

May 2018 Briefing to CEO and EVP by email

The P75 cost risk range was \$5.67B to \$5.87B assuming summer, winter wetland capping respectively. The large strategic risk of \$2B+ for all soil removal from the reservoir was not included .

The AFE was not updated

This briefing was to provide the CEO and EVP with the results of the Cost and Schedule QRA carried out in May 2018 by Westney Consulting Group.

The email had an attached deck which provided Summary information of the QRA results as follows:

Cost Risk

MFG P75 costs have increased to \$5.67B from the previous AFE of \$5.5B due to factors outside of Project management control – specifically Government Directives to date, Impact of Judicial Inquiry and Minimum Wetland Capping (in Summer)

In addition there is a further \$200M risk exposure from external sources outside of Project management control, specifically if the minimum amount of wetland capping was to be performed in winter conditions which would result in a delay of one year to the project – this was considered to be a conservative view of additional costs and did not include the extension of time claims, lost revenue and Owners costs.

In addition to the costs noted above there remains the risk that the GNL as recommended by the IEAC will require the removal of all soil from the reservoir , with an estimated cost of \$2B.



QRA May 2018 C1

Paul Harrington to: Stan Marshall, Gilbert Bennett
Cc: Ron Power, Scott O'Brien, Lance Clarke, Tanya Power

05/14/2018 04:56 PM

Please find attached the results of the May 2018 Cost and schedule QRA
Regards Paul



Nalcor Cost QRA Summary Slides V_1.pptx

Paul Harrington

Project Director (Consultant to LCMC)

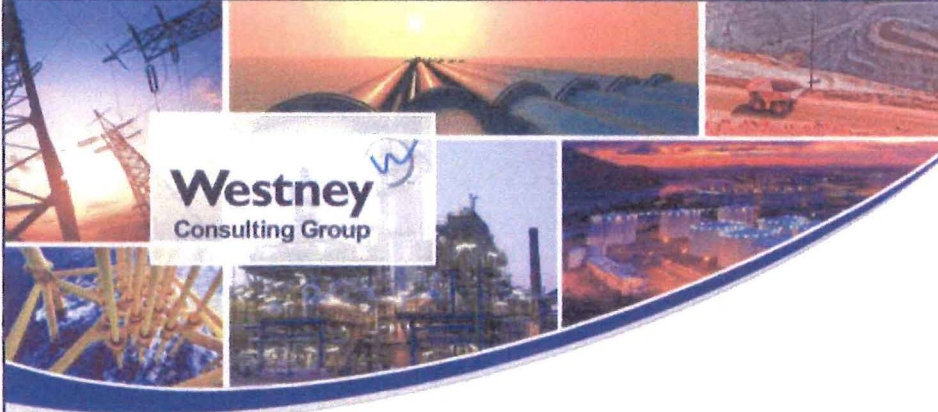
PROJECT DELIVERY TEAM

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Westney Consulting Group

Lower Churchill Project Muskrat Falls Generation - Updated Risk Assessment

Summary Slides
May 2018

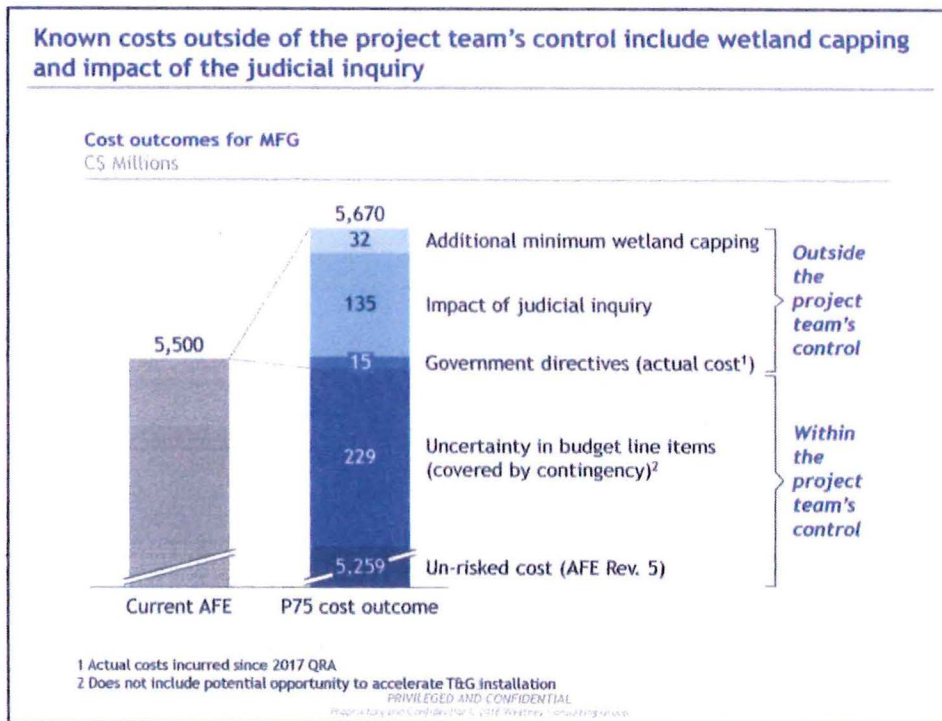
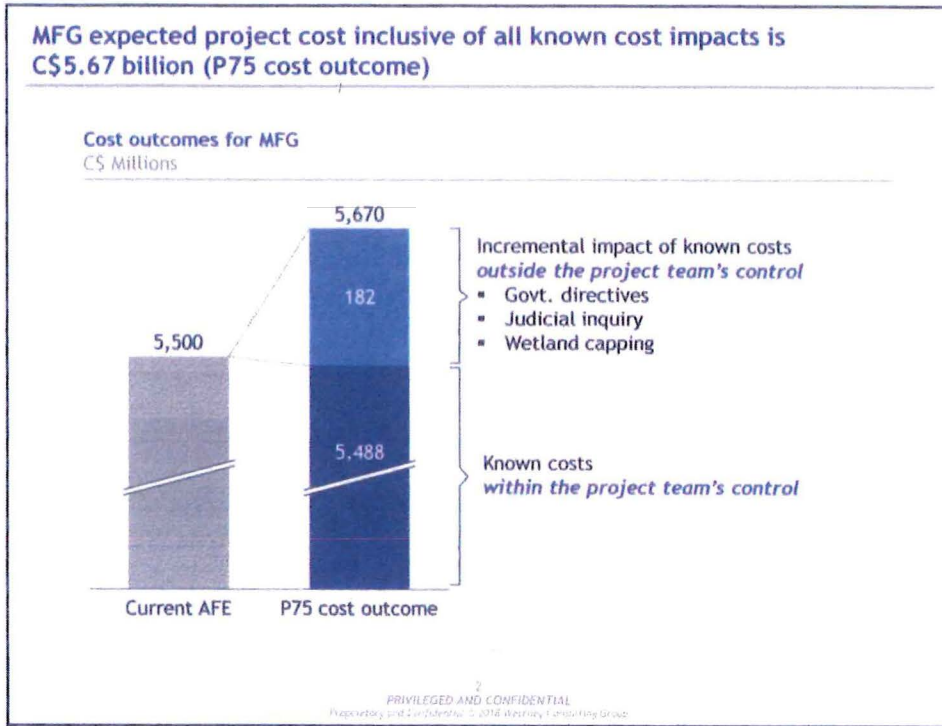
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Summary

	Status of analysis	Key findings
Cost-risk	<ul style="list-style-type: none"> Complete 	<ul style="list-style-type: none"> MFG expected project cost is C\$5.67 billion (P75 cost outcome has increased due to factors outside the project team's control) External risks could add C\$200 million more (above the C\$5.67 billion)
Time-risk	<ul style="list-style-type: none"> In-progress 	<ul style="list-style-type: none"> The probability of achieving the November 2019 First Power date is very high

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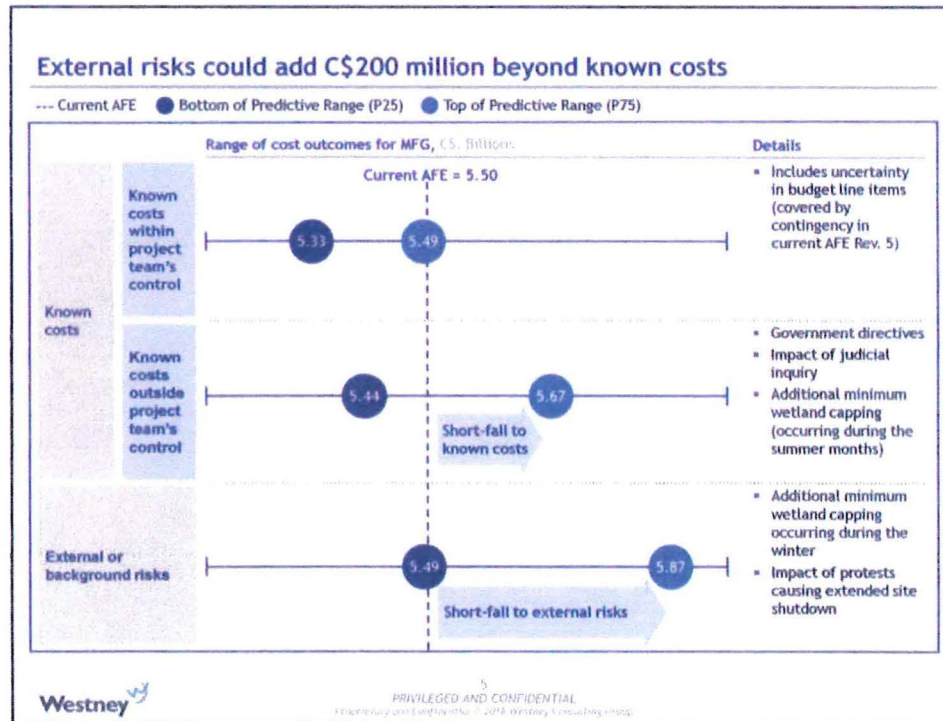


Inquiry impacts are already being realized

	Negative impacts typical of external project investigations	Realized by LCP to-date	How increased cost is realized
Project team	▪ Distraction/loss of focus	✓	▪ Increased hours and duration due to inefficiency, mistakes due to distraction, and staff discontinuity
	▪ Loss of motivation	✓	
	▪ Slowed decision-making	✓	
	▪ Resignations	✓	
Contractors	▪ Loss of relationships with project team	✓	▪ Loss of focus on project completion and delay
	▪ Reluctance to support	✓	
	▪ Apathy	✓	
	▪ Opportunistic behaviors	✓	
External	▪ Executive and corporate paralysis	✓	▪ Claims due to decision delay and inefficiency
	▪ Inquiry scope growth / forensic audit	✓	
	▪ Damaged aboriginal relationships		
	▪ Protests encouraged		

Overall impact of C\$40 to C\$170 million (best and worst case)

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Mitigations can reduce cost- and time-risk (many are already underway)

● Low potential ● Med. potential ● High potential

	Cost-risk	Time-risk	Risk mitigations
Known costs within the project team's control			
Intake, powerhouse, spillway, and transition dams (CH0007)	● Med. potential	● Med. potential	<ul style="list-style-type: none"> Ensure focus and visibility on production plan to meet milestones Continue monitoring Astaldi's financial position and be prepared act expeditiously Continue high-level dialogue and engagement with Astaldi corporate leadership Ensure timely analysis and closure of commercial matters
North dam (CH0009)	● Low potential	● Low potential	<ul style="list-style-type: none"> Ensure closure of commercial matters around BPLP's revised schedule which aligns with Impoundment target Aggressively oversee the go-forward work with the goal of reducing indirect labor cost exposure Use 'levelling concrete' in lieu of RCC in adverse weather
Turbines and generators (CH0030)	● Low potential	● Low potential	<ul style="list-style-type: none"> Push for decision on accelerating T&G installation to deliver earlier First Power Ensure continuous management of Interface/Integration plan for Andritz, Astaldi (CH0007), and balance of plant contractor (CH0031)
Hydro-mech. equipment (CH0032)	● Med. potential	● Med. potential	<ul style="list-style-type: none"> Ensure commercial/contractual arrangements are completed to adjust current Intake Gate schedule to align with Impoundment target Actively manage new contractual arrangement(s) (i.e., reimbursable labor)
Mechanical and electrical auxiliaries (CH0031)	● Low potential	● Low potential	<ul style="list-style-type: none"> Continue implementation of optimized work program for earlier First Power and manage interfaces/work coordination risks Aggressively oversee the work going forward with the goal of reducing indirect labor cost exposure
Known costs outside the project team's control	● High potential	● High potential	<ul style="list-style-type: none"> Ensure clear communication and direction from inquiry commission to Nalcor Educate all associated parties on the potential impact of the judicial inquiry Try to ensure inquiry process is fair and efficient Wait to conduct the portion of the inquiry that impacts execution until after the project is complete Assess and manage project team health to the extent possible (e.g., take steps to minimize the impacts on the project team)

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Disclaimer

The analysis in this report was developed by Westney Consulting Group (Westney) in concert with the project team using project documents and interviews.

Westney has had varying levels of involvement on this project since 2008, providing us with good general knowledge of the project.

For probabilistic analysis, the Westney Risk Resolution® process and proprietary distributions were used.

Any expressed opinions or recommendations expressed by Westney herein are the product of the experience of the Westney consultant(s) and are provided as input and information for decisions; any reliance upon or decisions made from the information is the sole judgment/ decision of the user of the information.

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