

From: dawndalley@nalcenergy.com
To: [Julia Mullaley](#)
Subject: Report with our comments
Date: Sunday, September 27, 2015 4:17:39 PM
Attachments: [.png](#)
[New Format_Draft Report June 2015 revised 415pm Sep 27 Nalcor comments.docx](#)



New Format_Draft Report June 2015 revised 415pm Sep 27 Nalcor comments.docx

As noted, I am checking on a few more items.

Dawn S. Dalley
Vice President, Corporate Relations & Customer Service
Nalcor Energy
t.709.737.1315 c. 709.727.7715 e. ddalley@nalcenergy.com

Introduction



Muskrat Falls Site – Progress on Gates – June 2015 [NTD: NALCOR Can we get more recent picture?]

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 <http://gov.nl.ca/mfoversight>.

The Committee's last report for the quarter ended March 2015 highlighted several risks to the Project budget and schedule including that two major contracts had not yet been awarded and schedule and cost pressures were being experienced, particularly with respect to the **Powerhouse & Intake** contract for the Muskrat Falls Generating Facility. During the ensuing period, the Committee has been closely monitoring these risks and receiving regular updates on the Project from Nalcor. Over this period, Nalcor has finalized costing of the two outstanding contracts referenced above; increased allowance for maximum labour costs with respect to the **Powerhouse & Intake** contract; and identified additional cost pressures, including labour and materials for access clearing based on experience gained to date. As a

Commented [A1]: I am checking the sensitivity of this statement with Paul.

result, on September 22, 2015, Nalcor revised the Project Budget from \$6.99 billion to \$7.65 billion¹.

Project Costs

Table 1 provides information on the allocation of the adjustment in the Project budget from \$6.99 billion to \$7.65 billion among the three sub-projects. This Table also includes incurred costs up to the end of August 2015, totaling \$3.3 billion.

Table 1
Project Cost Change as of September 2015 & Incurred cost as of August 2015 (in \$ thousands)

Muskrat Fall Project	Project Budget		Change		Incurred Costs August 2015
	June 2014	September 2015	(\$)	(%)	
Muskrat Fall Generation Facility	\$3,371,988	\$3,685,966	\$313,978	9.3%	\$1,726,356
Labrador-Island Transmission Link	\$2,786,481	\$3,089,378	\$302,897	10.9%	\$1,046,647
Labrador Transmission Assets	\$831,945	\$877,557	\$45,612	5.5%	\$488,277
Total Project	\$6,990,414	\$7,652,901	\$662,487	9.5%	\$3,261,280

Table 2 provides additional information on the revised Project Budget by expenditure category for each of the sub-projects.

¹ Total Project costs include construction costs of \$7.65 billion plus interest and other financing costs of \$1.3 billion that will be incurred during construction, for an estimated total of \$8.95 billion.

Table 2
Project Cost Change by Sub-Project as of September 2015 (in \$ thousands)

Muskrat Fall Generation Facility	Project Budget		Change	
	June 2014	September 2015	(\$)	(%)
NE-LCP Owners Team, Admin and EPCM Services	\$382,811	\$408,723	\$25,912	6.8%
Feasibility Engineering	\$17,949	\$17,949	(\$0)	0.0%
Environment & Regulatory Compliance	\$24,312	\$25,825	\$1,513	6.2%
Aboriginal Affairs	\$13,314	\$13,314	\$0	0.0%
Procurement and Construction	\$2,786,766	\$3,121,813	\$335,047	12.0%
Commercial & Legal	\$25,989	\$25,239	(\$750)	-2.9%
Contingency	\$120,847	\$73,102	(\$47,745)	-39.5%
Total MFGen	\$3,371,988	\$3,685,966	\$313,978	9.3%
Labrador-Island Transmission Link	Project Budget		Change	
	June 2014	September 2015	(\$)	(%)
NE-LCP Owners Team, Admin and EPCM Services	\$225,814	\$221,293	(\$4,521)	-2.0%
Feasibility Engineering	\$21,252	\$21,252	\$0	0.0%
Environment & Regulatory Compliance	\$22,306	\$14,446	(\$7,860)	-35.2%
Aboriginal Affairs	\$2,244	\$2,684	\$440	19.6%
Procurement and Construction	\$2,426,095	\$2,717,326	\$291,231	12.0%
Commercial & Legal	\$16,490	\$16,490	\$0	0.0%
Contingency	\$72,280	\$95,887	\$23,607	32.7%
Total LIL	\$2,786,481	\$3,089,378	\$302,897	10.9%
Labrador Transmission Assets	Project Budget		Change	
	June 2014	September 2015	(\$)	(%)
NE-LCP Owners Team, Admin and EPCM Services	\$99,973	\$144,958	\$44,985	45.0%
Feasibility Engineering	\$220	\$220	\$0	0.0%
Environment & Regulatory Compliance	\$710	\$811	\$101	14.3%
Aboriginal Affairs	\$188	\$188	\$0	0.2%
Procurement and Construction	\$696,322	\$709,643	\$13,321	1.9%
Commercial & Legal	\$3,141	\$3,891	\$750	23.9%
Contingency	\$31,391	\$17,846	(\$13,545)	-43.2%
Total LTA	\$831,945	\$877,557	\$45,612	5.5%
Total Project	\$6,990,414	\$7,652,901	\$662,487	9.5%

Additional details of the cost increase for the revised budget by Sub-Project are provided below:

I. Muskrat Falls Generation Facility

Total budgeted costs for the Muskrat Falls Generation Facility have increased from \$3.37 billion to \$3.69 billion, a difference of \$314 million or 9.3 per cent from the June 2014 budget. This cost increase is primarily attributable to the finalization of major outstanding contracts and contractor performance.

Table 3
Muskrat Fall Generation Facility – Revised Project as of September 2015 (in \$ thousands)

Muskrat Fall Generation Facility	Project Budget		Change	
	June 2014	September 2015	(\$)	(%)
NE-LCP Owners Team, Admin and EPCM Services	\$382,811	\$408,723	\$25,912	6.8%
Feasibility Engineering	\$17,949	\$17,949	(\$0)	0.0%
Environment & Regulatory Compliance	\$24,312	\$25,825	\$1,513	6.2%
Aboriginal Affairs	\$13,314	\$13,314	\$0	0.0%
Procurement and Construction	\$2,786,766	\$3,121,813	\$335,047	12.0%
Commercial & Legal	\$25,989	\$25,239	(\$750)	-2.9%
Contingency	\$120,847	\$73,102	(\$47,745)	-39.5%
Total MFGen	\$3,371,988	\$3,685,966	\$313,978	9.3%

1. Finalization of Major Outstanding Contracts

In earlier reports, the Committee noted it was monitoring the progress of three major contracts to be awarded for the Muskrat Falls Generating Facility as this was a risk to the contingency budget. These three contracts were valued at approximately five (5) per cent of the total June 2014 Project Budget. In its December Report, the Committee noted that the contract for the North Spur Stabilization Works was awarded at a higher value than originally budgeted. Since March 2015, one of the two remaining contracts - the construction of the North and South Dams ~~CH0009 and the supply and installation of the Mechanical and Electrical Auxiliaries~~ **were** finalized and similarly resulted in finalized costs being significantly higher than original budget. Nalcor indicates that this cost escalation is reflective of increased market pressures and will also apply to the remaining contract the supply and installation of the Mechanical and Electrical auxiliaries which is still under review. The cost escalation of these ~~two~~ three major contracts and Nalcor's expectation on the remaining contract is reflected in the increase in the budget for Procurement and Construction category in Table 3 above.

2. Contractor Performance on the Muskrat Falls Generation Facility

In its March 2015 Report, the Committee noted continued slippage in schedule progress at the Muskrat Falls Generating Facility, specifically the **Powerhouse & Intake**. The Committee

observed an increase in risk levels associated with contractor performance, Powerhouse concrete placement rates and readiness for River Diversion in 2016. Nalcor continues to work with the contractor to implement the recovery plan which involves ramping up labor and production in an effort to get back on schedule. The ~~acceleration~~ additional efforts of work at the Muskrat Falls Generation Facility ~~are~~ is inducing additional cost pressures on the project. While the contractual agreement between Nalcor and the civil contractors contains provision to reduce Nalcor's exposure to project cost increases related to contractor performance, Nalcor has increased the Project budget to account for the maximum allowable labour compensation payable to the contractor under the agreement. This additional cost is reflected in the increase in the budget for Procurement and Construction above.

In addition, to ensure continued productivity improvements and minimize risk of further schedule slippage, Nalcor has increased the budget for project oversight by deploying additional project management resources. This is expected to increase project management costs under the category NE-LCP Owners Team, Admin and EPCM Services above, as well as increase demand for overhead costs associated with centralized camp services for both contractor and project management personnel [NTD: Where would these latter costs be budgeted with respect to the 7 expenditure categories above? NTD response- the additional camp costs would be under NE-LCP Owners team costs].

II. Labrador Island Transmission Link

Total budgeted costs for the Labrador Island Transmission Link have increased from \$2.79 billion to \$3.09 billion, a difference of \$302.9 million or 10.9 per cent.

Table 4
Labrador Island Transmission Link – Revised Project as of September 2015 (in \$ thousands)

Labrador-Island Transmission Link	Project Budget		Change	
	June 2014	September 2015	(\$)	(%)
NE-LCP Owners Team, Admin and EPCM Services	\$225,814	\$221,293	(\$4,521)	-2.0%
Feasibility Engineering	\$21,252	\$21,252	\$0	0.0%
Environment & Regulatory Compliance	\$22,306	\$14,446	(\$7,860)	-35.2%
Aboriginal Affairs	\$2,244	\$2,684	\$440	19.6%
Procurement and Construction	\$2,426,095	\$2,717,326	\$291,231	12.0%
Commercial & Legal	\$16,490	\$16,490	\$0	0.0%
Contingency	\$72,280	\$95,887	\$23,607	32.7%
Total LIL	\$2,786,481	\$3,089,378	\$302,897	10.9%

In previous reports, the Committee noted that there had been drawdowns on contingency for changes relating to steel towers, foundation types, and additional materials required for the Labrador-Island Transmission Link. [NTD: confirm that these are part of the issue re

geotechnical conditions NTD response – correct these additional costs also relate to soil in the Muskrat Falls Converter station area which resulted in a revised layout in addition the grounding quantities had to be increased because of the low resistivity in the area]. Nalcor reports that as work progressed for clearing right-of-way access roads, the geotechnical conditions encountered, particularly in Central Labrador, were significantly more challenging than originally anticipated based on core sample testing???. [NTD: NALCOR Please confirm statement NTD Response the soil conditions in central Labrador are very challenging . core samples would not have helped because we are experiencing different soil conditions even on the four foundations needed for a self supporting tower – we are finding different foundations foundations are needed because each of the four areas for a single tower vary significantly] prior to construction start. Based on experience to date and recent in-depth field sampling and testing experience of the ground conditions, Nalcor has confirmed that additional labour and materials will be required to complete this work. As contracts for this work are time and material contracts, an increase in labour and materials will directly result in an increase in contract costs. Harsher than normal winter conditions has also impacted labour productivity [NTD: is this a factor at all for increase in contract budget?? NTD response – yes, we had to demobilize the Valard workforce because the ground conditions in the Spring thaw became hazardous and of course were impacting productivity], resulting in projected additional labour hours to complete the work. A change in foreign exchange rates has also resulted in an increase in contract costs, however the reduction in the value of the Canadian dollar has from an overall project been largely avoided however the Alstom Contract for the Switchyard, Converter and Synchronous condensers is impacted by \$20M [NTD: is foreign exchange loss tied to these contracts or others?].

In addition, given the geotechnical conditions encountered, Nalcor has enhanced the tower and foundation design to ensure reliability of this infrastructure. This change in design, combined with investments towards road infrastructure (including bridges and culverts) to improve year around access reliability, will also increase anticipated costs.

The anticipated cost escalation as outlined above is reflected in the increase in the budget for Procurement and Construction and Contingency categories in Table 4.

III. Labrador Transmission Assets

Total budgeted costs for the Labrador Transmission Assets have increased from \$831.95 million to \$877.56 million, a difference of \$45.6 million or 5.5 per cent.

Table 5
Labrador Transmission Assets – Revised Project as of September 2015 (in \$ thousands)

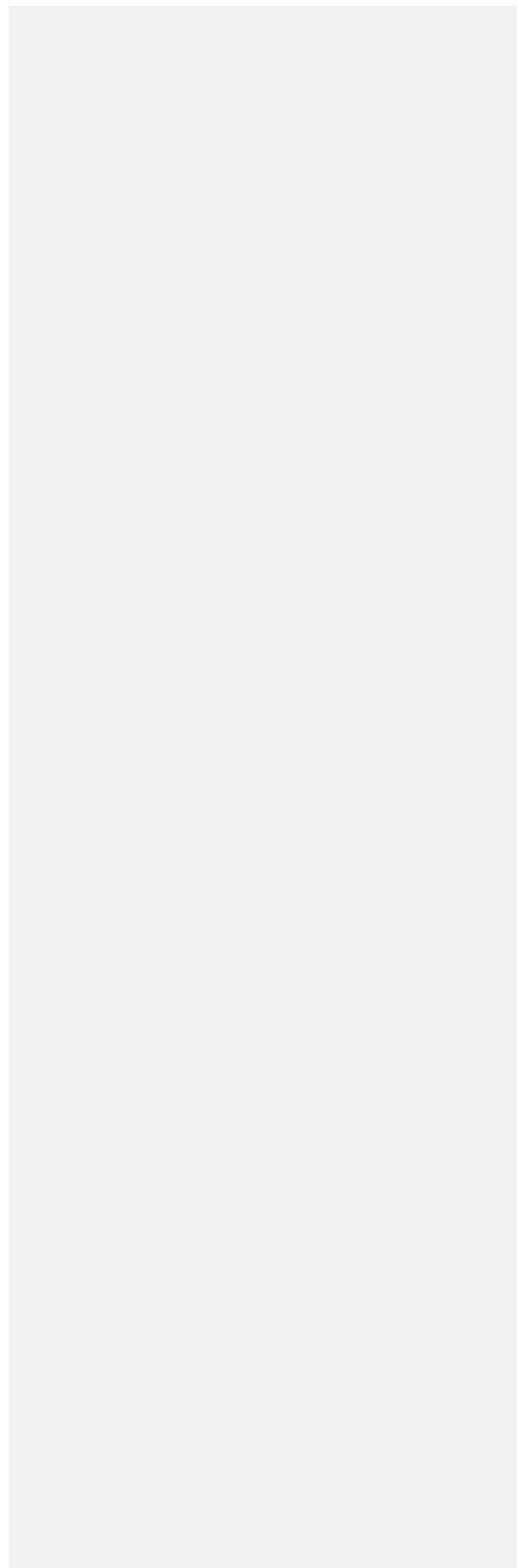
Labrador Transmission Assets	Project Budget		Change	
	June 2014	September 2015	(\$)	(%)
NE-LCP Owners Team, Admin and EPCM Services	\$99,973	\$144,958	\$44,985	45.0%
Feasibility Engineering	\$220	\$220	\$0	0.0%
Environment & Regulatory Compliance	\$710	\$811	\$101	14.3%
Aboriginal Affairs	\$188	\$188	\$0	0.2%
Procurement and Construction	\$696,322	\$709,643	\$13,321	1.9%
Commercial & Legal	\$3,141	\$3,891	\$750	23.9%
Contingency	\$31,391	\$17,846	(\$13,545)	-43.2%
Total LTA	\$831,945	\$877,557	\$45,612	5.5%

In previous reports, the Committee noted that there had been drawdowns on contingency for changes relating to additional foundations and mechanical rock anchors for the transmission line and backfill required for the foundations of some transmission towers for the Labrador Transmission Assets [NTD: confirm that these are part of the issue re geotechnical conditions NTD Response - yes they are].

Although to a much lesser degree than noted above for the Labrador-Island Transmission Link, the geotechnical conditions encountered for the Labrador Transmission Assets were more challenging than originally anticipated [NTD: Is this accurate? NTD Response - YES]. As a result, Nalcor has indicated that additional labour and materials will be required to complete these works. [NTD: is this accurate? YES]. Cost pressures have also been identified to address recommended design changes to the AC Line and switchyard layout at Churchill Falls and Muskrat Falls have been necessary because of the actual geotechnical conditions. Harsher than normal winter conditions has also impacted labour productivity [NTD: is this a factor at all for increase in contract budget? YES it contributes to productivity and therefore cost], resulting in projected additional labour hours to complete the work. The anticipated cost pressures as outlined above are reflected in the increase in the budget for Procurement and Construction category in Table 5.

~~In addition, similar to the Muskrat Falls Generation Facility Nalcor is proposing to increase project management resources towards the Labrador Transmission Assets to ensure productivity improvements and minimize risk against unforeseen schedule slippage. [NTD: NEED EXPLANATION AS DO NOT KNOW WHY THIS IS NEEDED/ ANY CONCERNS ON LTA?] The Project Management costs increase is a combination of a correction in cost allocation between LIL and LTA and additional Project management personnel to ensure adequate oversight of the field work.~~ This is expected to increase project management costs under the category NE-LCP Owners Team, Admin and EPCM Services..

Additional information on the revised Project Budget can be found at: (include Link to Nalcor website)



Project Schedule Performance

In this section, the Committee provides information on actual schedule progress compared to planned schedule progress for the period ended August 2015. Readers are cautioned that Nalcor is currently establishing new baselines for the Project schedule and that the planned progress reference measures will change when the new baseline is complete. As a result, the progress measures are provided here as reference to general progress on the original planned schedule to August 2015.

Committee Observations

Muskrat Falls Project

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

Current Schedule

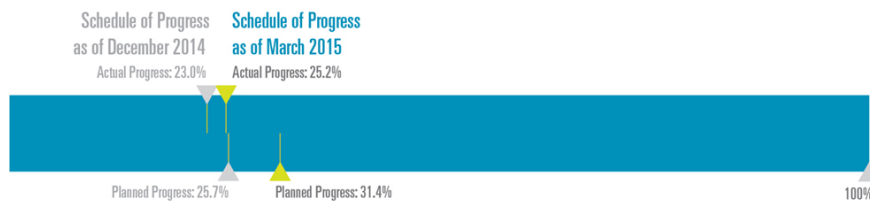
Nalcor monitors and reports schedule progress on all activities, both construction and manufacturing. Construction activities include all those activities occurring at site locations in the province. Manufacturing activities include those supply/install contracts that take place outside the province (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 the Muskrat Falls Project since March 2015. As outlined in Figure 2 and detailed in Table 6, overall Project schedule progress at the end of August 2015 is 33.5 per cent as compared to a planned schedule progress of 43.3 per cent, a variance of 9.8 per cent lower than planned [March 2015 Report variance was 6.2 per cent lower than planned].

Figure 2
Muskrat Falls Project – Schedule of Progress at August 2015
(including March 2015 comparison)



Schedule progress is distributed among the three sub-projects as outlined below. Progress variance continues to relate primarily to the Muskrat Falls Generating Facility which continues to track behind schedule. Mitigation actions continue to be implemented to mitigate against further schedule slippage. Since March 2015, there has been increased slippage on both the Labrador-Island Transmission Link and the Labrador Transmission Assets sub-projects. The slippage in the latter two sub-projects is primarily due to more challenging geotechnical conditions being encountered than anticipated, [a Quebec Innu protest and blockade and harsh winter weather followed by the Spring thaw which made travelling on the right of way and via the access roads impossible. Valard laid off most of the workforce during a two to three week period which further impacted planned progress ...](#) [NTD: is this accurate?/ REQUIRE FURTHER EXPLANATION]

Table 6
Planned Construction Schedule Progress vs. Actual Schedule Progress – August 2015

Muskrat Falls Project: Sub-Project	Planned Schedule Progress – August 2015	Actual Schedule Progress – August 2015	Variance August 2015	Variance June 2015	Variance March 2015
Muskrat Falls Generating Facility	48.8%	34.8%	-14.0%	-14.3%	-11.7%
Labrador-Island Transmission Link	33.4%	27.1%	-6.3%	-5.5%	-1.4%
Labrador Transmission Assets	57.1%	51.8%	-5.3%	-2.1%	1.0%

Total	43.3%	33.5%	-9.8%	-9.3%	-6.2%
-------	-------	-------	-------	-------	-------

2. Manufacturing Activities

The six material manufacturing supply and install contracts awarded to date are as follows:

- Turbines and Generators; (CH0030)
- Powerhouse Hydro-Mechanical Equipment; (CH0032)
- HVdc Convertors and Transition Compounds; (CD0501)
- Submarine Cable for the Strait of Belle Isle crossing; (LC-SB-003)
- AC substations; and,(CD0502)
- Synchronous Condensers for the Soldiers Pond Switchyard (CD0534)

A summary of progress on these manufacturing activities as of June 2015 **[NTD: Why are reports only available to June 2015?- This is a Q2 report]** is outlined below as the Manufacturing reports subsequent to this period are either not available or under review by Nalcor:

The **Turbine and Generators** contract continues to track behind the original contract schedule based on the contractor report – 33.60 per cent complete as compared to a planned progress of 45.29 per cent representing a slight increase in variance from the previous quarter (11.69 per cent in June 2015 vs. 10.01 per cent in March 2015). Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery dates. In its Draw Certificate for the period ending June 2015, the Independent Engineer continues to note that there is considerable float between the site need date in the Integrated Project Schedule and the contract schedule, and that there is currently no cause for concern.

The contractor’s report for the **Powerhouse Hydro-Mechanical Equipment** for the month of June 2015 indicates the project progress is at 24.67 per cent complete as compared to a planned progress of 39.12 per cent. **[NTD: Grown from 13.38% vs 22.71% in March]** Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery.

The contractor’s report for the **HVdc Convertors and Transition Compounds** for the month of March 2015 **[NTD: NEED JUNE 2015!]** indicates that the cumulative progress is 10.1 per cent complete as compared to a planned progress of 13.8 per cent. Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery **[NTD: Confirm status of contractor report for CH0501, is June report now available?]. It will not be available in time for report release.**

For the quarter ended June 2015, the **Submarine Cable for the Strait of Belle Isle** crossing continues to track on schedule with a cumulative progress of 49.36 per cent complete as compared to a planned progress of 50.56 per cent.

The contractor's report for the **AC Substations** for June 2015 indicates that overall progress is ahead of the base line schedule by 1.7 percent with actual progress of 10.9 per cent complete compared to a planned progress of 9.2 per cent. [NTD: Confirm status of contractor report for CH0502, is this report available?] As above, it will not be available for report release.

The contractor's report for the **Synchronous Condensers** for the month of June 2015 indicates the project progress is at 15.8 per cent complete as compared to a planned progress of 27.2 per cent. Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery. [NTD: According to the report, the project is behind schedule due to delays experienced in the piling works being carried out by the subcontractor. The contractor is studying this impact and is organizing a Planning Workshop with the subcontractor and Nalcor to troubleshoot this issue and come up with an accelerated work plan to recover lost schedule. Is the Piling work on site? Is there any risk to delivery and installation dates?] NTD Response Nalcor is working with the Contractors and is not currently forecasting a delay to the completion date.

Sub-Project: Muskrat Falls Generating Facility

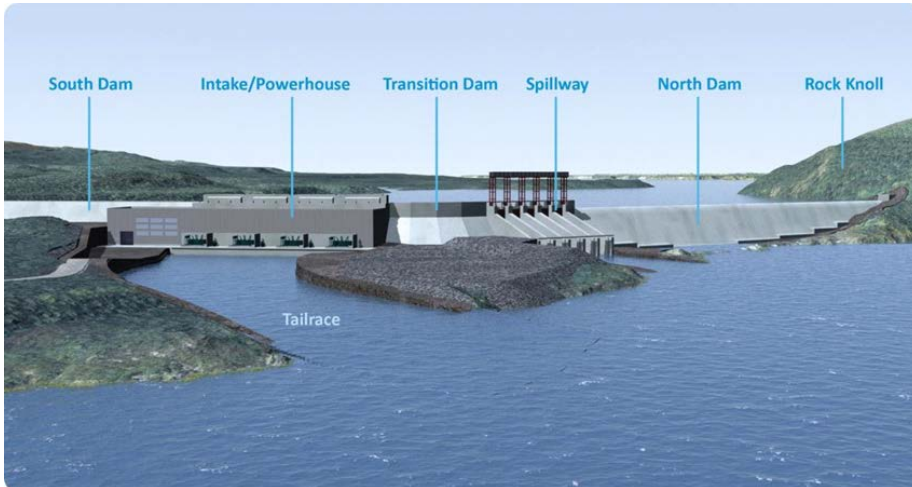
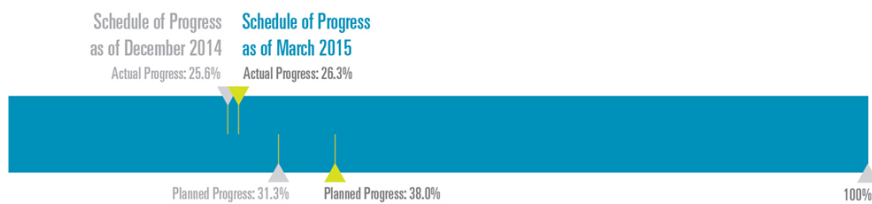


Figure showing the Muskrat Falls Generating Facility

Current Schedule

As of the end of August 2015, the actual construction progress for the generating facility was 34.8 per cent complete compared to a planned progress of 48.8 per cent complete, a variance of 14.0 per cent behind the planned schedule [March 2015 Report variance was 11.7 per cent behind the planned schedule].

Figure 4
Muskrat Falls Generating Facility – Schedule of Progress at August 2015
(including March 2015 comparison)



This schedule variance is mainly attributable to three activities within the generating facility sub-project:

- o North Spur Stabilization;
- o Powerhouse & Intake; and

- o Reservoir Preparation.

The progress status of each of these activities is summarized in Table 7 below as follows:

Table 7
 August 2015 - Construction Activity for the Muskrat Falls Generating Facility
 - Planned Progress vs. Actual Progress

Construction Activity	August 2015 Cumulative %			June 2015 Variance	March 2015 Variance
	Planned	Actual	Variance		
Activity	A	B	B - A	C	
North Spur Stabilization	41.6%	16.6%	-25.0%	-25.8%	-21.2%
Powerhouse & Intake	41.9%	18.5%	-23.4%	-22.9%	-18.3%
Reservoir Preparation	71.5%	60.8%	-10.7%	-6.2%	0.6%

As noted in the previous reports, with respect to the **North Spur Stabilization Works**, Nalcor advises that the slippage recorded in the current schedule is not reflective of the revised plan for this work activity. As reported in the September 2014 Oversight Committee report, the planned date for the North Spur Works Ready for Diversion Milestone has been revised from November 2015 to September 2016. Nalcor advises that the progress will continue to track behind current plan for this scope of work until a new baseline of the work schedule is set based on this revised execution strategy and that there is no change in the completion date for this scope. **INTD: NALCOR, PLEASE CONFIRM THAT THERE ARE NO ISSUES WITH NORTH SPUR** - [NTD response- there are no issues with the North Spur, progress is good and the quality is good – as confirmed during the recent IE visit](#)

Commented [A2]: Checking with Paul to see if we can include progress against new schedule.

The progress on the **Powerhouse & Intake** continues to fall behind against the original contractor's schedule. Nalcor advises..... **INTD: Need explanation.** [Nalcor is fully aware of the planned versus actual progress of the Intake and Powerhouse, as reported previously Nalcor and the CH0007 contractor are working diligently to improve concrete placement rates and achieve increased and sustained production rates during each season. The critical path required priority on the spillway in order to achieve river diversion in 2016, the spillway and transition dams concrete placement is on target to achieve this milestone, with the mechanical outfitting of the gates and stop logs next on the critical path. There are ongoing high level discussions with the CH0007 contractor to determine the completion of the remaining work in the Powerhouse and Intakes. These discussions are commercially sensitive.](#)

The Committee has observed a notable change in the progress on the Reservoir Preparation since the March 2015 report. As of the end of August 2015, the actual construction progress for the Reservoir Preparation was 60.8 per cent complete compared to a planned progress of 71.5 per cent complete, a variance of 10.7 per cent behind the planned

schedule [the March 2015 variance was 0.6 per cent ahead of the planned schedule]. [NTD: Need explanation of why variance has grown and materiality to plans] NTD response – there is considerable float in the reservoir preparation work and it is not on the critical path, contractor resources have therefore been reassigned to the clearing work on the LIL which has a higher priority. There are no issues with achieving reservoir clearing completion.

The Committee notes that for the period April to August 2015, considerable progress has been reported for the **Spillway and Gates** sub-project. As of the end of August 2015, the actual construction progress for the Spillway and Gates was 58.0 per cent complete compared to a planned progress of 54.6 per cent complete, a variance of 3.4 per cent ahead of the planned schedule [March 2015 Report variance was 9.0 per cent behind the planned schedule]. Nalcor has advised that Spillway concrete work will be significantly complete in 2015 and is on target to achieve River Diversion in 2016.

In the Draw Certificate dated July 28, 2015, the Independent Engineer indicates that concrete placement continues to track behind plan; however, there is an improvement in the progress trend for concrete placements over the period April to June 2015.

The Committee posed the following questions to Nalcor:

1. Does the continued schedule slippage on the Powerhouse and Intake jeopardize the Critical Path and Milestone dates?

[NTD: Need response from NALCOR]

Nalcor advises that River Diversion in 2016 is the next activity on the critical path, this milestone requires the North Spur work to be complete in order to impound the reservoir to the 25m level and this work is going well and will not be an issue, as well the Spillway concrete works and mechanical outfitting have to be advanced enough to be able to control the gates and this work is on target and finally the river closure work under the CH0009 contract has to be advanced such that the groins can be pushed out into the river to cut off the natural flow path of the river, which is also on target for 2016. It can be seen that progress can be improved, the spillway concrete progress a case in point. The Spillway is now 3.4 % ahead of plan when in March the spillway was 9.0% behind plan. Therefore progress improvements can be made and Nalcor is naturally concerned about the schedule of the Powerhouse and Intake and is working closely with the Contractor to develop schedule mitigation measures for example applying the CSA revise standard regarding concrete curing times and the use of prefabricated concrete sections in the intakes.

Are the productivity/production improvements including target concrete placement rates sustainable to maintain critical path and Milestone dates.

Formatted: Font: Not Bold

Commented [PH3]: Note it is very important that the OC avoids the use of the word productivity..this is Astaldi's position that poor productivity is the reason for the delay- we simply cannot do anything to back that claim up

Formatted: Normal, No bullets or numbering

2. As described above the next activity on the critical path is the River Diversion in 2016 and because of the major turnaround in concrete placement rates brought about by the efforts of Nalcor and CH0007 contractor this milestone is back on target and the schedule delay to that Milestone which was reported in March 2015 has been recovered. The Powerhouse and Intakes will now be subject to the same schedule mitigation, production improvements and efforts that were applied to the Spillway with such success and therefore Nalcor is still working to achieve the Project Milestone dates

Formatted: Font: Not Bold

[NTD: Need response from NALCOR]

Should include information on concrete placement rates (it was indicated that concrete pours increased from 8,000 cubic meters per month in May to 24,000 cubic meters in July, but declined to 18,000 cubic meters in August), still high risk, etc]

RESPONSE TO PARAGRAPH ABOVE

There are complexities involved here...the spillway and transition dams are nearing completion and therefore the number of work faces are being reduced and it is natural for the concrete placement to fluctuate based on the difficulty of the concrete work - for example the formwork for the draft tubes is much more complex than that on the spillway and transition dams.

Formatted: Font: Not Bold

Formatted: Font: Not Bold

Formatted: Font: Not Bold



Progress on the Spillway at the Muskrat Falls Site - June 26, 2015 [NTD: NALCOR Can we get more recent picture?]

Sub-Project: Labrador-Island Transmission Link



Figure showing the route for the Labrador-Island Transmission Link by Segment

Current Schedule

As of August 2015, the actual construction progress for the Labrador-Island Transmission Link was 27.1 per cent compared to a planned progress of 33.4 per cent complete, a variance of 6.4 per cent behind planned schedule [March 2015 Report variance was 1.4 per cent behind planned schedule].

Figure 6
Labrador-Island Transmission Link – Schedule of Progress at August 2015
(including March 2015 comparison)



Nalcor advised that there was increased slippage in schedule performance is mainly due to

...Nalcor has advised that severe winter weather conditions , combined with the lost production following the Quebec Innu protest and blockade followed by the lay off of workers because of the severe conditions cause by the Spring thaw have contributed to the progress being less than planned. The geotechnical conditions being experienced in Central Labrador further impact on cost and progress.

Sub-Project: Labrador Transmission Assets

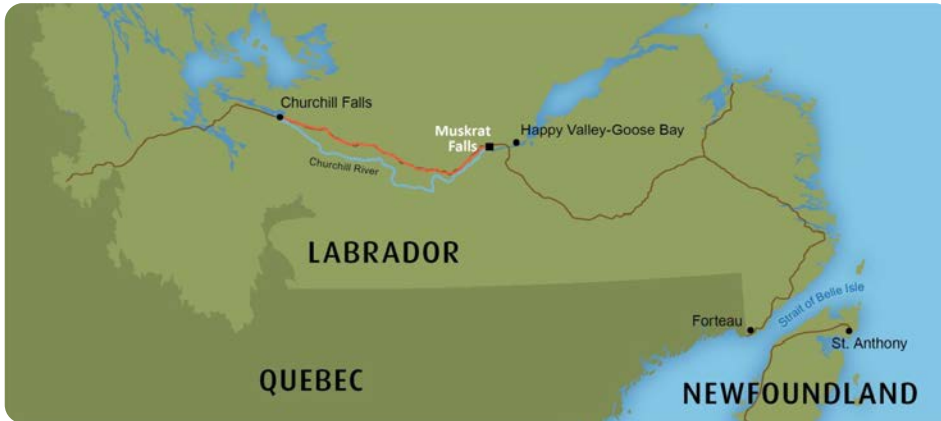


Figure showing the route for the transmission line for the Labrador Transmission Assets

Current Schedule

As of the end of August 2015, the actual construction progress for the Labrador Transmission Assets was 51.8 per cent complete as compared to a planned progress of 57.1 per cent complete, a variance of 5.3 per cent lower than planned schedule [March 2015 Report variance was 1.0 per cent behind planned schedule].

Figure 8
Labrador Transmission Assets – Schedule of Progress at August 2015
(including March 2015 comparison)



Nalcor advised that there was some slippage in schedule performance, mainly due to ...[NTD: any reason why adding project management personnel for productivity reasons????]e

Nalcor has advise that severe winter weather conditions , followed by the Spring thaw have contributed to the progress being less than planned. The geotechnical conditions being experienced further impact on cost and progress.



[NTD: NALCOR Can we get more recent picture?]

Long-term Schedule

Committee Observations at August 2015

Nalcor is currently establishing new baselines for the Project schedule; therefore, as outlined in Table 8, the majority of the Milestone Dates have either been revised or are currently under review. [NTD: NALCOR Confirm no ongoing rebaselining for those noted with NO CHANGE. Also Consider adding context around this statement.] [NTD response – Nalcor advise that those noted as NO Change are confirmed](#)

Table 8
Milestone Schedule

Muskrat Falls Generating Facility	Planned Date March 2015	Actual/Forecast August 2015	Status
Project Sanction	December 2012	December 2012	Complete
North Spur Works Ready for Diversion	September 2016	September 2016	Under review
River Diversion Complete	November 2016	November 2016	Under review
Reservoir Impoundment Complete	November 2017	November 2017	Under review
Powerhouse Unit 1 Commissioned - Ready for Operation	December 2017	December 2017	Under review
First Power from Muskrat Falls	December 2017	December 2017	Under review
Powerhouse Unit 2 Commissioned - Ready for Operation	February 2018	February 2018	Under review
Powerhouse Unit 3 Commissioned - Ready for Operation	April 2018	April 2018	Under review
Powerhouse Unit 4 Commissioned - Ready for Operation	May 2018	May 2018	Under review
Full Power from Muskrat Falls	May 2018	May 2018	Under review
Commissioning Complete - Commissioning Certificate Issued	June 2018	June 2018	Under review
Labrador-Island Transmission Link	Planned Date March 2015	Actual/Forecast August 2015	Status
Project Sanction	December 2012	December 2012	Complete
SOBI Cable Systems Ready	October 2016	October 2016	No change
MF Switchyard and Converter Station Ready for Operation	February 2017	July 2017	Revised
HVdc Transmission Line Construction Complete and Connected	June 2017	July 2017	Revised
Soldier's Pond Switchyard & Converter Stn. Ready for Operation	October 2017	July 2017	Revised
Ready for Power Transmission	October 2017	September 2017	Revised
Soldier's Pond Synchronous Condenser Ready for Operation	November 2017	June 2017	Revised
Commissioning Complete - Commissioning Certificate Issued	June 2018	June 2018	Under review
Labrador Transmission Assets	Planned Date March 2015	Actual/Forecast August 2015	Status
Project Sanction	December 2012	December 2012	Complete
Hvac Transmission Line Construction Complete	June 2016	September 2016	Revised
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	Under review

Project Risks

Given the size and complexity of the Project, it is important that any risks continue to be 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 register for the period ending June 2015 (latest available register), the Committee focused on providing updates with respect to the following risks:

1. Risk of Project Schedule Delays
2. Contract Risk for Muskrat Falls Generation Facility

1. Risk of Project Schedule Delays

While there has been significant improvement in concrete placement rates over the summer period and risk levels for certain areas, including the North Spur and River Diversion in 2016, have decreased in the risk register since March 2015, risk assessments for contractor performance causing schedule delays and Powerhouse concrete placement remains high.

River diversion in 2016 is a critical milestone to achieve first power in 2017 and is directly related to the civil construction associated with the Muskrat Falls Generating Facility, more specifically with the work on the Spillway and Gates. The Committee notes that to avoid Project schedule delays significant productivity improvements in concrete placement and schedule performance will continue to be required in the short term, with those projected improvements consistently being maintained with the established targets in the future. As previously referenced, the Milestone Dates relating to the Muskrat Falls Generating Facility remain under review at this time.

The Committee questioned Nalcor as to its assessment of risk for not achieving River Diversion in 2016 and first power in 2017. **Nalcor indicated that**

RESPONSE

There are always risks associated with a project of this magnitude there are meta organizational risks which are outside of the control of Project Management. The Nalcor Project Team is working diligently to manage the risks that it can directly control. The River Diversion in 2016 is the next major activity on the Project Critical path in order to achieve this significant event. the North Spur work must be complete in order to impound the reservoir to the 25m level and this work is going well and will not be an issue, as well the Spillway concrete works and mechanical outfitting have to be advanced enough to be able

to control the gates and this work is on target and finally the river closure work under the CH0009 contract has to be advances such that the groins can be pushed out into the river to cut off the natural flow path of the river, which is also on target for 2016. It can be seen that progress can be improved, the spillway concrete progress a case in point. The Spillway is now 3.4 % ahead of plan when in March the spillway was 9.0% behind plan. Therefore progress improvements can be made and Nalcor is naturally concerned about the schedule of the Powerhouse and Intake and is working closely with the Contractor to develop schedule mitigation measures for example applying the CSA revise standard regarding concrete curing times and the use of prefabricated concrete sections in the intakes.

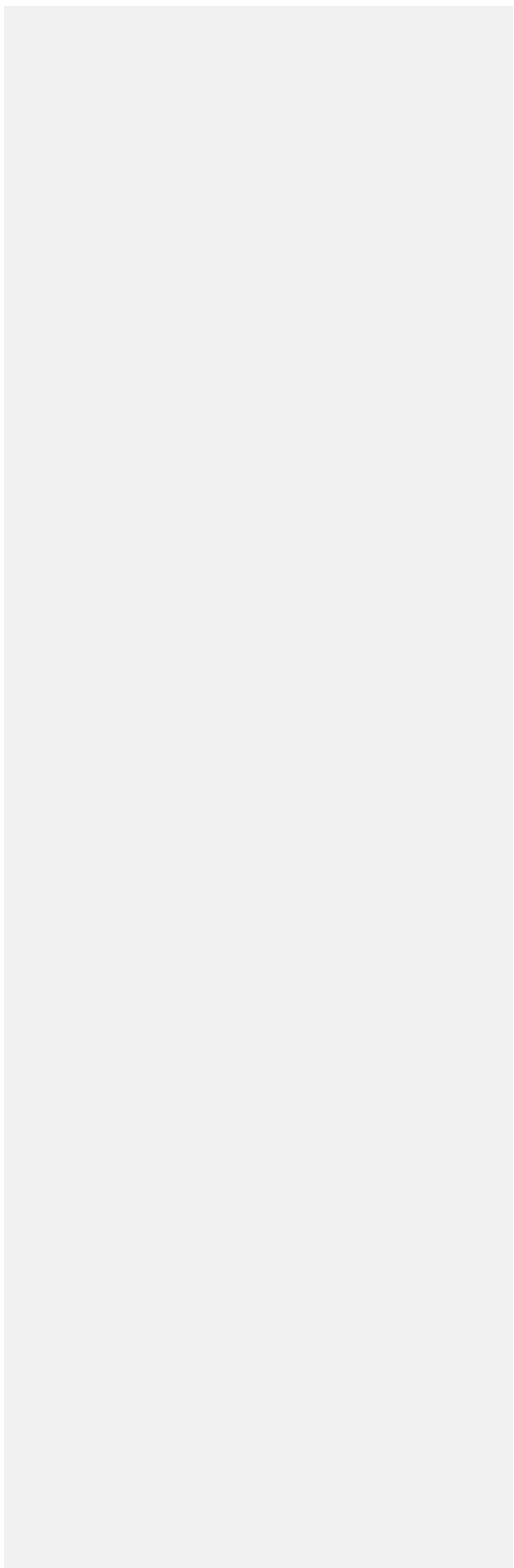
2. Cost escalation risk [NTD: Please review given commercial sensitivity and possible claims issues but need to message Cost risk on this issue?]

Remaining cost risks that the Project faces are much reduced as the project advances and high risk activities which can impact project costs are achieved and Capital costs are adjusted. Initially the cost risks were associated with the Major Contract and Purchase Order awards. The Purchased material costs have been generally aligned with our Budgetted amounts however Major Contract costs have been much higher that were budgetted for, these market pressures are not within the control of the Project Team , the capital costs of civil projects have increased significantly in North America, Canada and NL and the Lower Churchill Project is not immune from those same cost pressures. The latest Contract awards have been the primary reason (70%) for the \$663 capital cost increase. There is some risk associated with the awarded Contracts which have a reimbursable or time and material content and of course Claims. So remaining project cost risks are in the Contractor Performance which can be impacted by many things and is a major part of Nalcor's project management team attention, along with weather and geotechnical risks and commissioning, startup and integration associated risks.
however the Contingency of \$187M is designed to cover these potential risks. It should be noted that Nalcor sets aggressive contingency amounts in order to drive costs to the lowest possible.

Formatted: Font: Not Bold

The Committee notes that the revised budget for September 2015 includes Contingency of \$186.8 million. Nalcor has advised that this Contingency has been estimated using [NTD: NALCOR Note how estimated] to address normal Project execution risk. However, the Committee notes that schedule pressures with respect to the Muskrat Falls Generating Facility remain. The performance of the civil contractor for the Muskrat Falls Generating Facility, while recently improved remains an ongoing concern given the schedule slippage already incurred. It will be critical for the civil contractor to sustain the productivity improvements to avoid further schedule slippage and may require acceleration of work from certain Project contractors which could impact costs beyond the normal Project execution risk contingency.

Commented [PH4]: The only additional comment would be that the contingency is in accordance with the low range advised by The AACEI standard the expected accuracy range for a project with a high percentage of definition with contracts placed, engineering and purchasing complete, overall progress of the project over 50% . The AACEI standard for the hydropower industry states that the accuracy of the capital cost is between -3% to +3% - we have gone for a little over 4% on the remaining scope of the project.



Other Oversight Activities

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

Independent Engineer

From March 13 to 16, 2015 the Independent Engineer accompanied Nalcor representatives on a factory visit to the Andritz facility in Chengdu, China where the turbines and generators are being manufactured. Based on the site visit the Independent Engineer concluded that the workmanship of the manufacturing work was very good and the most up-to-date technologies and tools were being used during the manufacturing process. The Independent Engineer also noted that in general good safety procedures were being observed during manufacturing.

Subsequently, On March 19, 2015 the Independent Engineer also accompanied Nalcor representatives on a site visit to the Nexans facility in Futtsu, Japan. The purpose of this visit was to verify the status of work and review the quality processes for to the manufacture of the submarine cables for the Strait of Belle Isle cable crossing as well as the High-Voltage underground cables. The Independent Engineer found the manufacturing workmanship to be very good and observed that the manufacturing process thus far has been carried out in compliance with very high standards of safety, quality and environmental criteria. The Engineer also reported that the work under this contract appears to be on schedule.

The official reports on both site visits were released in August 2015 and can be found on the Committee's website at: www.gov.nl.ca/mfoversight/engineer/

or, on Nalcor's website at: <https://muskratfalls.nalcorenergy.com/newsroom/reports/>

Nalcor's External Auditor [NTD: Confirm whether this internally prepared statements or reviewed by external]

Commented [PH5]: confirms this was reviewed by external - Deloitte

On August 13, 2015 Nalcor released its 2015 Q2 Financial Report which included unaudited consolidated interim financial statements for the three and six months ended June 30, 2015 and associated Management Discussion and Analysis. Nalcor's Internal Audit Committee has reviewed this report. The document can be found on Nalcor's website at:

<http://www.nalcorenergy.com/uploads/file/Nalcor%20Energy%202015%20Q2%20Financial%20Report.pdf>

The Report indicates that capital expenditures for the project for Q2 2015 were \$509.7M and \$830.1 million year-to-date. This represents an increase of \$231.6 million for the quarter and \$364.2 million year-to-date compared to the same period in 2014. The Q2

capital expenditures included \$199.7 million for Muskrat Falls Generating Facility, \$93.7 million for Labrador Transmission Assets and \$178.1 million for the Labrador-Island Transmission Link.

The unaudited financial statements also reported on capital costs incurred on the Maritime Link, which is owned and financed by a subsidiary of Emera Inc. Capital expenditures for the Maritime Link for Q2 2015 were \$94 million, bringing the total expenditure for that project to date to \$526 million.

Other Assurance Reviews [NTD: Need Nalcor reply to populate]

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:

1. 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, was engaged to undertake an ~~assessment-review~~ of the Project Controls for Cost and Schedule. EY has completed execution of this work and has ~~finalized their report~~ provided a ~~debrief~~ outlining ~~their opinions and advice~~ ~~key observations and recommendations~~ to the Committee. The report acknowledges that Nalcor has “a range of conventional schedule control plans, processes and procedures[Summarize Positive key findings page 4]. However, the report outlines some key aspects of the management processes and controls that at the time of EY’s review were not fully developed and deployed.

EY observed the following **Schedule Management** process and control risks and issues:

1. *For three of five of the Samples selected, contractor Control Schedule Baselines Documents (CSBD) and Schedule Development and Control Plans (SDCP) were incomplete and/or did not meet the criteria defined in Nalcor’s processes.*
2. *A majority of contractors’ schedule updates included in the Sample were not systematically rolled up into the Nalcor Integrated Project Schedule (IPS).*
3. *A completion date has not been established for finalizing an integrated baseline of contractor and IPS schedules to correct the issues noted in #1 and #2 above.*
4. *The IPS development and maintenance process is not fully documented.*

EY observed the following **Cost Management** process and control risks and issues:

1. *The conditions and processes for rebaselining cost and schedule are not defined in the Project’s control processes and procedures. The Oversight Committee’s understanding*

of such conditions and processes is an important foundation, as it conducts its oversight activities.

2. Nalcor uses a relatively basic approach to contingency forecasting which in our (EY) experience is not consistent with the expected practices for a project of this scale and complexity. It is not clear whether the cost contingency forecasts for the Project are adequate.
3. The Project does not define thresholds for variance management, reporting, and escalation purposes. We would normally expect these to be in place as they assist in giving clear indications of the severity of issues and the need to escalate to key stakeholders, such as the Oversight Committee.
4. A fully quantified risk or trend has not been documented for the most significant challenges related to work performed by a key contractor included in the Sample. The scale of potential challenges is not quantified in the summary reporting made available to the Oversight Committee. *[this comment should be removed – it refers to Astaldi and doing what they suggest is **COMMERCIALY IRRESPONSIBLE**-- Risk management was not in their mandate and therefore is not in scope]*

4-5.

The report advises that until such time as the noted management process and controls risks and issues are addressed, the completeness and accuracy of Project schedule and cost forecasting status reporting to the Committee cannot be fully verified. EY made the following recommendations to the Committee:

1. Work with Nalcor to obtain management response for each of the findings noted in this report with defined corrective action, responsibility and anticipated completion dates. Given the volume of Project activity (burn), timeliness of action is critical. Therefore, the Oversight Committee should actively monitor status and verify completion of management response to its expectations.
2. Consider conducting detailed assessments of the cost and schedule status of the Project on an ongoing basis until Nalcor’s corrective action addressing key risks and issues noted in this report is complete to the Oversight Committee’s satisfaction. This ongoing assessment should include the basis and accuracy of the forecasts for completion at the contractor level, as well as the quantification of cost and schedule risk.

Commented [PH6]: As previously explained this is clearly outside of E&Y scope and is highly commercially sensitive because it refers to Astaldi – this statement can cause significant damage .

Formatted: Font: Bold

Formatted: Font: Bold

Commented [PH7]: This is a blatant attempt to duplicate the IE scope by E&Y and must be stopped

Commented [PH8]: This is clearly an attempt to extend E&Y scope – the Independent Engineer performs this role on a monthly basis and via regular visits and audits of Project – we do not need another IE here

Next Report

The Committee will continue its oversight of the construction of the Project in accordance with its mandate and the Oversight Framework.

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.

Appendix B

EY Report on Cost and Schedule Risk