operation	November 2017	November 2017	No change
Commissioning Complete - Commissioning Certificate Issued	June 2018	June 2018	No change
<b>Labrador Transmission Assets</b>	<b>Planned Date September 2014</b>	<b>Actual/Forecast December 2014</b>	<b>Status</b>
Project Sanction	December 2012	December 2012	Complete
Hvac Transmission Line Construction Complete	June 2016	June 2016	No change
Churchill Falls Switchyard Ready to Energize	May 2017	May 2017	No change
Muskrat Falls Switchyard Ready to Energize	May 2017	May 2017	No change
Ready for Power Transmission	May 2017	May 2017	No change
Commissioning Complete - Commissioning Certificate Issued	June 2018	June 2018	No change

# Current Cost and Schedule to December 2014

## Committee Observations

- Incurred costs: \$2.143 billion. Planned costs: \$2.118 billion. Variance of \$25 million, or 1.2 per cent
- Actual construction progress 23.0 per cent. Planned progress 25.7 per cent. Variance of 2.7 per cent
  - Progress on the Muskrat Falls Generating Facility continues to track slower than planned; mitigation actions are being implemented to address slippage
  - Progress on the Labrador-Island Transmission Link is tracking as planned
  - Progress on the Labrador Transmission Assets continues to track ahead of plan
- Actual progress for the supply and installation of the Turbine Generators continues to track behind the original contract schedule, but remains on track to meet the planned delivery date

## Muskrat Falls Project

This section provides an overview of the current costs and schedule, first on an overall Project basis, and then by each of the sub-projects

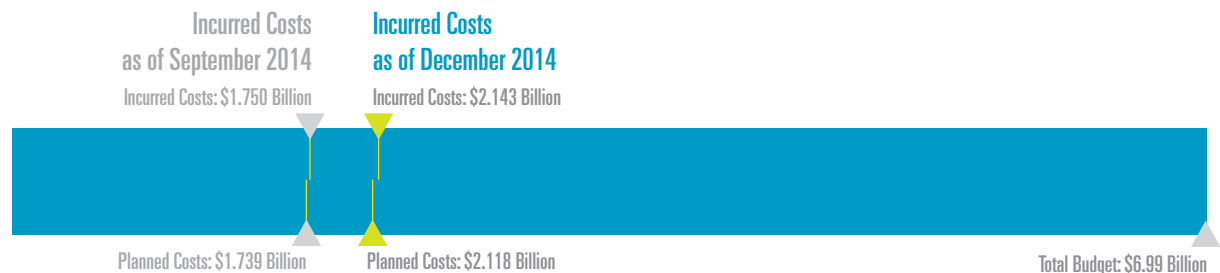
### Current Cost

Cumulative to the end of December 2014, the incurred costs for the Muskrat Falls Project totaled \$2.143 billion as compared to the planned costs of \$2.118 billion, a variance of \$25 million or 1.2 per cent higher than planned [September 2014 Report was 0.6 per cent higher than planned].

Figure 1

**Muskrat Falls Project - Incurred Costs at December 2014**

(including September 2014 comparison)



## Current Schedule

Nalcor monitors and reports schedule progress on all activities, both construction and manufacturing. Construction activities include all those activities occurring at site locations in the province. Manufacturing activities include those supply/install contracts that take place outside the Province (e.g. the generators are being manufactured in China).

Construction activities are mainly monitored and reported on an ongoing installation/construction progress basis, while Manufacturing activities are generally monitored and reported based on a Milestone and/or delivery date basis.

### 1. Construction Activities

Construction has continued to advance on all components of the Muskrat Falls Project during this past quarter. As outlined in Figure 2 and detailed in Table 5, overall Project schedule progress is 23.0 per cent as compared to a planned schedule progress of 25.7 per cent, a variance of -2.7 per cent [September 2014 Report variance was -0.2 per cent].

Figure 2

**Muskrat Falls Project – Schedule of Progress at December 2014**

(including September 2014 comparison)



This schedule progress is distributed among the three sub-projects as outlined below. The schedule progress variance relates primarily to the Muskrat Falls Generating Facility which continues to track behind schedule. Mitigation actions are being implemented to address this schedule slippage.

Table 5

**Planned Construction Schedule Progress vs. Actual Schedule Progress<sup>4</sup> – December 2014**

Muskrat Falls Project: Sub-Project	Planned Schedule Progress - December 2014	Actual Schedule Progress - December 2014	Variance - December 2014	Variance - September 2014
Muskrat Falls Generating Facility	31.3%	25.6%	-5.7%	-1.8%
Labrador-Island Transmission Link	17.8%	17.6%	-0.2%	0.8%
Labrador Transmission Assets	31.6%	32.6%	1.0%	2.5%
Muskrat Falls Project Total	25.7%	23.0%	-2.7%	-0.2%

**2. Manufacturing Activities**

Two additional material manufacturing supply and install contracts were awarded during the quarter ended December 2014, bringing the total to six contracts awarded to date as follows:

1. Turbines and Generators;
2. Powerhouse Hydro-Mechanical Equipment;
3. HVdc Convertors and Transition Compounds;
4. Submarine Cable for the Strait of Belle Isle crossing;
5. AC substations [awarded November 2014]; and,
6. Synchronous Condensers for the Soldiers Pond Switchyard [awarded November 2014].

A summary of progress on these manufacturing activities is outlined as follows:

<sup>4</sup> This schedule progress does not include manufacturing activities

The **Turbine and Generators** contract continues to track behind the original contract schedule. Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery dates. The Independent Engineer does not express concern with achieving delivery dates and continues to monitor the progress under this contract. The IE has noted in its Draw Certificate dated January 28, 2015 that:

Contract CH0030 (Supply and Install Turbines and Generators) appears to be currently behind schedule a small amount of time (-9.4 percent - slight increase from previous month); the contractor notes that the relatively small lateness of engineering, procurement and manufacturing does not affect the planned delivery dates. Continued monitoring of the progress of all items listed is important since this contract is a significant contract to complete in accordance with the Integrated Project Schedule. However it is noted by the IE that there is considerable float between the site need date in the Integrated Project Schedule and the CH0030 contract schedule, which was put in place long before the CH0007 Contract schedule and that there is currently no cause for concern, however the Project team are monitoring manufacturing delivery dates to ensure that the site need dates are not compromised.

The contractor's report for the **Powerhouse Hydro-Mechanical Equipment** for the month of December 2014 states the project progress is at 8.14 per cent complete but does not include the planned progress. The contractor is awaiting Nalcor approval of its proposed baseline schedule. Nalcor advises that they are in the process of reviewing this baseline schedule and once approved, the Contractor will begin reporting progress against this baseline. Nalcor further advises that the work under this contract continues to progress and currently there are no schedule concerns.

The contractor's report for the **HVdc Convertors and Transition Compounds** for the month of December 2014 was not available at the time of publication of this report. Nalcor advises that the report for December 2014 was returned to the contractor for resubmission of additional information and should be available by late March 2015. Nalcor further advises that the work under this contract is currently progressing and there are no schedule concerns.

For the quarter ended December 2014, the **Submarine Cable for the Strait of Belle Isle crossing** continues to track on schedule.

The reports issued by the contractors for the recently awarded contracts for the **AC substations and the Synchronous Condensers** state that they are currently working with Nalcor to develop the initial baseline schedule. Nalcor advises that once developed and approved, the Contractors will begin reporting progress against these baselines. Nalcor further advises that the work under these contracts is currently progressing.

# Sub-Project: Muskrat Falls Generating Facility

## Current Cost and Schedule



Figure showing the Muskrat Falls Generating Facility

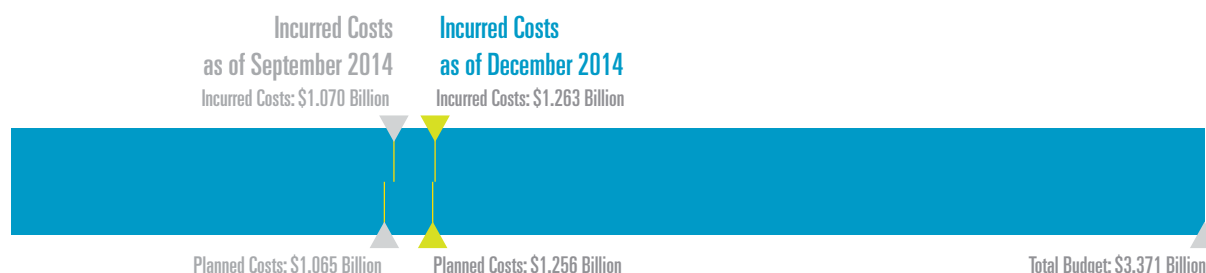
### Current Costs

The Muskrat Falls Generating Facility comprises 48.2 per cent of the total Project Budget. As of the end of December 2014, the incurred costs for the generating facility totaled \$1.263 billion as compared to the planned costs of \$1.256 billion, which was \$7 million or 0.6 per cent higher

Figure 3

#### Muskrat Falls Generating Facility - Incurred Costs at December 2014

(including September 2014 comparison)





than planned [September 2014 Report variance was 0.5 per cent higher than planned]. The Committee noted that the costs are tracking generally as planned.

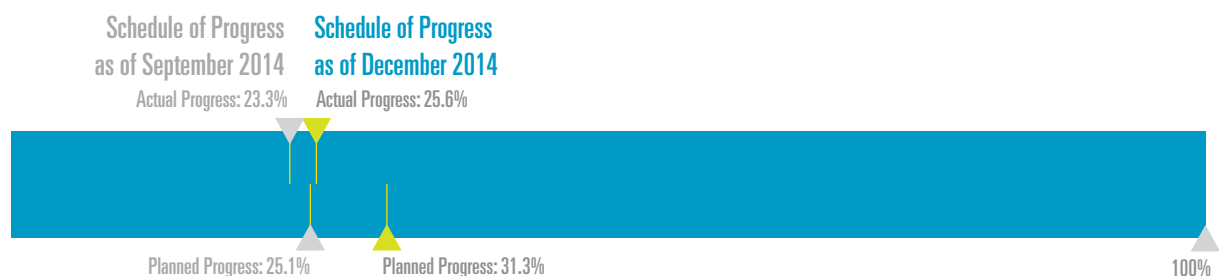
## Current Schedule

As of the end of December 2014, the actual construction progress for the generating facility was 25.6 per cent complete as compared to a planned progress of 31.3 per cent complete, a variance of 5.7 per cent behind the planned schedule [September 2014 Report variance 1.8 per cent behind the planned schedule].

Figure 4

### Muskrat Falls Generating Facility – Schedule of Progress at December 2014

(including September 2014 comparison)



The Committee noted that the variance between actual progress and planned progress has grown since the previous quarter [-1.8 per cent in September 2014 to -5.7 per cent in December 2014]. The Committee questioned Nalcor as to:

- 1) How current costs can generally be tracking to plan while the current progress is tracking behind plan;
- 2) What activities were behind schedule and what caused the progress slippage for these activities; and,
- 3) What actions Nalcor was undertaking to address the progress slippage.

#### 1) How can costs generally be tracking to plan while current progress is tracking behind plan?

Nalcor advised that incurred costs are based on the commercial payment terms of the various contracts whereas schedule progress is based on the estimated percentage of the total work that is physically completed on site. Many costs, such as the up-front engineering work and purchase of prefabricated materials, are incurred before any physical progress occurs on site. As a result, the incurred cost and schedule progress will track differently and, though not directly comparable, are used in conjunction with each other. Nalcor's project team monitors both for identification of issues.

**2) What activities were behind schedule and what caused the progress slippage for these activities?**

The schedule variance for the Muskrat Falls Generating Facility between actual and planned progress was mainly attributable to four activities within the generating facility sub-project:

- the Reservoir Preparation;
- the North Spur Stabilization;
- the Spillway & Gates; and,
- the Powerhouse & Intake.

The progress status of each of these activities is summarized in Table 6 as follows:

Table 6

**Construction Activity for the Muskrat Falls Generating Facility**

**- Planned Progress vs. Actual Progress** – December 2014

Construction Activity	December 2014 Cumulative %			September 2014 Variance
	Planned	Actual	Variance	
Reservoir Preparation	53.8%	60.8%	7.0%	5.9%
North Spur Stabilization	12.2%	0.0%	-12.2%	-3.7%
Spillway & Gates	30.1%	26.5%	-3.6%	-2.2%
Powerhouse & Intake	19.5%	9.6%	-9.9%	-2.9%

*Reservoir Preparation* – The work by the contractor on the clearing of the north and south banks of the Muskrat Falls for the Reservoir Preparation is progressing well ahead of schedule, with approximately 1,250 hectares cleared to date. Final cleanup of the north side blocks is nearing completion and all river-based work has been completed for 2014.

*North Spur Stabilization Work* – This activity was originally planned to start earlier in the current quarter but has been deferred to begin in the spring of 2015. This is the result of a change in the contract execution strategy and associated change to the “North Spur Works Ready for Diversion” Milestone date as reported in the September 2014 Committee Report. Nalcor advised that this change has no impact on the completion date for this scope of work. The contract for the stabilization work was awarded to Gilbert Newfoundland and Labrador Contracting Limited and a Limited Notice to Proceed was issued in December 2014. Nalcor advises that the progress will continue to track behind current plan until a new baseline of the work schedule is set based on this revised execution strategy (currently being detailed in conjunction with the contractor).

*Spillway & Gates and the Powerhouse & Intake* – These activities are primarily associated with contract CH0007. Nalcor has advised that the civil contractor for contract CH0007 has tracked behind schedule as it continues to mobilize its workforce while it develops more effective work plans. The impacts of weather conditions have also resulted in productivity being lower than planned.

The Committee questioned why there was minimal progress (0.4 per cent) on the Powerhouse & Intake from the previous quarter. Nalcor advised that the work during the quarter ended December 2014 was focused on the construction of the integrated cover systems (the ICS) over the Powerhouse & Intake which includes the four turbine units. This ICS formed part of the weather mitigation strategy to facilitate work on the Powerhouse & Intake, particularly the pouring of concrete over the winter months. The construction of the ICS does not form part of the schedule progress being measured for the Powerhouse & Intake since it is a temporary structure intended to facilitate, but not form part of the final facility. While work was ongoing for the installation of the ICS, physical work could not progress on the Powerhouse & Intake facility. Hence, there is minimal measured progress for the Powerhouse & Intake facility during this last quarter.

The construction of the ICS over Units 1 and 2 was completed in January 2015 allowing work to proceed on these units throughout the winter months. Construction of the ICS over Units 3 and 4 was not completed and Nalcor's civil contractor has decided not to complete the ICS over these units. This decision to not complete the ICS over Units 3 and 4 will impact the schedule progress on the Powerhouse & Intake over this upcoming winter 2015, but mitigation measures are being undertaken to address this change in project execution strategy.

**3) What mitigating measures are Nalcor undertaking to address the progress slippage?**

Nalcor advises that they have had numerous meetings with the civil contractor for CH0007 over the last several months. The contractor has been responsive with the implementation of a new Project Management organization which it began implementing in January 2015, including the hiring of additional new site Managers with experience from other major capital projects ongoing and/or completed in this province. Nalcor has increased its Project team members working on site and are working closely with the civil contractor on several performance improvement initiatives to mitigate this slippage. The civil contractor has also modified its project delivery plans to introduce an additional concrete batch plant to increase its concrete pouring capacity. This increased capacity will facilitate the pouring of concrete for Units 3 and 4 of the Powerhouse during the summer of 2015 and will continue through the winter of 2016 using the winter protection method involving tarp coverings and heaters that has proven successful on the Spillway during the current winter of 2015. These efforts are designed to mitigate this schedule impact resulting from the decision not to complete the ICS over these two units.

It is currently anticipated that this slippage in schedule progress will continue over the upcoming winter months while these mitigation actions are implemented. Nalcor anticipates schedule improvement over the spring and summer of 2015 as the mitigation actions take effect. Nalcor advises that though the timelines may change for the individual work within the project, such as the progress on Units 3 and 4 over this winter, the slippage to date has not had an impact on the key Project milestones or the critical path for first power in December 2017. The Oversight Committee will continue to monitor progress and the results of the mitigation measures being implemented by Nalcor and the contractor.



Progress on the Spillway at the Muskrat Falls Site – December 2014

# Sub-Project: Labrador-Island Transmission Link

## Current Cost and Schedule



### Current Cost

The Labrador-Island Transmission Link comprises 39.9 per cent of the total Project Budget. As of the end of December 2014, the incurred costs for the Labrador-Island Transmission Link totaled \$575.7 million as compared to the planned costs of \$525.3 million, which was \$50.4 million or 9.6 per cent higher than planned [September 2014 Report variance was 5.1 per cent higher than planned].

Figure 5

**Labrador-Island Transmission Link - Incurred Costs at December 2014**

(including September 2014 comparison)



Information requested by the Committee on reasons for this variance indicates that it is caused primarily by early payments to contractors achieving milestones or undertaking work sooner than planned. The main transactions affecting the variance include, but are not limited, to the following:

- \$26 million for contracts for the clearing and construction of the HVdc line that were incurred earlier than planned in the Planned Cost baseline;
- \$5 million relating to an increase in costs for an increase in excavated quantities for the construction of the earthworks at the Soldier's Pond switchyard;
- \$5 million relating to the contractor for the synchronous condensers achieving a payment milestone earlier than planned; and,
- \$14 million relating to contracts for the Strait of Belle Isle cable crossing achieving better than planned progress on the drilling and rock crushing and consequently receiving payment earlier than planned.

## Current Schedule

As of the end of December 2014, the actual construction progress for the Labrador-Island Transmission Link was 17.6 per cent as compared to a planned progress of 17.8 per cent complete, a minor variance of 0.2 per cent behind planned schedule [September 2014 Report variance was 0.8 per cent ahead of planned schedule].

Figure 6

**Labrador-Island Transmission Link – Schedule of Progress at December 2014**

(including September 2014 comparison)



Overall, incurred costs are tracking higher than planned and schedule progress is generally tracking as planned. As explained in the above section for the Muskrat Falls Generating Facility, incurred costs are not directly comparable to schedule progress. For example, a \$5 million cost was incurred for achieving a payment milestone earlier than planned relating to the synchronous condensers. These condensers are one of the manufacturing activities not included in the schedule progress until installed at site. Similarly, costs were incurred for rock crushing and storing of the aggregate for the Strait of Belle Isle cable crossing but no progress is measured and reported until it is physically installed for cable protection after the cable is installed.

At the end of the December 2014, right-of-way clearing and construction work was ongoing with respect to segments 1 and 2 of the Labrador-Island Transmission Link. Work is scheduled to start on the island part of the province segments 3 and 4 in early 2015. The construction schedule for this work is outlined in Table 7 below.

Table 7

**Labrador-Island Transmission Link Construction Schedule by Segment**

Segment	Right-of-way Clearing	Foundation Construction & Tower Erection	Wire Stringing
Segment 1: Muskrat Falls to Southern Labrador	Summer '14 - Winter '15	Fall '14 - Summer '15	Winter '15 - Summer '15
Segment 2: Southern Labrador to Forteau	Summer '14 - Spring '15	Winter '15 - Fall '15	Spring '15 - Fall '15
Segment 3: Shoal Cove to End of Northern Peninsula	Winter '15 - Winter '16	Fall '15 - Fall '16	Spring '16 - Summer '17
Segment 4: End of Northern Peninsula to Port Blandford	Winter '15 - Winter '16	Fall '15 - Fall '16	Spring '16 - Fall '16
Segment 5: Port Blandford to Soldiers Pond	Spring '15 - Winter '16	Spring '16 - Spring '17	Fall '16 - Summer '17

# Sub-Project: Labrador Transmission Assets

## Current Cost and Schedule

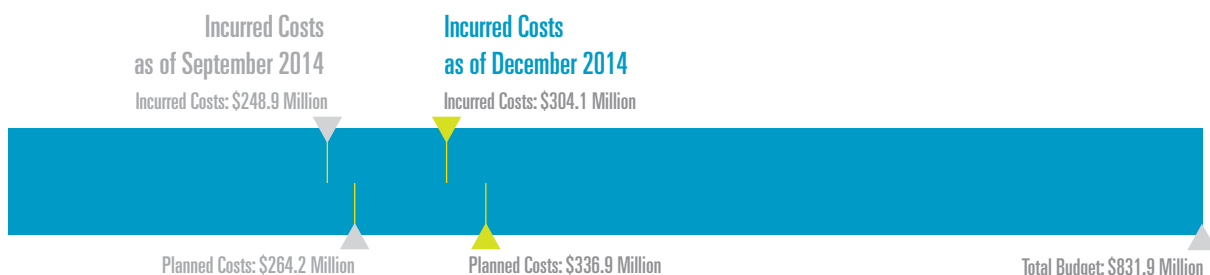


### Current Cost

The Labrador Transmission Assets comprise 11.9 per cent of the Total Project Budget. As of the end of December 2014, the incurred costs for the Labrador Transmission Assets totaled \$304.1 million as compared to the planned costs of \$336.9 million, which was \$32.8 million or 9.7 per cent lower than planned [September 2014 Report variance was 5.8 per cent lower than planned].

Figure 7

#### Labrador Transmission Assets - Incurred Costs at December 2014





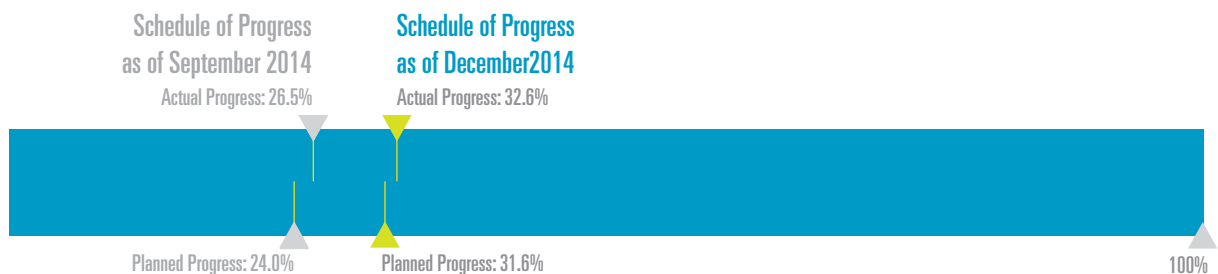
Information requested by the Committee on reasons for this variance indicate that the primary driver has been the focus of the contractor on accelerating tower foundation installations ahead of tower erection, which is time intensive but not as cost intensive per unit. When the contractor shifts its focus to tower erection, the incurred costs will catch up to plan.

## Current Schedule

As of the end of December 2014, the actual construction progress for the Labrador Transmission Assets was 32.6 per cent complete as compared to a planned progress of 31.6 per cent complete, a variance of 1.0 per cent ahead of planned schedule [September 2014 Report variance was 2.5 per cent ahead of planned schedule].

Figure 8

### Labrador Transmission Assets – Schedule of Progress at December 2014



The schedule variance continues to relate primarily to the work on the Churchill Falls Switchyard which had progressed ahead of planned schedule. Due to this significant progress, work was scaled back this last quarter, and as a result, the progress variance has dropped accordingly from 13.4 per cent ahead of schedule for the quarter ended September 2014 to 8.9 per cent ahead of schedule for the current quarter ended December 2014.



Installed towers for the Labrador Transmission Assets transmission line – November 2014

# Project Risks

Given the size and complexity of the Muskrat Falls Project, it is important that risks are proactively identified and monitored and that mitigation measures are implemented as appropriate. The Committee continues to review Nalcor's monthly risk report and meets regularly with Nalcor officials to discuss major project risks and mitigation strategies.

Based on the Committee's review of the risk reports, it focused on providing updates with respect to the following risks:

- 1 Weather impact on Project Schedule - Update
- 2 Major Contracts not yet awarded – Update
- 3 Impact of Contractor Performance on Project Schedule – Update relating to CH0007

## 1 Weather impact on Project Schedule - Update

The Committee sought an update from Nalcor as to what impacts the weather has had on the Project Schedule during the quarter ended December 2014.

Nalcor advises that there were no individual significant weather events that impacted the Project Schedule in the quarter ending December 2014; however, severe winter weather conditions occurred in Labrador with higher than normal snowfall in October and November (about 30 per cent greater precipitation than normal – ref: Environment Canada). This has been combined with extreme cold conditions, particularly in November (which was two to three degrees colder on average than historical norms for November – ref: Environment Canada), resulting in higher than normal transportation difficulties, equipment breakdowns, and extra work in snow clearing and removal. These challenges have contributed to lower than planned productivity performance.

## 2 Major Contracts not yet awarded – Update

In the September 2014 Committee Report, three major contracts for the Muskrat Falls Generating Facility, valued at approximately five (5) per cent of the total Project Budget had not been awarded: the construction of the North Spur Stabilization Works; the construction of the North and South Dams; and, the supply and installation of the Mechanical and Electrical Auxiliaries. The Committee asked Nalcor to provide and update on the status of these contracts.

Nalcor advised that as at December 31, 2014, Contract CH0008 for the North Spur Stabilization Works was awarded to Gilbert Newfoundland and Labrador Contracting Limited in December 2014 and a Limited Notice to Proceed was issued. The contract award value is higher than budgeted for this scope of work. This additional contract cost is reflected in the draw down of the Contingency budget as at December 2014.

With respect to the two remaining contracts: Contract CH0009 for the construction of the North and South Dams is currently undergoing clarifications and negotiations with award planned in 2015; and, Contract CH0031 for the supply and installation of the Mechanical and Electrical Auxiliaries is scheduled to receive bids in February with award planned for 2015.

The Committee notes that until these contracts are awarded, the associated costs and any impact on the Contingency budget for the Project remain uncertain.

### 3 Impact of Contractor Performance on Project Schedule – Update relating to CH0007

The Committee sought information from Nalcor with respect to the performance of the Contractor under contract CH0007 at the Muskrat Falls Generating Facility.

Nalcor advised that it is working closely with the contractor to address the work progress. Actions being taken by both Nalcor and the contractor are designed to improve production, increase productivity and regain the schedule to ensure there is no impact on the critical path to first power in December 2017.

The contractor is responsible to take all necessary actions to address any variances between planned and actual progress on the Powerhouse & Intake and Spillway & Gates Contract. The contract format requires the contractor to meet certain milestones or be liable for liquidated damages if a milestone is not achieved.

Mitigating measures are being taken on a number of fronts with this contract. These measures include:

- Nalcor and the contractor's leadership have regular dialogue to address any issues that may affect progress.
- The contractor is mobilizing additional management resources and Nalcor is supporting and providing additional project oversight.
- The contractor is taking initiatives to improve performance.
- The contractor is mobilizing additional plant material and equipment required for concrete placement.
- Additional equipment is being procured where required.
- Working groups have been formed to address key focus areas including the Powerhouse/Intakes, Spillway, and Productivity.

# Other Oversight Activities

The Committee provides the following update with respect to additional oversight activities.

## Independent Engineer

During the week of October 22 to 24, 2014, the Independent Engineer conducted a review of Nalcor's progress payment and invoicing process. This visit consisted of reviewing the invoice and progress payment and control procedures; and testing those procedures against transactions for two of the major contractors for the Project. The Independent Engineer did not note any issues and made the following conclusion in its report:

“Nalcor has a rigorous approval system setup that verifies the scope of work completed and invoiced on each contract each month...The invoice and progress certificates we inspected were in order.”

As noted in the Committee's September 2014 report, the Independent Engineer visited the Muskrat Falls site from November 24 to 27, 2014. Committee representatives accompanied the Independent Engineer on this visit. The IE's report dated February 5, 2015 summarizes its comments and conclusions resulting from this visit. A link to the full report can be found on the Committee's website at: [www.gov.nl.ca/mfoversight](http://www.gov.nl.ca/mfoversight) or on Nalcor's website at: [www.muskratfalls.nalcorenergy.com/wp-content/uploads/2015/03/Lower-Churchill-Project-November-2014-IE-Site-Visit-Report.pdf](http://www.muskratfalls.nalcorenergy.com/wp-content/uploads/2015/03/Lower-Churchill-Project-November-2014-IE-Site-Visit-Report.pdf)

The Independent Engineer's conclusions and comments relating to this site visit were presented as follows:

- The IE team visited construction operation at the HVac transmission line between Muskrat Falls and Churchill Falls. The quality of the line clearing and transmission tower construction work is very good. All work is being carried out in a very safe manner, in accordance with Nalcor/LCMC [Lower Churchill Management Corporation] safety guidelines and regulations.
- Astaldi Canada's progress on the ICS (shelter structure) for the Powerhouse construction is behind schedule. At the time of the IE site visit the ICS portion over Bays 1 and 2 was substantially complete (minus much of the wall cladding).

- LCMC are actively working with Astaldi to identify and implement production improvements to maintain the schedule for River diversion in 2016 and First Power in 2017.
- Initially, shelter was to be provided for Bays 1 and 2 by January and a decision will be made in January 2015 regarding winter protection for Units 3 and 4.
- During the IE site visit concrete works were underway for the spillway structure. While this work is behind schedule, there has been substantial progress with the concrete abutment and piers.
- No work was being carried out on the North Spur stabilization works at the time of the site visit and this area was not visited by the IE.
- Site camps and infrastructure are being utilized to house site workers as required. Roads are generally good, and are up to the normal standard for a hydroelectric construction site.
- At all sites, the construction works are being carried out in compliance with very high standards of safety and environmental criteria.
- During the November 27 meeting in St. John's, LCMC advised on the positive outcome of the recently held discussions with Astaldi Canada's upper management. New reorganization of Astaldi and LCMC site personnel, targeting a significant contract progress improvement will be implemented on the site during the holiday season shut-down period.

## Nalcor's External Auditor

At this time Nalcor's external auditor is finalizing its review of Nalcor's financial statements for the year ended December 31, 2014. This review includes the additional procedures requested by the Committee in its letter to Nalcor dated July 31, 2014 with respect to the validity of costs charged to the Project

Nalcor advises that it anticipates the year-end statements, including the Combined Statements for the Lower Churchill Project and the audit results of these additional procedures, will be completed and issued by late March 2015.

## Other Assurance Reviews

In fulfilling its mandate, throughout the construction period the Committee will examine issues such as whether management processes and controls are well-designed and followed. The Committee provides the following update with respect to three areas of focus for review:

### **1. Project Controls for Risk Management**

Nalcor's Internal Audit Department has completed its review of the Project controls and procedures for risk management and is currently finalizing its report. This report will be available to Committee representatives for review upon completion.

### **2. Project Controls for Change Management**

Nalcor's Internal Audit Department also completed a review of Project controls and procedures for change management. This report will be available to Committee representatives for review upon completion.

### **3. Project Controls for Cost and Schedule**

As noted in the September 2014 Committee Report, Ernst & Young, LLP (EY), in its role as consultant to the Committee, has been engaged to undertake a review of the Project Controls for Cost and Schedule. This review was initiated in February 2015. The Committee will report on the results of this review when completed.

# Next Report

The Committee will continue its oversight of the construction of the Project in accordance with its mandate and the Oversight Framework. The next report will be for the quarter ended March 2015.



# Appendix A

## Project Budget Summary Expenditure Categories

The summary expenditure categories are described as follows:

**NE-LCP Owners Team, Admin and EPCM Services:** includes the labor, facilities and overhead costs of the LCP Project team as well as costs of SNC Lavalin.

**Feasibility Engineering:** includes the cost of early stage engineering activities which are now complete.

**Environmental & Regulatory Compliance:** includes costs associated with environmental assessment, permits, licenses and similar such costs.

**Aboriginal Affairs:** includes costs associated with activities in the aboriginal communities along with obligations under the Impact and Benefits Agreement.

**Procurement & Construction:** includes costs associated with the major construction activities and the award of contracts.

**Commercial & Legal:** includes costs associated with insurance, legal and other commercial activities.

**Contingency:** provision for additional expenditure, if required.

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