Lower Churchill Project
7 – Pre-Sanction
June 2018

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LOWER CHURCHILL PROJECT

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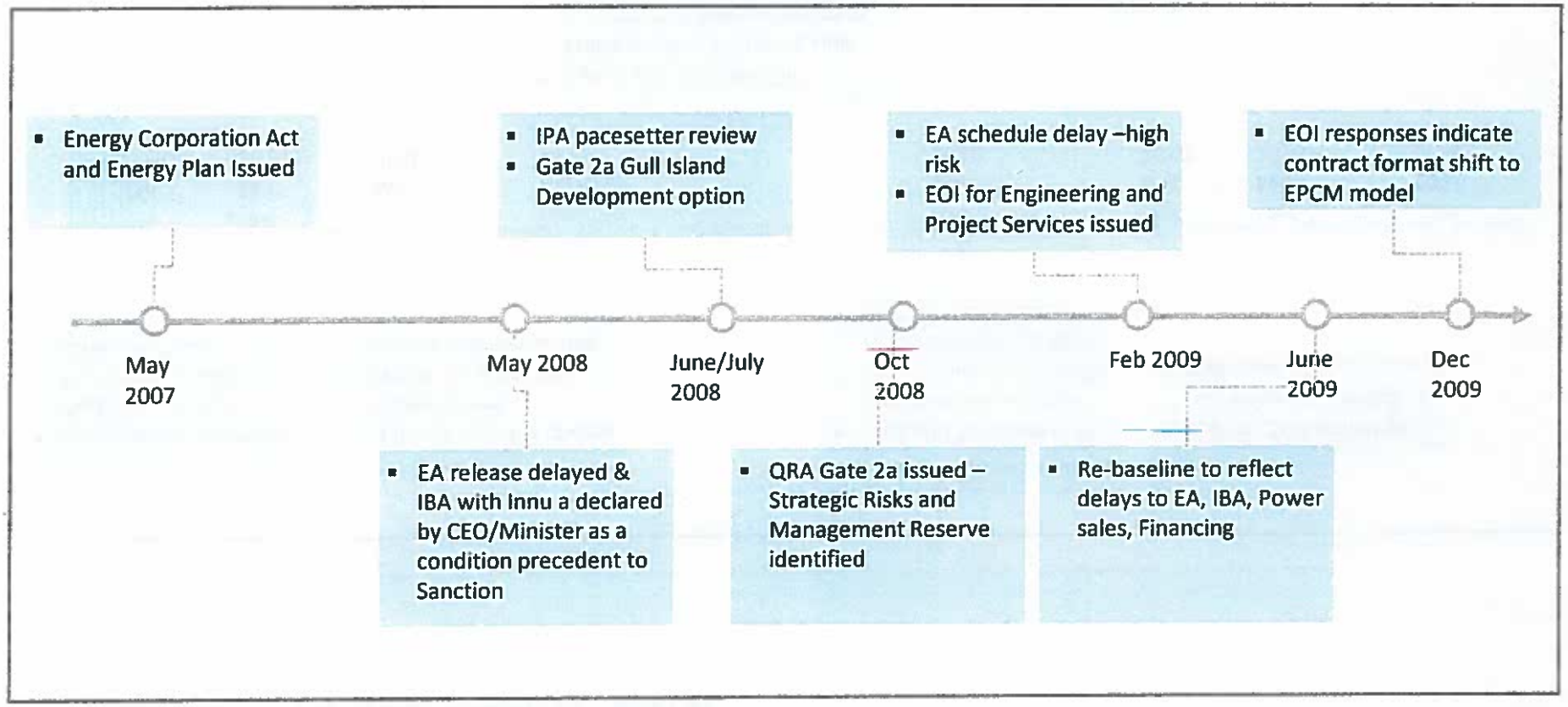
Contents

Summary

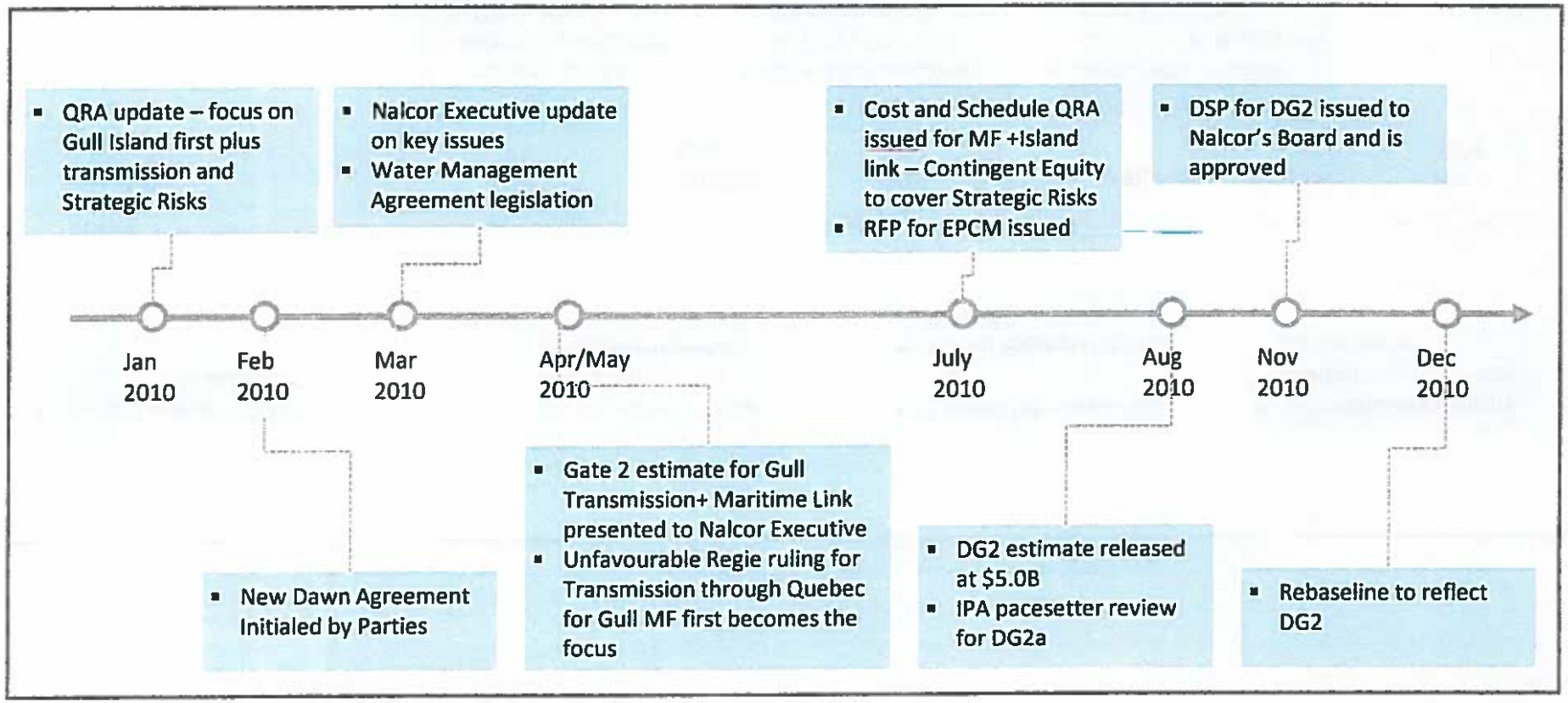
Background

- In May 2006, the Government of Newfoundland and Labrador's (GNL) announced that Newfoundland and Labrador Hydro will lead development of the Lower Churchill Assets
- A small team was established to update previous studies and site investigations, and in February of 2007, completed Decision Gate 1 (DG1)
- The focus was on development of Gull Island followed by Muskrat Falls after a few years
- Transmission was to wheel power through Quebec with various options of bringing power to the Island and Maritimes

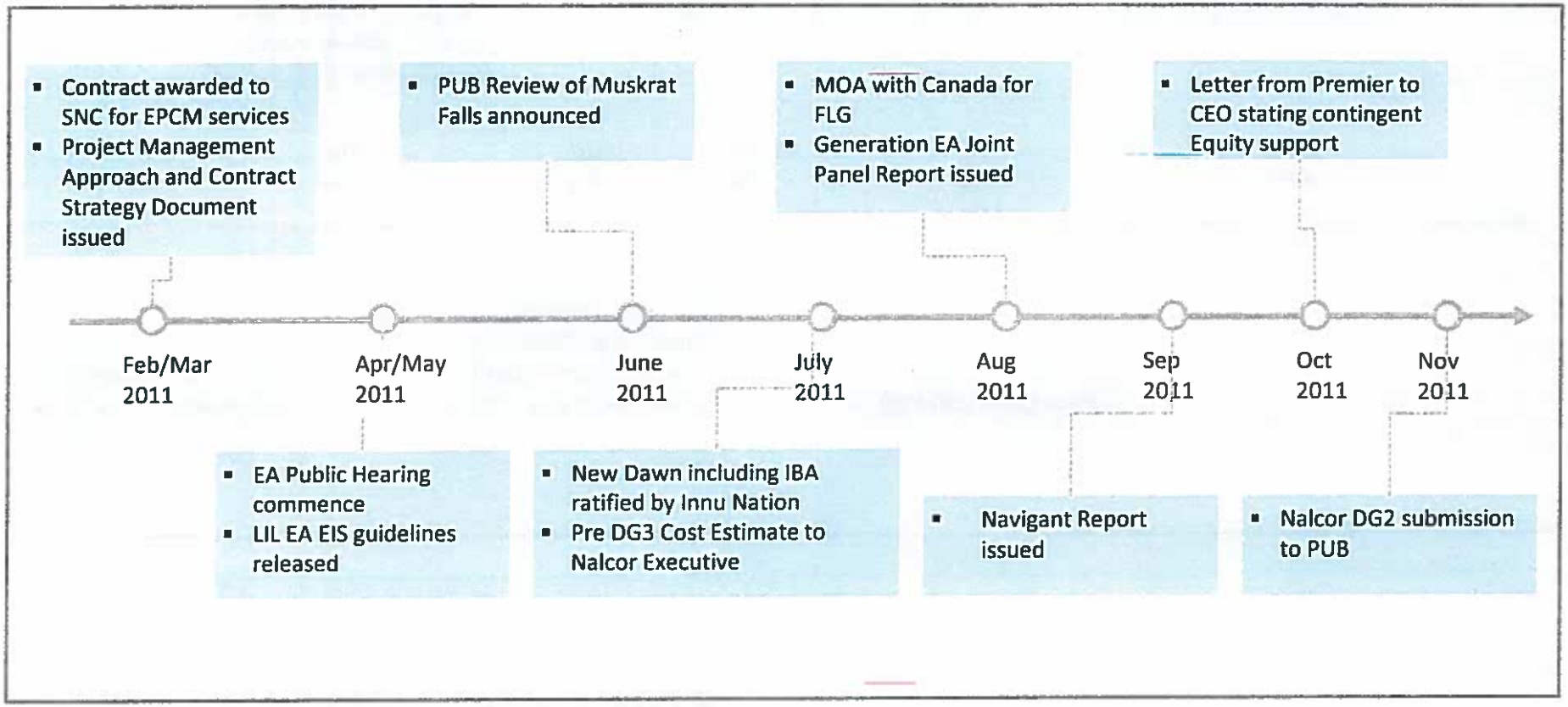
Summary of key events 2007 – 2009



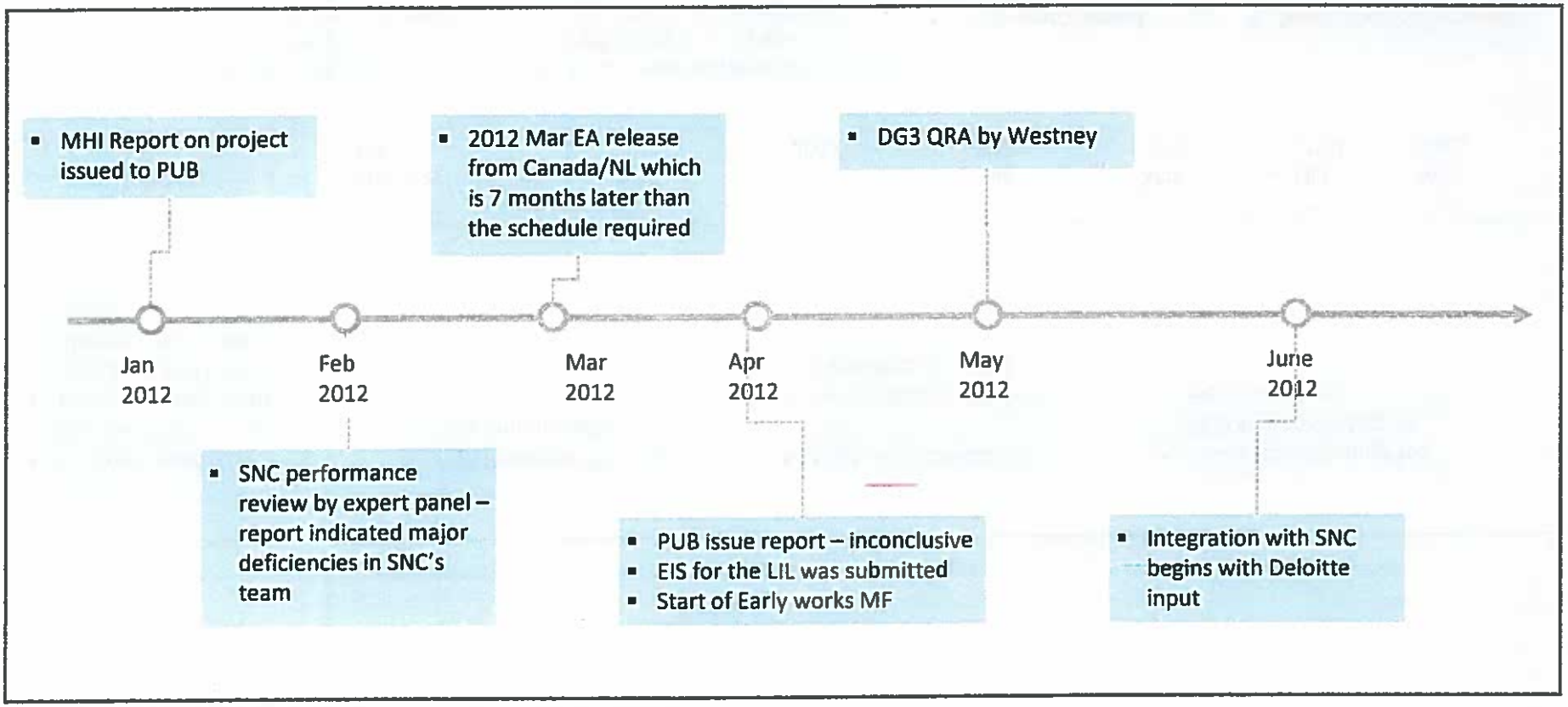
Summary of key events 2010



Summary of key events 2011



Summary of key events 2012

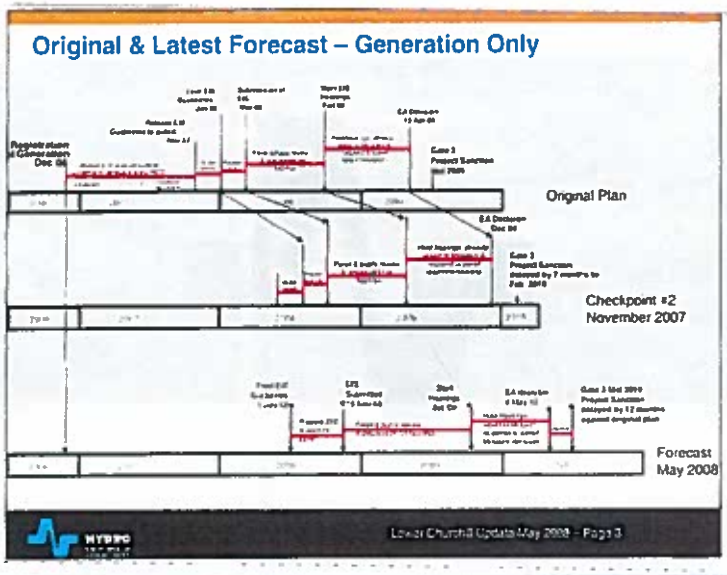


Early delays

The project was met with some regulatory and stakeholder challenges

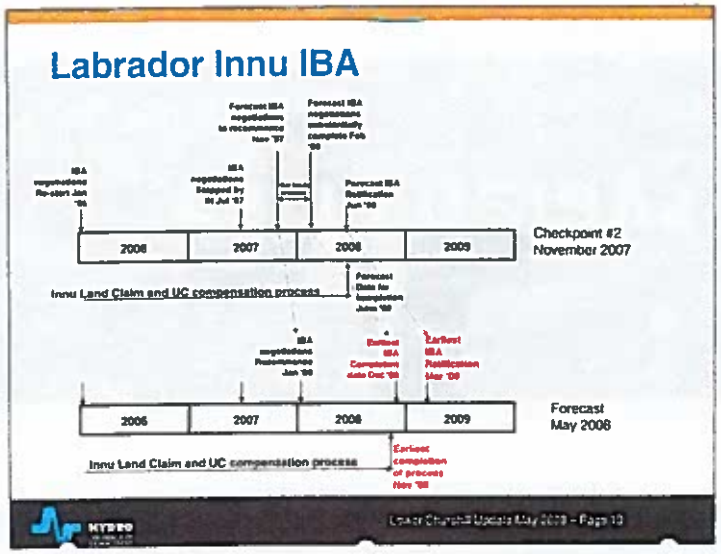
Environmental guidelines delays

- In December 2006, the Generation Project EA was expected to be a 28 month process
- By March 2008 the process was slipping due to CEAA delay in issuing the Environmental Impact Statement (EIS) guidelines
- These guidelines were needed for NLH to prepare a comprehensive EIS for submission



Innu Nation negotiation challenges

- Innu Nation needed clarity on 3 issues prior to a bringing an IBA for a ratification vote:
  - details on their commercial participation in the LCP`
  - positive movement on the Land Claims file
  - inclusion of Upper Churchill Redress

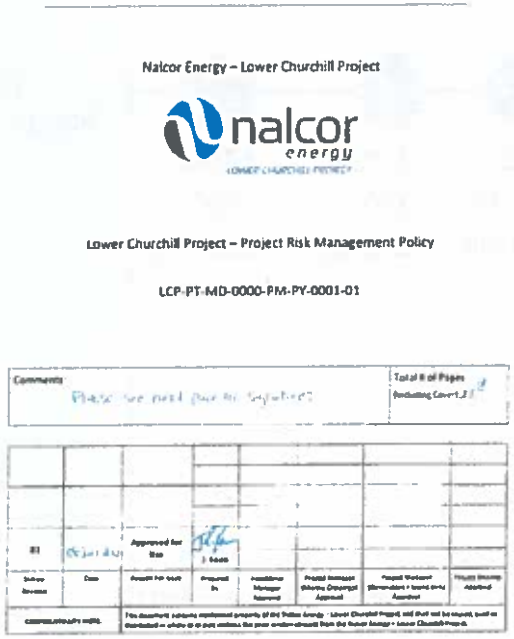


Risk analyses

Risk allocation philosophy

- Premised upon early identification of risks
- Recognized that many risks are multi-dimensional and complex requiring creative solutions
- Acknowledged that cost-effectively managing risks will require risks to be allocated to various stakeholders

Risk management documents



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Lower Churchill Project – Project Risk Management Policy

LCP-PT-MD-0000-PM-PY-0001-01

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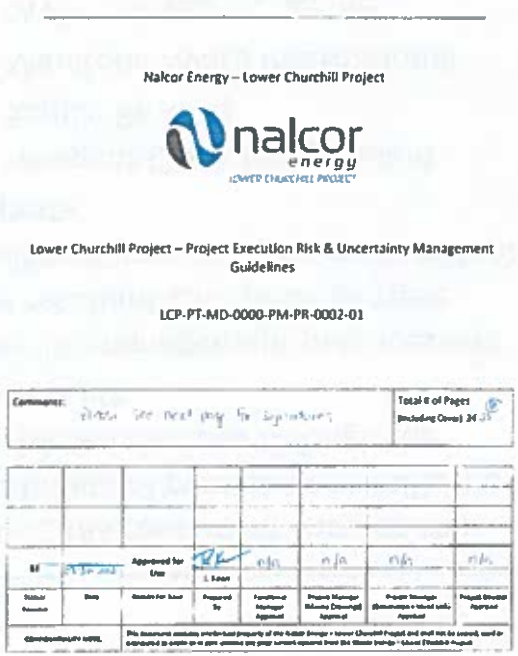
PROJECT RISK MANAGEMENT PLAN

Nalcor Doc. No. LCP-PT-MD-0000-RI-PL-0001-01



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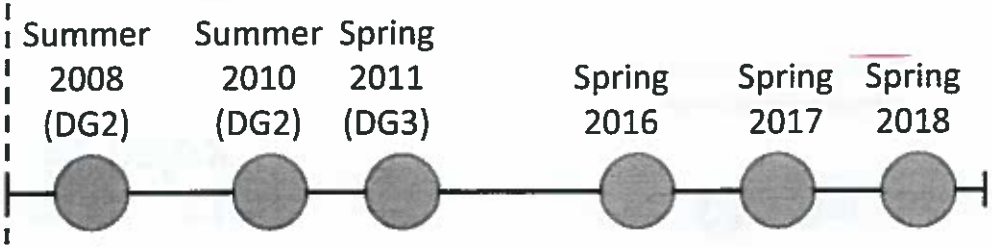
Lower Churchill Project – Project Execution Risk & Uncertainty Management Guidelines

LCP-PT-MD-0000-PM-PR-0002-01

The project risk process was initiated early with first QRA in 2008

Westney QRA

Timeline of events

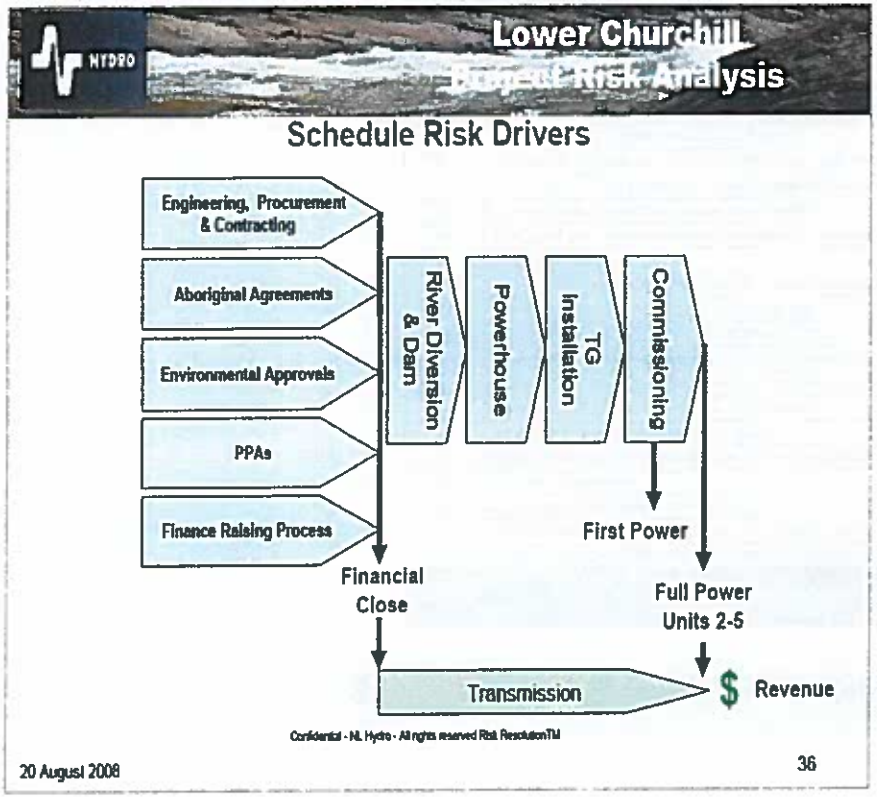


Details

- The QRAs conducted ensured the continuity of consistent classification of risk terminology through the project life
- The risk management practices and the resultant QRA findings were reviewed favourably by independent experts
  - Navigant (2011 Independent Supply Review)
  - Manitoba Hydro International
  - MWH Canada Inc. as the Independent Engineer (IE)
  - Lummus International (who were engaged to conduct due diligence on behalf of Emera Inc.).
  - These risk management practices continue to be applied through Project Execution

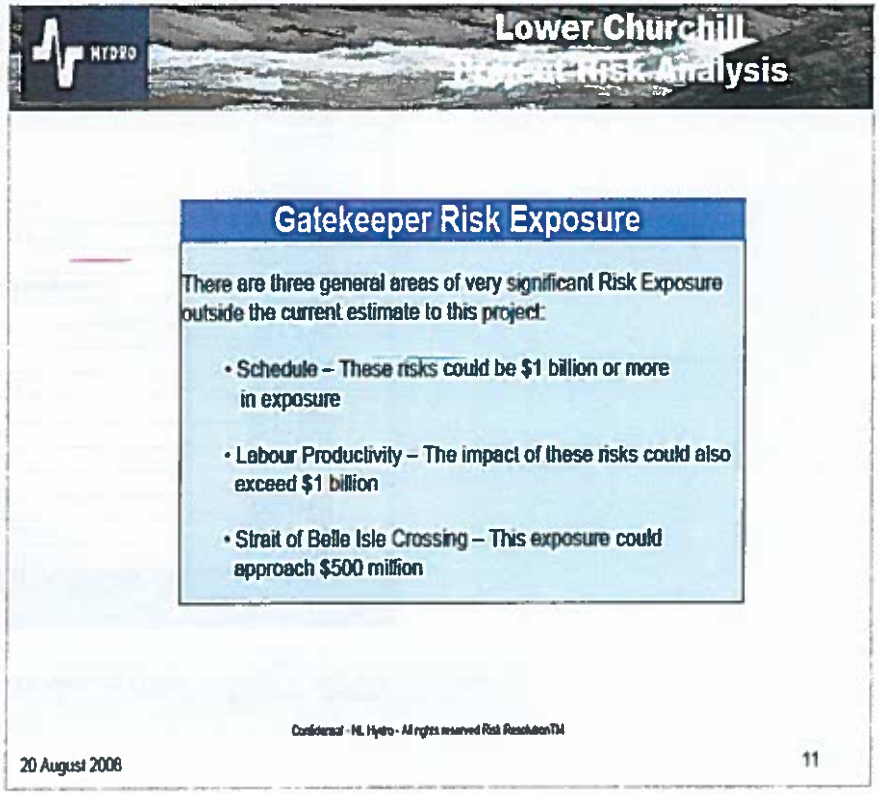
Examples of the Westney 2008 QRA

Gull Island Project Schedule Risk Drivers – 2008 QRA



Extracted DG2a QRA document Lower Churchill Project – Gate 2a Risk Management Plan, Nalcor document no. GEN-RI-001, Rev B1 dated 14-Oct-2008.

Westney's 2008 QRA view of risk exposure beyond the estimate contingency levels



Ibid

Examples of the Westney 2008 QRA (cont'd.)

Summary listing of strategic risk from Westney's 2008 QRA

Risk #	Description	Unmitigated Exposure ($M CDN)
1	Organizational experience and resources for a project of this size	$50 to $500
2	Time required under Crown Corporation rules to gain approval	$20 to $130
3	Changes in the financial market	$0 to $330
4	Foreign Exchange	-$200 to $200
5	Risk premium for obtaining lump sum contracts	$0 to $600
6	Extra year required to secure PPAs	$0 to $120
7	Federal Government support / facilitation	-$500 to $0
8	Changing power market requires changes in project scope	$0 to $300
9	Good HSE record is critical for project success	$0 to $100
10	Availability of resources for quality design	$0 to $500
11	Submarine crossing of Strait of Belle Isle	$0 to $100
12	Faults in submarine cable during commissioning and post installation	$0 to $60
13	Facility Reliability	$0 to $140
14	Securing EA's consistent with project schedule and financial close	$0 to $120
15	Environmental process impact on design	$0 to $150
16	Potential design impact on environmental process	$0 to $130
17	Schedule impact due to lack of IBA with Labrador Innu	$0 to $120
18	Problems with other Aboriginal groups	$0 to $120
19	Nonaligned or non-government organization protest	$0 to $50
20	Availability of experienced hydro contractors	$0 to $400
21	Ability to use Provincial / Labrador contractors due to creditworthiness	$10 to $50
22	Availability of qualified construction management / supervision	$0 to $500
23	Site conditions exceed geotechnical baseline	$0 to $150
24	Availability and retention of skilled construction labour	$0 to $100
25	Availability of unskilled labour	$0 to $25
26	Limited number of hydro turbine suppliers	$0 to $50
27	De-Escalation / Hyper-Inflation Risks	-$200 to $300
28	Availability of experienced high voltage contractors and skilled labour	$0 to $200
29	Limited number of HVdc experienced suppliers and installers	$0 to $50
30	Regulatory approval for sea-return electrodes	$0 to $10

SNC awarded EPCM contract

SNC awarded EPCM contract for engineering and project support services

- In February 2011, the EPCM Services contract was awarded to SNC Lavalin
- The contract included Engineering, Procurement and Construction Management Services with the flexibility to adjust as needed
- The flexibility was incorporated by Nalcor due to concerns regarding SNC's and the market overall construction management capacity
- Under the contract, SNC was responsible for all engineering with the exception of engineering for the SOBI crossing and any engineering work that was to be encompassed within an Engineering, Procurement and Construction (EPC) agreement (e.g. converter stations)

Reference Deck: SNC Lavalin Inc. Contract

Lower Churchill Project
10a – SNC Lavalin Inc. Contract
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Evolution of the Project Delivery Team

SNC's performance shortfall led to the shift to an integrated project team

- The Project Delivery Team addressed the performance short-fall within SNC by shifting to an Integrated Delivery Model
- SNC's engineering responsibility would not be integrated and would remain with SNC as the Engineer of Record
- In its fall 2015 assessment, Independent Project Analysis acknowledged the integrated team model as being effective means of providing project management to a complex mega project
- While this risk reduction measure was successful and was acknowledged by external stakeholders and reviewers, its implementation occupied significant management resources during a critical period of the Project

Reference Deck: Project Delivery Model and Organization

Lower Churchill Project
2 -Project Delivery Model and Organization
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