

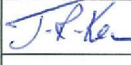




## Nalcor Energy – Lower Churchill Project





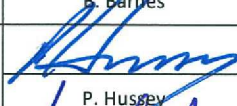
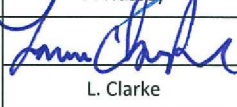
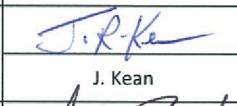
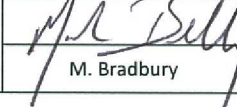
## Project Risk Management Plan

LCP-PT-MD-0000-RI-PL-0001-01

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## 1.0 Purpose

This *Project Risk Management Plan* is one of several key management plans under the umbrella of [LCP-PT-MD-0000-PM-PL-0001-01 Project Execution Plan \(Scope and Approach\)](#) that detail how the Nalcor Energy-Lower Churchill Project (NE-LCP or the Project) will be managed in order to achieve the goals and objectives stated in the Project Charter. This Management Plan provides:

- Overall risk approach / philosophy adopted by Nalcor for the Project;
- Roles and responsibilities of both Nalcor and the EPCM consultant as it relates to risk management;
- Key interfaces for risk management activities between Nalcor and the EPCM consultant; and
- Risk management process used on the Project.

## 2.0 Scope

This *Project Risk Management Plan* is a key component of the NE-LCP Risk Management Program illustrated in Figure 1. Together these documents provide the core direction as to how risk management will be conducted within the Project.

This Management Plan is applicable during the planning and execution of Phase 1 of the Project, including the following project elements:

- Nalcor owner activities including environmental assessment, aboriginal affairs, power sales, regulatory, financing, and labor relations
- Muskrat Falls Hydroelectric Facility
- Labrador – Island Transmission Link
- Maritime Link

This *Project Risk Management Plan* addresses all project risks, however does not specifically address the completion of specific health, safety and environmental risk assessments (e.g. hazard operability reviews “HAZOPs”, or process hazard analysis). While general project risks will be evaluated in accordance with these criteria, details of specific risks assessments related to these items are contained in the respective management plans.

**Figure 1: NE-LCP Risk Management Program**

### 3.0 Definitions

|                             |   |
|-----------------------------|---|
| <b>Allowance</b>            | Costs added to the base estimate, based on experience, to cover foreseen but not fully defined elements.  |
| <b>Base Estimate</b>        | Reflects most likely costs for known and defined scope associated with project's specifications and execution plan.   |
| <b>Decision Gates</b>       | A Decision Gate is a predefined moment in time where the Gatekeeper has to make appropriate decisions whether to move to the next stage, make a temporary hold or to terminate the project. The option to recycle to the current stage is considered an undesirable option unless caused by changes in business conditions. |
| <b>Escalation</b>           | Provision for changes in price levels driven by economic conditions. Includes inflation.  |
| <b>Estimate Contingency</b> | Provision made for variations to the basis of an estimate of time or cost that are likely to occur, that cannot be specifically identified at the time the estimate is prepared but, experience shows, will likely  |

occur. Contingency does not cover scope changes outside the Project's parameters, events such as strikes or natural disasters, escalation or foreign currency impact.

**Key Risks**

A risk selected to be overseen by the Risk Resolution Team or LCP Executive Committee due to the risk's complex nature and high profile.

**Management Reserve**

Approved capital budget held in reserve and controlled by Gatekeeper, which is used to provide a higher confidence cost level (i.e. comfort factor).

It is often used by Gatekeeper as a mechanism to support scope additions in a project raised as part of the change management process which would not be covered by Estimate Contingency. The Management Reserve is also used to handle the impact of strategic risk.

Unlike Estimate Contingency, Management Reserve is not expected to be spent unless the Gatekeeper so directs.

**Pareto's Principle**

Also known as the 80-20 rule, states that, for many events, roughly 80% of the effects come from 20% of the causes. Application to risk management suggest that 80% of the risk exposure comes from 20% of the project's risk.

**Project Change**

A deviation which represents a change or departure from the Project baseline scope, estimate, schedule, intended plant quality, HSE targets, project policy, or execution plan that causes an addition or reduction to the Original Control Budget or baseline Project Control Schedule including correction for scope / estimate omissions, or change in execution approach.

**Project Change Notice**

A mechanism used to facilitate the processing of Project Changes.

**Project Management Team**

The Project Management Team (PMT) is led by the Project Director and is made up of project leaders and key functional representatives. The PMT meets periodically, to identify issues that may affect cost and schedule and to determine how such issues should be resolved.

**Project Scope**

A concise and accurate description of the end products or

deliverables to be expected from the project and that meet specified requirements as agreed between the Project stakeholders. It represents the combination of all project goals and tasks, and the resources and activities required to accomplish them.

**Project Team**

Personnel assembled to develop and execute a project from planning through start-up. The Project Team (PT) is dedicated to managing the overall project including significant focus on monitoring and controlling the EPCM consultant's and contractor's performance in execution of the work.

**Risk**

An uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives.

**Risk Brokering**

The process of allocating project risks to various providers (of technology, engineered equipment, engineering & construction services, insurance, and financing) such that each provider's levels of cost and risk are optimized.

**Risk Action Plan**

Action plan prepared to address all non-Key Risks identified in the Sub-Project Risk Register.

**Risk Frame**

Form used to document Key Risk details, unmitigated risk exposure, risk response / resolution strategy, and status.

**Risk Register**

A database or register of the identified project risks.

**Risk Response Plan**

Management strategy and action list prepared for Key Risks.

**Risk Resolution Team**

Multi-functional group, acting as a resource to the Project Director, who select the highest priority risks (can include identification of that risk) for management based upon defined criteria and assist Risk Owners with the development of response plans.

**Sub-Project**

Sub-division of LCP Projects contained in the Work Breakdown into components to assist with the planning, executing and controlling of the work. Reference [Project Controls Management Plan LCP-PT-MD-0000-PM-PL-0001-01](#) for details.

**Strategic Risk**

Identified background risks that are outside of the controllable scope of the project team, typically pertaining to external issues such as enterprise-level issues, governance, financial markets,



stakeholders, hyperinflation, and regulatory approvals. Managing these risks requires significant effort and influence by the Gatekeeper with external stakeholders. Strategic risk is also referred to as the risk of failure of the general execution plan.

**Strategic Risk Exposure** Probabilistic impact of Strategic Risks that is quantified. Covered by Management Reserve.

**Tactical Risk** Refers to risks associated with the base capital cost estimate as a result of uncertainties with the four components of the estimate: (1) project definition and scope omission, (2) construction methodology and schedule, (3) performance factors, and (4) price. It excludes price escalation.

## 4.0 Abbreviations and Acronyms

|               |   |
|---------------|---|
| <b>EPCM</b>   | Engineering, Procurement and Construction Management  |
| <b>ERM</b>    | Enterprise Risk Management  |
| <b>FEL</b>    | Front End Loading   |
| <b>HAZID</b>  | Hazard Identification Review  |
| <b>HAZOP</b>  | Hazard Operability Review   |
| <b>HSE</b>    | Health, Safety and Environment  |
| <b>LACTI</b>  | <u>L</u> eads, <u>A</u> ccountable, <u>C</u> onsulted, <u>T</u> echnical and <u>I</u> nformed Chart |
| <b>MoC</b>    | Management of Change  |
| <b>NE-LCP</b> | Nalcor Energy – Lower Churchill Project   |
| <b>PCN</b>    | Project Change Notice   |
| <b>PMT</b>    | Project Management Team   |
| <b>PT</b>     | Project Team  |
| <b>WBS</b>    | Work Breakdown Structure  |

## 5.0 Reference Documents and/or Associated Forms

|  |  |
|--|--|
| <a href="#">LCP-PT-MD-0000-PM-PL-0001-01</a> | <a href="#">Project Execution Plan</a>           |
| <a href="#">LCP-PT-MD-0000-PM-LS-0001-01</a> | <a href="#">Project Dictionary</a>               |
| <a href="#">LCP-PT-MD-0000-PC-PI-0001-01</a> | <a href="#">Project Controls Management Plan</a> |
| <a href="#">LCP-PT-MD-0000-PR-PL-0001-01</a> | <a href="#">Procurement Management Plan</a>      |
| <a href="#">LCP-PT-MD-0000-PC-PL-0001-01</a> | <a href="#">Project Change Management Plan</a>   |
| <a href="#">LCP-PT-MD-PR-PL-0001-01</a>      | <a href="#">Procurement Management Plan</a>      |
| <a href="#">LCP-PT-MD-0000-RI-RP-0001-01</a> | <a href="#">Gate 2 Project Risk Analysis</a>     |
| <a href="#">MSD-LE-001</a>                   | <a href="#">Insurance Philosophy</a>             |
| <a href="#">MSD-RI-001</a>                   | <a href="#">Project Risk Management Policy</a>   |

MSD-RI-002

Project Execution Risk and Uncertainty Ranking Matrix

MSD-RI-003

Project Execution Risk & Uncertainty Management  
Guidelines

MSD-RI-004

Risk Management Philosophy

## 6.0 Responsibilities

|   |   |
|---|---|
| <b>Project Director</b>   | <ul style="list-style-type: none"> <li>Chairs the Risk Resolution Team and accountable for implementation of this Risk Management Plan</li> <li>Approves Risk Response Plans for Key Risks and subsequent updates, or seeks approval of Risk Response Plan (as required) from LCP Executive Committee</li> </ul>  |
| <b>Project Manager(s) or Scope Manager</b><br>(reports to Project Director) | <ul style="list-style-type: none"> <li>Responsible for implementation of this Risk Management Plan within their sub-Project</li> <li>Management of risk within their sub-Project or area of responsibility</li> </ul>   |
| <b>Risk Owner</b>   | <ul style="list-style-type: none"> <li>Can be any individual within the organization (e.g. Area Manager), including EPCM Consultant</li> <li>Develops the Risk Response Plan for Key Risks or Risk Action Plan for other project risks</li> <li>Spearheading the implementation of the Risk Response Plan</li> <li>Advising the Nalcor Risk Coordinator and Project Manager of any implementation issues with Risk Response Plan</li> <li>Take action to adjust mitigation efforts as appropriate for Risk Response Plan</li> </ul> |
| <b>Risk Resolution Team</b>   | <ul style="list-style-type: none"> <li>Multi-functional group, acting as a resource to the Project Director, who select the highest priority risks (can include identification of that risk) for management based upon defined criteria and assists Risk Owners with the development of Risk Response Plans, including assistance with the assistance of optimal risk brokering.</li> <li>Monitors the implementation status of Risk Response Plans</li> </ul>  |
| <b>LCP Executive Committee</b>  | <ul style="list-style-type: none"> <li>Approves the selected list of highest priority risks made by the Risk Resolution Team</li> <li>Approves selective Risk Response Plans (as required due to their delegation of authority or nature of the risk)</li> <li>Making decisions on risk mitigation trade-offs (corporate / project trade-offs)</li> </ul>   |

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|  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>• Removing roadblocks to enable Risk Response Plans to be implemented</li> </ul>  |
| <b>NE-LCP Project<br/>Risk Coordinator</b>             | <ul style="list-style-type: none"> <li>• Schedules and facilitates risk assessments</li> <li>• Lead the population of the sub-project risk register, including interface with EPCM Consultant's Risk Manager to participate in EPCM Consultant's risk activities</li> <li>• Facilitates discussions to identify the Risk Owners for each risk</li> <li>• Facilitate the identification of the Key Risks (i.e. top 20)</li> <li>• Provide updated risk listing to procurement or package engineer for contracting strategy preparation and subsequent commercial negotiations</li> <li>• Ensures Risk Response Plan is prepared for Key Risks in a consistent fashion</li> <li>• Ensures Risk Action Plans are developed and implemented for all Project Risks</li> <li>• Monitors the status of Risk Response Plan implementation (i.e. collecting updates) – must be in touch with all risk owners – eye on the ball</li> <li>• Produces Risk Response Plan status reports</li> <li>• Facilitates the Risk Resolution Team meetings</li> <li>• Attend LCP Executive Committee meetings as appropriate</li> <li>• Reviews Risk Response Plans for Project Change considerations and Project Changes for risk considerations (as required)</li> </ul> |
| <b>Sub-Project Risk<br/>Register Lead</b>              | <ul style="list-style-type: none"> <li>• Organizes and consolidates the sub-project risk register by category</li> <li>• Leads the preliminary risk ranking on the sub-project risk register</li> <li>• Coordinating with Risk Owners to develop and implement Risk Action Plans</li> <li>• Informing Risk Coordinator of overall risk status</li> </ul>   |
| <b>Risk Advisor<br/>(Westney)</b>                      | <ul style="list-style-type: none"> <li>• Provides process expertise and specialized tools for conducting risk assessments</li> <li>• Assists with the assessment of financial exposure of Strategic Risks</li> <li>• Participates on Risk Resolution Team reoccurring meetings</li> <li>• Acts as independent risk broker</li> </ul>   |
| <b>Nalcor ERM<br/>Committee LCP<br/>Representative</b> | <ul style="list-style-type: none"> <li>• Providing the linkage between the Project Risk Register and the Corporate Risk Register in terms of risk identification, risk rating and ongoing monitoring of mitigation strategies.</li> <li>• Conveying details of best practices in project risk management as practiced by the NE-LCP to the benefit of the ERM Committee and Nalcor Energy generally.</li> </ul>  |

|  |  |
|--|--|
| <b>EPCM Consultant's General Project Manager</b> | <ul style="list-style-type: none"> <li>• Ensure that EPCM Consultant provides EPCM services consistent with Nalcor's Risk Philosophy and Risk Management Plan.</li> <li>• Participate on Risk Resolution Team</li> <li>• Review Risk Action Plans for potential Project Changes</li> </ul>                     |
| <b>EPCM Consultant's Risk Manager</b>            | <ul style="list-style-type: none"> <li>• Responsible for implementation of Consultant's risk management plan</li> <li>• Establishing a working interface with Nalcor Risk Coordinator</li> <li>• Ensures Risk Action Plans are developed and implemented (for risks within EPCM consultant's scope)</li> </ul> |
| <b>Supply Chain</b>                              | <ul style="list-style-type: none"> <li>• Responsible for development of contracting and procurement plans that consider risk inventory for the package</li> <li>• Risk brokering during the negotiation of the commercial terms of the package with the contractor or supplier</li> </ul>                      |


## 7.0 Risk Management Philosophy

Nalcor Energy's [Risk Management Policy](#) for the Lower Churchill Project (document [Project Risk Management Policy MSD-RI-001](#)), as shown in Figure 2, makes a strong commitment towards identifying and management all project risks. With consideration of this Policy Statement, the Project's risk management program described in this Management Plan is structured to encapsulate the following beliefs held by Nalcor.

- Proactive risk awareness and management is a key enabler of "flawless execution."
- Predictability of outcome will be vastly improved when achievable objectives are first established. A full understanding of project risks early in the project's lifecycle will provide the greatest opportunity to complete the necessary work required to fully understand these risks (i.e. Risk-Driven Front End Loading) from which achievable objectives will be established.
- Quality decision making will be facilitated through a comprehensive understanding of project risks and how they can be managed with least impact on the Project. Such risk-informed decision making, illustrated in Figure 3, will be a standard for the Project.
- Consistent with Pareto's Principle, we believe a few, select, complex risk (15 – 20) will provide the greatest exposure for the Project. These Key Risks will be subject of heavy focus by Nalcor's Project Management Team and the Risk Resolution Team.

- Many risks are multi-dimensional and complex requiring creative solutions. Cost effectively managing risks will require risks to be allocated to various stakeholders who are best positioned to manage them through Risk Brokering. This process of Risk Allocating will be featured significantly through the procurement process for the project's supply and construction contracts.
- Risk management is an on-going, continual looped process as the project progresses through the Gateway Phases (i.e. Plan-Do-Check-Act process).
- Consistent with practice up to Decision Gate 2, the Project will continue to use the Risk Resolution Team (see Figure 4) to support the development and validation of Risk Response Plans, however its membership will be adjusted to reflect the progression of the Project.

**Figure 2:** Project Risk Management Policy Statement



## Lower Churchill Project

# Risk Management Policy

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The Lower Churchill Project Management Team is committed to planning and executing the Lower Churchill Project in such a way as to minimize the potential negative effects of risks and to maximize opportunities. We will serve the needs of all our internal and external customers, stakeholders and our shareholder by tangibly demonstrating this commitment through compliance with our Risk Management System and by making continual improvement an integral part of our activities.

**Our Philosophy**

- Proactive risk management is fundamental to achieving the Lower Churchill Project's objectives.
- All participants in the Lower Churchill Project are responsible for identifying & mitigating risk and identifying & developing opportunities.
- Empowerment comes through strong leadership and involvement of all personnel.

**Our Goals**

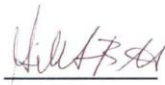
- Create a culture that supports proactive project risk management that is viewed by all Team Members as an enabler to successfully achieve the Lower Churchill Project's objectives.
- Identify, assess, respond to and manage all key risks and uncertainties.
- Allocate project risk to the party who can most efficiently and effectively manage the risk.
- Improve decision-making by thoroughly understanding project risks and uncertainties.

**Our Commitments**


- We will ensure this Policy is known and clearly understood by all persons associated with the Lower Churchill Project.
- We will work to identify, assess, respond to and manage all key project risks and opportunities consistent with guidelines and tools advocated by this Policy.
- We are committed to managing project risks and opportunities from the following perspectives: occupational health and safety, environmental, technical, schedule, cost, operational reliability/quality, and reputation/image.

This Policy Statement supports and complements other policies within the Lower Churchill Project Integrated Management System. This Policy Statement is not intended to replace or duplicate Newfoundland and Labrador Hydro Corporate risk management policies with respect to market and financial loss risk mitigation activities.

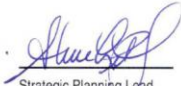
Endorsed by:

  
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 Vice-President  
Lower Churchill Project

20 Dec 07  
 Date

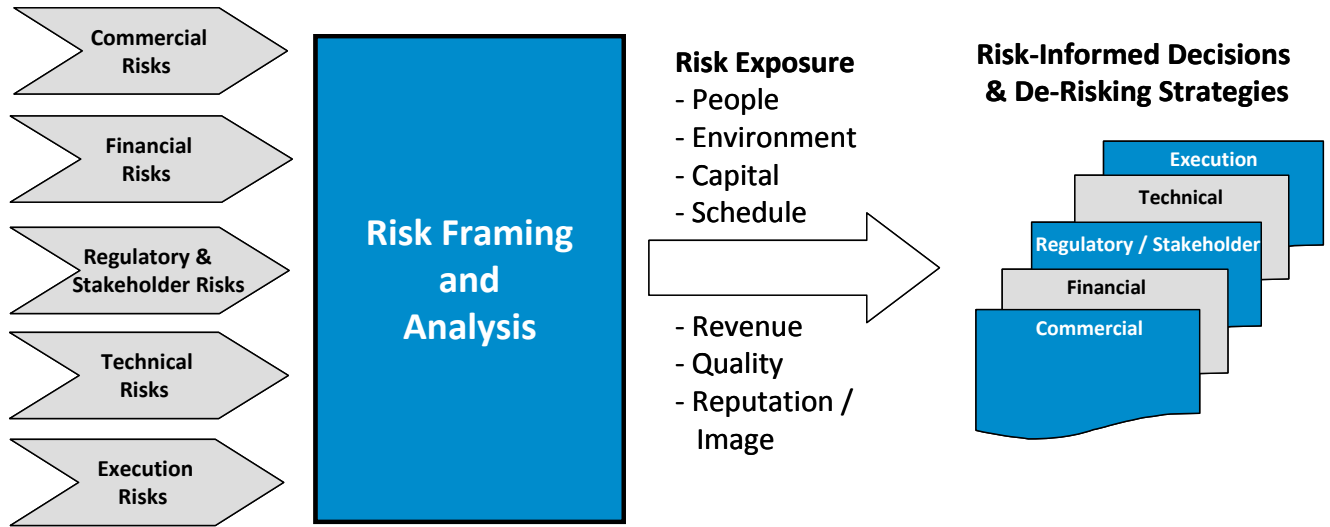
  
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 Project Manager  
Lower Churchill Project

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 Date

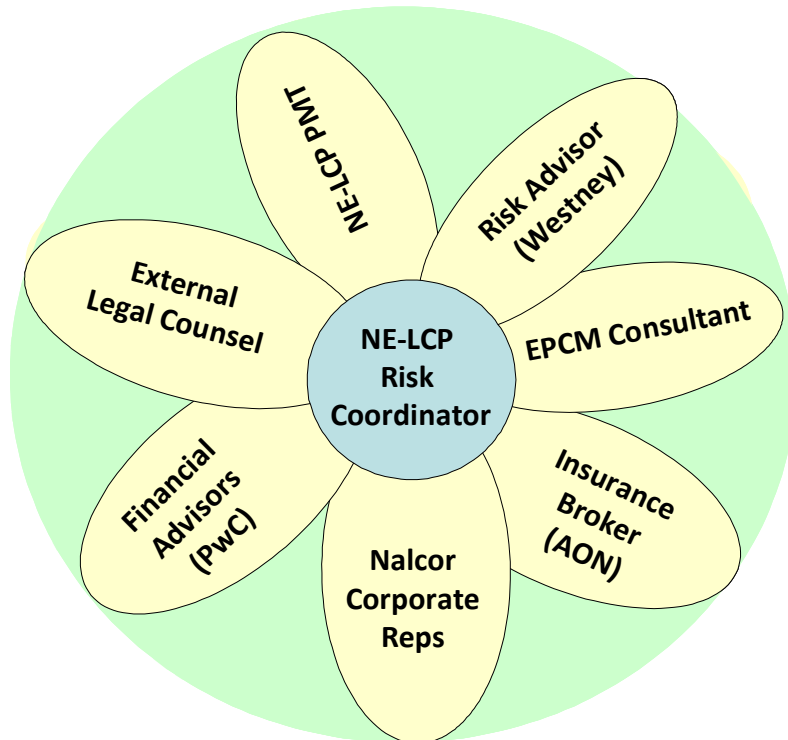
  
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Lower Churchill Project

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 Date

**Figure 3: Risk-informed Decision Making Approach**



**Figure 4: Risk Resolution Team Post Decision Gate 2**



## 8.0 Overview of Risk Management Process

### 8.1 Risk Management Process Cycle

The risk management process used to effectively manage risks during the planning and execution stages of the Nalcor Energy – Lower Churchill Project is depicted in Figure 5. This risk management process is comprised of four main steps which combine to form an ongoing cycle.

**Figure 5:** Illustration of Risk Management Process Cycle



#### **Step 1 – Identify and Organize Risks**

All risks are captured on sub-project risk registers. The risks are then organized by major activity and type of risk; this organization facilitates both efficiency and effectiveness in the handling of the risks.

#### **Step 2 – Assess and Prioritize Risks**

Each risk is given a “first-cut” priority ranking which is a function of the risk’s likelihood of occurrence and its potential consequence. From there, approximately 15-20 of the more complex and higher profile risks (Key Risks) are selected to be overseen by the Risk Resolution Team. Risk Assessments are performed to evaluate both the individual and collective impacts of risks on the project, and to provide insight into the value of possible risk mitigations.



**Step 3 – Address Risks**

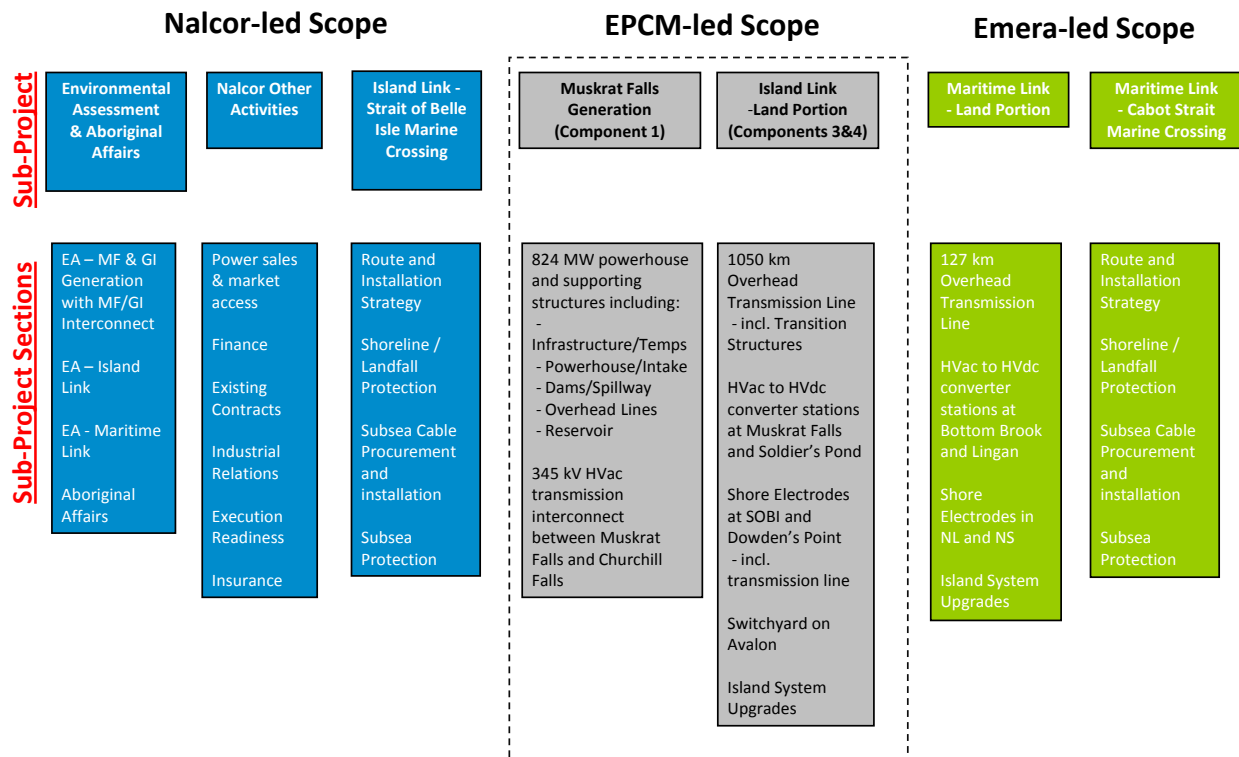
Each Key Risk is managed using a Response Plan which is developed using a Nalcor Key Risk Frame, as contained in Attachment B1. The Response Plan will detail the recommended strategy for managing the risk (i.e., avoidance, mitigation, allocation, or acceptance). The majority of risks are not elevated to Key Risk status and are managed using Action Plans (see Attachment B.2 for template) which are specified on the sub-project risk registers. Each risk's Risk Owner is responsible for leading the development and implementation of that risk's Response Plan or Action Plan.

**Step 4 – Monitor and Control Risks**

The Response Plans and Action Plans are reviewed on a regular basis and are adjusted as conditions warrant to promote optimal outcomes. The frequency of reviews ranges from monthly to quarterly depending on the organizational entity involved in the review.

**8.2 Scope of Nalcor's and EPCM Consultant's Responsibilities**

Figure 6 (below) shows the division of responsibilities between Nalcor and the EPCM Consultant for Phase I of the Lower Churchill Project. The overall project is divided into sub-project areas; these sub-project areas are used as the basis for designating the sub-project risk registers used in the Risk Management Process.

**Figure 6: Depiction of Risk Register Responsibilities**

Nalcor will have the responsibility for overseeing: the Strait of Belle Isle (SOBI) Marine Crossing; and General Project Risks (including issues related to overall project execution, Environmental Assessment, Aboriginal Affairs, Financing, Regulatory, Power Sales, and Labor Relations).

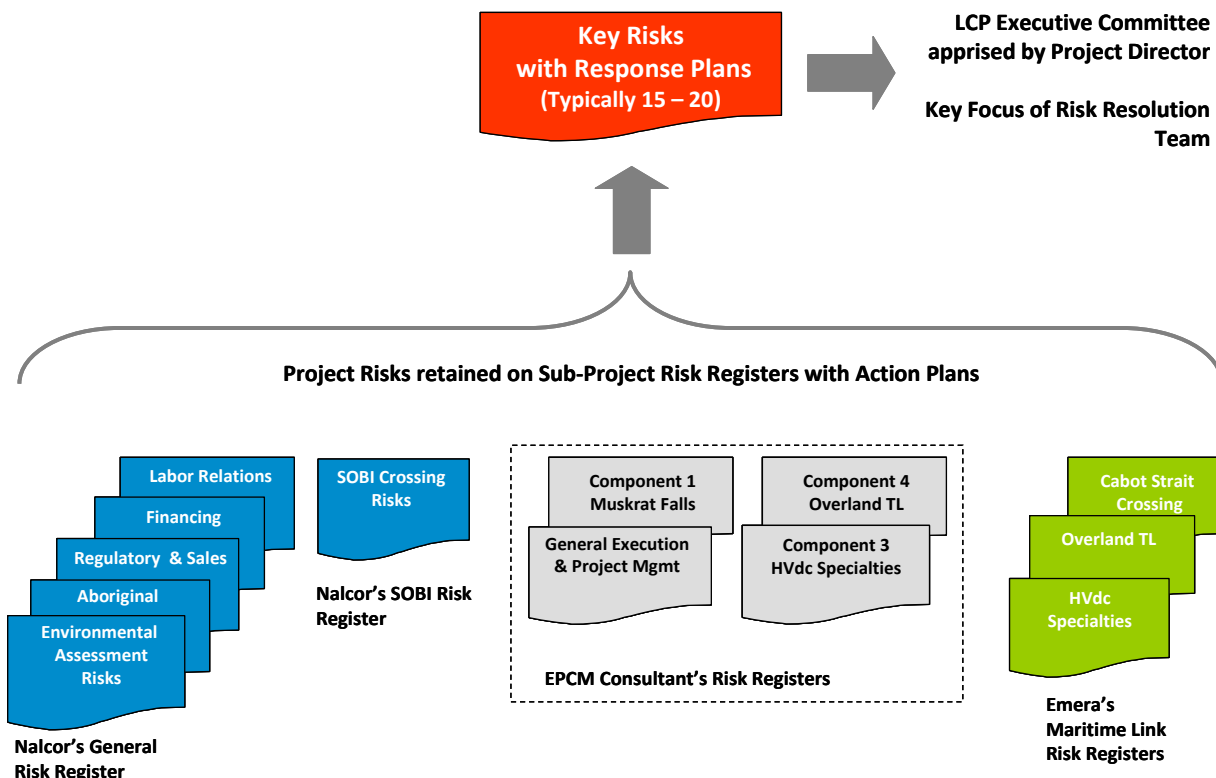
The EPCM Consultant will oversee sub-project risk registers pertaining to: Muskrat Falls Generation (Component 1), HVdc Specialties (Component 3), Overland Transmission (Component 4), and General Execution of Project Management within its area of responsibility.

At current it is envisioned that Emera, as lead for the Maritime Link, will be responsible for overseeing the risks associated with the Maritime Link. Risk register synergies with other portions of the Project will be explored as the planning for the development of this asset continues (e.g. common marine crossing risk register for SOBI and Cabot Strait).

### 8.3 Flow of Risks from Sub-Project Risk Registers to List of Key Risks

Figure 7 (below) portrays the flow of project risks from the sub-project risk registers to the List of Key Risks which are overseen by the Risk Resolution Team / LCP Executive Committee. Response Plans are used to manage the Key Risks while Action Plans are used to manage the risks that are retained on the sub-project risk registers.

**Figure 7: Flow of Project Risks from Sub-Project Risk Registers**



## 8.4 Division of Nalcor's and EPCM Consultant's Responsibilities in Risk Management Process

Table 1 (below) depicts the various responsibilities that Nalcor and EPCM Consultant have throughout the Risk Management Process.

**Table 1: Risk Management Division of Responsibility Matrix**

| CORE ACTIVITY  | RESPONSIBILITY ASSIGNMENT |                 |   |
|--|---------------------------|-----------------|---|
|  | Nalcor Energy             | EPCM Consultant | INTERACTION NOTES   |
| <b>Identifying and Organizing Risks</b>                                  |                           |                 |   |
| Initial population risk register   |                           |                 |   |
| For Nalcor-led Sub-Project risks   | R                         |                 | EPCM Consultant to participate upon request   |
| For EPCM Consultant-led Sub-Project risks                                |                           | R               | Nalcor to participate   |
| Organizing risks by category   |                           |                 |   |
| For Nalcor-led Sub-Project risks   | R                         |                 |   |
| For EPCM Consultant-led Sub-Project risks                                |                           | R               | Nalcor to provide guidance as required  |
| Identifying risk owners  |                           |                 |   |
| For Nalcor-led Sub-Project risks   | R                         |                 |   |
| For EPCM Consultant-led Sub-Project risks                                |                           | R               | Nalcor to provide input as required   |
| <b>Assessing and Prioritizing Risks</b>                                  |                           |                 |   |
| Conduct preliminary rankings for Nalcor-led Sub-Project risks            |                           |                 |   |
| For Nalcor-led Sub-Project risks   | R                         |                 |   |
| For EPCM Consultant-led Sub-Project risks                                |                           | R               | Nalcor to participate   |
| Develop list of Key Risks to be overseen by Risk Resolution Team         | R                         |                 | EPCM Consultant to provide input  |
| Determine schedule for cost and time risk workshops                      |                           |                 |   |
| For Nalcor-led Sub-Project risks   | R                         |                 |   |
| For EPCM Consultant-led Sub-Project risks                                | R                         |                 | Nalcor is responsible for informing EPCM  |
| Determine schedule for health, safety and environmental risk assessments |                           |                 | E.g. HAZIDs, HAZOPs, PHAs   |
| For Nalcor-led Sub-Project risks   | R                         |                 |   |
| For EPCM Consultant-led Sub-Project risks                                |                           | R               |   |
| Conduct cost and time risk assessments                                   |                           |                 |   |
| For Nalcor-led Sub-Project risks   | R                         |                 |   |
| For EPCM Consultant-led Sub-Project risks                                | R                         |                 | EPCM Consultant will participate  |
| Conduct health, safety and environmental risk assessments                |                           |                 |   |
| For Nalcor-led Sub-Project risks   | R                         |                 |   |
| For EPCM Consultant-led Sub-Project risks                                |                           | R               |   |
| <b>Addressing Risks</b>  |                           |                 |   |
| Develop and approve Response Plans for Key Risks                         | R                         |                 | EPCM Consultant to provide input into Response Plan                                     |
| Implement Response Plans for Key Risks                                   | R                         |                 | EPCM Consultant to provide implementation support                                       |
| Develop and approve Actions Plans for Project Risks                      |                           |                 |   |
| For Nalcor-led Sub-Project risks   | R                         |                 |   |
| For EPCM Consultant-led Sub-Project risks                                |                           | R               | Nalcor to provide input into Action Plans and approve if its triggers a Project Change  |
| Implement Action Plans for Project Risks                                 |                           |                 |   |
| For Nalcor-led Sub-Project risks   | R                         |                 |   |
| For EPCM Consultant-led Sub-Project risks                                |                           | R               |   |
| Address Risks through the Procurement Process                            |                           |                 |   |
| For Nalcor-led Sub-Projects  | R                         |                 |   |
| For EPCM Consultant-led Sub-Projects                                     |                           | R               | Nalcor to provide input as required   |
| Secure Project Insurance Program   | R                         |                 | EPCM Consultant to provide support to the placement of the Project's insurance program. |
| <b>Monitoring and Controlling Risks</b>                                  |                           |                 |   |
| Review and adjust Response Plans for Key Risks                           | R                         |                 | EPCM Consultant to provide input as applicable  |
| Review and adjust Actions Plans for Project Risks                        |                           |                 |   |
| For Nalcor-led Sub-Project risks   | R                         |                 |   |
| For EPCM Consultant-led Sub-Project risks                                |                           | R               | EPCM Consultant to provide regular status reports                                       |

## 9.0 Identifying and Organizing Risks

### 9.1 Initial Risk Identification

All project risks associated with Phase 1 of the Lower Churchill Project will be placed on a sub-project risk register. As portrayed in Figure 6, Nalcor will oversee sub-project risk registers pertaining to: the SOBI Crossing; and General Project Risks (including issues related to overall project execution, Environmental Assessment, Aboriginal Affairs, Financing, Regulatory, Power Sales, and Labor Relations), and EPCM Consultant will have the responsibility for overseeing sub-project risk registers pertaining to: Muskrat Falls Generation (Component 1), HVdc Specialties (Component 3), Overland Transmission (Component 4), and General Execution of Project Management.

To assist with the initial population of a sub-project risk register, it is recommended that the Sub-Project Risk Register Lead (EPCM Consultant Risk Manager for EPCM Consultant-led sub-project risk registers) create a preliminary list of the risks which pertain to that particular sub-project. A workshop can then be held, with broad participation from multiple disciplines, to further develop the list of risks for the risk register. This workshop will be facilitated by the LCP Project Risk Coordinator (EPCM Consultant Risk Manager for the EPCM Consultant-led sub-project risk registers).

Inputs into this process will include the risk identification activities completed up to Decision Gate 2 as documented in [Gate 2 Project Risk Analysis](#), document [LCP-PT-ED-0000-RI-RP-0001-01](#).

Note: It is anticipated that the EPCM Consultant will use its corporate standard risk register and software as the basis for establish of a risk register.

### 9.2 Organizing Risks by Category

Organizing the risks on the sub-project risk registers is critical to the risks being efficiently and effectively managed. The Sub-Project Risk Register Lead will have primary responsibility for organizing risks on the sub-project risk register.

Initially, it may be helpful to group risks by major activity or physical component of the Work Breakdown Structure. Risks should be further organized by type of risk. The following ten categories of risk are used on the sub-project risk register:

- 1) Commercial
- 2) Commissioning and Start-up
- 3) Completeness
- 4) Environmental

- 5) Construction
- 6) External
- 7) Interface
- 8) Organizational / Enterprise
- 9) Regulatory
- 10) Technical

After this level of organization has taken place, the list of risks should be reviewed to see what consolidation/elimination is appropriate.

Finally, to assist future risk assessments, a determination should be made for each risk as to whether it is a tactical risk or a strategic risk. In general, if the sub-project team has the authority to address a risk, it is a tactical risk; if a level of the organization above the sub-project team is required to address a risk, then it is a strategic risk.

### **9.3 Identifying Risk Owners**

The NE-LCP Project Risk Coordinator (EPCM Consultant's Risk Manager for EPCM Consultant-led sub-project risks) has primary responsibility for identifying the Risk Owner for each risk. This identification would typically be made during the workshop discussion at the time the risk is placed on the risk register. Afterwards, it is important that the Sub-Project Risk Register Lead (or NE-LCP Project Risk Coordinator as appropriate) confirm with the Risk Owner that he/she understands and accepts the responsibilities associated with being the Risk Owner.

### **9.4 Updating Risk Registers based upon Gathered Intelligence**

The Sub-Project Risk Register Leads and NE-LCP Project Risk Coordinator (EPCM Consultant's Risk Manager for EPCM Consultant-led sub-project risk registers) will work together to update or add risks to the sub-project risk registers based on discussions in management meetings, information gathered from Risk Assessments, or other new intelligence. The Sub-Project Risk Register Leads will also have primary responsibility for updating the status of each risk on the sub-project risk register as appropriate.

## 9.5 LACTI Chart for Identifying and Organizing Risks

| <u>Description of Activity</u>   | LCP Executive Committee | LCP Project Director | LCP Risk Resolution Team <sup>1</sup> | LCP Project Risk Coordinator | Sub-Project Risk Register Lead | Risk Owner | Risk Advisor (Westney) | EPCM Consultant General Proj. Mgr. <sup>2</sup> | EPCM Consultant Risk Manager <sup>2</sup> | Nalcor ERM Committee LCP Rep. | LCP Change Mgt. Coordinator |
|--|-------------------------|----------------------|---------------------------------------|------------------------------|--------------------------------|------------|------------------------|---|---|-------------------------------|-----------------------------|
| Initial Population of Sub-project Risk Register  |                         | A                    | I                                     | L                            | C                              | C          | T                      | I   | C   | I                             |                             |
| Organises Risks by Category on Sub-project Risk Registers (incl. designating tactical/strategic & consolidating risks)   |                         | A                    | I                                     | C                            | L                              | C          | T                      | I   | C   |                               |                             |
| Identify Risk Owner for each Risk  |                         | A                    | I                                     | L                            | C                              | C          | T                      | I   | C   |                               |                             |
| Update Risk Registers based on Intelligence Gathered from LCP Executive Committee, Risk Resolution Team, Risk Workshops, Contractors, and General Surveillance | C                       | A                    | C                                     | L                            | C                              | C          | T                      | C   | C   |                               | C                           |

### Legend:

- L LEADS - Who leads the activity
- A ACCOUNTABILITY - Who has accountability for the activity
- C CONSULTED - Who needs to be consulted during the activity
- T TECHNICAL - Who provides technical input on the activity
- I INFORMED - Who should be informed, but is not actively participating in the activity

<sup>1</sup> Financial Advisor, Legal Advisor, and Insurance Advisor participate on Risk Resolution Team as appropriate.

<sup>2</sup> As appropriate, EPCM Contractor participates on LCP Risk Resolution Team and as a Sub-Project Risk Register Lead and as Risk Owner.

## 10.0 Assessing and Prioritizing Risks

### 10.1 Determining Preliminary Risk Rankings

The Sub-Project Risk Register Lead, with assistance from the NE-LCP Project Risk Coordinator (EPCM Consultant Risk Manager for EPCM Consultant-led sub-project risk registers) and other members of the sub-project team as appropriate, will assess the likelihood of occurrence and the potential consequence(s) of each risk on the sub-project risk register. There are six categories used for potential consequences:

- People (Occupational Health and Safety)
- Environmental (Physical)
- Capital Cost

- First Power Target Date
- Product Quality (Availability, Reliability, and Performance)
- Reputation / Image

Each risk's likelihood of occurrence combined with its potential consequence(s) produces a first-cut priority ranking for the risk (Critical, Serious, Moderate, or Low). The [Project Execution Risk and Uncertainty Ranking Matrix](#), document [MSD-RI-002](#), provides additional details on this ranking process and is intended to be used in the evaluation of all project risks, including by the EPCM consultant.

Nalcor Area or Scope Managers will validate all first-cut rankings for risks related to their areas of responsibility.

## **10.2 Develop List of Key Risks to be Overseen by Risk Resolution Team / LCP Executive Committee**

A critical aspect of Nalcor's [Risk Management Philosophy](#), reference document [MSD-RI-004](#), is the Risk Resolution Team (with involvement from the LCP Executive Committee as appropriate) managing a select number (approximately 15-20) of complex risks which provide the greatest exposure for the Project. The 15-20 Key Risks to be overseen by the Risk Resolution Team are selected from all of the risks on all sub-project risk registers as well as the risks on the Decision Gate 2 Strategic Risk Frames, reference document [Gate 2 Project Risk Analysis LCP-PT-MD-0000-RI-RP-0001-01](#). The NE-LCP Project Risk Coordinator has responsibility for facilitating the Key Risk selection process with the Risk Resolution Team.

## **10.3 Risk Assessments (Tactical-Risk, Strategic-Risk and Time-Risk Analyses)**

The NE-LCP Project Risk Coordinator has primary responsibility for developing a schedule for Risk Assessments (Tactical-Risk, Strategic-Risk, and Time-Risk analyses) to evaluate risks at the sub-project and total project levels. It will often be desirable to have early "baseline" Risk Assessments (i.e. Decision Gate 2 risk assessment) to be updated later at appropriate stages.

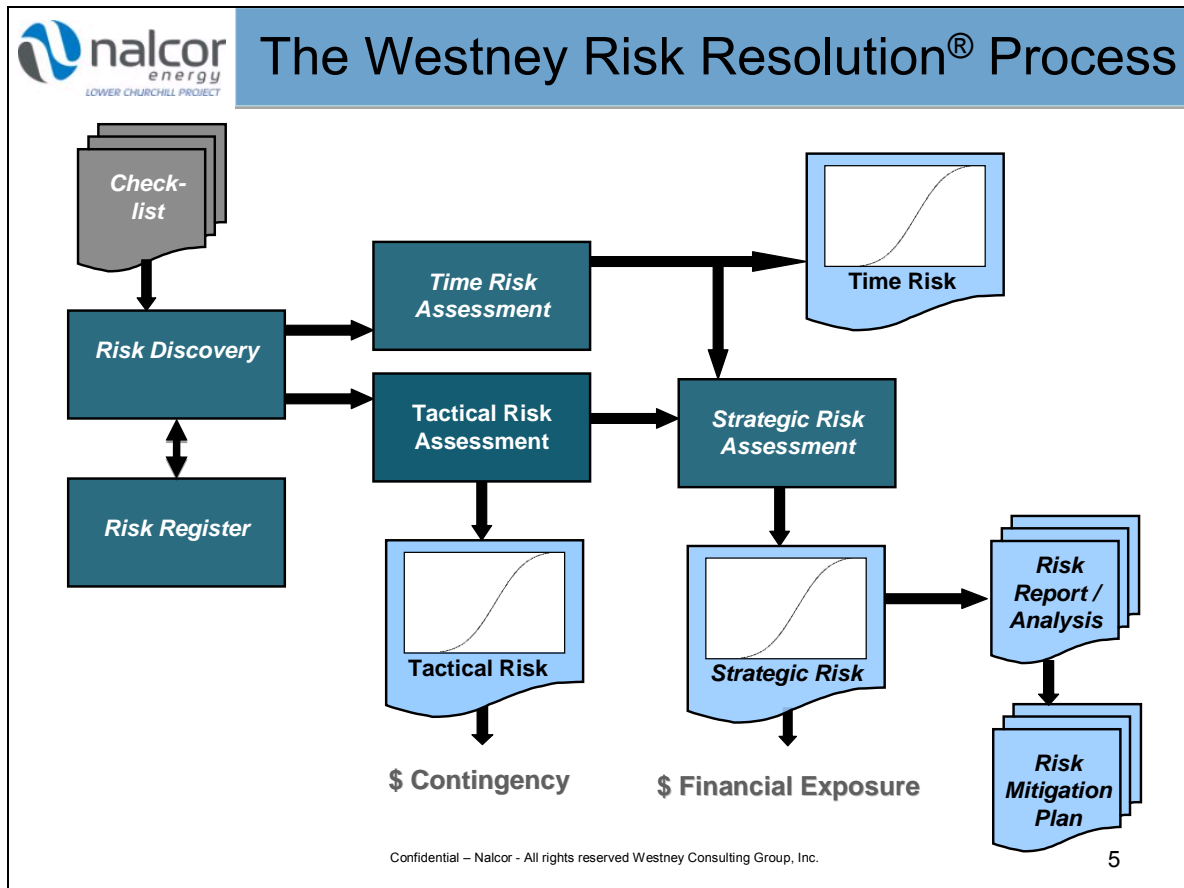
The NE-LCP Project Risk Coordinator, working with the Risk Advisor (Westney Consulting Group), will facilitate the discovery (document review and interviews) and workshop discussions associated with the Risk Assessments. It is intended that a broad range of project knowledge holders participate in the discovery process and Risk Workshops. Nalcor's Strategic Risk Frames will be used to describe the attributes of each Key Project Risk.

The Risk Advisor (Westney) will be responsible for performing the analysis and creating reports to document findings. The analysis, including Monte Carlo-type simulation techniques, will be structured to gain insights on important issues identified by Nalcor; these issues may pertain to

individual risks or groups of risks. Risk Assessments may consider both the impact of risks as well as the impact of potential mitigations. The Risk Assessment results are carefully considered in the determinations of both project contingency and management reserve levels (reference [Project Controls Management Plan](#), document [LCP-PT-MD-0000-PC-PI-0001-01](#)).

The Risk Assessment process is illustrated in Figure 8 below.

**Figure 8: Westney's Risk Assessment Process**



#### 10.4 Health, Safety and Environmental Risk Assessments

As deemed required, focused health, safety and environmental risk assessments (e.g. HAZIDs, HAZOPs, etc.) will be undertaken. Details on the process for undertaking these specific risk assessments can be found in [Health and Safety Management Plan LCP-PT-MD-HS-PL-0001-01](#) and [Environmental Management Plan LCP-PT-MD-EV-PL-0001-01](#).

Depending on the relevant risk ranking, a health & safety or environmental risk may become a Key Risk.



## 10.5 Confirm List of Key Risks based upon Gathered Intelligence

On a regular basis, the NE-LCP Project Risk Coordinator will facilitate reviews with the Risk Resolution Team to confirm that the list of Key Risks is current based on discussions in management meetings, information gathered from Risk Assessments, or other new intelligence. The LCP Project Risk Coordinator will update the list of Key Risks as appropriate.

## 10.6 LACTI Chart for Assessing and Prioritizing Risks

| <u>Description of Activity</u>   | LCP Executive Committee | LCP Project Director | LCP Risk Resolution Team <sup>1</sup> | LCP Project Risk Coordinator | Sub-Project Risk Register Lead | Risk Owner | Risk Advisor (Westney) | EPCM Consultant General Proj. Mgr. <sup>2</sup> | EPCM Consultant Risk Manager <sup>2</sup> | Nalcor ERM Committee LCP Rep. | LCP Change Mgt. Coordinator |
|--|-------------------------|----------------------|---------------------------------------|------------------------------|--------------------------------|------------|------------------------|---|---|-------------------------------|-----------------------------|
| Conduct Preliminary Risk Rankings  | I                       | A                    | I                                     | C                            | L                              | C          | T                      | I   | C   |                               |                             |
| Develop List of Key Risks to be Overseen by Risk Resolution Team / LCP Executive Committee   | C                       | A/C                  | C                                     | L                            | C                              | C          | T                      | C   | C   | I                             |                             |
| Determine Schedule for Risk Assessments (Tactical-, Strategic-, and Time-Risk Assessments)   | I                       | A                    | C                                     | L                            | C                              | C          | T                      | C   | C   |                               |                             |
| Conduct Risk Assessments (including discussion and evaluation of key individual risks)   | C                       | A                    | C                                     | L                            | C                              | C          | T                      | C   | C   |                               |                             |
| Update Lists of Key Risks based on Intelligence Gathered from LCP Executive Committee, Risk Resolution Team, Risk Workshops, Contractors, and General Surveillance | C                       | A                    | C                                     | L                            | C                              | C          | T                      | C   | C   | I                             | C                           |

### Legend:

- L** LEADS - Who leads the activity
- A** ACCOUNTABILITY - Who has accountability for the activity
- C** CONSULTED - Who needs to be consulted during the activity
- T** TECHNICAL - Who provides technical input on the activity
- I** INFORMED - Who should be informed, but is not actively participating in the activity

<sup>1</sup> Financial Advisor, Legal Advisor, and Insurance Advisor participate on Risk Resolution Team as appropriate.

<sup>2</sup> As appropriate, EPCM Contractor participates on LCP Risk Resolution Team and as a Sub-Project Risk Register Lead and as Risk Owner.

## **11.0 Addressing Risk**

### **11.1 Developing and Implementing Response Plans to Address Key Risks Overseen by Risk Resolution Team**

The Risk Owner for each Key Risk has the primary responsibility for developing the Response Plan for that risk. The Response Plan will detail the recommended strategy for managing the risk (i.e., avoidance, mitigation, allocation, or acceptance). The Risk Owner will consult with members of the Risk Resolution Team as appropriate when developing the Response Plan. Findings from Risk Assessments should also be used to help shape the Response Plans. Nalcor Key Risk Frames (see Attachment B.1) are used to structure the Response Plans.

The NE-LCP Project Director will approve each Response Plan or, when required, seek higher-level approval for the Response Plan. The Risk Owner for each Key Risk will be responsible for leading the implementation of the Response Plan.

### **11.2 Developing and Implementing Action Plans to Address Project Risks on Sub-Project Risk Registers**

The vast majority of risks are not elevated to Key Risk status, and they continue to reside on the sub-project risk registers; Action Plans are used to manage these Project Risks. The Risk Owner for each Project Risk has the responsibility for developing that risk's Action Plan, as per Attachment B.2. The Risk Owner will be responsible for consulting the Sub-Project Risk Register Lead and other resources as appropriate in developing the Action Plan.

The applicable Nalcor Project Manager (or delegate) will approve each Action Plan. The Risk Owner for each Project Risk will be responsible for leading the implementation of the Action Plan.

### **11.3 Addressing Risks through the Procurement Process**

Another important aspect of the Project's Risk Management Philosophy is effectively using the procurement process to address risks. Area or Scope Managers (or delegates) will work with the contracts coordinator/specialist and the Sub-Project Risk Register Leads to develop a risk inventory for each contract package.

The procurement strategy for each contract package will then consider the optimal risk brokering for the identified risk inventory. The NE-LCP Project Risk Coordinator is responsible for working with the contracts coordinator/specialist to facilitate any required risk brokering reviews and approvals.

For further details, reference the [Procurement Management Plan LCP-PT-MD-PR-PL-0001-01](#).

#### 11.4 Project Insurance Procurement

The Insurance Advisor (broker) will act as the technical advisor during the procurement of the Project's insurance program, which entails a thorough understanding of the project and its associated risks discovered throughout the application of this Management Plan. Details on the strategy for placement of the Project's insurance program are contained within [Insurance Philosophy MSD-LE-001](#).

#### 11.5 LACTI Chart for Addressing Risks

| <u>Description of Activity</u>  | LCP Executive Committee | LCP Project Director | LCP Risk Resolution Team <sup>1</sup> | LCP Project Risk Coordinator | Sub-Project Risk Register Lead | Risk Owner | LCP Supply Chain Management | LCP Business Services Manager | Nalcor Insurance Advisor | Risk Advisor (Westney) | EPCM Consultant General Proj. Mgr. <sup>2</sup> | EPCM Consultant Risk Manager <sup>2</sup> | Nalcor ERM Committee LCP Rep. | LCP Change Mgt. Coordinator |
|---|-------------------------|----------------------|---------------------------------------|------------------------------|--------------------------------|------------|-----------------------------|-------------------------------|--------------------------|------------------------|---|---|-------------------------------|-----------------------------|
| Develop and Implement Response Plans to Address Key Risks Overseen by Risk Resolution Team / LCP Executive Committee <sup>3</sup> | A/I                     | A/C                  | T/C                                   | C                            | C                              | L          |                             |                               |                          | T                      | C   | C   | I                             | I                           |
| Develop and Implement Action Plans to Address Project Risks Retained on Sub-Project Risk Registers <sup>3</sup>                   |                         | A                    | I                                     | C                            | C                              | L          |                             |                               |                          | T                      | I   | C   |                               | I                           |
| Address Risks through the Procurement Process <sup>4</sup>  | I                       | A                    | C                                     | C                            | C                              | C          | L                           |                               |                          | T                      | C   | C   |                               | I                           |
| Secure Construction All-Risk Policy   | I                       | A                    | C                                     | C                            | C                              | C          |                             | L                             | T                        | C                      | C   | C   | I                             |                             |

**Legend:**

- L LEADS - Who leads the activity
- A ACCOUNTABILITY - Who has accountability for the activity
- C CONSULTED - Who needs to be consulted during the activity
- T TECHNICAL - Who provides technical input on the activity
- I INFORMED - Who should be informed, but is not actively participating in the activity

<sup>1</sup> Financial Advisor, Legal Advisor, and Insurance Advisor participate on Risk Resolution Team as appropriate.

<sup>2</sup> As appropriate, EPCM Consultant participates on LCP Risk Resolution Team and as a Sub-Project Risk Register Lead and as a Risk Owner.

<sup>3</sup> The results of Risk Assessments should be used to help shape Response Plans (and Action Plans as appropriate).

<sup>4</sup> Supply Chain Management with the Scope or Area Manager will be responsible for developing of a contracting strategy which considers risk brokering.

<sup>6</sup> Nalcor insurance group with AON as broker will technical support for the placement of the CAR policy.

## **12.0 Monitoring and Controlling Risk**

### **12.1 Monitoring and Adjusting Response Plans for Key Risks Overseen by Risk Resolution Team**

The Risk Owner for each Key Risk will be responsible for providing a monthly update on the status of the Response Plan to the NE-LCP Project Risk Coordinator. The NE-LCP Project Risk Coordinator will issue a Response Plan Status Report, see Attachment B.3, which will be reviewed with the LCP Management Team on a monthly basis and reviewed with the Risk Resolution Team on a quarterly basis. After each quarterly review with the Risk Resolution Team, the NE-LCP Project Director will review highlights of the Response Plan Status Report with the LCP Executive Committee.

Response Plans may be adjusted based on feedback from the reviews. The NE-LCP Project Director will approve any adjustments to a Response Plan or, when required, seek higher-level approval for the adjustment.

### **12.2 Monitoring and Adjusting Actions Plans for Project Risks on Sub-Project Risk Registers**

The Risk Owner for each Project Risk will be responsible for providing a monthly update on the status of the Action Plan to the Sub-Project Risk Register Lead. All updates of Action Plans are captured in the Sub-Project Risk Registers. Each Sub-Project Risk Register Lead will prepare an Action Plan Status Report which will be provided to Project Managers and Area Managers on a monthly basis.

Action Plans may be adjusted based on feedback. The applicable Nalcor Project Manager (or delegate) will approve each Action Plan adjustment.

**12.3 LACTI Chart for Monitoring and Controlling Risks**

| <u>Description of Activity</u>  | LCP Executive Committee | LCP Project Director | LCP Risk Resolution Team <sup>1</sup> | LCP Project Risk Coordinator | Sub-Project Risk Register Lead | Risk Owner | Risk Advisor (Westney) | EPCM Consultant General Proj. Mgr. <sup>2</sup> | EPCM Consultant Risk Manager <sup>2</sup> | Nalcor ERM Committee LCP Rep. | LCP Change Mgt. Coordinator |
|---|-------------------------|----------------------|---------------------------------------|------------------------------|--------------------------------|------------|------------------------|---|---|-------------------------------|-----------------------------|
| Review (and adjust as appropriate) Response Plans to Address Key Risks Overseen by Risk Resolution Team / LCP Executive Committee | A/I                     | A/C                  | T                                     | L                            | C                              | C          | T                      | C   | C   | I                             | I                           |
| Review (and adjust as appropriate) Action Plans to Address Project Risks Retained on Sub-Project Risk Registers                   |                         | A                    | I                                     | C                            | L                              | C          | T                      | I   | C   | I                             | I                           |
|   |                         |                      |                                       |                              |                                |            |                        |   |   |                               |                             |

**Legend:**

- L** LEADS - Who leads the activity
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<sup>1</sup> Financial Advisor, Legal Advisor, and Insurance Advisor participate on Risk Resolution Team as appropriate.

<sup>2</sup> As appropriate, EPCM Consultant participates on LCP Risk Resolution Team and as a Sub-Project Risk Register Lead and as a Risk Owner.

**A.0 Activity Flowchart (Excel Format)****A.1 N/A****B.0 Attachments/Appendices****B.1 Key Risk Frame Template****B.2 Risk Action Plan Template****B.3 Key Risk Monthly Status Report – SAMPLE**



|                            |  |
|----------------------------|--|
| <b>Revised</b>             |  |
| <b>Risk #</b>              |  |
| <b>Category</b>            |  |
| <b>Current Risk Rating</b> |  |

## Risk Details

Lead

Risk Description

Specifics and Root Causes

Consequence / Impact

Early Warning Indicator of Risk Materialization

## Unmitigated / Raw Risk Exposure

Unmitigated Best Case Scenario

Basis:

Exposure \$M CDN:

Unmitigated Worst Case Scenario

Basis:

Exposure \$M CDN:

## Risk Response

Management Strategy

Action Plan



## Key Risk Frame

|         |  |
|---------|--|
| Revised |  |
|---------|--|

|        |  |
|--------|--|
| Risk # |  |
|--------|--|

|          |  |
|----------|--|
| Category |  |
|----------|--|

|                     |  |
|---------------------|--|
| Current Risk Rating |  |
|---------------------|--|

|                                  |
|----------------------------------|
| Risk Responsibilities<br>(LACTI) |
|----------------------------------|

|  |
|--|
| Unmitigated Risk<br>Rating Rationalization |
|--|

### Residual Risk Exposure Following Implementation of Risk Response

|                                     |
|-------------------------------------|
| Residual Risk Best<br>Case Scenario |
|-------------------------------------|

Basis:

Cost of Response  
\$M CDN:

Residual Exposure  
\$M CDN:

|                                      |
|--------------------------------------|
| Residual Risk Worst<br>Case Scenario |
|--------------------------------------|

Basis:

Cost of Response  
\$M CDN:

Residual Exposure  
\$M CDN:

|   |
|---|
| Residual Risk Rating<br>Rationalization |
|---|

### Risk Trend and Status Update

Risk Reference Number:

Risk Group:

WBS Reference Number:

Risk Monitor

Risk Name or Opportunity Description:

Risk Strategy:

Risk Owner:

Risk Rating: (reference Project Execution Risk and Uncertainty Ranking Martix)

Likelihood

☐ Intangible
 ☐ Rare
 ☐ Unlikely
 ☐ Possible
 ☐ Probable
 ☐ Almost Certain

Opportunity or Threat:

Potential Consequence On Project Objectives

People (OHS)

☐ None
 ☐ Insignificant
 ☐ Minor
 ☐ Moderate
 ☐ Major
 ☐ Catastrophic

Environment (Physical)

☐ None
 ☐ Insignificant
 ☐ Minor
 ☐ Moderate
 ☐ Major
 ☐ Catastrophic

Capital Cost

☐ None
 ☐ Insignificant
 ☐ Minor
 ☐ Moderate
 ☐ Major
 ☐ Catastrophic

First Power Target Date

☐ None
 ☐ Insignificant
 ☐ Minor
 ☐ Moderate
 ☐ Major
 ☐ Catastrophic

Product Quality

☐ None
 ☐ Insignificant
 ☐ Minor
 ☐ Moderate
 ☐ Major
 ☐ Catastrophic

Reputation/Image

☐ None
 ☐ Insignificant
 ☐ Minor
 ☐ Moderate
 ☐ Major
 ☐ Catastrophic

Urgency

☐ Very Low
 ☐ Low
 ☐ Moderate
 ☐ High
 ☐ Extreme

Manageability

☐ Easy
 ☐ Manageable
 ☐ Hard
 ☐ Complex
 ☐ Extremely Difficult

Originator and Discipline:

Action Due Date:

Location and Contact Details:

Date Logged:

Action Status:

Keywords:


**Risk Action Plan**

Potential Risk or Opportunity Response Plan:

Action:

Notes:



**MONTHLY KEY RISK STATUS REPORT**  
**CIMFP Exhibit P-00956**

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| ID  | Title  | Description   | Risk Response Plan   |   | Current Status  |
|-----|--|---|--|---|---|
|     |  |   | Management Strategy  | Action Plan   |   |
| 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. | <ul style="list-style-type: none"> <li>- Recognize the risks and challenges and evaluate all available opportunities as early as possible (pre Gate 2) in order to Avoid / Mitigate the risk.</li> </ul> | <ul style="list-style-type: none"> <li>- Perform due diligence with additional studies, in particular on trenching technology.</li> <li>- Engage the best consultants available in order to fully understand the subsurface conditions.</li> <li>- Complete a detailed geotechnical program for the area.</li> <li>- Understand the risk of cable loss due to icebergs and fishing activity.</li> <li>- Gather more marine data, i.e. currents, bottom survey, geotech., etc.</li> <li>- Evaluate a design with respect to spacing - also how the submarine cables in 2 different routes.</li> <li>- Identify and minimize installation difficulties.</li> <li>- Establish marine specialist capability within Nalcor.</li> <li>- Engage 2 suppliers in design competition for the preferred crossing solution and pay for it.</li> <li>- Build and test rock trenching equipment.</li> </ul> | <ul style="list-style-type: none"> <li>- Early review of available geotechnical and ocean currents is questioning the basis of the submarine cable option. Further evaluation is required.</li> <li>- Current construction schedule based upon completion of installation 1 year prior to in-service date.</li> <li>- Submarine option requires tunnel from each shore to deep water - 3-4km on Newfoundland side, 2-3 km on Labrador side.</li> <li>- Statnet final cost estimate was double their original estimate and full of caveats.</li> <li>- A seismic and drilling program in the SOBI was carried out in 2009.</li> <li>- Detailed work completed in 2009 and 2010 have facilitated a better understanding of this risk, thereby reducing the likelihood of materialization.</li> <li>- Cable crossing method decided to be Horizontal Directional Drilling (HDD) at Labrador side and Island side to get down to deeper water.</li> <li>- Cable Protection will be via rock placement.</li> <li>- Ongoing design work is focussed on selected cable crossing method.</li> </ul> |

Sample