

Lower Churchill Project

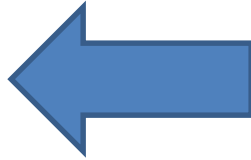
Decision Gate 3 – Independent Project Review

Final Report

August 31, 2012

TOPICS

- Background & Objectives
- The DG3 IPR Process
- DG3 IPR Findings and Observations
- Appendix
 - DG3 IPR Team
 - List of Interviewees



An Independent Project Review (IPR) enhances decision-making

- The value of an expert, “cold eyes” review of a project at key decision gates, is a well-established best practice for major projects. Key Success Factors are:
 - Team of experts with complementary areas of expertise who are not directly involved in the project
 - Short, intense effort
 - Top priority for owner and contractor management and project leads
 - Open access to key people and documents
 - Full transparency and open-mindedness both by reviewers and project participants
- Goal of IPR is to advise the decision-maker (i.e., “Gatekeeper”) of the project’s readiness to move to the next stage of the project; it is *not* an audit or validation of the design, cost estimate, project economics, or plan.
- Decision Gate (DG) 3 is particularly critical as it enables full project funding and the commitment to execute, startup and operate. The role of the IPR at this point is to help ensure that the investment decision is well-founded.

An IPR addresses the two drivers of readiness

Project Readiness

- Health & Safety Management Plans
- Regulatory and Environmental Management Plans
- Benefits Plan
- Scope definition & firmness
- Project Execution Plan
- Engineering & design definition
- Procurement & Contract Strategy
- Cost estimate basis and accuracy
- Schedule basis and accuracy
- Project Controls Plan
- Risk Management Plan
- Finance & Accounting Plan
- Operating Plan

Organization Readiness

- People
 - Ability to meet staffing requirements
 - Experience / qualifications
 - Ability to be effective
 - Plan for meeting Benefits commitments
- Work Processes
 - Appropriate for the size and type of project
 - Proven, effective, efficient
 - Conform to relevant industry best practices
- Organizational Effectiveness
 - Owner teams (i.e., Nalcor)
 - EPCM contractor teams (i.e., SNC Lavalin, Inc.)
 - Interface Management
 - Alignment & Issues Management

An IPR uses three tools for assessing readiness

- Review of work product (i.e., deliverables)
 - Completeness, quality of documentation, approvals, issued for use
 - Conformance to agreed project strategies, work processes and procedures
 - Conformance to relevant best practices
 - Fitness for purpose for the project at hand
 - Timeliness
 - Appropriate for the project's current level of progress
 - Meets the decision-maker's requirements
- Meetings, discussions, interviews with owner and EPCM management, technical, and project leads
 - All relevant functions covered, including technical, commercial, regulatory etc.
 - Reviewers use expertise and independent perspective to constructively challenge teams and validate state of readiness
- Application of external objectivity, diverse experience and executive judgment to develop findings, observations and recommendations
 - Experience with similar, past projects; key success factors and lessons learned
 - Incorporation of industry trends, latest thinking
 - Appropriate application of relevant best practices

Overview of the Lower Churchill Project (LCP) Decision Gate 3 IPR

- Scope: the Lower Churchill Project (LCP) IPR addressed:
 - Muskrat Falls Generation (MF)
 - Labrador Transmission Assets (LTA)
 - Labrador - Island Transmission Link (LITL) (includes Strait of Belle Isle (SOBI) crossing)

Note: Maritime Link and Gull Island are excluded from this IPR
- Timing: IPR conducted in August 2012 in order to be available for use in the Project Sanction decision gate 3 (DG3)
- Five person IPR team
 - Experienced in IPR process
 - Combined project experience includes global mega-projects, hydro-projects, transmission & distribution
 - Collective expertise includes project management best practices, engineering, procurement, construction, startup and operations, planning & scheduling, cost engineering, project risk management, project finance
 - Highly respected across the energy, engineering and construction industry

Comments on the LCP DG3 IPR Process

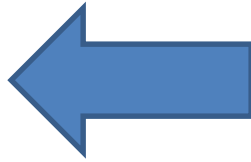
The IPR Team acknowledges with thanks the contribution of Nalcor and SNC Lavalin (SLI) management and staff in the IPR process

- All requested documents were addressed with Information Management support as needed
- IPR was clearly a top priority for all concerned; everyone made themselves available when and to the extent needed, even when follow-up meetings were required
- IPR Team observed a high level of professionalism from Nalcor and SLI; insightful answers and open discussions characterized the review

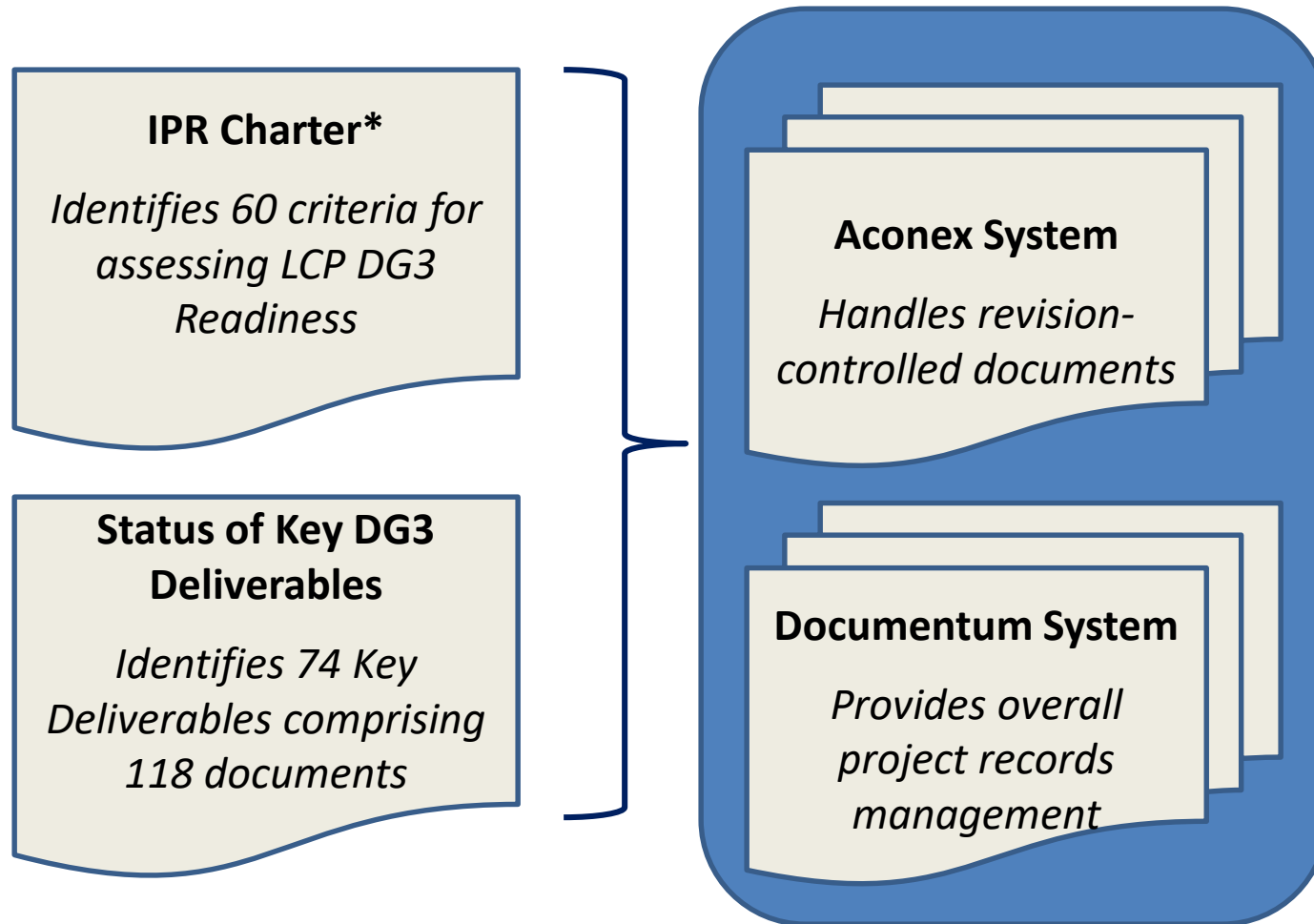
Special thanks to Mark Peddle and Samantha Lundrigan for tireless support throughout the process

TOPICS

- Background & Objectives
- The DG3 IPR Process
- DG3 IPR Findings and Observations
- Appendix
 - DG3 IPR Team
 - List of Interviewees



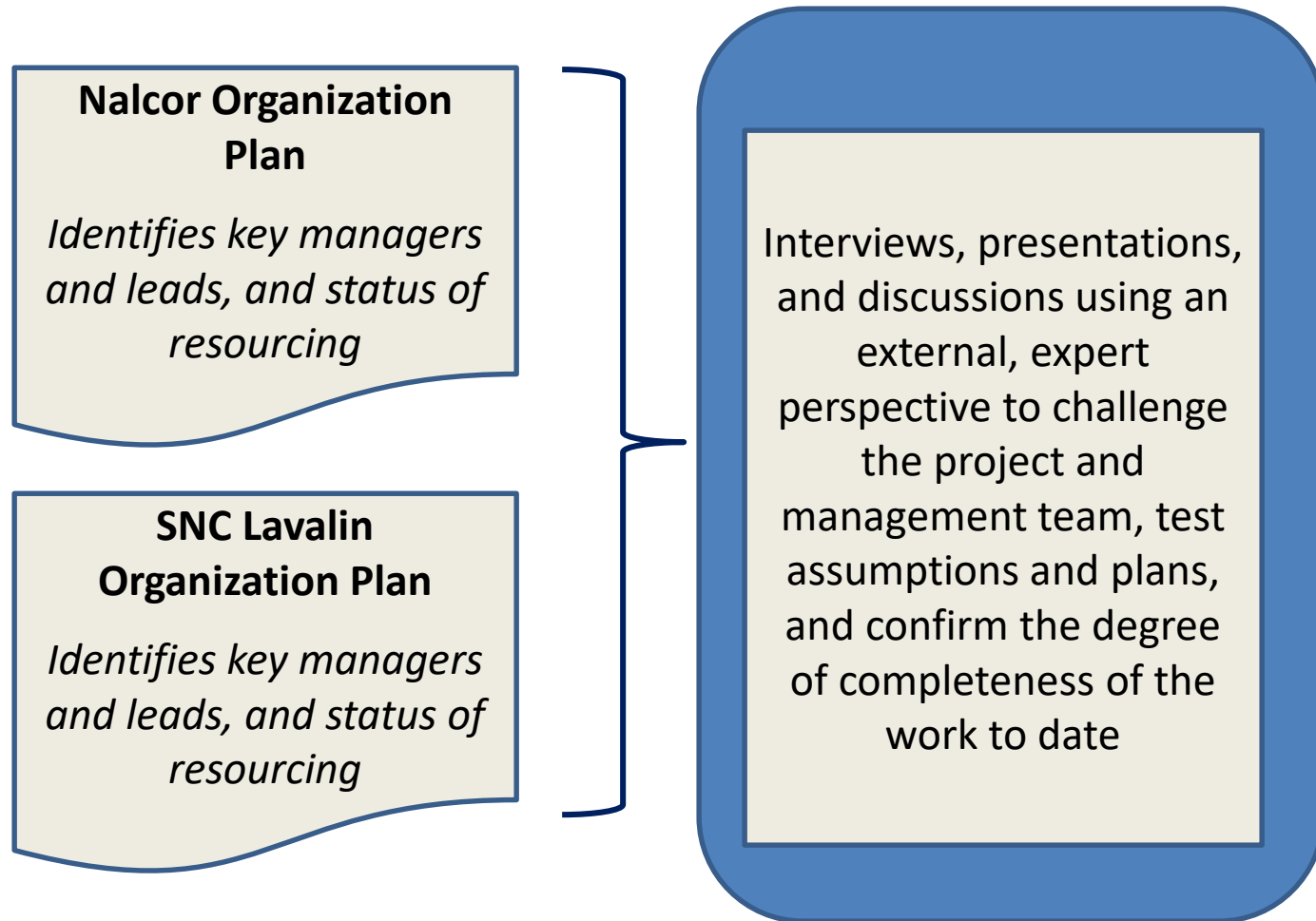
LCP DG3 IPR process for addressing *Project Readiness*



The IPR Team carefully adhered to the specific requirements of the IPR Charter, and addressed the 60 criteria in terms of process, deliverables and best practice consideration.

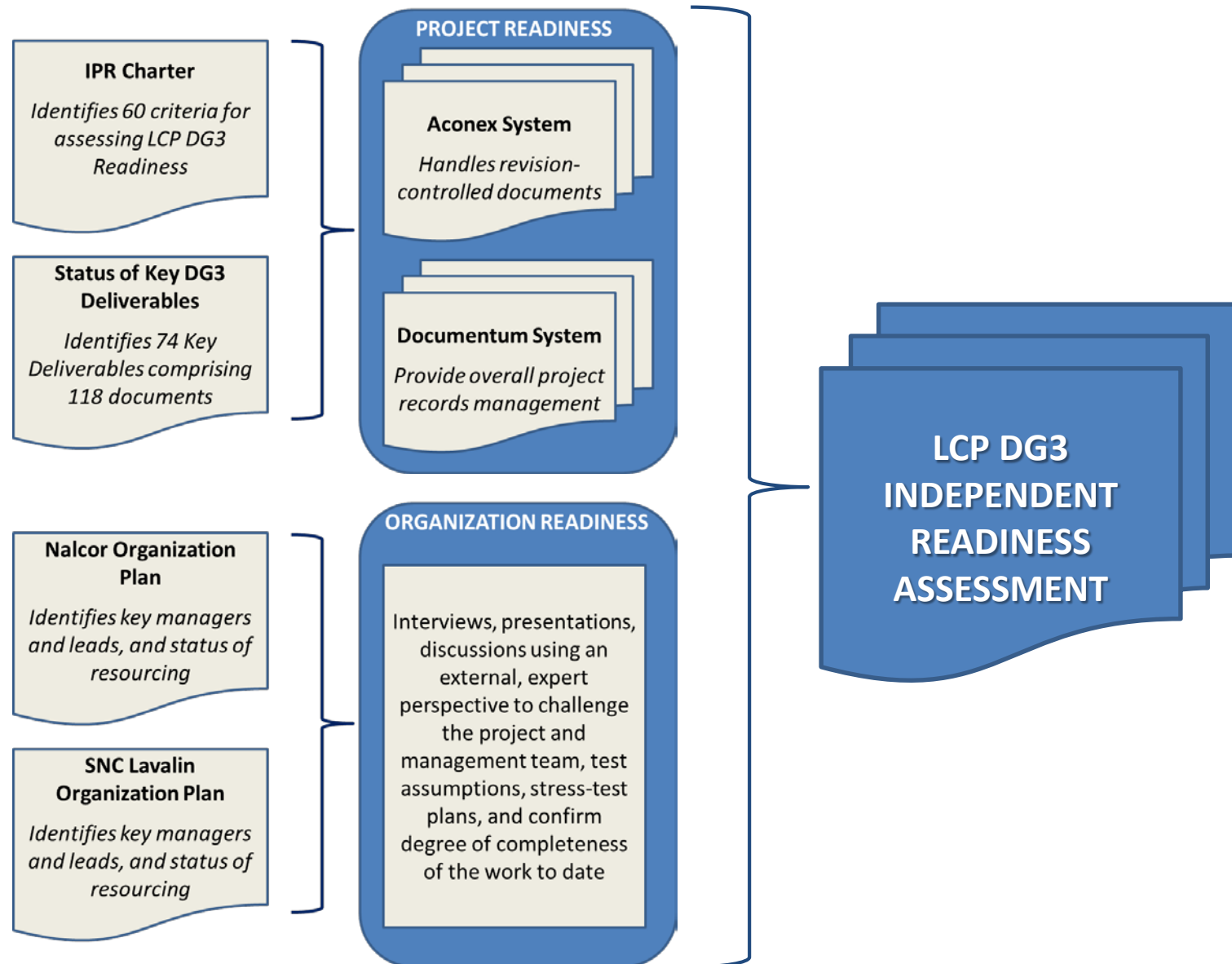
* LCP-PT-MD-0000-PM-CH-0003-01; Rev. B1, 24 Aug 2012

LCP DG3 IPR process for addressing *Organizational Readiness*



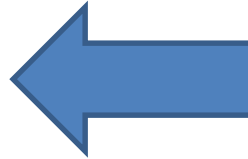
The IPR Team observed that the Nalcor and SNC Lavalin teams appeared well-aligned and open to the in-depth discussions the Review required.

Project and Organizational Readiness assessments are combined into the overall LCP DG 3 Readiness Assessment



TOPICS

- Background & Objectives
- The DG3 IPR Process
- DG3 IPR Findings and Observations
- Appendix
 - DG3 IPR Team
 - List of Interviewees



Key Messages

1. The LCP exhibits a degree of readiness for Decision Gate 3 that meets or exceeds Nalcor and industry requirements
2. The Nalcor team made excellent use of the interval between DG2 and DG3 to:
 - Significantly de-risk the project via engineering studies (such as the physical model and turbine model testing for MF, special studies of ice data to enhance transmission reliability modeling, and the SOBI pilot hole to test the efficacy of the planned Horizontal Directional Drilling program)
 - Increase value by continuing value engineering and constructability initiatives
 - Advance the engineering to improve predictability and facilitate timely award of contracts
 - Commit to critically constrained services and shop space such as provision of the specialized SOBI cable
 - Mobilize early field works (the “Early Works”) to protect schedule milestones and gain early on-site experience
 - Proactively mobilize or recruit top talent for key positions
 - Develop and continuously improve Nalcor – SNC Lavalin alignment and organizational effectiveness

Key Messages

3. Many of the deliverables required for Phase 4 (Detailed Engineering, Procurement and Construction) are not yet in the Aconex document management system or approved for use. An aggressive, focused effort to close these gaps is required.
4. The technical definition of the project is very solid; the IPR Team found no cause for concerns
5. The IPR Team finds that best practice risk analysis processes were followed that can reasonably be expected to indicate adequate and realistic cost and schedule allowances. This information will inform the Gatekeeper and the DG3 decision regarding appropriate contingencies. The Project Sanction decision is subject to other pre requisites including economic and other analysis which are underway and not yet complete, the IPR Team understands that appropriate cost and schedule allowances will be included in the Project Sanction cost and schedule.

Findings & Observations: *Project Management -Organizational Readiness (1)*

- The IPR Team has some concerns regarding the implementation of the Construction Management (CM) strategy. Experience suggests that “mature” owner organizations often find it difficult to step back into a monitoring & appraisal role, allowing the CM contractor (i.e., SNC Lavalin) to be both responsible for performing the work and accountable for the results.
 - Nalcor and SNC Lavalin have proactively addressed this concern, using such tools as alignment workshops and a step-by-step approach as major construction contracts are awarded. The IPR Team commends this approach and recommends its continued implementation be considered a Key Success Factor (KSF) going forward.
 - The IPR Team observed a very thorough, detailed and collaborative approach to developing the construction schedule; this provides a sound basis for an effective owner-CM contractor interface going forward.
- Nalcor and SNC Lavalin have dissimilar estimates for the person hours required to complete the full EPCM scope of work, and are working to develop and agree on the staffing plan that will reconcile these estimates. This process should be completed timely, and an agreed plan and budget reached.
- Best practice suggests that the person who will be administering a construction contract in the field participate in the contract preparation, review, and award process. The IPR Team recommends this practice be implemented where applicable.

Findings & Observations: *Project Management - Organizational Readiness (2)*

- Nalcor has been successful overall in staffing key engineering and project management roles, however certain areas, such as the Technical Design Integrity function, have a critical need to increase staffing.
- The IPR Team observed a high level of alignment and collaboration amongst and between the Nalcor and SNC Lavalin project leads and teams.
- The provision of engineering support to construction is a Key Success Factor and will require careful management.
- The Health and Safety Management function needs to be staffed to meet upcoming construction activity, with all required documentation finalized, approved and issued for construction before the start of bulk excavation.
- The documents for the Benefits Program need to be approved and issued. The IPR Team notes occupation skills training has been completed for 500 aboriginals and continuing high interest in LCP training opportunities has been expressed.
- Interface Management and Management of Change (MOC) functions are well positioned to proceed to the next project phase.

Findings & Observations: *Project Management - Organizational Readiness (3)*

- Environmental and Regulatory resources are in place for the next project phase.
- Information Technology and Management functions appear prepared to move into the next project phase.
- Labour relation plans appear to be well-structured for optimal productivity; position of Site Labour Manager remains to be filled.
- Quality Management plans are in place; SNC Lavalin's plans need to be approved and issued. The need for additional senior resources for Document Control has been recognized and a plan is in place to mobilize/recruit these positions.
- SOBI Project is well-planned with significant de-risking, including:
 - Cable and ship recommendations
 - Required resources and plans in place
 - Drilling risks recognized; pilot hole program significantly improves confidence
 - Required deliverables (e.g., environmental protection plans) are in place

Findings & Observations: *Project Management* - *Project Readiness*

- The following slides display the results of the IPR Team's analysis of DG3 key deliverables.
- Each DG3 deliverable was mapped to one of the IPR focus areas, and the Aconex and/or Documentum systems used to assess readiness.
- The results are displayed using the following format: Each DG3 deliverable is rated in one of three ways:
 - Meets the readiness requirements of DG3; is issued for approval, no further work required now
 - Has been developed in draft form, released for approval, but not yet approved.
 - Needs to be developed, approved and released
- For each deliverable that is not yet approved and released, color codes are used to indicate whether it is required prior to the DG3 decision (blue), or whether the project schedule permits it to take more time, such as 60 days after the DG3 decision (brown).

DG3 Deliverables Assessment – Project Management (1)

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
1		That the preparation and planning of the project including those prerequisites identified by the Gatekeeper, which may not all be directly controlled by the Project team but are key enablers of the Project, have been cleared or are at an advanced or otherwise acceptablestate of completion or readiness.			IPR concurs, based on discussions with Project Director; timing for closure is well understood.		
2		That there are adequate processes, procedures, tools, and systems in place or planned to be developed to proceed to the next Gateway Phase and that there is an adequate general understanding by the project team of these processes, procedures, tools, systems and drivers of the project.			Nalcor integrated Management System provides 25 functional focus areas; IPR id not observe any indicators of insufficient level of understanding and acceptance		
PROJECT MANAGEMENT							
3		Project Charter and PEPs are in place.					
	KD-1	Project Charter	Dec-2011	B	Needs to be updated to support Phase 4.		
	KD-11	PEP - NALCOR	Sept-2011	B	Needs to be updated to support Phase 4.		
		PEP - SLI "EPCM PEP"	June-2012	B	This is an acceptable EPCm PEP; provides Resp Alloc Matrices and points to specific procedures. Being reviewed by - need to ensure Nalcor accepts; some areas need more definition.		

DG3 Deliverables Assessment - *Project Management* (2)

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
4		That the project execution approach is clearly defined, validated and endorsed by management.			IPR Concurrs		
5		That the governance structures are established and clearly communicated for current and subsequent project Gateway Phases.					
	KD-10	Project Governance Plan			Not in Aconex		
6		That the project management system structure is developed and being implemented.			The Nalcor LCP Integrated Management System appears well thought out, in the process of being defined, and implemented. SLI has Global MM Processes and Procedures as well as PM+ system.		

DG3 Deliverables Assessment - Project Management (3)

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
7		That an organization, mobilization and supporting office plan has been developed and the organization is adequate to enter into the next Gateway Phase.			"Office Plan" not available although assessed at 90% complete. Admin Plan drafted 3/23/11 (not approved) but does address office planning. Plan should deal with both E/P functions in St John's, as well as CM. No plan in place.		
	KD 12	Nalcor LCP Org Charts			Project docs provided, latest not in system		
		SLI Project Org Charts			Project docs provided, latest not in system		
	KD-25	Gender & Diversity Plan			Draft project document provided, not in system		
	KD 28	Office Plan (replaced with Administrative Management Plan)		A	Not Approved - Title Changed - Same document number		
	KD-29	Training Plan			Draft of Workforce Preparation Training Plan provided, not in system		
	KD-32	HR Management (repl. with Team Effectiveness & Labour Relations Management Plan)	Aug-2012	A	Not Approved - Title Changed - Same document number		
	KD-33	Team Functionality			No docs to review	20	

DG3 Deliverables Assessment - *Project Management (4)*

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
8		That Construction Management and Execution Plans are in place.					
	KD 30	PM+ implementation plan			Describes how SLI will use PM+ on LCP		
	KD 44	Nalcor Const Mgt Plan	May 2012	B	Approved. Acceptable. Rated 75% complete.		
		SLI CM Plan	June-2012	A	Not Approved. Status report notes need for further alignment - note EW CM plan available		
		SLI Design/CM Plan	April-2012	A	Not Approved. Short doc, discusses constructability etc.		
	KD 49	SLI Construction Execution Plan			Covers Temp Facilities etc.. No doc to review.		
	KD-45	SLI Construction Organization Plan			No formal deliverable to review - rated 60%.		

DG3 Deliverables Assessment - *Project Management (5)*

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
9		That the 3rd party resources are available and that there is an interface management plan in place.					
	KD-35	Tech Interface Mgt Plan - Nalcor	Sept-2011	B	Approved. Addresses technical interfaces with external organizations. Very well done. Probably should be reviewed for applicability to Phase 4.		
		Tech Int Mgt Plan SLI	Sept-2011	B	Approved. similar to the Nalcor plan		
		Nalcor RFI Procedure	Feb-2012	B	Approved. documents RFI procedure		
10		That Construction Performance Management Plans are in place.					
	KD-48	Productivity Action Plan			No doc referenced in DG3 Deliverables List (Traffic Light - 15% COMP)		
11		That there are Project-wide Interface Management Plans in place.			see 9		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
12		That there is Health and Safety Management Plan and supporting policies and procedures are in- place.					
	KD-60	Nalcor H&S Plan	May-2012	B	Good document - shown as 100% complete		
		SLI H&S Plan	April-2012	B	Good document		
	KD-59	Safety by design			See Design Philosophies		
	KD-66	D&A Policy			See project documentation		
	KD-61	Nalcor ER Plan	Feb-2012	A	Not approved		
		SLI Corp ER Plan (Cancelled)	Dec-2011	A	To be removed		
		Field ER Plan	Dec-2011	A	Not approved		
	KD-62	Nalcor Security Mgt Plan			Not issued		
		SLI Site Security and Access Control Plan	Feb-2012	B	issued for use		
13		That the Project Site Safety Plan is in place.					
	KD-60	SLI Site Specific H&S Strategic Plan	July-2012	A	Need to complete this and approve		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
14		That there is an Environmental Management Plan and Regulatory Compliance Plan and supporting policies and procedures are in-place.					
	KD-63	SLI Reg Compliance Plan	Dec-2011	B	Approved		
		Nalcor Reg Compliance Plan			Need to complete		
		Generation Environmental Assessment Commitments Inventory			Need to complete		
		Regulatory Roadmap for 2011 Field Program	May-2011	A	Needs to be issued		
	KD-64	Nacor Env Mgt Strategy			9/2/10. not yet approved. Has some good info incl RACI. Need to complete and approve unless superceded .		
		SLI Env Mgt Strategy			not in system, "reserved" Need to complete		
		SLI Waste Mgt Plan	April-2012	B	Looks ok, approved for use		
		SLI Master Spill Response Plan			not issued - "may not be needed for DG3". Reserved		
		SLI Project-Wide Env Protection Plan	April-2012	B	Approved for use. Looks ok		
		SLI Contract specific EP Plan	Nov-2011	B	Approved for use. Looks ok		
	KD-65	Nalcor env effects Mgt Plan			Work in progress, contract with AMEC. Not needed.		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
15		That there is Quality Assurance Plan in place.					
	KD-18	Nalcor - Quality Manual	July-2011	B	Approved, in use. Good document		
		Nalcor - Overarching QM Plan	Feb-2011	B	Approved, in use. Good document		
		Nalcor - EPCM Coord Procedure			Addresses QM responsibilities		
	KD-19	SLI - LCP Quality Plan	Nov-2011	A	Not approved. Need to complete and implement		
		SLI - Global M&M QM Procedures			Available, very detailed. Appears adequate		
		SLI - Contractor Quality Req Spec	Oct-2011	B	In use. Good doc.		
		SLI - Supplier Quality Req for Eng Goods	Aug-2012	B	Issued for construction. Good doc.		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
16		That there is a strategy and plan in place to have Operations and Maintenance representation in the Project and that an Operations philosophy has been developed which includes responsibilities during handover and a "Ready for Operations" philosophy aligned with corporate operating philosophy.					
	KD-51	Handover/Startup Plan			No doc to review		
	KD-67	Nalcor RFO Strategy			No doc to review		
	KD-68	Nalcor Operability Reviews			various design philosophies issued ~ 2011, 2010		
	KD-69	Nalcor Sparing Philosophy	May-2011	B	In place		
	KD-71	Nalcor Completions Philosophy	Dec-2012	B	In place		
	KD-72	Nalcor DFO Strategy			Doc cancelled per Bob Barnes		
		Nalcor Directions to Contractors/Suppliers	Mar-2012	B	Issued		
		SLI Suplier Contractor Doc Reqmnts	Mar-2012	B	Issued for construction		
	KD-73	O&M Estimates			Done - Available for review		
	KD-74	Operability Stds for Equipment Selection			Docs are issued and approved for use		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
17		That the project's stakeholders are identified, an engagement plan is in-place and an appropriate level of engagement underway.					
	KD-16	Nalcor Communications and Stakeholder Relations Plan	Mar-2012	A	Not approved. Need to complete and approve		
18		That the project risks are understood and a risk management plan is in-place and being actively pursued.					
	KD-3	Nalcor Risk Mgt Plan	June-2011	B	Good doc.		
		SLI Risk Mgt Plan	Nov-2011	B	Acceptable		
		SLI LCP Risk Mgt Req for Suppliers and Contractors	Dec-2011	B	Acceptable		
	KD-6	EW Insurance			Review Policy		
	KD-7	Nalcor Insurance Philosophy	Aug-2011	B			
19		That Benefits obligations are understood and clearly communicated.					
	KD-24	Nalcor Overall Project Benefits Strategy			Not available Doc exists in working file. Need o complete and approve.		
20		That collective negotiations are progressing and support the timeline for readiness for Mass Excavation in November 2012.			IPR concurs based on interviews with Business Manager.		
					see 21		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
21		Labour Relations Plan is in-place and clearly communicated.					
	KD-27	Nalcor Industrial Relations Management Plan (to be replaced by Team Effectiveness & Labour Relations Management Plan)	Aug-2012	A	Not Approved. Document to be replaced with new title		
	KD-46	Nalcor Collective Agreements (Not needed before Gate)			No documents to review		
	KD-47	SPO Designation			No documents to review (Legislation)		
22		That an Information Management plan is in place and communicated.					
	KD-23	Nalcor IM Plan	Aug-2011	B	Issued		
		Nalcor IT Mgt Plan	Feb-2012	B	Issued		
		Nalcor Admin Records Mgt Procedure	Mar-2012	B	Issued		
		IS/IT Tech Environment	Apr-2012	B	Issued		
		SLI IM Plans	May-2012	B	Issued		
		SLI IT Plan	Apr-2012	B	Issued		
23		That the Environmental Assessment Process for the Labrador-Island Transmission Link is well advanced that no showstoppers are apparent and that there is a plan to finalize the environmental activities leading up to a final decision to meet the Project schedule.			No docs to review		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
24		That a process is in-place for implementation and monitoring commitments of release under the Generation EA.					
	KD-9	Nalcor Mgt Plan for Gen. EA Commitments Inventory			Doc not avail (reserved) - there is a tracking system in Aconex		
		Nalcor Env. Mgt Plan			Doc not avail (reserved)		
25		That plans are in-place for acquisition of properties and easements as required for the construction of the transmission lines and switchyards.					
	KD-26	Nalcor Lands Acquisition Plan			No doc to review - plan is in progress, 5 person team working it		
26		That a process is in place for acquisition of regulatory permits and licenses to facilitate the construction works, and to monitor / manage conditions of use.					
		LCP Regulatory Compliance Strategy			Does not exist		
	KD-8	Nalcor Reg Compliance Plan			Number reserved - no doc to review		
		SLI Reg Compliance Plan	Dec-2011	B	Issued for use		
		Reg Communication and Site Access Protocol (EW)	June2012	B	Complete		
		Envr and Reg Compliance Requirements	Dec-2011	A	For review; need to complete		

Findings & Observations: *Technical*

- The IPR team found all technical aspects of MF, LATL, LITL to be well-defined, with no major scope or technical concerns apparent at this time.

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
TECHNICAL							
27		That the Engineering deliverables required to commence the next Gateway Phase are available and complete and support that the Project is technically well defined, the risks and uncertainties are understood.					
	KD-21	Engineering Deliverables			No docs in system; can refer to Eng Deliv Progress Reports		
					Discussions with Eng Managers (Nalcor and SLI) indicate engineering well advanced for DG3		
28		That the quality and completeness of the source data used by Project is suitable.			Many studies (geotech, bathymetric, SOBI etc) have provided extensive source data; study results available in Aconex		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
29		Confirm that the design basis is frozen and that the Project Design Basis is well documented and that there is a rigorous Management of Change process in place.					
	KD-20	Nalcor Project Change Management Plan	Dec-2011	B	Issued for use, looks ok		
		SLI Project Change Management Plan	Mar-2012	B	Issued for use, looks ok		
	KD-34	Nalcor Basis of Design	Feb-2011	B	Done for DG2, updated document awaiting approval		
	KD-36	Design Philosophies			Review list of Design Philosophies in Aconex		
	KD-37	Technology Selection			Basis of Design - Review list of Design briefs in Aconex		
	KD-38	Design Criteria			Basis of Design - Review list of Design Criteria in Aconex		
	KD-40	Bulk Material Specifications			Available in Aconex		
	KD-41	Plot Plans, SLDs, Gas			List of key drawings to support the DG3 estimate		
					Also many systems studies have been completed		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
30		That there is a process to monitor Engineering/Design quality and performance, including design audits.					
	KD-17	Nalcor Eng Mgt Plan	Aug-2011	B	Issued for use		
		SLI Design Verification Plan	Apr-2012	B	Issued for use		
		SLI Eng Mgt Plan	Apr-2012	B	Issued for use		
31		That there are plans in place for Engineering support to construction.					
	KD-31	Engineering Workplan			Can be found in Eng. Deliverables, SLI Design Verification Plan, SLI Audit Plan		
32		That there has been constructability reviews of the design.					
	KD-50	Constructability Reviews on Design			Reviews conducted and		
33		That value-engineering initiative have been given consideration during the design process, including life-cycle cost assessment for equipment selection.					
	KD-22	Lessons Learnt, VIP Reviews			Reviews conducted and documented in project files		
		Nalcor Lessons Learned procedure	Dec-2012	B	Issued for use		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
34		That design and engineering resources are sufficient to meet the schedule requirements.			Nalcor and SLI engineering leads indicated key roles have been filled; need to bolster Tech. Integrity Team as design progresses.		
35		That site geotechnical surveys are complete to support engineering and construction.					
	KD-42	Geotech Baseline Report	Aug-2012	A	Hatch study, in review		
		HVdc Geotech Baseline Report	Apr-2012	B	Issued for use		
		HVac Geotech Baseline Report	Mar-2012	A	In review		
36		That there is a process being used to verify design integrity, including the use of peer reviews.					
	KD-68	Operability Reviews			Reviews conducted and documented in project records		
	KD-70	Life Cycle Value Analysis Reviews			Reviews conducted and documented in project records		
		Nalcor Life Cycle Cost Design Philosophy	Dec-2010	B	Issued for use		

Findings & Observations: *Procurement & Contracting*

- The IPR Team assessed the Procurement and Contracting functions and deliverables to be appropriate to DG3.
- The need for additional SNC Lavalin Procurement and Contracting resources has been recognized for home office and site. The IPR Team observed that the success of the Procurement and Contracting team depends on the timely receipt of engineering documents which requires completion of the staffing of the Nalcor Technology Design Integrity team.

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
37		That a Master Document Register is in-place and used by the team to confirm the technical documents that must be reviewed.			see 22		
38		That there are processes in-place and being used to effectively manage interfaces between the Project and Newfoundland & Labrador Hydro, Churchill Falls, and Emera.			see 9		
PROCUREMENT/CONTRACTING							
39		That the development of the Project Contracting Strategy was carried out in accordance with a defined process and that this complies with the appropriate standards, best practices or equivalent and the contracting plan.					
	KD-5	Nalcor Overarching Contracting Strategy	Feb-2012	B	Issued for use. Very good document		
		SLI Contract Plan	Feb-2012	B	Issued for use.		
40		That the project contract strategy has incorporated sufficient market intelligence to make it feasible from a legal, insurance and execution perspective.			see 39		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
41		That there is an approved Package Dictionary in-place that is supported by a detailed procurement and contracting schedule that supports the targeted First Power dates of June 2017					
	KD-39	Package Dictionary	Apr-2012	B	Issued for use. Very good document		
		CPN report (Commitment Package Schedule Status report)			Good working document; issued weekly		
	KD-43	Package Dictionary			See above		
	KD-52	Package Dictionary			See above		
	KD-56	Procurement Schedule			Commitment Package (CPN) report from PM+ download - not reviewed		
42		That the scope of work for Gateway Phase 4 is defined and that there is a process available for bidding, review and contract award and that this complies with best practice standards or equivalent.					
	KD-53	Procurement Management Plan	feb 2012	B	Issued for use		
		Overall Purchasing Plan	feb 2013	B	Issued for use		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
43		That individual procurement and contracts package plans are in place to ensure timely awards.			See 41 (package dictionary & CPN report)		
					Contracts for roads, const.		
	KD-57	MF Infrastructure Contracts			No doc found - see CPN for details of contracts		
44		That long lead and critical equipment and materials have been identified.			See 42		
	KD-55						
45		That there is a clear understanding of Owner approvals requirements, including due diligence / third party reviews by lenders engineers, co-ventures, etc.					
					See 58		
	KD-13	Financial Stewardship			RFI process in place for use by lenders engineer and other stakeholders		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
46		That vendor document and data management plan is in place.			See 22, 15		
47		That procurement/contracting resources are in place to meet the schedule requirements.			See 7		
					Home office and site resources have been identified and in process of mobilization		
48		That plans are in place to provide sub-contract administration support to construction.					
	KD-54	Contract Administration Plan	June-2011	B	Approved		
		Change Control Plan	Apr-2012	B	Approved		
	KD-58	Logistics Plan	Feb-2012	B	Approved		
		SLI Logistics study (See Mommoth Study)	Jan-2012	A	Not approved		

Findings & Observations: *Project Controls*

- The proactive management of project cost, resources, and time, is a Key Success Factor, and presents significant challenges on a mega-project. Nalcor and SNC Lavalin have recognized this, and placed a high priority on ensuring that a competent project controls organization is in place.
- The IPR Team provides the following findings and **observations** concerning the use of Management Reserve and Schedule Reserve to account for the strategic project risks associated with mega-projects such as LCP.
 - Nalcor LCP management team has long recognized the extensive and very public track record of large infrastructure mega-project risks and the need to account for their potential impact on project cost and schedule.
 - Front End Loading and pro active risk management has been a key feature of Nalcor's work leading up to DG3.
 - The size of these mega-projects increases their potential exposure to external risks such as regional and global economic conditions, market trends, changing governmental regulations, limits on resource availability, and declining global construction productivity. The LCP Project Execution and Project Risk Management Plans consider the appropriate use of Management Reserve and Schedule Reserve for this purpose.
 - Nalcor's decision gate process defines DG3 deliverables that include appropriate Risk Analyses and the Nalcor team has invested considerable effort in these analyses which have included the quantification of ranges of Project and other cost and schedule contingency and reserves.
 - The Nalcor team has been careful to align the project cost estimate and detailed schedule; the IPR Team recommends that this consistency be maintained in the use of risk analysis results.
 - The IPR Team concurs with the expectations set by the LCP Project Execution and Risk Management Plans that adequate provisions for Management Reserve and Schedule Reserve be recognized in the Project Sanction decision making process.

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
PROJECT CONTROLS							
49		That the Project Sanction AFE has been prepared in accordance with a defined process and that this process complies with the appropriate standards, best practices or equivalent.					
	KD-2	SLI Cost Estimate Report			Document exists, meets requirements, not in Aconex		
		SLI DG3 Capital Cost Estimate Basis of Estimate			Document exists, meets requirements, not in Aconex		
					Associated Nalcor docs		
50		That the project estimate has been recast into the Project Control Budget.			In process		
51		That the processes and methods used for Risk Analysis comply with appropriate standards, best practices or are equivalent.					
	KD-4				Risk procedures is well documented		
					Risk Analysis, not in Aconex		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
52		That adequate and realistic cost and schedule allowances have been determined and included in the Project Sanction costs and schedules and appropriate range of accuracy has been determined.					
		Risk Analysis			See 51		
53		That a project cost control process is in place.					
	KD-15	Project Controls Management Plan	Mar-2011	B	Approved		
		LCP Cost Management Plan	Mar-2012	B	Approved		
		Schedule Development and Control Plan	June-2012	B	Approved		
		LC PM+ Implementation Plan	May-2012	B	Approved		
54		That the Project Schedule has been developed in accordance to an agreed process and identifies the critical path and the correct sequence of key events.			See 53		

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
55		That the Project Reporting Plan is in place, with accurate and timely stewardship reporting occurring.			See 53		
					Referenced in Project Controls Mgmt Plan		
56		That the Project Benefits Reporting system is in-place or plans are in-place for full implementation.			See 19		
57		That the demand for labor is understood and considered in on-going collective agreement negotiations.			See 21		
					Collective agreement negotiations in progress		

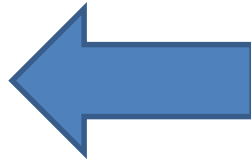
Findings & Observations: *Finance & Accounting*

- The IPR Team observed that the F&A plans are in place and in use, and that the interfaces with Nalcor corporate and SNC Lavalin are well-understood.

Number	DG3 Reference	IPR Charter Focus Area	Date	Status	Comments	Req'd for Gate	Req'd < 60 days post Gate
FINANCE & ACCOUNTING							
58		That the approaches and strategies project financial management are in-place, including appropriate processes and controls to effect financial stewardship of the Project AFE.					
	KD-13	Capital Expenditure Authorization Procedure	Mar-2012	B	Approved		
		Project Financing & Accounting Management Plan	Apr-2012	B	Not Approved		
		Invoicing and payment Plan	Aug-2012	B	Approved		
					Other relevant docs include Cost Allocation Principles which are approved		
59		That the project finance and accounting activities have a clear linkage with the Project Controls, treasury and corporate accounting functions.			See 58		
60		That the processes and systems are in place to facilitate accurate financial reporting for each Sub-Project or Special Purpose Vehicle.			See Finance & Accounting docs in Integrated Mgt System		
NOTES: IPR team assumes all documents associated with a Key Deliverable should be revision-controlled and in the Aconex system							
KEY to STATUS CODES: "A" = issued for comment and review; "B" = approved and issued for use							

TOPICS

- Background & Objectives
- The DG3 IPR Process
- DG3 IPR Findings and Observations
- Appendix
 - DG3 IPR Team
 - List of Interviewees



LCP IPR Team



IPR Team Leader
Derek Owen
P.Eng., C.Eng, F.I.Mech.E.

- >40 years major project experience
- Founded RDO Consulting Ltd. In 2002
- 20 years East-Coast Canada projects
- Life Member, Association of Professional Engineers of Nova Scotia, Fellow Institution of Mechanical Engineers UK, Chartered Engineer UK
- B.Sc Nottingham University

Engineering & Operations
John Mallam
P.Eng.



- > 30 years electric utility experience with Nalcor, member of leadership team as VP of Engineering Services
- >25 years R&D through Canadian Electrical Association
- Member Association of Professional Engineers & Geoscientists of Newfoundland and Labrador
- B.Eng. Memorial University

Transmission Eng. & Construction
Tim Leopold
P.Eng



- 29 years electric utility experience – Nova Scotia Power; engineering, project, and management positions
- Chair of the Transmission Council of the Canadian Electrical Association; Task Forces on Coordinated Operations & Planning
- BSc St. Mary's University, Tech.University of Nova Scotia

Hydro-Electric Power Eng. & Construction
Bernie Osiowy
P.Eng.



- >40 years major project experience focusing on Canadian hydro – generation with Manitoba Hydro.
- Represented Manitoba on the Split Lake Cree Resource Management Board
- Member Association of Professional Engineers & Geoscientists of Manitoba
- BSc University of Saskatchewan

Project & Risk Management
Richard Westney
PE, PMP



- >40 years major project experience
- Founded Westney Consulting Group in 1978
- Author of 5 books on project and risk management
- Past President, Fellow and Award of Merit; AACE Int'l.
- BS City College of New York, MS Rensselaer Polytechnic Inst., Harvard Business School

Interviewees (1/3)

Topic	Nalcor	Title	SLI	Title
Kickoff	G. Fleming	Marine Crossings Project Manager	N. Bechard	General Project Manager
	R. Power	General Project Manager MF, LTA and LITL		
	J. Kean	Deputy Project General Manager		
	L. Clarke	Business Services Manager		
Project Strategy	P. Harrington	LCP Project Director		
Project Management - Overall	R. Power	General Project Manager MF, LTA and LITL	N. Bechard	General Project Manager
Project Management - Muskrat Falls Generation (MF)	S. O'Brien	Project Manager Muskrat Falls Generation	A. Hanna	Project Manager Hydro Component 1
Project Management - Labrador Transmission Assets (LTA)	D. Debourke	Project Manager HVdc Specialties and Switchyards	L. Chausse	Project Manager DC Specialties Component 3
Project Management - Labrador Island Transmission Link (LITL)	K. Tucker	Project Manager Overland Transmission	A. Hussain	Project Manager Transmission Component 4
Quality / Document Control	D. Green	Quality Assurance Manager	K. Morrison	Quality Assurance Manager
			S. Guerette	Project Controls Manager
Information Management	G. Marshall	IS/IT Supervisor	R. Cumming	Information Systems Manager
Interface Management / MOC	S. Gillis	Change and Technical Interface Coordinator	JD. Tremblay	Interface Manager & Risk Coordinator
			S. Guerette	Project Controls Manager
Stakeholder Management	K. O'Neill	Senior Communication Specialist		
	D. Dalley	VP Corporate Relations		
Health & Safety	D. Riffe	H&S Manager	S. Lee	H&S Manager

Interviewees (2/3)

Topic	Nalcor	Title	SLI	Title
Environment & Regulatory	M. Organ	Environmental and Regulatory Compliance Lead		
	P. Madden	Environmental and Regulatory Compliance Specialist		
Benefits	M. Moran	Benefits and Training Lead	A. Perrot	SLI Commitments Lead
Labour Relations	L. Clarke	Business Services Manager		
Operations and Maintenance	B. Barnes	TDI/RFO Manager		
	R. Henderson	Manager System OPPS and Customer Service		
Construction Management - General	R. Power	General Project Manager MF, LTA and LITL		
	J. Kean	Deputy Project General Manager		
Construction Management - MF, LTA, LITL	S. O'Brien	Project Manager Muskrat Falls Generation	G. Savard	Construction Manager Hydro
	M. Dykeman	Early Works Construction Manager	C. Daneau	Construction Manager
	K. Tucker	Project Manager Overland Transmission		
Engineering Management - Muskrat Falls Generation (MF)			G. Snyder	Engineering Manager Hydro
Engineering Management - Labrador Transmission Assets (LTA)			S. Sud	Engineering Manager DC Specialities
Engineering Management - Labrador Island Transmission Link (LITL)			H. Bakhshi	Lead Engineer Transmission Lines

Interviewees (3/3)

Topic	Nalcor	Title	SLI	Title
Technical Integrity	B. Barnes	TDI/RFO Manager		
	D. Brown	Civil Lead		
	R. Kaushik	Electrical Lead		
	B. Besaw	Mechanical Lead		
	J. Walsh	Transmission Lead		
Procurement and Contracting	P. Hussey	Supply Chain Manager	E. Over	Procurement Manager
Project Controls	D. Pardy	Project Controls Lead	S. Guerette	Project Controls Manager
	T. Scott	Senior Project Planner	G. Chehab	Lead Cost Controller
	J. Robertson	Senior Cost Engineer		
Estimation and Risk	J. Kean	Deputy Project General Manager		
	S. Goulding	Business Analyst		
	D. Pardy	Project Controls Lead		
	P. Harrington	LCP Project Director		
Finance and Accounting	G. Cahill	Project Controller (Acting)		
	M. Bradbury	General Manager Finance		
Project Financing	D. Sturge	VP Finance and CFO		
	J. Meaney	Team Lead Financing		
Insurance	M. Leonard	Treasury, Risk & Insurance Management		
	L. Clarke	Business Services Manager		
Straight of Belle Isle	G. Fleming	Marine Crossings Project Manager		
	S. Follett	Offshore Area Manager		
	B. Budgen	Onshore Area Manager		
	C. Freake	Area Planner - SOBI		