Lower Churchill Project
11 - SNC Risk Report
June 2018

Boundless Energy

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LOWER CHURCHILL PROJECT

Privileged and Confidential in Contemplation of Litigation

After the SNC risk assessment was released, Westney was engaged to analyze the validity of the assertations in the report

SNC Risk assessment report

- In June of 2017, a Risk Assessment report for the Lower Churchill Project (LCP) was released to the public, making assertations about LCMC's risk management practices
- Minister Siobhan Coady stated *"we've always questioned this project, the galling thing is there were severe risks identified that were either simply ignored, not addressed, or even assigned any credibility for that matter." She further added "we understand that they (PCs) would not even accept the report."*[1]

Westney was engaged to analyze the report

- Given the very serious allegations and accusations of neglect, the LCMC engaged Westney to analyze the validity of these assertations
- Specifically, this review sought to bring clarity to questions of public concern that have been posed, including to determine:
  - Whether SNC provided the 2013 Risk Assessment Report to the CEO at the time and was it returned and/or rejected;
  - Whether LCP deliberately ignored the risks identified and took no action to mitigate them;
  - Whether LCP were not aware or ignorant of the risks identified by SNC; and
  - Whether the risks identified by SNC were not quantified and reported to Executive.

Source 1: https://nlliberals.ca/muskrat-falls-update-reveals-pc-neglect-at-expense-to-province/

Analysis conclusion

The Telegram Article

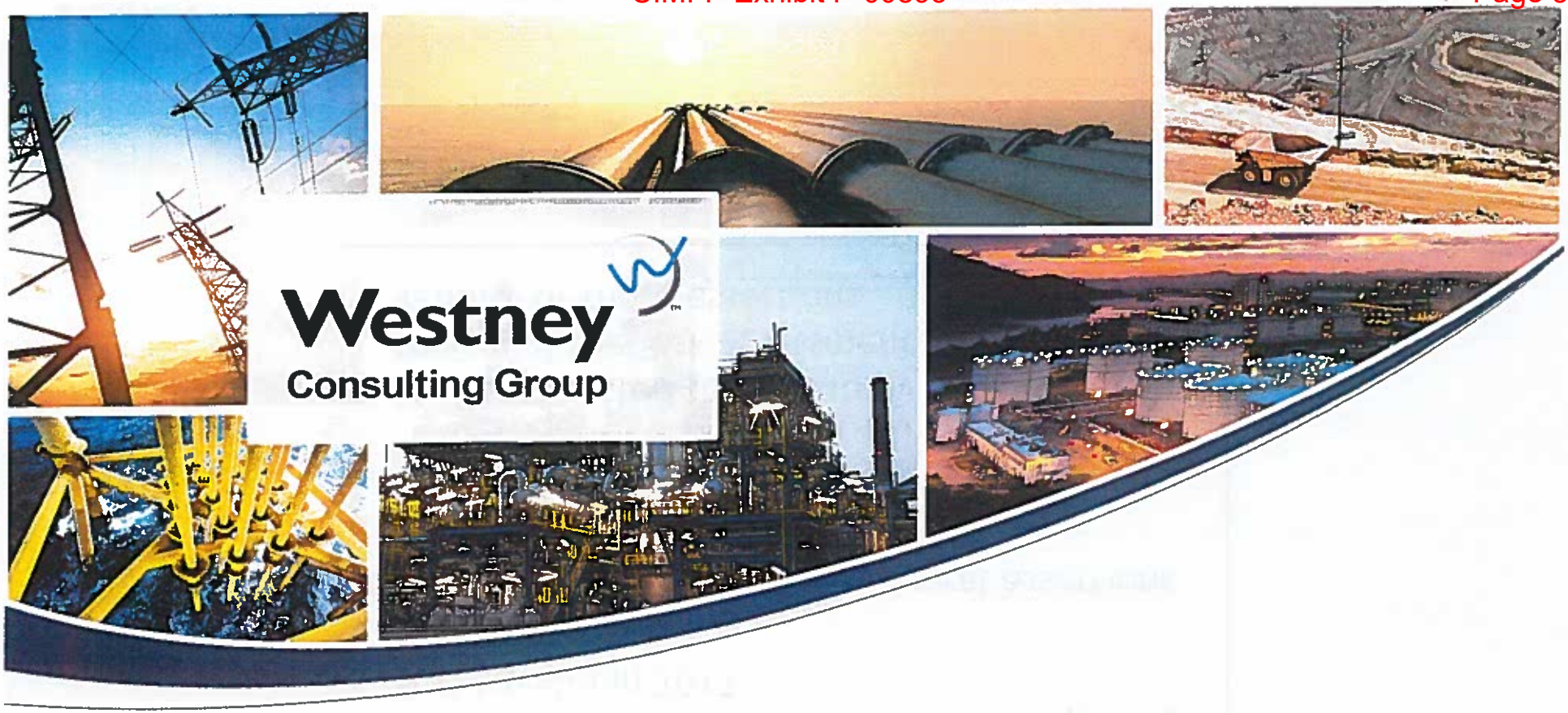
- "Regarding the allegation that SNC was unable to deliver the Risk Assessment to the CEO in 2013 (which the then CEO denies) it is important to note that SNC could have simply sent the risk assessment using established communication methods under a cover letter to LCMC. If this had been done there would have been a record of LCMC receiving such a cover letter in the Project's document management system 'Aconex'. This system does not allow deletion of incoming records, a check has been performed and no record exists of the report or associated cover letter[2]"

Analysis Conclusion

- The Westney analysis clearly shows that there were no new risks in SNC's analysis or included in their report
- The accusation of neglect is unfounded , the Project team had already identified the risks, quantified the risks in the QRA and were actively managing the risks and continue to do so
- This is just one more example of the misinformation that is allowed to propagate by those who have an agenda and unfairly demonize the Project team

- Source 2: Reference article *Ball, Martin spar over 2013 risk assessment report* contained in The Telegram, 27-Jun-2017

The Westney Report



An Analysis of SNC-Lavalin's Risk Assessment Report

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Discussion document

December 2017

Context

- In June of 2017, a Risk Assessment report for the Lower Churchill Project (LCP) was released to the public that was developed by SNC-Lavalin in 2013
- The Risk Assessment made several assertions about Nalcor Energy – LCMC's risk management practices
- LCMC requested that Westney complete a review of the Risk Assessment to analyze the validity of those assertions

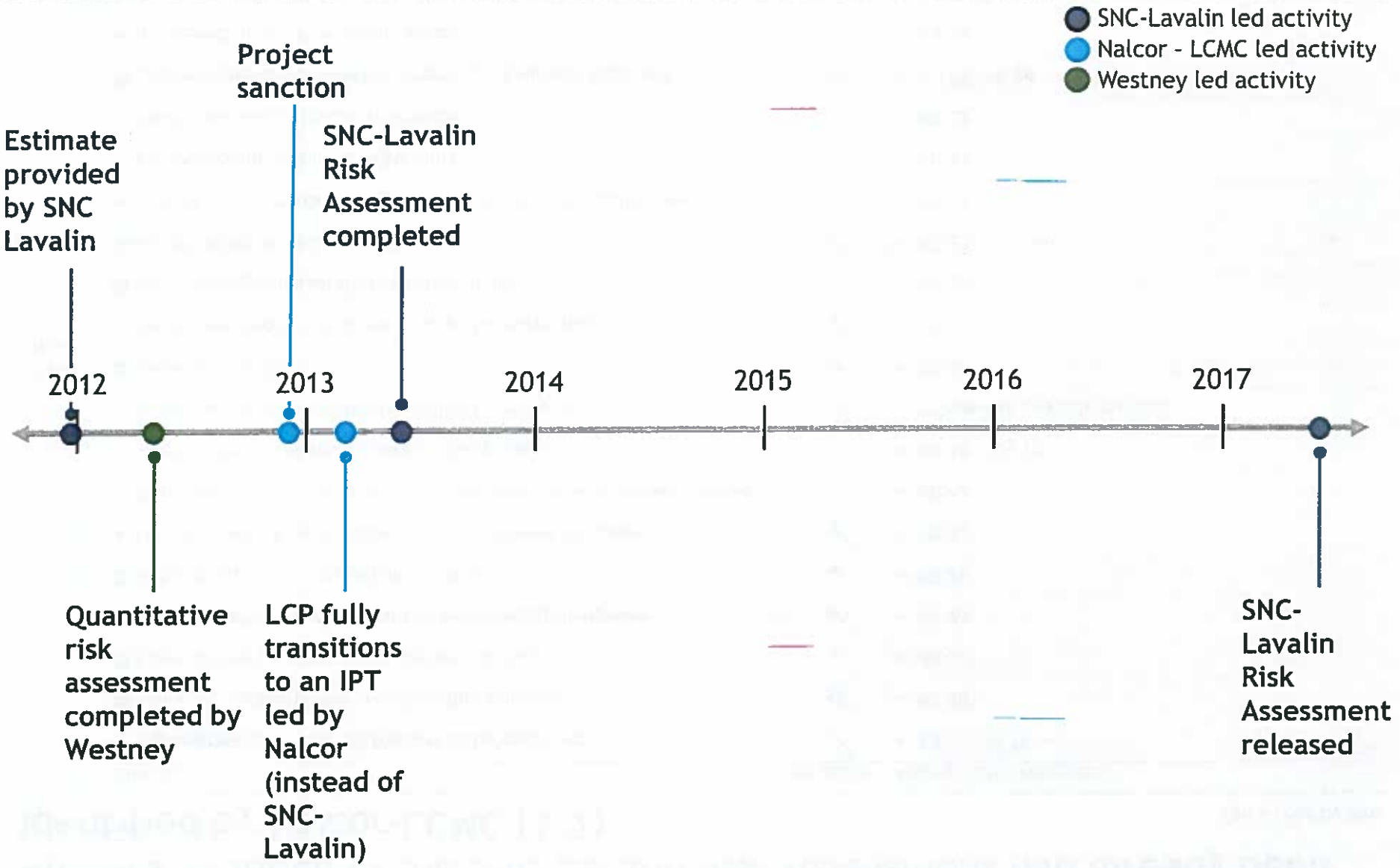
Important items to note

- The SNC-Lavalin Risk Assessment for the LCP developed in 2013 was never submitted to Nalcor
- No copy exists in LCMC's comprehensive document control system
- The review was not requested by LCMC management
- The document is identified as "Confidential for SNC-Lavalin Internal Use Only" and was not approved (signed) by Executive VP Scott Thon, who was a sitting member of the Steering Committee for SNC-Lavalin's EPCM services agreement

Assertions made in the 2013 SNC-Lavalin Risk Assessment are not supported by the facts available

Assertions about LCMC's risk management approach	Facts available	Supporting slides
1 A quantitative evaluation of risk exposure was not completed	▪ Westney with LCMC and SNC-Lavalin completed a quantitative risk analysis in 2012 prior to sanction	4
2 The existing LCP risk register did not provide a realistic portrait of actual project risk	▪ All risks identified by SNC-Lavalin were included in the LCP risk register and considered in Westney's analysis ▪ SNC-Lavalin had several participants in Westney's risk identification and ranging sessions (which leveraged the existing LCP risk register)	5 - 6
3 A clear picture of the total cost-risk exposure was not provided	▪ The range of outcomes from Westney's analysis were inclusive of the results in SNC-Lavalin's Risk Assessment ▪ SNC-Lavalin provided critical cost estimate data to LCP (e.g., concrete installation production rates, costs per cubic meter) and was a key contributor in risk sizing/ranging	7
4 The risk management function was not empowered	▪ SNC-Lavalin was compensated for a full-time risk manager and a LCMC senior manager was engaged in the day-to-day risk activities	
5 Mitigation plans were needed for the top 9 risks identified	▪ Top risks had been identified prior to sanction, with mitigations planned or already underway in 2013	8

Timeline of key events



All risks included in the SNC-Lavalin Risk Assessment had already been identified by Nalcor-LCMC (1/2)

Top 9 risks by size

	Risk title	Included[1]	Nalcor-LCMC reference[2]
Very high[3]	● High market cost from contractors to be expected	✓	▪ KR 5 / KR 20
	● Concrete works slippage from baseline schedule	✓	▪ KR 20
	● River closure slippage from baseline schedule	✓	▪ KR 20
	● Limited availability of skilled and experienced manpower	✓	▪ KR 24
	● Major components outsourcing in China	✓	▪ KR 26
	▪ Limited availability of skilled site management personnel	✓	▪ KR 22
	▪ Difficulty transitioning to an integrated team project delivery model	✓	▪ KR 43
	▪ Mobilization of community against the project	✓	▪ KR 18 / KR 19
	▪ Additional delays resulting from difficult early works	✓	▪ **Time-risk analysis variable
	● Large EPC packages	✓	▪ KR 29
	▪ Insufficient geotechnical information for north spur area	✓	▪ KR 23
	● Large packages issued for transmission lines	✓	▪ KR 28
	● No geotechnical data available	✓	▪ KR 23
	▪ Lack of control on delivering of Strait of Belle Isle (SOBI) crossing cable	✓	▪ KR 11
	▪ Commissioning failures of T&G units	✓	▪ KR 13
	▪ Insufficient geotechnical information	✓	▪ KR 23
	● Limited camp accommodation capacity at Muskrat Falls site	✓	▪ R 185/ KR 24
	▪ No geotechnical information for dam	✓	▪ KR 23
	▪ C3 coordination of packages will be a challenge	✓	▪ R 162
	▪ Insufficient suppliers' QA/QC	✓	▪ R 61 / R 159

[1] Included in Nalcor's Decision Gate 3 Project Cost and Schedule Risk Analysis Report and incorporated into Westney's analysis [2] KR = Key risk, R = Risk [3] SNC-Lavalin risk level based on "probable consequence" (further details on slide 7)

All risks included in the SNC-Lavalin Risk Assessment had already been identified by Nalcor-LCMC (2/2)

	Risk title	Included[1]	Nalcor-LCMC reference[2]
Very high[3]	Contractors' (or sub-contractors') errors / omissions	✓	R 59
	Native issues for powerlines in Labrador	✓	KR 18
	Possibility of strike	✓	KR 24
	Underestimating workforce required to accomplish project	✓	KR 24
	Claims arising from contractors or suppliers	✓	R 24
High[3]	Requirements surrounding environmental assessment release	✓	KR 15
	Complexity of commissioning and system integration	✓	KR 13
	Riverside cofferdam catastrophic flooding	✓	R 12
Medium[3]	Scope of packages not aligned with suppliers' core businesses	✓	R 147
	Readiness for start-up might be a challenge	✓	KR 13
	Problematic long lead items	✓	R 51 / R 130
	Possible dispute for acquiring ROW for approx. 100km of powerlines	✓	R 84
	Powerlines corridor located in remote areas	✓	R 122 / R 94
	Delay in availability of admin. building creating inefficient site mgmt.	✓	Not considered a risk (minor issue)
	Suitability of site south access road	✓	R 37 / R 130
	Cost overrun on electrode pond in Labrador	✓	R 70
	Bankruptcy of major LCP contractors or suppliers	✓	KR 26 / KR 5
Low[3]	Limited camp accommodations capacity at Upper Churchill Falls site	✓	KR 5
	Adverse weather conditions	✓	**Time-risk analysis variable
	Insufficient air travel to LCP sites	✓	KR 24

[1] Included in Nalcor's Decision Gate 3 Project Cost and Schedule Risk Analysis Report and incorporated into Westney's analysis [2] KR = Key risk, R = Risk [3] SNC-Lavalin risk level based on "probable consequence" (further details on slide 7)

The range of outcomes from Westney's analysis were inclusive of the results in SNC-Lavalin's Risk Report

	Westney	SNC-Lavalin
Cost timing assumptions	▪ 2012 C$ (at time of estimate)	▪ End-of-project costs
Estimate basis	▪ C$5.465 Billion	▪ C$6.1 Billion stated, which is likely inclusive of contingency (the amount was C$5.8, excluding contingency)
Risk identification	▪ LCP's risk register and collaborative risk identification sessions with SNC-Lavalin and Nalcor	▪ LCP's risk register and discussion with SNC-Lavalin internal personnel
Risk quantification and modeling	▪ Ranging of best and worst cases for both "tactical" (i.e., risks around the estimate) and "strategic" risks, with probabilistic modeling of all risks via Monte Carlo simulation techniques	▪ Sizing of each risk based on a formula for probable consequence ("consequence" x "probability" x (1 - "manageability")) ▪ Probable consequences added to determine total risk
Analysis completion	▪ 2012	▪ 2013 (after several key bid packages had been received)
Cost-risk results	▪ C$5.8 Billion - C$8.2 Billion[1] (P5 to P95, escalated to end-of-project C$)	▪ C$8.2 Billion (C$5.8 Billion + C$2.4 Billion in risk)

[1] P5 to P95 range in 2012 C$ is C$5.5 Billion - C$7.4 Billion

Westney

Top risks had been identified by Nalcor prior to Decision Gate 2 (2010), with mitigations planned or already underway in 2013

Risk title	SNC-L risked amount ($ millions)	Nalcor-LCMC response / actions already underway in 2013
▪ High market cost from contractors to be expected	225	▪ Bidders were aggressively profiled ▪ Almost all packages bid had 4 or more bidders
▪ Limited camp accommodation capacity at Muskrat Falls site	203	▪ Design of the "in ground" services was changed to allow for additional camp accommodation blocks to be built as the need arose
▪ Limited availability of skilled and experienced manpower	203	▪ A competitive wage / labour agreement with the Hebron Project was established ▪ A high quality camp and accommodations was built (e.g., fiber internet, TVs in all rooms, central gym, cinema, etc.) ▪ An aggressive campaign was executed to attract workers from Western Canada ▪ Transportation was streamlined (e.g., charter aircraft, bussing from the airport)
▪ Large packages issued for transmission lines	180	▪ First package bid (HVac TL) was broken into small packages. Bid revealed significant savings for larger package which was leveraged for the HVdc TL
▪ Major components outsourcing in China	168	▪ An extensive bidding process was conducted and supplier inspections/quality reviews were completed for the proposed facilities in China ▪ LCP had a full-time QA team on-the-ground in China, and quality was good
▪ Concrete works slippage from baseline schedule	126	▪ The project schedule at sanction was recognized as a target schedule with aggressive milestones
▪ River closure slippage from baseline schedule	96	▪ To further de-risk schedule, a decision was made in March of 2013 to move diversion from 2015 to 2016 ▪ Mitigations resulted in river closure, diversion, and spillway operation being achieved on schedule
▪ Large EPC packages	90	▪ LCP's financial advisors and rating agencies required large packages that limited interfaces from contractors with global EPC capabilities and high credit-worthiness, with a preference for unit-rate and lump-sum contractors
▪ No geotechnical information for dam	90	▪ A decision was made that the in-river geotechnical investigations actually offered a much lower cost and schedule risk than portrayed by SNC-Lavalin's geotechnical engineers