From: jasonkean@nalcorenergy.com
Sent: Thursday, May 10, 2012 9:27 PM
To: Eric Briel
Cc: Kelly Clifton; Jack Evans
Subject: Upcoming Risk Analysis
Attachments: LCP RR STATS YR051012.pdf; LCP April 2012 RISKS Monthly Report.docx; Key Risk Status Report with Lead - 14-Jul-2011.pdf

Eric,

In follow-up to our conversation from yesterday, we would like to build upon the risk work with Westney to-date in order to produce this critical risk review for DG3. The objective of this review is to verify that we are to establish with a level of confidence both cost and schedule contingencies upon the baseline estimate and schedule that can be used to support a Project Sanction decision.

As you are aware, we have heavily promoted our risk work with Westney to-date as well as our use of risk informed decision making to strategically shape the project. That being said, we have had some internal challenges with respect to incorporation of the outcomes from any strategic risk event modelling in our contingency review and expected outturn cost. To avoid this in the future, I wish to only have 1 cost contingency curve available, which considers all risk events and uncertainties in the base cost and schedule estimates. Can this be accommodated?

Historically I feel we have done an excellent job on event driven cost risks via our Strategic Risk work, however I have felt exposed on both the general uncertainties surrounding the baseline cost and schedule, as well as how we diligently considered the risk exposure of all the risks contained in our risk register. While we have any amount of capacity through the SLI Risk Manager, to undertake some of these analysis, time has not allowed me to work with him to complete such an assessment. He is quite competent in this area and available to support key aspects of this current review - we just need to determine where to best deploy his expertise. To that effect I have forwarded to Jack the current risk register and risk action logs that he has produced.

So taking stock of where we are at present as we prepare execute this review. We have the following as input:

-
- Nearly a finalized base cost estimate that is well documented and supported - fully meets the requirement of a AACEI Class 3 estimate. Some clean-up remains, documentation of estimate summarizes, and basis of estimate however if will be very easy to produce a cost model - we have the estimate available for each contract package - would make an ideal cost model format.
-
- Overall Project Control Schedule including integrated detailed engineering, procurement and construction schedule is nearly ready to baseline - planned to lock-down next week. Dave Pardy has the insight to use this to produce a time-model.
-
- Updated risk registers for SLI scope - very detailed and results from on-going risk identification workshops and action updates - see attached for summary produced by the SLI Risk Manager - Yuri Raydugin
-

- LCP Key Risk Summary Report - this was last updated in July 2011 - needs to be revisited as part of a broader, yet smaller, focus group. It is likely that 1/2 of these can now be closed.
-
- SOBI Risk review of December 2010 - all risks from this review formed part of the SOBI team work plan - an update will be available for the risk workshop.
-
-

Given the amount of data available, I suggest we need to spend minimal time as a group in the basis risk discovery mode, rather we should spend time exploring the impact of these risk events on the project. We do however need to spend time discussing the basic uncertainties in the cost and schedule baselines, as well as have a day later in the week (when Keith is available) to discuss pan-project strategic or key risks. With this in mind, I suggest the following as a preliminary schedule. I really need Westney to drive the schedule!

- Next Week - Westney review of existing material from Houston and discussions with J.Kean about status of project
- Tuesday 22-May - Kick-off and risk interviews
- Wednesday 23- May - Cost and schedule uncertainty review
- Thursday 24-May - Strategic risk workshop
- Friday 25-May - SOBI (1/2 day) + discussion on risk modelling
- Following Week - Risk Modelling - Houston - target completion by end of week - prepare to stay in St. John's if spillover from earlier week requires

Given the tightness of the schedule, I believe it would be prudent for you to fully leverage the SLI Risk Manager within this process. We can discuss how this can be achieved.

I suggest you give this some thought and perhaps we can connect before COB tomorrow.

Jason

LCP RR STATS YR051012.pdf

LCP April 2012 RISKS

Monthly Report.docx

Key Risk Status Report with Lead - 14-Jul-2011.pdf

<u>What we have as a starting point</u>

- June 2010 risk reviews
- Current risk registers prepared by SNC-Lavalin - they are extensive
-

I don't think we need to spend a lot of time in the risk discovery mode, rather we

Known Unknowns –General Uncertainties: Ranges around baseline values

Known Unknowns –Uncertain Events: Identified risks (risk register*)

Unknown Unknowns: Unidentified (missed) Known Unknowns

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You owe it to yourself, and your family, to make it home safely every day. What have you done today so that nobody gets hurt?

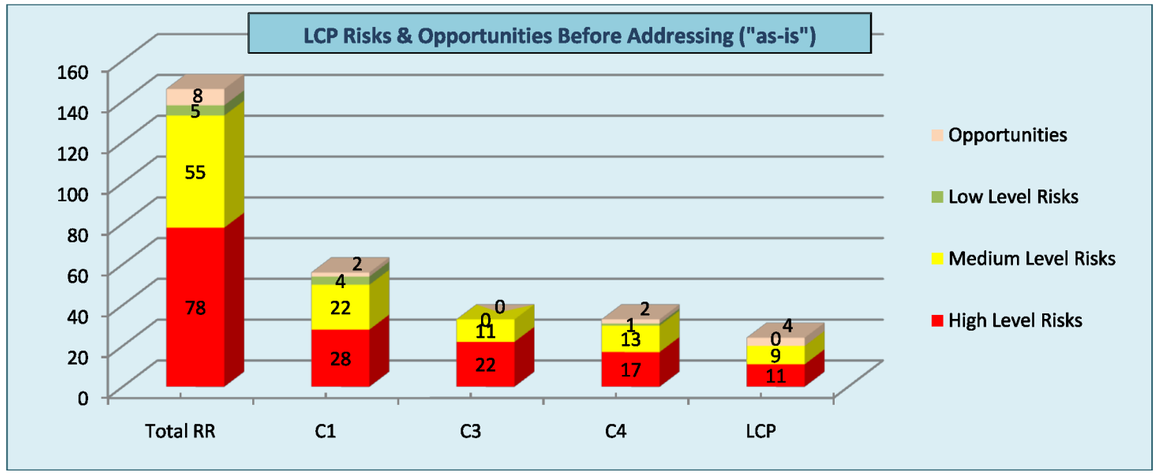
Lower Churchill Project

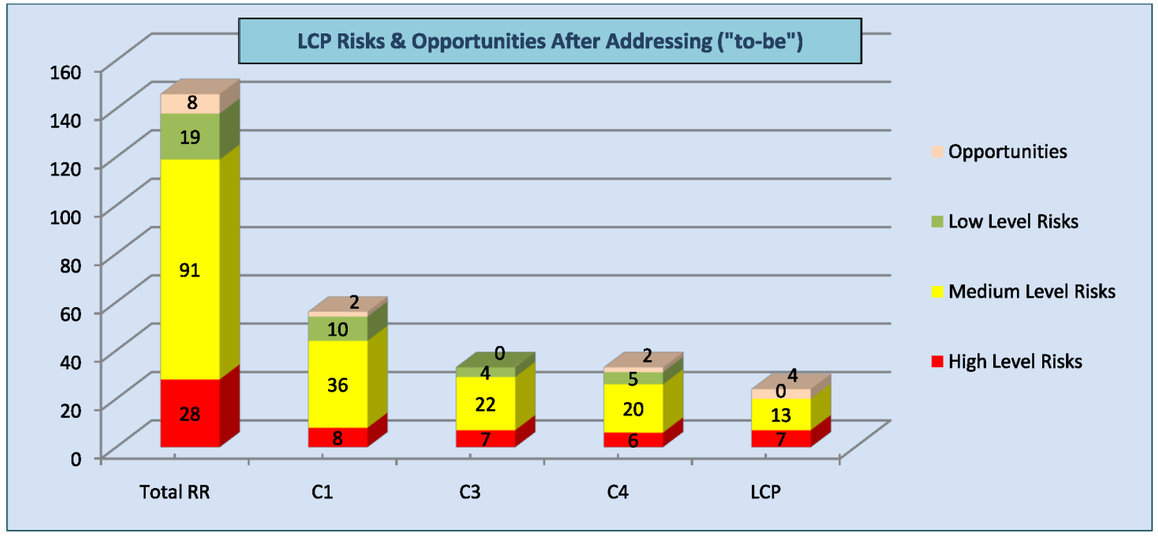
LCP Master Risk Register Statistics

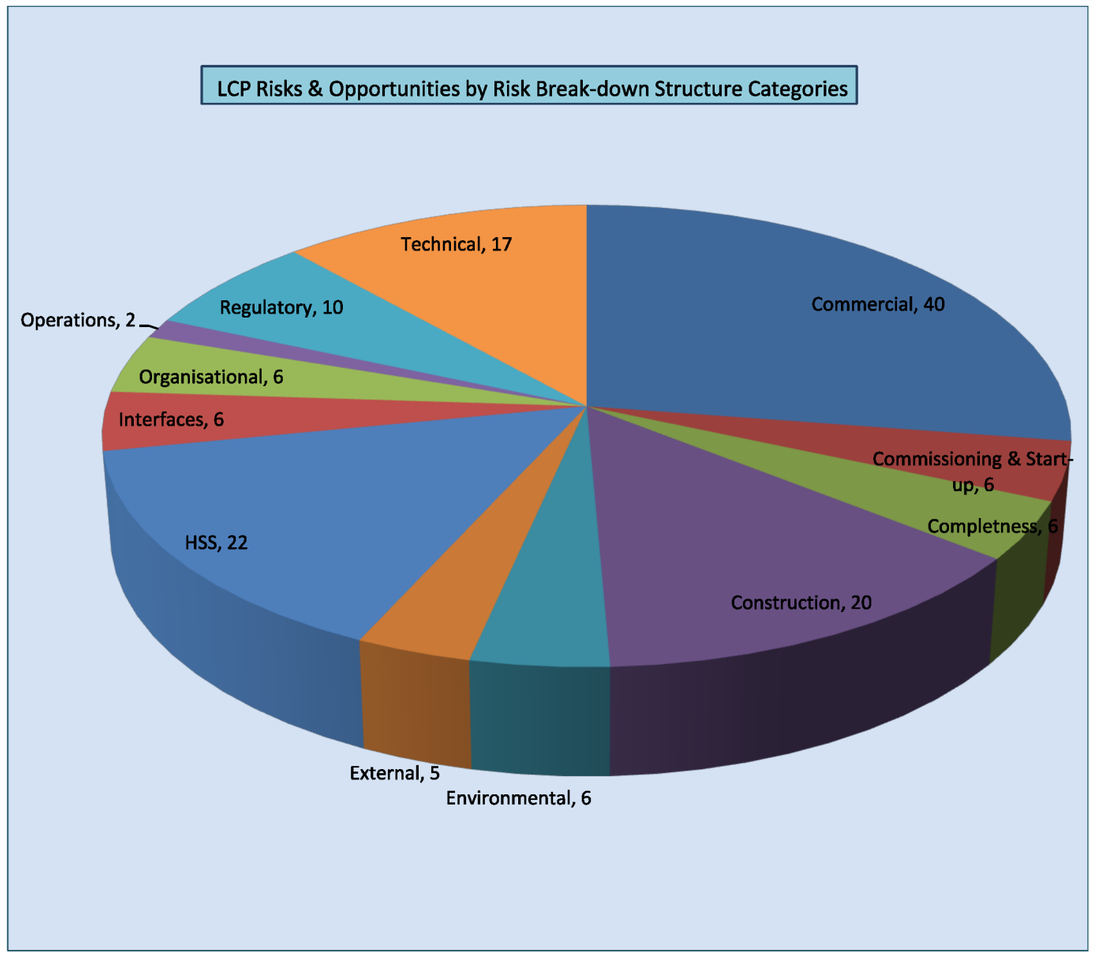
Date: May 10th, 2012

Number of	Total RR	C1	C3	C4	LCP
Risks & Opportunities	146	56	33	33	24
Opportunities Only	8	2	0	2	4
Addressing Strategies	234	93	43	59	39
Addressing Actions	492	175	93	137	87
High Level Risks ("Red') Before Addressing ("as-is")	78	28	22	17	11
High Level Risks ("Red') After Addressing ("to-be")	28	8	7	6	7
Medium Level Risks ("Yellow') Before Addressing ("as-is")	55	22	11	13	9
Medium Level Risks ("Yellow') After Addressing ("to-be")	91	36	22	20	13
Low Level Risks ("Green') Before Addressing ("as-is")	5	4	0	1	0
Low Level Risks ("Green') After Addressing ("to-be")	19	10	4	5	0

Risk Category	Risks & Opportunities	Opportunities Only
Commercial	40	2
Commissioning & Start-up	6	0
Completness	6	0
Construction	20	1
Environmental	6	0
External	5	0
HSS	22	0
Interfaces	6	1
Organisational	6	1
Operations	2	0
Regulatory	10	0
Technical	17	3
TOTAL	146	8







1.1 RISK MANAGEMENT

There are 146 risks (including eight opportunities) in LCP Risk Register addressed by 492 actions. Top six project risks that have low manageability are as follows:

- Construction Labour Availability
- Construction Labour Productivity
- Contractor's Availability
- Class of Estimate & Cost Escalation
- Archaeological Sites
- SLI – Nalcor Contract Coordination

Three C1 and C4 risk review meetings were held to update status of risks and response actions.

Several risk based variant studies were undertaken to facilitate design decisions (spillway, head pond clearing, transition compound location, service bay location in power house, use of wire mesh in excavation areas). Two of the variant studies (spillway and transition compound) were completed. Early works risk review was carried out.

Number of	Total RR	C1	C3	C4	LCP
Risks & Opportunities	146	56	33	33	24
Opportunities Only	8	2	0	2	4
Addressing Strategies	234	93	43	59	39
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High Level Risks ("Red') Before Addressing ("as-is")	78	28	22	17	11
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Risk Category	Risks & Opportunities	Opportunities Only
Commercial	40	2
Commissioning & Start-up	6	0
Completeness	6	0
Construction	20	1
Environmental	6	0
External	5	0
HSS	22	0
Interfaces	6	1
Organisational	6	1
Operations	2	0
Regulatory	10	0
Technical	17	3
TOTAL	146	8

SECTION 2. RISK AND OPPORTUNITY MANAGEMENT

Overview of the LCP Master Risk Register and Supporting Risk Register:

- The LCP Master Risk Register contains 146 risks (including eight opportunities) in MOINS - RISC – LESS (Stature). There are 234 addressing strategies supported by 492 addressing actions to manage the 146 identified risks in the LCP Master Risk Register (Figure 1, stats for May 10th, 2012).
- Eight general LCP risks were introduced to play a role of 'umbrellas' for managing corresponding Component risks (Table 1). The 'duplication' of the kind enforces "Line-of-Sight" risk governance concept to coordinate and manage risks at both Component and LCP level.
- There are dozens of HSS risks that are managed separately following HSS guidelines. They are kept in LCP HSS Risk Register in MOINS - RISC – LESS (Stature). All HSS risks are rolled up to 22 HSS risks in the LCP Master Risk Register for visibility and communication purposes (Table 2).

- There are risk inventories for about two dozen packages developed in MOINS - RISC – LESS (Stature). Key package risks are represented in the LCP Master Risk Register.
- There is a file in MOINS - RISC – LESS (Stature) that was developed as a result of the Component 1 HAZOP review. Key technical risks from that file are represented in the LCP Master Risk Register.

Overview of Top Project Risks:

- Six top LCP risks shown in Table 3. These risks have high level both before and after addressing despite proposed addressing actions (low manageability).

Discussion: Concerns and Overview of Newly identified, Occurred Risks, Upgraded and Downgraded Risks:

- Two new C1 risks were added to the LCP Risk Register R188 (Impoundment in Winter: Head Pond (12.5 – 25m)) and R189 (Impoundment in Winter (25 – 39m)). They represent a specific type of risks associated with construction windows as well as final integration. Despite impoundment is not planned for winter for both cases, combination of factors could lead to winter impoundment. This might be required if powerhouse is ready for commissioning before impoundment.
- One general LCP risk was added R187 (IT/ IS). In the course of project development and entering the execution phase the risks of IT/ IS failure will be increasing.
- Several risk addressing actions were completed and closed and several added to reflect current status of risks. Most of these actions were related to the level of engineering development, environmental activities as well as to stakeholder's relations.
- Several engineering and design decisions had yet to be finalised. They included selection of spillway option, selection of transition compound location, level of head

pond clearing, use of wire mesh in excavation areas, location of service bay in power house. As the design had yet to be frozen, development of final versions of schedule and base estimate could not be possible. Corresponding risk-based variant studies were initiated to facilitate design decision making and two of them were completed.

Project Risk Management Activities:

- Three reviews of component's risk and action logs were undertaken in small groups of component's key specialists
- Required preparations for the head pond clearing, spillway final design and transition compound variant studies were undertaken, Spillway and transition compound variant studies were completed.
- Preparations for Lesson's Learned reviews were continued.
- Risks associated with early construction work's were reviewed
- On-going package risk management activities were undertaken including meetings with Voith and Alstom representatives (T&G bidders).
- Required IT/ IS activities were continued to properly format & map Aconex and Stature Action Log in order to use Aconex as a tracking tool.
- Preparations for coming probabilistic risk analyses were initiated including reviews of project schedule.

Table 1.

Risk ID	Comp.	Risk Title	Risk Owner	Risk Category	Level Before Addressing	Level After Addressing
R3	LCP	**EA Release Special Conditions**	Ron Power (NE)	Regulatory	Medium	Medium
R67	C3	Electrode vs. EA Release Special Condition	Darren DeBourke (NE)	Regulatory	Medium	Medium
R172	LCP	**Construction Labour Availability**	Ron Power (NE)	Organisational	High	High
R43	C1	Construction Labour Availability	Scott O'Brien (NE)	Construction	High	High
R123	C3	Construction Labour Availability	Darren DeBourke (NE)	Commercial	High	High
R124	C4	Construction Labour Availability	Kyle Tucker (NE)	Commercial	High	High
R65	C1	Availability of Construction Management Personnel	Scott O'Brien (NE)	Construction	High	High
R164	C3	Availability of Construction Management Personnel	Darren DeBourke (NE)	Construction	High	High
R165	C4	Availability of Construction Management Personnel	Kyle Tucker (NE)	Construction	High	High
R52	LCP	Contracting Strategy Adjustments	Ron Power (NE)	Commercial	High	Medium
R173	LCP	**Construction Labour Productivity**	Ron Power (NE)	Organisational	High	High
R127	C1	Construction Labour Productivity	Scott O'Brien (NE)	Construction	High	High
R128	C3	Construction Labour Productivity	Darren DeBourke (NE)	Construction	High	High
R129	C4	Construction Labour Productivity	Kyle Tucker (NE)	Construction	High	High
R175	LCP	**Sensitive Areas**	"Steve Pellerin (NE)"	Regulatory	Medium	Medium
R9	C1	Excavation vs. Water Contamination	Michael Maeyens (SLI)	Construction	Medium	Medium
R10	C1	Archaeological Sites	Scott O'Brien (NE)	Regulatory	High	High
R19	C1	Fish Habitat	Steve Pelerin(NE)	Environmental	Medium	Medium

R20	C1	Terrestrial Habitat (Loss of Wetlands)	Steve Pellerin(NE)	Environmental	Medium	Medium
R21	C1	Bird Nesting	Gervais Savard (SLI)	Environmental	Medium	Medium
R105	C4	Terrestrial Habitat	Steve Pellerin (NE)	Environmental	Medium	Medium
R106	C4	Bird Nesting	Claude Daneau (SLI)	Environmental	Medium	Medium
R180	C4	River Crossings vs. TSS	Real Mailhot (SLI)	Environmental	Medium	Low
R176	LCP	**Construction Permits**	Ron Power (NE)	Regulatory	High	Medium
R36	C1	Construction Permits	Scott O'Brien (NE)	Regulatory	High	Medium
R119	C3	Construction Permits	Darren DeBourke (NE)	Regulatory	High	Medium
R120	C4	Construction Permits	Kyle Tucker (NE)	Regulatory	High	Medium
R177	LCP	**Contractor's Availability**	Ron Power (NE)	Commercial	High	High
R44	C1	Contractors Availability	Scott O'Brien (NE)	Commercial	High	High
R85	C4	HVdc Contractor Availability	Kyle Tucker (NE)	Commercial	High	High
R125	C3	Contractors Availability	Darren DeBourke (NE)	Commercial	High	High
R178	LCP	**Interfaces**	Ron Power (NE)	interfaces	High	Medium
R64	C1	Interfaces	Scott O'Brien (NE)	Interfaces	High	Medium
R71	C3	CFLco-Nalcor Interface	Darren DeBourke (NE)	External	Medium	Medium
R75	C3	Outage Planning	Darren DeBourke (NE)	Commissioning	High	Medium
R76	C3	Maritime Link Assumption	Darren DeBourke (NE)	Interface	Medium	Medium
R78	C3	System Integration & Commissioning	Darren DeBourke (NE)	Commissioning	Medium	Medium
R162	C3	Interfaces	Darren DeBourke (NE)	Interfaces	High	Medium
R163	C4	Interfaces	Kyle Tucker (NE)	Interfaces	High	Medium

R179	LCP	**Suppliers Availability**	Ron Power (NE)	Commercial	High	Medium
R33	C1	Manufacturing Labour Availability	Michel Landreville (SLI)	Commercial	Medium	Medium
R68	C4	Insulator Supplier Availability (HVdc)	Hartfield Stevens (SLI)	Commercial	Medium	Medium
R115	C3	Manufacturing Capacity & Availability	Tousignant, Daniel (SLI)	Commercial	Medium	Medium
R147	C1	Supplier Availability	Scott O'Brien (NE)	Commercial	Medium	Medium

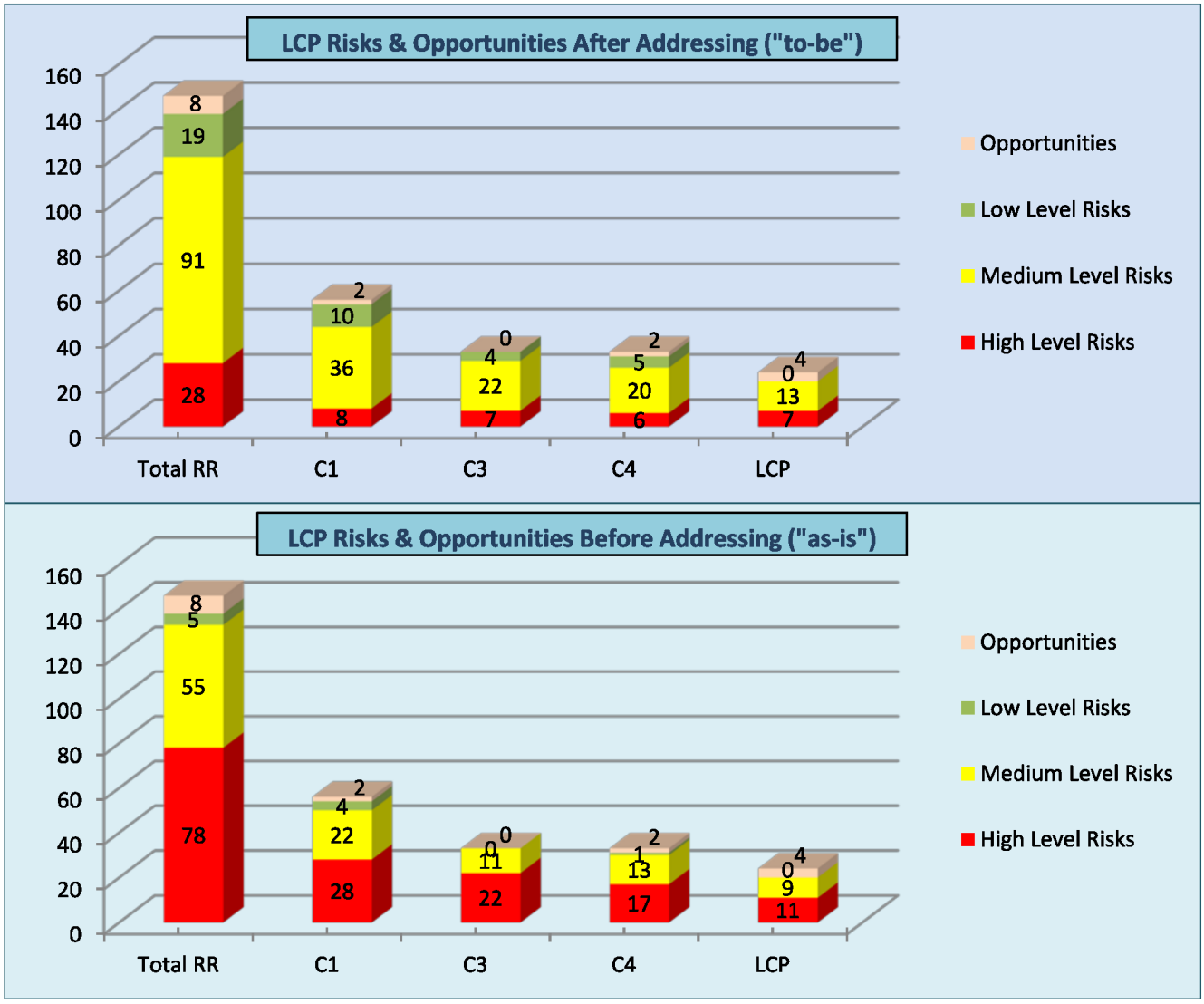
Table 2.

Risk ID	Component	Risk Title	Risk Category (RBS)	Risk Owner	Level Before Addressing	Level After Addressing
R13	C1	**Safety vs. Heavy Equipment (C1)**	HSS	Scott O'Brien (NE)	High	Medium
R14	C1	**Safety vs. Construction Hazards (C1)**	HSS	Scott O'Brien (NE)	High	Medium
R15	C1	**Safety vs. Traffic Incidents (C1)**	HSS	Scott O'Brien (NE)	High	Medium
R22	C1	**Safety vs. Schedule Acceleration (C1)**	HSS	Scott O'Brien (NE)	High	High
R29	C1	**Wild Fires (C1)**	HSS	Scott O'Brien (NE)	High	Medium
R138	C1	**Drug & Alcohol Abuse (C1)**	HSS	Scott O'Brien (NE)	High	High
R83	C1	**Site Safety Coordination (C1)**	HSS	Scott O'Brien (NE)	High	Medium
R82	C3	**Site Safety Coordination (C1)**	HSS	Darren Debourke (NE)	High	Medium
R98	C3	**Safety vs. Heavy Equipment (C3)**	HSS	Darren Debourke (NE)	High	Medium
R100	C3	**Safety vs. Construction Hazards (C3)**	HSS	Darren Debourke (NE)	High	Medium
R102	C3	**Safety vs. Traffic Incidents (C3)**	HSS	Darren Debourke (NE)	High	Medium
R107	C3	**Safety vs. Schedule Acceleration (C3)**	HSS	Darren Debourke (NE)	High	Low

R111	C3	**Wild Fires (C3)**	HSS	Darren Debourke (NE)	High	Medium
R139	C3	**Drug & Alcohol Abuse (C3)**	HSS	Darren Debourke (NE)	High	Medium
R170	C3	**Site Safety Coordination (C3)**	HSS	Darren Debourke (NE)	High	Medium
R99	C4	**Safety vs. Heavy Equipment (C4)**	HSS	Kyle Tucker (NE)	High	Medium
R101	C4	**Safety vs. Construction Hazards (C4)**	HSS	Kyle Tucker (NE)	High	Medium
R103	C4	**Safety vs. Traffic Incidents (C4)**	HSS	Kyle Tucker (NE)	High	Medium
R108	C4	**Safety vs. Schedule Acceleration (C4)**	HSS	Kyle Tucker (NE)	High	Medium
R112	C4	**Wild Fires (C4)**	HSS	Kyle Tucker (NE)	High	Medium
R140	C4	**Drug & Alcohol Abuse (C4)**	HSS	Kyle Tucker (NE)	High	High
R171	C4	**Site Safety Coordination (C4)**	HSS	Kyle Tucker (NE)	High	Medium

Table 3.

Risk ID	Comp.	Risk Title	Risk Owner	Risk Category	Level Before Addressing	Level After Addressing
R10	C1	**Archeological Sites**	Scott O'Brien (NE)	Regulatory	High	High
R77	LCP	**Class of Estimate & Cost Escalation**	Jason Kean (NE)	Commercial	High	High
R156	LCP	**SLI – Nalcor Contract Coordination**	Ron Power (NE)	Organisational	High	High
R172	LCP	**Construction Labour Availability**	Ron Power (NE)	Commercial	High	High
R173	LCP	**Construction Labour Productivity**	Ron Power (NE)	Commercial	High	High
R177	LCP	**Contractor's Availability**	Ron Power (NE)	Commercial	High	High


LCP Risks & Opportunities After Addressing ("to-be")
160
140
120
100
80
60
40
20
0
Total RR
C1
C3
C4
LCP
8
19
91
28
2
10
36
8
0
4
22
7
2
5
20
6
4
0
13
7
Opportunities
Low Level Risks
Medium Level Risks
High Level Risks
LCP Risks & Opportunities Before Addressing ("as-is")
160
140
120
100
80
60
40
20
0
Total RR
C1
C3
C4
LCP
8
5
55
78
2
4
22
28
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11
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13
17
4
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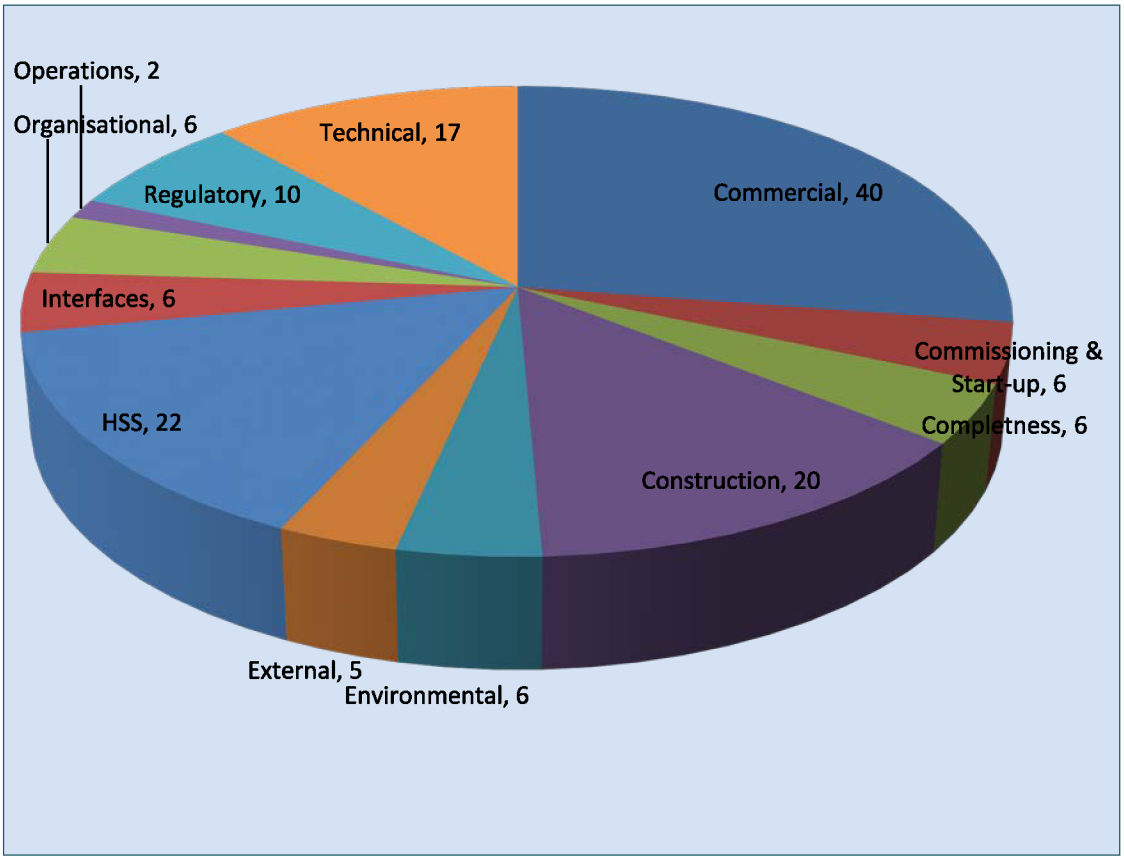
9
11
Opportunities
Low Level Risks
Medium Level Risks
High Level Risks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Organisational, 6
Technical, 17
Regulatory, 10
Commercial, 40
Interfaces, 6
Commissioning & Start-up, 6
Completness, 6
HSS, 22
Construction, 20
External, 5
Environmental, 6

nalcor energy
LOWER CHURCHILL PROJECT

KEY RISK STATUS REPORT

Revised
7/14/2011

ID	Title	Description	Risk Response Plan		Current Status
			Management Strategy	*Action Plan*	
Risk Lead:	**Paul Harrington**				
R1	Organizational experience and resources for a project of this size	Potential for the accelerated growth and diversification of Nalcor Energy to place strain on the organization and hinder timely decision making. Nalcor needs to recognize the risk and make the required changes in organizational governance and devolution of financial authorities and decision making in order to avoid loss of opportunities and best in class Project execution.	Avoid this risk by early and aggressive effort to address each specific cause: - Select project execution strategy that helps reduce this risk. - Demonstrate internal alignment and clarity on strategic direction - Secure experienced resources to supplement existing organization breadth and depth - Establish a project governance approach - Implement best PM practices, including structured decentralized decision making processes - Consider planned commercial structure for Maritime Link and understand impact on the overall execution approach for the LCP. An amount of residual risk that can not be avoided will have to be accepted by Nalcor.	- Define corporate/enterprise governance and establish a decision making structure - Establish project charter. - Establish decision making protocol and processes. - Develop Project Execution Plan - Clearly define corporate / matrix organization interfaces. - Document and seek alignment on project governance approach - Leverage insight from other owners / developers who have faced similar challenges. - Finalization of PM / contracting approach - Develop Nalcor Matrix Organization LACTI - Identify roles and responsibilities - Develop LACTI defining interface between LCP and appropriate Nalcor departments (matrix organization) - Early engagement of lender's engineer and demonstrate internal capacity - ($2 to $5M) - Engagement of competent experienced contractors (known entities with the "A" team)	- Project Governance Plan (Rev-B1) issued for approval in August 2010. Project Team working in accordance with this key project document. - Capital Expenditure Approval Procedure and Procurement Approvals process re-worked to reflect requirements for Gateway Phases 3 & 4. - GM of Finance appointed – key interface point with Project Team. - Corporate Integration Manager hired focussed towards effective integration of the various elements of the Project into Nalcor's activities. - Recruitment and appointment of key resources is ongoing. - Requirement for a vendor's Engineer has been reaffirmed – required to facilitate internal understanding of technical and execution deliverables required for project financing. - Key Management Plans, developed specifically for Project, have been implemented. - Sound financial and project control / MOC protocols in place. - Executive Committee (i.e. Steering Committee) meeting regularly to address key issues. Terms of Reference pending approval. - Further clarity required in the immediate near term regarding overall responsibility for system integration, including interconnection of the Island link with the existing NL Hydro system. - JOA development continuing with Emera – Emera team working at Hydro Place, however further clarity is required on the long-term execution relationship with

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KEY RISK STATUS REPORT

Revised 7/14/2011

ID	Title	Description	Risk Response Plan		Current Status
			Management Strategy	*Action Plan*	
					Emera.
Risk Lead: Gilbert Bennett					
R2	Time required under Crown Corporation rules to gain approval	Potential exists that key strategic decisions could be delayed which impact the project schedule as a result of the time required to obtain shareholder approvals.	Mitigate this risk by: - Over communicating with shareholder to ensure alignment on issues of critical importance. - Communicate project impact of issue to shareholder and proactively work at the Executive level to ensure Decision making processes and information are available to support timely approvals. - Focus on embedding governance structure and ensuring alignment with Nalcor leadership, Board and Shareholder. - Implement governance structures that are designed to facilitate efficient Decision making and push accountability down within the organization. - Recognize the constraints of a crown corporation and the shareholder in design our execution approach. An amount of residual risk that can not be mitigated will have to be accepted by Nalcor LCP given the Shareholder is the Crown and are not use to executing large capital intensive projects.	- Define Nalcor and LCP corporate structure - Increase awareness of impact (communicate to market place) - Establish a Steering Committee and ensure regular communication of key dates and activities to Shareholder.	- LCP PMT continue to work with the Gatekeeper to understand the Shareholder's needs and schedule sufficient to address them, while at the same time building confidence / trust with the Shareholder. A process of engagement has helped to streamline the decision making process. - Well-documented approval process proposed, including use of AFE's and increased financial approval levels within the LCP PMT will facilitate the approval process. - Multiple independent reviews of the Project by various entities (Lender's Engineer, Public Utilities Board, Underwriters, Federal Government?) will strain Nalcor's and the Project Team resources leading to schedule slippage due to an inability to make timely decisions.
Risk Lead: Mark Bradbury					
R3	Changes in the financial market	As a result of changes in the Financial Market, preferred financing instruments may not be available in the quantity and terms desired, leading to additional financing cost.	- Monitor financial markets. - Structure all aspects of the Project so as to minimize percieved transfer of risk to the lenders. - Carefully craft and execute Financial Market Sounding. - Engage appropriate expertise.	Represents best practice; potentially no cost over and above what Nalcor would seek to do in any case.	- Overall Financing Strategy and associated plans for the Project being led by a designated Sr. Mgmt rep for Nalcor. Preparations being made for Financial Market Sounding in fall 2011. - Government of Canada's commitment for a Loan Gurantee or equivalent, the Province's current fiscal capacity, and the

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LOWER CHURCHILL PROJECT

KEY RISK STATUS REPORT

Revised
7/14/2011

ID	Title	Description	Risk Response Plan		Current Status
			Management Strategy	*Action Plan*	
			IMPORTANT NOTE: Risks associated with financial market unrest cannot be directly affected by Nalcor. The risk strategy seeks to be affected as little as possible by these risks. However, the effect of mitigation is difficult to quantify at this stage. It will be important to structure the project appropriately, to consider the construction contracting strategy and to ensure a significant proportion of high quality off take contracts to support minimizing the impact. Demonstrate predictability of our hydro project as compared to other more technically complex projects. This strategy may result in reduced debt-service coverage ratio.		less capital extensive nature of LCP Phase I that Gull Island, has dramatically altered the profile of this risk. - This risk needs to be closely monitored in order to understand its potential implications on the Project.
Risk Lead: Mark Bradbury					
R4	Foreign currency exchange risk	As a result of foreign currency exchange rate swings, the value of the Canadian Dollar may erode, leading to foreign currency exposure during the purchase of goods and materials.	- Mitigate exposure by developing cost estimating consistent with Nalcor's business planning assumptions for exchange rates. - Transfer risk by implementation of a currency hedging strategy.	- Establish realistic baseline Fx exchange rates to be used in economic analysis - Establish an overall currency hedging program - Develop an improved forecast of currencies for the overall project estimate	- Gate 2 Estimate currently uses $0.95 CDN/USD conversion - appropriate based upon current outlook. - Additional Euro exposure for specialist HVDC equipment and sub sea cable. - US dollar is continuing to weaken thereby reducing US currency exposure. - LCP foreign currency exposure considered as part of the broader Nalcor Financial Risk Management Strategy.
Risk Lead: Lance Clarke					
R5	Risk Premium for obtaining lump sum contracts	As a result of the concerns of lenders regarding the creditworthiness of contractors and vendors, lenders may push Nalcor towards negotiating lump sum contracts in order to minimize their perception of risk exposure, which would result in additional	- Risk brokering / allocation. - Increase equity contribution thereby removing risk.	Avoid and mitigate this risk by: - Focus on risk brokering / allocation arrangement to achieve the most cost effective arrangement for all parties. - Ensure awareness of financial market of latest industry trends w.r.t lump sum contracts	- Gate 2 basis was 100% equity from Province for Muskrat Falls, + 25% Equity / 75% debt for Island Link with Emera holding 20% of Island Link and 100% of Maritime Link. - Debt for Island Link provided by Province, hence no project financing

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		capital cost for the Project.		- Leverage risk strategy and 3rd party expertise to help sell the LCP approach during market sounding - Engage a shadow engineer and work with them to educate prospective lenders. - Optimize debt to equity structure to remove this risk. - Engage 3rd party partners on Maritime Link who can naturally reduce risk.	assumed. - Subsequent to DG2 and favourable response from Government of Canada to the Province's request for a federal loan guarantee, Nalcor proposing more extensive debt financing strategy which requires a finance raising process. - Nalcor is planning to engage a shadow lender's engineer – have met with SNC-Lavalin and received some input of potential firms. - Require development of contracting strategy for post DG2 package listing that includes details of proposed risk mitigation strategy for each package and in total. This should be focussed towards conveying why the proposed strategy is prefaced to reduce risk for both Nalcor and lender. This should be baked into the Financial Roadshow planned for fall 2011. - Contractor creditworthiness assessment program to be implemented with SLI support, in particular to understand potential off-balance sheet risk exposure.
Risk Lead: **Joanna Harris**					
R6	Extra year required to secure long-term PPA's	As a result of a slow negotiation process, the timeline to secure long-term PPAs for anchor loads may extend, resulting in a deferment of Project Sanction by 1 year.	Avoid this risk from materializing through: - Agressively focusing Power Sales teams on Atlantic Canada customers. - Selling LCP value proposition to Atlantic Canada customers. - Seeking political alignment on the value of LCP to NS and NB in reducing their GHG problem. - Advancing the Energy Gateway initiative through the Federal Government Recognize that this risk is not entirely	- Engage Emera and NB Power to discuss product and pricing - Prepare for Regie hearings for OATT complaints - Prepare fallback strategy if Regie decision is unfavorable - Work the Energy Gateway file on the political front. - Push for clarity on Government of Canada's GHG Policy	- Phase 1 (MF+IL+ML) Term Sheet with Emera has allowed a Gate 2 decision to be made. Given that MF is being developed to meet the Island's energy needs, PPA requirements are limited to NL Hydro. Hence, risk of delaying in achieving Sanction due to PPA completion schedule is largely considered eliminated. - Phase 2 - Gull Island development being actively pursued with OATT applications, appeals of Regie de l'Energie decision.

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			within Nalcor's control, but depends on counterparties, thus some acceptance of this risk is required. Mitigate potential exposure by only awarding Engineering Contract at Gate 2b when clarity on Market Access is available.		
Risk Lead: **Mark Bradbury**					
R7	Federal government support for generation and transmission projects (OPPORTUNITY)	As a result of Federal Government financial support for the Project, general public and financial market confidence in the Project would increase, resulting in an exposure reduction for many of the strategic risks faced by the Project.	- Active and aggressive pursuit by Executive - Atlantic Canada political alignment on the value of the Energy Gateway and how it will develop each region. - Development of Federal Ask strategy and present to Feds. - Engage opposition parties to maintain support for the Project. - Influence GHG Policy through all vehicles including Canadian Hydropower Association.	- Lobby Federal government through Summa - Evaluate potential benefits to the Project from carbon credits	- Harper Government has committed to a Federal Loan Guarantee or equivalent for the Project as part of the Spring election campaign. Legal arrangements being worked.
Risk Lead: **Joanna Harris**					
R8	Changes in Project scope resulting from maturing system integration / operation definition	As a result of limited maturity of the integration of the Island and Maritimes electrical systems with LCP power, significant change in the Project Definition / Scope may occur, leading to schedule delays and additional capital cost.	- Avoid risk by engaging counterparties and validate project scope assumptions (i.e. Maritimes integration) ASAP. - Mitigate risk by maintaining commitment to maximize Front-End Loading (i.e. scope definition) prior to sanction. Select final market option prior to proceeding through Gate 2b. - Transfer some of the risks to 3rd parties through the Commerical Construct for Transmission.	- Inform and communicate impact with commercial/markets - Assure alignment between commercial/markets and technical (decision gate assurance process) - Receipt of NBSO Facilities Study for 800MW injection at Salisbury, NB. - Consider the merit of completing a 1000MW System Impact Study with NBSO pending the results of the proceeding. - Kick-off integrated work plan with NB Power and Emera to explore how LCP power will be integrated and used with their systems.	- Requirements for integration of LCP power into the existing NL Hydro system continue to be developed. This remains a significant risk for the Project as demonstrated by PCN-014 which subsequently changed the operating voltage from 320 kV to 350 kV, while overload capacity of the system is also now deemed to be a requirement. - Long-term operations plan must be prepared for the system. System planning will take a more active role with the Project Team, coordinating the interface with Emera on all power system issues. - SLI have indicated that given the limited maturity of the design of the HVDC

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					system, only a Class 4 estimate is viable for these components (i.e HVDC converters). - Executive Committee has confirmed that LCP PMT with SLI will lead the EPC & Management of the 3 new Synchronous Condensers and Soldier's Pond switchyard, while NL Hydro will address all other requirements.
Risk Lead: Jason Kean					
R9	Good HSE record is critical for project success	As a result of a lack of a safety culture, HSE performance is poor, which could lead to reputation and financial implications for Nalcor.	Avoid the likelihood of this risk occuring through: - Establishing and implementing a robust, consistent H&S and E management system across the Project. - Early and proactive program to promote and secure labour and contractor commitment to HSE. - Engaging and retaining contractors who are leaders in safety performance and have demonstrated the ability to proactively manage all aspects of HSE performance on remote worksites. - Recognizing HSE performance is imperative and start embedding an HSE culture early in the project. It all starts with management's commitment to safety. - Maintaining team awareness and establish strong & open communication channel on all aspects of HSE.	- Establish safety culture in owner team (attitude and commitment) - Mitigate impact of catastrophic event with insurance (environment) - Incorporate environmental minimization into design - Implement a Behavioural Based Safety Program and a Safety Leadership Program for Supervisors across the Project. - Implement Safety-By-Design concept into the engineering phase. - Design necessary controls into project - Embed HSE within the front-end of the project - Ensure contractor understands roles - HSE processes in-place - Develop environmental management plan for construction phase - HSE is to be a key selection criteria for contractors - Establish training and competency development programs - Focus efforts on engagement and SWOP reporting of near misses.	- Decision made to separate H&S and E functions within Nalcor PMT to facilitate stronger linkage of environmental and regulatory compliance function with EA. Environmental Manager transistioning from Generation EA process, hence good linkage. Functional resources now embedded within the Nalcor PMT. Actively recruiting H&S Manager and further functional support. - The selected EPCM consultant has a best-in-class H&S performance. - Nalcor Environmental Management Plan in-place, with strong linkages beginning to develop with SLI. - SLI have mobilized separate H&S and Environmental Managers with supporting team. H&S Management Plan drafted. - HSE criteria continues to be a key selection criteria for contractors. - Safety-by-Design work program being developed by SLI. - "Safety culture" firmly taking hold with Nalcor Project Team, however more focus required within SLI.
Risk Lead: Ron Power					
R10	Availability of resources to achieve a quality design	As a result of strong demand for hydro and transmission resources, the	Avoid risk by: - Early and aggressive action to secure	- Divide engineering requirements into areas of specific expertise	- SLI awarded EPCM contract for Hydro, transmission and HVDC specialities.

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		Project has challenges attracting the quality and quantity of required resources, resulting in poor and late engineering leading to quality and schedule delays during construction.	required engineering competences and resources required to avoid this risk - Schedule sufficient time for engineering completion prior to start of construction (enabled by requirements for Final Disclosure) Mitigate exposure by developing and implementing a project-wide Quality Management System and embed QA requirements in all contracts.	- Pay a premium for the A-Team - Provide retention incentives - Sell the job as a desirable opportunity - Select contractor on basis of competency of key named persons - Have s strong owners team in place - design / integrity function for checking - Establish design integrity review with expert panel - Combine with insurance and contractor parent company guarantee - Liquidated damages for early removal of key personnel by contractor - Factor productivity into engineering schedule	Contract included naming of 43 key resources and for completion of engineering in St. John's. - SLI have approximately 100 people mobilized to the project office. Anticipate peak of 200 in full – this will be a challenge to deliver. - Generally, considering we have the A-team for engineering with some noted exceptions that are being addressed. - Largest area of concern with SLI is a lack of PM and project controls capability. New Project Director will start in early July. - DAN-0022 has been raised to address the increased cost of completing all engineering work in St. John's as required under the Benefits Agreement with the Province. - Significant engineering, procurement planning and construction planning (220,000 hrs) are estimated as required by December 15 in order to achieve DG3 requirements.
Risk Lead:	**Bob Barnes**				
R11	Submarine cable crossing of Strait of Belle Isle	As a result of the many firsts associated with installing a submarine cable across the SOBI, construction and installation challenges may occur, leading to significant cost and schedule exposure.	- Recognize the risks and challenges and evaluate all available opportunities as early as possible (pre Gate 2) in order to Avoid / Mitigate the risk.	- Perform due diligence with additional studies, particular on trenching technology - Engage the best consultants available in order to fully understand the subsurface conditions. - Complete a detailed geotechnical program for the area. - Understand the risk of cable loss due to icebergs and fishing activity - Gather more marine data, i.e. currents, bottom survey, geotech., etc - Develop a design with adequate sparing - also have submarine cables in	- Following extensive desk top and field work in 2008-2010, the submarine cable crossing method was chosen over a cable-conduit option. - Conceptual design of submarine cable option using HDD tunnels on each side with rock protection covering other exposed areas. - Further geotechnical data, iceberg tracking and current data collection activities are planned for 2011. - Contracting & Execution Strategy is based upon owner-managed agreements for: (1) Cable design and installation

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				2 different routes - Identify and minimize installation difficulties - Establish marine specialist capability within Nalcor - Engage 2 suppliers in design competition for the preferred crossing solution and pay for it - Build and test rock trenching equipment.	(EPCI); (2) Rock supply and placement (EPCI), (3) HDD engineering, and (4) HDD drilling - Following an EOI and pre-qualification process, the RFP for cable design and install to be issued in June 2011 to 3 companies. Anticipate potential award of cable supply and install contract at year-end. Market conditions continue to be buoyant for cable manufacturers. - Plan is to target the submarine cable for a single season in 2015, thereby providing schedule opportunity to help mitigate schedule slippage. - Recent Project Change Notice indicating requirement for 350kV O/L transmission voltage and 10 min current overload will be incorporated into the cable RFP. Cost impact is uncertain.
Risk Lead: **Bob Barnes**					
R12	Faults in submarine cable during commissioning and post installation	As a result of design, fabrication and installation errors, the SOBI submarine cable may fail in-service, leading to/resulting in poor reliability, extensive increase in operating cost, and the requirement to maintain back-up power generation capacity.	Avoid risk by: - Developing and implementing a project-wide Quality Management System and embed QA requirements in all contracts. - Having significant owner involvement in all technical and construction aspects of the work, including a QC surveillance program at the manufacturing locations. - Understanding problems on recent installations and avoid risks to degree possible. - Using a conservative, robust design based upon proven technology. - Selecting design and contracting strategy that minimizes interfaces. - Clearly specify technical standards and acceptance criteria as part of all contracts for cable.	- Implement manufacturing surveillance program - Gather lessons learned from Norned and embed within LCP - Type test cable prior to manufacturing - Provisions in purchase/installation (EPIC) contract - Perform FAT - Include installation standards regarding allowable bending radius / kinking - Evaluate potential insurance coverage - Include appropriate provisions in PPA (force majure) - Attempt to insure post installation from installation contractor - Understand key hazards and take actions to mitigate - Include installed spare cable	- This risk materialized on the NorNed project resulting in a 6 month impact on start-up. We have captured these lessons learned and will be striving to implement. - Significant progress on understanding this issue has been made in 2010 by SOBI Task Force. Historically failure has been predominantly at cable joints. - Statnett will be approached to provide key documents for cable specification, testing, shipping, handling and deployment based on their experiences.

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			- Advance tunnel option thereby removing failure point due to icebergs, fishing and dragged anchors. Mitigate risk by: - Keep Holyrood available until HVdc system is proven. - Maintain capability to repair / replace a failed cable. Transfer risk by placing a Construction-All-Risk Policy for construction / installation risks.	- Understand cable w.r.t. interfaces and design with required level of redundancy	
Risk Lead:	**Bob Barnes**				
R13	System reliability during commissioning and start-up	As a result poor design and construction practices, overall reliability of the power system may be less than expected, resulting in extended period for start-up, performance degradation and / or rework during the operating phase.	Avoid risk by enacting the following - Implement an overall project-wide Quality Management System and supporting programs. - Engage experience Engineering contractors who have a good track record for equipment specification and selection - equipment selection through Life Cycle Analysis - Early commissioning and operability planning - Material and component testing - Optimization System design based upon design Life, cost and reliability performance specifications. - Utilize M/C and Commissioning system with experienced team. Consider transferring risk through: - Commercial insurance products - e.g. delayed start-up, production insurance - Performance incentatives in major supply contracts linked to start-up and year 1 of operations.	- Negotiate a Water Management agreement with CF(L) Co. to increase production flexibility - Bring operation team representative on early as possible to influence key design decisions - Build simulator to facilitate commissioning and start-up - Engage existing operation staff for lessons learned - Negotiate in PPA to minimize cost impact of initial start-up and full load demands issues - Consider Negotiate performance incentives in equipment supply contracts - System redundancy considered in initial design - Establish and implement life-cycle design philosophy - Turbine - Generator supply with or w/o Balance of Plant to be determined. - Complete design review of overland Tx in order to optimize reliability requirements. - Conduct FAT and SAT on all control	- SLI HVDC system engineering function has been established with experienced resources. - Overall system operations plans yet to be devised by NLH. - Overland transmission design will be based upon 1/50 year reliability period with additional reinforcement in selected areas. - Continuing to collect ice data for Long Range Mountains. - Quality Management Plan in place with supporting resources, including Nalcor Quality Assurance Manager. - Operations Lead (John Mallam) embedded within Project Team - RFO Manager planned for 2012. - Equipment specifications being prepared by SLI experienced engineers for review by Nalcor. - Decision made to install spare submarine cable with separate routing across SOBI in order to provide increased reliability. - SOBI cable will be designed with ~10 min temporary current overload capacity to

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				software / hardware - Evaluate available insurance products that could reduce our exposure should this risk occur.	facilitate switch over to spare cable and running in monopole mode. - Water Management Agreement in place. PUB ruling made.
Risk Lead: **Todd Burlingame**					
R14	Securing generation project release from Environmental Assessment	As a result of a lack of information in the Generation EIS, a legal challenge to the EA by Hydro Quebec, or Aboriginals claiming insufficient consultation, could result in a schedule slippage for achieving EA release and hence a delay in Project Sanction.	Avoid this risk by: - Focus on ensuring quality information is provided to the EA Panel. - Step up consultation efforts, in particular with Aboriginal groups. - Bolster team resources to allow for efficient management and support of the EA process. Mitigate this risk by seeking Executive and Shareholder alignment on using 1980 EARP decision as a fallback measure.	- Advance planning for technical sessions for Generation Project. - Prepare quality and complete answers to IRs - Push panel to meet all deadlines - Identify and fill information gaps - Prepare for hearings - Educate and engage stakeholders and regulators - Develop detailed plan to obtain permits with mitigating actions to accelerate - Public awareness campaign at various levels (appropriate timing is critical) - Strong owner's team direction and accountability - Lobby regulators through appropriate government ministries. - Mobilize required EA team resources to manage process.	- Aboriginal consultation efforts continue and have been fruitful. - In September 2010, a report was issued to the JRP detailing the results and findings from these engagements. - JRP Panel Hearings occurred in Q1-2011 – Nalcor's extensive preparation paid dividends. - Report from the JRP has been delayed until end of August 2011 with a Ministerial decision by year-end 2011. Nalcor is preparing to respond to the JRP report. - Focus is turning towards ensuring all commitments made in the EIS, subsequent Information Requests, and JRP Panel Hearings are planned for implementation. - SLI are working to develop a Regulatory Compliance Plan that will ensure all construction permits are in place following EA release to allow unhindered commencement of construction work.
Risk Lead: **Todd Burlingame**					
R15	Environmental process impact on design	As a result of the outcome of the Generation Environmental Assessment, late changes to the design or project scope may be required, resulting in cost and schedule impact.	Avoid risk by: - Working to understand environmental issues and accommodate realistic solutions early in the design process to minimize downstream effects on procurement and construction. - Preparing a strong, defensible positions on each recommended option contained in the EIS - convince the	- Quantify financial commitments being considered prior to making them. - Develop an early warning system to forecast potential conditions imposed by the EA Panel / process.	- 2 key issues need to be resolved for Generation EA: 1) Adequate Habitat Compensation 2) Terrestrial Habitat Compensation The Project Team are concerned regarding the potential impact of the latter since DG2 included no cost provision for this item.

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			Panel that our basis and assumptions are the most pragmatic. Ensure alignment and communicate any policy decisions and potential impact prior to making a commitment as part of the EA process. - Verifying potential impacts of commitments made during the EA process with all disciplines of the Project Team prior to making such commitments. Mitigate risk by: - Complete early concept desktop studies on potential scope / design changes that the EA could recommend in order to be in a better position to react if such changes are requied to secure EA release. - Tracking commitments and concessions made during the EA process and communicate within Project Team to allow for effective management of any implications on the design, construction, start-up and operation phases. This risk cannot be entirely avoided or mitigated given its nature, thus residual risk must be accepted as a part of doing business.		- It was reaffirmed by Nalcor during the JRP Panel Hearings that while we acknowledged a preferred time to water up the reservoir (full), the final construction sequence would determine when this would occur. - Comprehensive Reservoir Preparation Plan finalized in fall 2010 forming DG2 basis and was submitted to the JRP. Moving forward with execution approach based upon this Plan. - Remain uncertain regarding recommendations of the JRP. - Working to secure a Scallop Dragging restriction for SOBI.
Risk Lead: **Todd Burlingame**					
R16	Unanticipated design changes impact environmental assessment process	As a result of design evolution, there may be differences between the design assessed within the EA and the current design, resulting in schedule slippage due to the need to assess the impact of the design changes.	Avoid risk by: - Where uncertainty exists multiple concepts / options to be assessed as part of the EA process in order to increase flexibility (e.g. tunnel versus submarine cable for SOBI). - Early screening for issues and try to	- Clarify what is in each EA to anticipate impact - Communicate and adjust plan to involved stakeholders - Diligence on clear internal alignment on potential business impact and plan adjustment as EA evolves	- Design optimizations are continuing and will do so until DG3 starts (e.g. 345kV line CF to MF construction sequence, MF configuration - Being addressed through MOC process), however currently there are no indications of design changes that will impact the Generation EA.

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			work acceptable solutions that avoid schedule impact. Mitigate risk by leveraging Project Change Management Process to include approval of design changes by EA Manager in order to avoid surprises within the EA Process.	- Validation of concept through further studies - Lay-out multiple options (if applicable) in a EA registration for each project component	
Risk Lead: **Todd Burlingame**					
R17	Schedule impact due to delay in ratification of IBA by Labrador Innu Nation	As a result of an inability to reach agreement on the IBA and related agreements, the IBA and related agreements are not ratified, leading to/resulting in the project not proceeding to sanction.	Avoid risk by: - Maintain close ties with Aboriginal leaders - be responsive to the needs of various Aboriginal groups. - support the communication of accurate information on the arrangement. - Accelerate Federal Government activities on Land Claims file. - Maintain a good working relationship with the Innu Nation. - Strengthen consultation activity with other Aboriginal groups.	- Conclude IBA, Redress and Land Claims agreements - Continue to disseminate facts into the community on the Project.	- Federal Government and the Innu Nation reached an agreement on the Innu's Labrador Claim earlier this year. New Dawn Agreement ratified by Innu Nation. Risk has been eliminated.
Risk Lead: **Todd Burlingame**					
R18	Lack of support from other Aboriginal groups	As a result of a perceived lack of consultation by other Aboriginal groups, EA process may be challenged, which could lead to a delay in the EA process and other demonstrations.	Avoid risk by: - Aggressive engagement and consultation of all potentially impacted Aboriginal groups. - Add additional consultation resources to ensure consultation is addressed. - Negotiate some sort of compensation agreement with the other Aboriginal groups.	- Establish consultation agreements with each of NunatuKavut, Labrador Inuit and 6 Quebec Innu bands. - Seek a mandate to negotiate a compensation agreement with these groups. - Increased consultations and communications with parties - Ensure compliance with EA Guidelines and Terms of Reference - Ensure Crown complies with fiduciary requirements - Proactive engagement with government to ensure they are aware of this risk and work with us to manage	- Strong focus on Aboriginal consultation and engagement by Nalcor. Workplan with supporting resources in-place / being implemented. - In Sept-10, Nalcor submitted an Aboriginal consultation summary to the JRP, which should reduce the likelihood of this risk materializing. - Consultation agreement signed with Pakua Shipi (a Quebec Innu group) on April 30, 2010 for the Generation EA. - Consultation agreements signed with Pakua Shipi on Nov 24, 2010 and NunatuKavut on Jan 19, 2011 for the Island Link EA.

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				it. - Seek training opportunities under ASEP - Understand their claims and traditional use of the land	- Consultation agreement near signing with Unamen Shipu (a Quebec Innu group) for the Island Link EA.
Risk Lead: Dawn Dalley					
R19	Non-governmental organization / stakeholder protest	As a result of a lack of proactive stakeholder engagement, stakeholders may be misinformed on matters relevant to them, leading to/resulting in adverse community relations and protest against the Project.	- Develop and fully implement a stakeholder communication and consultation plan. - Focus on getting Nalcor's message out on the benefits of the Project (i.e. sell the project in order to leverage public support). - Convince our "silent" supporters to speak-out for the Project. - Monitor public and media pulse and focus strategic messages accordingly. - Leverage Quebec versus NL debate to rally support for this venture.	Avoid risk through: - Develop and fully implement a stakeholder communication and consultation plan. - Monitoring public and media pulse and focus strategic messages accordingly. Mitigate impact by: - Focusing on getting Nalcor's message out on the benefits of the Project (i.e. sell the project in order to leverage public support). - Convincing our "silent" supporters to speak-out for the Project. - Leverage Quebec versus NL debate to rally support for this venture. Accept the fact that Nalcor will recieve some negative attention for undertaking a project like LCP.	- The Project has not received substantial bad press from International NGOs. Routing of Tx line through GMNP created quite a stir leading to significant protest. - Current construction program heavily dependant on significant pre-sanction spending commitments funded by equity - this may be limited if public support for the project is not strong. - Recently the Province has faced significant critism regarding whether LCP is the solution to meet the Island's long-term energy needs, in particular are been challenged on the basis of their assumptions. These developments have predicated the current review of DG2 decision by the Public Utilities Board as well as an Independent 3rd Party - Navigant. - Facebook site opposing GMNP Tx line is an example of the potential negative publicity this can create. - Meeting with BCTC and Manitoba Hydro in Oct-09 to collect lessons learned from their experiences (Mother's Against Power Poles) - Sea Electrode issue could fit into this category - however no public outcry during recent meetings with communities on Labrador South Shore
Risk Lead: Lance Clarke					
R20	Availability of experienced hydro contractors	As a result of the strong demand for new hydro, industry consolidation,	Avoid risk by: - Engaging worldwide market and "sell	- Obtain market intelligence - Early engagement of qualified	- Market and contractor market improving in late 2009 due to weakening demand, as

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		and a lack of hydro over the past 20 years, there is a limited availability of experienced hydro contractors, which could result in less than expected number of qualified contractors being interested.	the project" to stimulate interest. - Developing an Innovative contracting strategy to make project attractive to contractors with risk/benefit balance. Accept that this risk is not entirely avoidable and cover additional contingency to mitigate it.	contractors - Evaluate and make decision on contract package configuration - Convey to contractors that the Project is "real" - Provide sufficient on-site oversight - Obtain completion guarantee	a result the premium to pay for experience is decreasing (i.e. lower profit margins for contractors). - Stable environment, big enough to generate interest from engineering contractors - we now have SNC-Lavalin as our EPCM Consultant - SLI as our EPCM Consultant have excellent insight into this market. - SLI are evaluating the package strategy in consideration of attracting large civil contractors - proposing one large package for spillway, intake and powerhouse - Low commodities level is impacting this group more than the any stimulus money is adding. - Federal Government support for the Project will likely significantly reduce this risk.
Risk Lead:	**Lance Clarke**				
R21	Ability to use Newfoundland & Labrador contractors due to lack of creditworthiness	As a result of the conditions of non-recourse project finance, our ability to use NL-based contractors due to their lack creditworthiness could lead to Nalcor having to backstop the inherent risks of using these contractors.	Miitgate by: - Work with local contractors to find suitable partners or underwriters. - Initiate discussions with Atlantic Canada Opportunities Agency (ACOA) to educate them on this risk and work with them to help mitigate this risk. - Consider this risk in the contract package definition.	- Proactive program to educate contractors and supplies on issue - Potentially develop regional vendor data base - Encourage teaming or partnering arrangements for local companies - Consider insurance program to backstop this exposure - Develop creditworthiness assessment guidelines	- Current trend indicates that there is a good chance that this will materialize, however it will be influenced by a number of external factors. - Minimal requirements to engage local contractors, however precedents set for Hebron will influence our project. - Contractor creditworthiness assessment guidelines produced with the assistance of PwC. - Given the current marketplace we need to contemplate legal default and bankruptcy provisions for all contractors and suppliers. - Equity injection for Muskrat Falls and regulated Island Link asset funded by debt service guarenteed by either the Government of Newfoundland and Labrador or Canada would minimize this

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					risk. - Surety and Bonding Workshop planned for August 2011.
Risk Lead:	**Lance Clarke**				
R22	Availability of qualified construction management / supervision	As a result of competition from other projects around the globe, the project may be unable to source the required qualified construction management and supervision, resulting in poor labor productivity, cost growth and schedule slippage.	Avoid risk by: -Establishing a benefit / reward relationship with the engineering & construction management contractor and construction contractors that entices them to put the "A-team" on the job. - Actively recruit Newfoundlanders home - leverage the "legacy" theme to entice end of career experienced supervisors to work on the Project. - Making the work and work site appealing to Newfoundlanders (e.g. attractive camp, compensation, rotation and transportation). Accept that this risk is not entirely avoidable and cover additional contingency to mitigate it.	- Make work location/employment attractive (quality of accommodation/resort complex, transportation, family benefits, vacation) - Sell the project as an opportunity for NL - Consistent employment deals where possible - Maintain some control of benefit distribution - Include provisions in contracts and labor agreements - Consider alignment with other mega projects being executed in province - Consider incentives with contractors to achieve labor objectives - Consider that some qualified supervision may be French Canadian	- Gate 2 labour wage rate assumptions for supervision are fairly robust. - Planned accommodations and recreation facilities at MF will be competitive with Western Canada, however will be difficult to compete on wages. - Anticipate Alberta market to pick-up in the 2012 period, hence again magnifying this risk. - Labor Collective Agreement will be negotiated prior to Sanction - EPCM Services Agmt with SLI includes a strong focus on construction planning
Risk Lead:	**Bob Barnes**				
R23	Site conditions worse than geotechnical baseline	As a result of geotechnical and design uncertainties at Muskrat Falls, scope increases due to increased civil work scopes, results in added cost and schedule slippage.	Mitigate the risk by maximizing geotechnical investigations to determine conditions as well as possible before bidding. Residual risk will have to be accepted by Nalcor since contracts will not accept it.	- Collect data and perform studies in order to develop comprehensive geotechnical baseline - Optimize plant layout using the findings from 2010 geotechnical program prior to the start of detailed engineering and contracting. - Consider commercial structure of contract to minimize impact (unit prices) - Establish owner's representatives (preferably on-site) to monitor contractor performance	- Field programs conducted in 2010 have established a Geotechnical Baseline for Muskrat Falls - no surprises - Findings from 2010 program have been incorporated into MF plant layout optimization working completed by SLI under WTO MF1340, including the development of a 3D model of the physical structures in CATIA software. This has allowed for the more accurate determination of major excavation and concrete quantities. - May 2011 desktop analysis of the potential geotechnical exposure based

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				Negotiate construction contracts that considers residual, immitigable geotechnical risk.	upon the existing data limitations have indicated the potential of some exposure in river, however NPV of completing a field program in 2011 is consider negative, hence no rationale for undertaking work. - Residual risk is being considered in the development of the construction schedule.
Risk Lead:	**Lance Clarke**				
R24	Availability and retention of skilled construction labour	As a result of competition from other provinces (Alberta), the Project may have challenges recruiting and retaining skilled, experienced trades, resulting in poor productivity, cost growth and schedule slippage.	Avoid risk by: - Recognize competition threat for labour and proactively manage. - Making the work and work site appealing to Newfoundlanders (e.g. attractive camp, compensation, rotation and transportation) and actively recruit NLs working afar - Actively recruit workforce currently commuting to Western Canada from Newfoundland and Labrador and Atlantic Canada – leverage the "legacy" theme to entice end of career experienced supervisors & labour back home. Mitigate the exposure by: - Developing a construction schedule based upon achievable labor productivities - Negotiating a labor agreement that supports trade flexibility - Implement a constructability focus at the start of engineering to ensure plant can be efficiently constructed. - Tap into traditionally under-represented groups such as women and aboriginals by encouraging training and education initiatives.	- Make work location/employment attractive (quality of accommodations, transportation, family benefits, vacation) - Consistent employment deals where possible - Maintain some control of benefit distribution - Structure labor strategy that does not impair engaging local labor - Develop a construction schedule based upon achievable labor productivities - Develop a dynamic labor supply and demand model in order to understand this issue. - Labor strategy that considers lessons learnt for other projects incl. demarkation and composite crewing.	- DG2 labor strategy considered this risk and baked mitigation measures into plans, including labor rate in a competitive environment and a 20/8 rotation. - Planned accommodations and recreation facilities at MF will be competitive with Western Canada, however will be difficult to compete on wages. - Anticipate Alberta market to pick-up in the 2012 period, hence again magnifying this risk. - Labor supply and demand model prepared - we understand the key shortfalls for LCP. - MF is heavy civil focus which will result in less competition for several key trades with Hebron - Evaluate opportunities for helicopter construction on transmission line - will reduce labor demand. - Productivity Action Plan developed and being gradually implemented within the actions for Nalcor and SLI. - Labrador Aboriginal Training Partnership established with $15M in training funding - great success to-date. - EPCM Services Agmt with SLI includes a strong focus on construction planning

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Risk Lead: Lance Clarke					
R25	Availability of unskilled construction labour	As a result of the Western Canada oil boom, the project may have challenges recruiting and retaining unskilled labor, resulting in poor productivity, cost growth and schedule slippage.	Avoid risk by: - Providing competitive opportunities for locals. - Promoting opportunity for training and advancement of local unskilled workforce. - Leveraging under-utilized labor pools (e.g. Aboriginal and other visible minority groups).	- Make work location/employment attractive (quality of accommodation/resort complex, transportation, family benefits, vacation) - Make the worksite attractive for the local residents (daily commute options, etc.) - Develop a diversity plan - Promote in recruitment plan - Consistent employment deals where possible - Maintain some control of benefit distribution - Include provisions in contracts and labor agreements - Structure labor strategy that does not impair engaging local labor - Leverage ASEP program to train Aboriginals	- People working in Western Canada commute & send money home to Newfoundland; most Newfoundlanders working in Western Canada would prefer to be in NL. - Labor supply and demand model prepared - we understand the key shortfalls for LCP. - Labrador Aboriginal Training Partnership established with $15M in training funding - great success to-date. - Unskilled workers are the first to be let go in a rotation, hence currently this risk should be minimal. But where will it be in 2011-17?
Risk Lead: Lance Clarke					
R26	Limited number of creditworthy hydro turbine suppliers	As a result of significant industry consolidations and limited activity within North America, there is a limited number of creditworthy hydro-turbine suppliers, which could lead to longer delivery lead times, and increased cost.	Mitigate the risk by: - Engaging 2 existing "bankable" suppliers and explore contracting model and risk allocation strategy. - Early strategy decision and selection of supplier. - Enhanced oversight during design and manufacture phases. Residual risk will have to be accepted since cost will be driven by underlying global demand.	- Gather market intelligence and monitor marketplace - Early engagement of qualified vendors - Evaluate and make decision on turbine package configuration - Convey to vendors that project is "real" - Provide sufficient factory oversight - Potential insurance to cover unexpected perils during manufacture - Obtain performance guarantee on efficiency (exclude run-a-way test)	- 3 major T/G suppliers currently under contract with Nalcor for Model Testing ($4.5M expenditure) as an effort to de-risk overall T/G delivery schedule. As a result these vendors are engaged and investing significant effort into our Project and are likely to remain very interested. This process has revealed some interesting insights into the capability of each. - We consider to monitor the marketplace - SLI now bring strength to the table in this area. - RFP with Technical Specs being prepared with a target issue date by end of Q3-11 for receipt of bid prior to DG3. - Down in global marketplace will provide schedule improvements, castings will be

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					easier/faster, therefore may see some improvement in price. - All 3 suppliers still very interested in LCP due to size, location and low risk - Decision still required on Balance of Plant with our without T/Gs - awaiting arrival of engineering contractor to make this decision.
Risk Lead: Jason Kean					
R27	De-escalation / hyper-inflation risks	As of result of global demand for construction goods and materials, the project may be exposed to hyper-inflation , resulting in significant increase in capital cost.	Avoid risk by: - Monitoring market and understand supply / demand balance for goods and materials. - Developing an escalation forecasting model specific for LCP in order to translate market intelligence into an educated assessment of likely exposure to this risk. Transfer residual risk by: - Consider commodity hedging strategy to reduce exposure. - Consider commerically pushing some of this risk to offtakers as part of the PPAs rather than pricing the associated cost uncertainty into power rates.	- Escalation will be applied by project components (turbine, labor, etc) - Consider core escalation plus market specific escalation - Obtain external benchmarking on escalation - Consider foreign currency and exchange assumptions - Continue to obtain market intelligence on supply & demand of key equipment (e.g. T/G's)	- Detailed escalation model prepared for MF and LIL which formed the basis of DG 2 escalation recommendations of approx. 2.9% annually. Analysis excluded investigation of market expectations for specialty items: submarine cable, installation vessels, TGs, skilled construction labor. Reference Report LCP-PT-ED-0000-EP-RP-0001-01 - Nalcor continues to monitor market through Global Insight and PowerAdvocate. Recently commodity upswing having an impact on the price of steel, conductor, etc. for transmission. - DG2 includes an investigation of major currency exposure based upon cash flow analysis - some, but limited exposure to US, NOK, and Euro. - Contracting strategy for major manufacturered components (submarine cable and TGs) includes consideration of this risk - decision to be made on who is best able to manage the risk.
Risk Lead: Lance Clarke					
R28	Availability of experienced high-voltage contractors and skilled labour	As of result of the limited availability of qualified overland Tx contractors and linespersons in North America and the strong demand for such services in the US, the Project may	Mitigate this risk by: - Commercial ownership construct for the Island Link and Maritime Link should be configured to reduce this risk (i.e. select partners who have the ability to	- Obtain market intelligence - Select equity / ownership partners who are able to reduce this risk. - Package scope into manageable segments/spreads	- SLI have recommended 7 packages for the CF-MF and Island Link Overland Transmission construction. - Labour strategy contemplates the traditional union jurisdictions under which

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		have challenges securing qualified contractors, leading to cost growth and schedule slippage.	reduce this risk). - Split into 5 to 6 smaller contracts for cost and scheduling reasons - Actively pursue potential suppliers and expand to worldwide considerations - Phase the transmission build in order to flatter resource demands - Actively support the training of linespersons. Residual risk will have to be accepted.	- Ensure contractor has adequate line resources - Train resources to improve quality and increase supply base - Union labor agreements may be able to help provide resources - Break contract into sequence of erection (material, towers, line installation, etc) - Identify availability of critical transmission equipment	this work is undertaken (i.e. IBEW or non-union). - Province has announced the opening of a new powerline technician program at CNA in Happy Valley – Goose Bay. - SLI have been urged to focus on the constructability and logistics aspects of this line. Initial indications from SLI are to explore opportunities for helicopter construction, in particular the remote line section in Labrador. Separate contractor viewpoints will be garnered as part of visits from Erickson Air Crane and a large Spanish firm in late June.
Risk Lead:	**Lance Clarke**				
R29	Limited number of HVdc specialties suppliers and installers	As a result of the limited number of HVdc specialties suppliers and installers, the Project may have challenges securing manufacturing and installation capacity, resulting in additional cost and schedule slippage.	Mitigate this risk by: - Optimization of packaging strategy of HVdc specialties equipment and services to entice key players - Early selection and engagement to ensure availability Acceptance of risk residual by paying a premium to get the best.	- Evaluate potential alternatives for marine installation vessels - Further understand the market and its dynamics. - Reassess execution and contract packaging for this scope to align with market intelligence and mitigation of this risk.	- Currently 3 main HVdc equipment suppliers (ABB, Areva & Siemens) have been engaged. SLI Component 3 Team has good, recent experience dealing with these vendors and understand the marketplace. - Nexans, ABB and Prysmian all Pre-Qualified for SOBI Cable EPCI and are interested, however cable market is very busy. RFP document near ready to be issue (by end of July) with a target award by year-end. - Nalcor investigations up to DG2 revealled other offshore construction vessels that are suitable for the cable install. - Cable supply remains significant commerical risk given market demand.
Risk Lead:	**Steve Bonnell**				
R30	Island Link EA results in late design changes	As a result of the outcome of the Island Link and Maritime Link Environmental Assessment, late changes to the design or project	Avoid risk by: - Working to understand environmental issues and accommodate realistic solutions early in the design process to	- Establish expert panel on the subject and undertake investigation of the optimal electrode type for LCP considering our operational	- Work to-date has not identified any surprises, however there will likely be construction restrictions coming out of the EA approval (e.g. nesting Songbirds

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		scope may be required, resulting in cost and schedule impact.	minimize downstream effects on procurement and construction. - Preparing a strong, defensible position on each recommended option contained in the EIS - convince the Panel that our basis and assumptions are the most pragmatic. Ensure alignment and communicate any policy decisions and potential impact prior to making a commitment as part of the EA process. - Verifying potential impacts of commitments made during the EA process with all disciplines of the Project Team prior to making such commitments. Mitigate risk by: - Complete early concept desktop studies on potential scope / design changes that the EA could recommend in order to be in a better position to react if such changes are requied to secure EA release. - Tracking commitments and concessions made during the EA process and communicate within Project Team to allow for effective management of any implications on the design, construction, start-up and operation phases. This risk cannot be entirely avoided or mitigated given its nature, thus residual risk must be accepted as a part of doing business.	requirements and public perception. - Develop a communications strategy that focus on the key message that our system is bi-pole, mono-pole is only utilized as back-up for emergency situation (hours per annum). - Consider alternate arrangements for electrode rather than in a marine environment (e.g. beachside, or near-shore pond) - Evaluate the economic and technical merit of routing the Labrador Tx line closer to the TLH and present a strong justification for selected route as part of the EIS.	hampering clearing operations, Woodland caribou birthing season on the Norhtern Pennisula). - LIL originating at MF rather than Gull Island reduces the amount of interior Labrador to be traversed - less disruption as now following TLH for half of Labrador line section. - Significant effort has been placed into consultation, however Spring 2011 cross-province consultation workshops were cancelled part way through due to a lack of attendance / public interest. - Shore-type electrode has been selected over sea-electrode. Location selected at Long Pond and SOBI. - Registration for Lab - Island Link has been revised to reflect known changes to design such as electrode site and type of electrode, SOBI cable crossing routing and landing points. - EIS guidelines not received until Q2-11, hence delaying EIS submittal. A number of component studies have been issued, however complete EIS not to be submitted until Q4 2011, with a decision on the Island Link EA anticipated in Q3 2012. - Scallop dragging restriction being sought for SOBI cable area.
Risk Lead:	**Gilbert Bennett**				
R31	Unwillingness of Shareholder to fund early	As a result of an unwillingness of the Shareholder to fund early	Avoid risk by: - Ensuring early and on-going alignment	- Confirm equity injection capacity from the Province prior to Decision Gate 2	- DG2 Financing Strategy based upon Deep Equity injection, however currently

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	construction on equity defers construction	construction activities prior to Financial Close, the planned execution approach and timeline for start of construction would change, resulting in a significant slippage of the target First Power date.	with the Shareholder on all aspects of the project. - Confirming Province's appetite for equity injection pre-Financial Close and validate the availability of equity from Shareholder is aligned with the proposed execution schedule. - Seek early commitment and release of capital for 2010 activities. Mitigate this risk by executing engineering and contracting in a scale-down fashion availing of the longer time time.	and adjust execution plan accordingly. - Regular briefings provided by Project Team to Executive Leadership on pending decisions for the next 90 days. - Regular communication on key messages between Nalcor and Shareholder. - Ensure clarity on overall project schedule and financial commitment curve.	working to secure arrangement with Government of Canada for Federal Loan Gurantee or equivalent which changes the financing strategy for the Project. - It's likely that EA release for Generation will occur in Q1-12 thus beyond the election timeline. Budget for all 2011 activities approved for use, which includes provisions for Financial Commitments for long-lead procurement items. - Working with Gatekeeper to clarify Shareholder requirements for Project Sanction, in particular wrt project financing. On-going alignment and checking at all levels is critical up to DG3.
Risk Lead:	**Todd Burlingame**				
R32	Delay in the release of the Island Link from EA	As a result of a delay in a decision of the type and level of federal EA required, a delay in the Island Link release from EA may occur, which could lead to an overall slippage on the target First Power date.	Avoid risk by: - Making a strategic decision to go with a Comprehensive Review rather than a Screening Study to avoid recycle and schedule slippage. Mitigate overall exposure by: - Leveraging the 1980 EARP Panel Approval - Strategically manage the EA process leveraging lessons learned from Generation EA - Increasing stakeholder consultation activities	- Respond to CEAA's letter re GMNP. - Consider merit of rolling the Island Link in with the Generation Project EA process. - Increase consultation resources - Execute consultation agreements as req'd.	- EIS final guidelines not received until Q2-2011, thus impacting the timeline for completion and submittal of EIS. Anticipate submittal by year-end and a Minister's Decision in Q3 2012. - DG2 schedule predicated upon start of Island Link construction in Spring 2012, hence delayed Minister's Decision is stressing the overall schedule. This issue is currently being considered in the development of the construction program and schedule by SLI. - Working with Gatekeeper to verify Project Sanction requirement as it relates to receipt of the Minister's Decision. (Note: With the Supreme Court of Canada January 21, 2010 decision re Red Chris Mine, the federal government re-evaluated its previous EA track decision for the Project and concluded that further involvement was required.)
Risk Lead:	**Gilbert Bennett**				

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R33	Uncertainty on commercial structure for transmission	As a result of the uncertainty of the commercial construct for the Maritime Link, delay in the EA process, financial market sounding, and PPA negotiations may arise, leading to an overall project schedule slippage.	Avoid risk by: - Strategically identify and evaluate all plausible options and develop recommendation based on alignment with Nalcor's and the Province's strategic objectives. Seek early clarity and alignment on recommendation. Developing supporting strategy and execute. - Aggressive engage Emera and NB Power - Nalcor to champion link. Mitigate exposure risk by: - Evaluating options for Nalcor led EA for Maritime Link	- Verify preferred option with Steering Committee. - Develop a strategy to progress selected option. - Develop EA strategy for Maritime Link. - Develop Aboriginal consultation plan for Maritime Link.	- Term Sheet for development of the Muskrat Falls, Labrador-Island Transmission Link signed with Emera on November 28, 2010. JOA currently under development / negotiation. - Key uncertainty at present regarding the approach to be used for implementation of the Maritime Link (e.g. integrated Emera – Nalcor team). - Emera will lead the EA process, however based upon current progress it is anticipated that it will be challenging to have the Maritime Link ready to accept Muskrat Falls power by May 2017. - All commerical agreements required for development of Project have been identified and are being championed by a designated Senior Mgmt rep.