

From: pharrington@lowerchurchillproject.ca
To: jamesmeaney@nalcorenergy.com
Cc: [Auburn Warren](#); [Derrick Sturge](#); [Gilbert Bennett](#); [Lance Clarke](#); [Peter Madden](#); [Rob Hull](#); [Martis Xeno](#)
Subject: Re: URGENT: Canada/CBB Memo for Nik/MWH on IE Report
Date: Wednesday, November 20, 2013 12:15:32 PM
Attachments: [_ong](#)
[20131120120126.pdf](#)

Jim

I attach my comments which broadly fall into a few categories

1 Factually incorrect - eg the AACEI estimate accuracy range for a Class 3 estimate is incorrect and that pops up four of five times, Page 226 is particularly troubling with the \$5b to \$8B range quoted however if you apply the +10 and -10% ranges then it comes down to \$5.6B to \$6.8B range of outcomes..... the comment on Page 151 regarding our wage rates is not correct

2 Redundant Commentary - eg the SLI legal issues - has no place here ...also page 41 para on SNC_L authority is superceded by the integrated organizational model

3 Astaldi - MWH are in a conflict with this the S American projects they claim to have been the Owners Engineer is incorrect - the Chacayes Project they were the detailed design engineer contracted to Astaldi , Hatch was the Owners Engineer and that Project won Hydro Project of the year in 2012 and also environmental awards so how MWH can say that they had a bad environmental performance and overall failure beats me. All specific comments to Astaldi and extra vigilance are uncalled for - I have no problem with MWH being generic in commentary, saying that "nalcor should take appropriate Project management oversight of key contractors based on the level of actual or perceived risk"

4 Schedule - I agree with CCB comments here - The MWH/nalcor contract states that MWH shall review the Project Schedules and determine if they are reasonable and take into account the engineering, procurement, construction, commissioning and startup appropriately - not to critique our scheduling principles that we require the Contractors to do the detailed scheduling of their own work - MWH are outside of their mandate and contract scope here and are on a philosophical mission



20131120120126.pdf

Paul Harrington

Project Director

PROJECT DELIVERY TEAM

Lower Churchill Project

t. 709 737-1907 c. 709 682-1460 f. 709 737-1985

e. PHarrington@lowerchurchillproject.ca

w. muskatfalls.nalcorenergy.com

This email communication is confidential and legally privileged. Any unauthorized reproduction, distribution or disclosure of this email or any attachments is strictly prohibited. Please destroy/delete this email communication and attachments and notify me if this email was misdirected to you.

James Meaney---11/20/2013 11:25:50 AM---Paul/Gilbert/Lance, See below and attached. As discussed, we need to get our comments out tonight as

From: James Meaney/NLHydro

To: Paul Harrington/NLHydro@NLHydro, Gilbert Bennett/NLHydro@NLHydro, Lance Clarke/NLHydro@NLHydro,

Cc: Derrick Sturge/NLHydro@NLHydro, Rob Hull/NLHydro@NLHydro, Auburn Warren/NLHydro, Martis_Xeno <xmartis@fasken.com>, Peter Madden/NLHydro@NLHYDRO

Date: 11/20/2013 11:25 AM

Subject: URGENT: Canada/CBB Memo for Nik/MWH on IE Report

Paul/Gilbert/Lance,

See below and attached. As discussed, we need to get our comments out tonight as well. To the extent ours align with / address Canada/CBB's comments that might be helpful.

If you think it would be worthwhile for us to get together this afternoon on this, I can come over to Torbay Rd. Let me know.

Jim



James Meaney, CFA
General Manager Finance
Nalcor Energy - Lower Churchill
Project
t. 709 737-4860 c. 709 727-5283 f.
709 737-1901
e.
JamesMeaney@nalcenergy.com
w. nalcenergy.com
1.888.576.5454

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

----- Forwarded by James Meaney/NLHydro on 11/20/2013 11:16 AM -----

From: "Manzer, Alison" <amanzer@casselsbrock.com>

To: David Pyper <dpyper@blairfranklin.com>, "JamesMeaney@nalcenergy.com" <JamesMeaney@nalcenergy.com>, "Kapoor, Anoop" <Anoop.Kapoor@NRCan-RNCan.gc.ca>, "Krupski, Joseph" <Joseph.Krupski@NRCan-RNCan.gc.ca>, "Newman, Charles" <CNewman@CasselsBrock.com>, John Medland <jmedland@blairfranklin.com>, "Anne Boudreau" <anne.boudreau@ic.gc.ca>, "Lazarus, Rhonda" <Rhonda.Lazarus@justice.gc.ca>

Date: 11/20/2013 10:57 AM

Subject: Memo for Nik - MWH - re report next steps [IWOV-Legal.FID1640195]

As instructed I have asked Nik for a call/ meeting to discuss report status and next steps – will advise as soon as I hear from him – trying for noon tomorrow. Idea is to send a memo ahead of time to outline the instructions and issues to have a coordinated approach.

Jim I know you team is pulling together the materials and comments on your end.

We also want a Canada view presented. This is a start only – has CBB and Anoop – David please revise as you see fit. Jim letting you see this start to assist in understanding our view of things. and hopefully to coordinate the ask and delivery, it may change considerably – I want to send to NIK by end of day.

 <p>CASSELS BROCK LAWYERS</p>	<p>Alison Manzer Direct: 416 869 5469 • Fax: 416 350 6938 • amanzer@casselsbrock.com 2100 Scotia Plaza, 40 King Street West, Toronto, Ontario, Canada M5H 3C2 www.casselsbrock.com</p>
--	---

This message, including any attachments, is privileged and may contain confidential information intended only for the person(s) named above. Any other distribution, copying or disclosure is strictly prohibited. Communication by email is not a secure medium and, as part of the transmission process, this message may be copied to servers operated by third parties while in transit. Unless you advise us to the contrary, by accepting communications that may contain your personal information from us via email, you are deemed to provide your consent to our transmission of the contents of this message in this manner. If you are not the intended recipient or have received this message in error, please notify us immediately by reply email and permanently delete the original transmission from us, including any attachments, without making a copy. [attachment "M Consolidated Comments Instructions Independent Engineer Nov 20 2013.DOCX" deleted by Paul Harrington/NLHydro]

SECTION 1

SECTION 1

MUSKRAT FALLS GENERATING STATION AND LABRADOR TRANSMISSION ASSETS

1.1 INTRODUCTION

The Lower Churchill Project (LCP) is a proposed large, important energy generating and transmission facility of regional and national significance to Newfoundland and Labrador, Nova Scotia, and the federal government of Canada (Government). When completed, the LCP will have a capacity to generate and transmit more than 824 megawatts (MW) of electricity at an initial capital cost of approximately \$6.2B¹.

The purpose of this report is to provide Independent Engineer's (IE) opinions to support the financing of the LCP using long-term bonds that will be guaranteed by Canada's best-in-the-world credit worthiness, rated AAA. To that end, this report presents professional opinions that the estimated construction and operations costs are reasonable, that the estimated construction schedule is reasonable, and that projected financial results of operations will generate sufficient net revenues to repay the debt, including revenues to meet debt service coverage requirements as well as to properly operate and maintain the LCP facilities.

Nalcor Energy (Nalcor) selected MWH Canada, Inc. (MWH) to prepare this Independent Engineer's Report (IER) and additional services pertaining to construction monitoring and long-term monitoring services after the LCP has been placed in commercial operation. MWH has no financial ties to Nalcor aside from the agreement to prepare this report (Nalcor/MWH Agreement). MWH has no fiduciary relationship with other firms involved with the LCP or interest in the sale of bonds to finance the LCP.

1.2 PROJECT DATA AND COMMUNICATIONS PROTOCOLS

1.2.1 Contacts

The Nalcor/MWH Agreement was signed on August 27, 2012. A kickoff meeting was held on September 13 and 14, 2012 in St. John's, Newfoundland. Nalcor selected Mr. Lance Clarke, Project Commercial Manager, LCP to be MWH's principal contact during the duration of the IE's review and preparation of the IER. Mr. James Meaney, CFA, General Manager Finance, was also designated as another principal contact. Additionally, Mr. Ross Beckwith, Nalcor's Commercial Coordinator, was also designated as a contact for discussions. Mr. Peter Madden has been the day-to-day contact for MWH. For all issues pertaining to the Nalcor/MWH Agreement, Mr. Nikolay Argirov, MWH Vice President, has been the principal Nalcor contact.

¹ The reader is advised that within this report, all dollars given are Year-2012 and Year-2013 Canadian Dollars, depending on the award date

Rey Hokenson is MWH's day-to-day contact and is the project manager (PM) for this assignment.

1.2.2 Documents

On September 7, 2012, MWH transmitted a list of documents to be provided by Nalcor for the IE's review. The request indicated that MWH wished to receive hard copies of all of the documents that Nalcor expected MWH to review, including two copies of each document along with two compact discs or DVDs of the data for further copies to be made by MWH for each of its principal offices in Vancouver, British Columbia (BC) and Bellevue, Washington. Nalcor subsequently requested that MWH use Nalcor's data room to obtain the information. Because of difficulties encountered in downloading information and to print and save documents for future assessments using the data room, MWH requested an additional system be employed to review data. In response to MWH's request, Nalcor gave permission for MWH to use the Aconex on-line project management system. The Aconex system greatly facilitated information gathering.

1.2.3 Project Schedule

The Project Milestone Schedule for the preparation and award of the numerous contracts that will be prepared by Nalcor and the Engineering, Procurement, and Construction Management (EPCM) Consultant is given in Appendix A. The IE's Execution Plan has been tailored to accommodate the Project Milestone Schedule.

Given contractual responsibilities pertaining to reporting, wherein MWH would be reporting directly to Government's representatives rather than Nalcor's for future phases of work, MWH would expect that new data-handling protocols may be required for MWH to follow. Additionally, new procedures may need to be established to gain access to contracts and other data required for the IE's review. MWH has been asked by Government to communicate through Cassels Brock & Blackwell, LLP, legal advisors to Government, and is currently following this request.

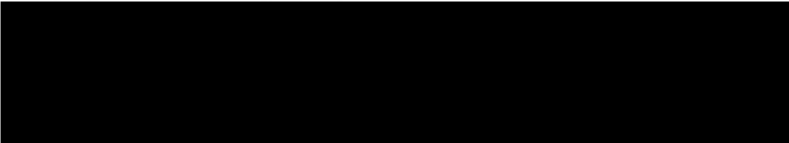
1.3 PROJECT DESCRIPTION

The history of the LCP dates to the early 20th century when it was envisioned that a series of hydroelectric projects would be developed on the Hamilton River (now the Churchill River). During the mid-1960s an earnest effort was made to plan for the development of this valuable resource when Labrador and Newfoundland were in need of power. At that time electricity demand was growing by more than 10 percent per year. The plan was to construct the first project, Churchill Falls, on the Churchill River upstream of the LCP for supplying power to Newfoundland Island in 1972, and then to construct the LCP following completion of the 5,428 MW Churchill Falls Generating Station. The Churchill Falls Project commissioned its first unit in 1971 to feed power to Newfoundland. The Churchill Falls Project provides about 65 percent of the power available from the Churchill River, with the remaining 35 percent coming from two proposed power stations, Gull Island and Muskrat Falls. Muskrat Falls has been sized to provide 824 MW, while Gull Island has been sized to provide 2250 MW.

This comment does not belong in this report - The Agreement LC-PM 082 applies.

SECTION 3

SECTION 3



3.2.4 Diversion Flood Assumed for Construction and Ice Affects

To enable cofferdam heights to be determined, Nalcor selected a return period flood of 20-years recurrence interval. Normally for larger projects where excavations are open for about one year while concrete is being placed, a 20-year to 25-year recurrence interval is selected as the minimum value for which the contractor must provide protection. Risks associated with floods with recurrence levels higher than this value are then either assigned to the Owner as their responsibility or to the contractor depending on contract language. For embankment structures, usually a longer period than 20-year return period for important structures is prescribed. For construction that takes longer than one year of cofferdam use, recurrence intervals of longer period are prescribed and costs of increased cofferdam sizes are paid for by the Owner. Determination of the value to use should be based on economics, balancing the cost of higher and larger cofferdams with the loss or damage of the structures being constructed and the cofferdam, cofferdam rebuilding, clean-up costs, environmental mitigation costs and fines, and lengthening of the contract schedule which delays power production, and higher interest during construction payments on construction loans. Once the recurrence interval is selected, the water surface elevation is determined from hydraulic studies associated with the construction flood discharge, and the freeboard (elevation distance between the flood level and cofferdam crest) is determined to establish the crest elevation of the cofferdam.

In the case of Muskrat Falls, another important consideration was required since ice jams are known to occur almost every year downstream of the dam and power station complex site. Historically data is available that allows a determination of water level flood elevation that occurs during an ice jam. Selecting the elevation that corresponds to a recurrence interval of 40-years for an ice jam event was then determined and compared to the elevation established from a 20-year return period flood; in this case, the ice jam elevation controlled the design of the RCC cofferdam (No.3) and establishes its height.

3.3 EXPECTED PERFORMANCE OF MAJOR SYSTEMS

Based on our current understanding of the LCP and Nalcor's contracting philosophy, which we have observed in reviewing the RFPs and the Contracts reviewed to date (November 2013), only tier-one fabricators, suppliers and installers of equipment and systems, along with tier-one contractors are being solicited to propose on the work. Tier one companies are assumed to be top-level and among the largest and most well-known companies of their type and are among the most important members of a supply chain to supply to an original equipment manufacturer. This philosophy in turn generates competitive responses from these firms who supply the utility-grade equipment required of the specifications. This equipment and systems meet, in our

opinion, the intent of the contract's quality requirements and the technical conditions. We, therefore, are currently of the opinion, and with our monitoring of the work during Phase II and thereafter, expect that the performance of major systems and sub-systems will be satisfactory.

3.4 MAJOR SYSTEMS COMPATIBILITY AND COMPLETENESS

We currently (November 2013) have only three contracts available to form a preliminary opinion pertaining to the compatibility of major systems and completeness. These contracts are as follows: CH0030, LC-SB-003, and CH0007.

Contract CH0030 involving the turbines, generators, and associated controls for this equipment is being provided by Andritz Hydro, a tier-one company. Andritz has provided numerous equipment packages for major hydro projects like this, and several recent ones that MWH has direct knowledge of, being the Owner's Engineer. Based on what has been reviewed to date, without viewing the fabrication, assembly, installation, and start-up and testing, we expect that the hydro-generating package will perform as designed and expected. Since the responsibility of the system compatibility and completeness lies with Andritz, following the technical provisions of the contract documents, we expect this package will be satisfactory.

Contract LC-SB-003 involving the Engineering, Procurement, and Construction (EPC) form of contract delivery for the submarine cable(s), which is directly managed by Nalcor is being provided by one of the three leading designers, fabricators, and installers of submarine cables, Nexans Cable. Based on information known to MWH about other projects Nexans has completed, which are judged to be more difficult than the SOBI cable crossing, we are of the current opinion that their system will be compatible with the land-based transmission systems and their system, and in itself will perform satisfactorily and will be completed, as specified.

Contract CH0007, involving the construction of Intake and Powerhouse, Spillway and Transition Dams, will be performed by Astaldi Canada Inc., based in Toronto. Astaldi's parent company is based in Italy and they have offices in the United States, Latin America, and the Middle East. MWH has direct working experience with Astaldi's Latin America company as Owner's Engineer on much smaller hydroelectric projects with less severe weather conditions than prevailing conditions at Muskrat Falls. Our experience leads us to a suggestion that this contract be very carefully managed by the Integrated Project Team to avoid change orders, in MWH's opinion, and to keep the work on schedule.

When additional contracts become available for review, MWH was planning to include remarks about their compatibility with other systems they tie to. Currently, Government has not informed MWH if these reviews will be required.

3.5 OPERATING HISTORY OF MAJOR EQUIPMENT

The following Table 3-2 lists major equipment that the IE has reviewed or will review during the Phase I work and comments germane to its operating history.

MWH were not the OWNERS Engineer on the Chacabuco Project which won Hydro Project of the Year 2012 - MWH must deduce

SECTION 3

SECTION 3

We also noted in contract CH0006 that dewatering of the excavation would be occurring after the contractor was granted substantial completion. Nalcor was questioned about this matter and they indicated that they would be responsible for this system that would be furnished to the contractor for CH0007 to allow it to construct the substructure of the power station, intakes and transition structure within its contract. The IE was pleased with Nalcor's response and finds it should allow the smooth transition between contracts to be promulgated.

3.8 EXPERIENCE AND CAPABILITY OF MAJOR PROJECT PARTICIPANTS

Nalcor has advised the IE that for all of the major contracts that are currently under design or that have been awarded, a careful screening process was conducted to allow only tier-one contracting groups and suppliers the opportunity to propose on the work. Of the contracts that we have reviewed wherein we have been apprised of the bidders who proposed on the work, we are of the opinion that careful consideration and due diligence to screen prospective bidders has been conducted and that supports Nalcor's philosophy and statements made to the IE.

Each of the contracts that have been awarded to date by Nalcor were awarded to experienced contractors and suppliers involved in the work. However, as noted in the preceding paragraph, careful monitoring of the Integrated Project Team is advised for CH0007. We will continue to monitor the quality of the selected contractors and suppliers and the procedures that Nalcor uses to select from only the best, most experienced, and most reliable fabricators, suppliers and contractors for the LCP.

Nalcor also selected a Canadian Engineering firm that has not only prepared numerous designs for hydroelectric projects and other projects in Canada, but worldwide. Following Nalcor's philosophy of project development and management, Nalcor shortlisted only tier-one engineering firms to propose on the EPCM services that were awarded to SNC-Lavalin (SNC-L). Work is currently ongoing with SNC-L transferring key hydroelectric specialists to St. John's but also performing work in several of their other offices in Canada.

Nalcor has also engaged very experienced consultants who have been employed on mega projects in Canada and internationally to assist permanent staff, but who work solely on the LCP and hold key positions of management on this project. The guidance the Nalcor team provides to its EPCM contractor, and to the contractors it has engaged, should allow early detection and resolution of any issues that may or will occur during the construction of the LCP.

Additionally, Nalcor has engaged an Advisory Board (Board) of senior engineers to review project aspects and independently opine on their findings directly to Nalcor. The Board meets as often as required by project needs and will be active throughout the construction period.

MWH personally knows these individuals they are qualified to provide sound opinions for the Integrated Project Team to consider. MWH's experience working with the contractor selected for CH0007 on three recently completed, smaller hydroelectric projects in Latin America has been less than satisfactory, in our opinion. MWH notes that special monitoring and dedication of

additional staff to this contract is advisable by the Integrated Project Team, to ensure that Nalcor's stated goals and methodologies are achieved. Nalcor has stated that they intend to closely manage this contract and adhere to their established philosophy as given in their manuals and as required by contract conditions.

STRIKE THIS MWH out
in comments this
conflicted here.
It is O.K. to state that
MWH recommends that all major
contracts are managed appropriately
based on actual and perceived
risks during execution!!

SECTION 4

SECTION 4

CONSTRUCTION PLAN AND SCHEDULE

4.1 EPCM (ENGINEERING, PROCUREMENT, AND CONSTRUCTION MANAGEMENT) CONTRACT REVIEW

We note that Nalcor advised MWH that they have revised a pure EPCM Model to an Integrated Project Team Model. According to Nalcor, they have not revised their project delivery model that required transition from the terms of their agreement with SNC-L. Section 4.1.1 discusses the Integrated Project Team Model.

4.1.1 Responsibilities of Parties

The EPCM Services Agreement (EPCM Agreement) for the Muskrat Falls Hydroelectric Development between Nalcor and SNC-L is a well prepared and comprehensive contract that places the responsibility for design of a successful project on SNC-L, in MWH's opinion. The effective date of the Agreement is February 1, 2011.

The EPCM Agreement does not give SNC-L the authority to issue any change order, no matter how small it may be, but requires all changes to be submitted to, and approved by, Nalcor's Project Manager. This process constricts the EPCM process of quickly facilitating resolutions of day-to-day issues by very experienced managers in SNC-L who have many years of hydropower practice experience, and appears to be an issue that may cause unnecessary and preventable delays to the project schedule. Experience has shown that on other large EPCM projects, when the EPCM Project Manager is authorized to issue change orders, usually provided with a reasonable "cap," this allows the process to proceed more quickly. Change orders above the cap would require authorization of Nalcor's Project Manager. For the LCP, we would recommend the SNC-L Project Manager be given the authority to authorize charging for work valued up to \$200,000. This would eliminate our initial impression that SNC-L has been given responsibility to deliver the project in a timely manner, but has not been given any level of authority over cost control. However, given that an Integrated Project Team Model is now being used, the extent of the perceived restricted facilitation of resolution of delays by the IE may not be warranted.

Late in 2012, Nalcor made a strategic decision to adjust its organizational model as it moved through Decision Gate 3 (DG3). At this decision point, the bulk of strategic front-end deliverables that were the focus of Nalcor (i.e., environmental approvals) had been achieved, while the LCP was transitioning from the engineering and procurement phase into the construction phase. A change in the working organizational model was also considered by Nalcor to be key to ensure clarity on roles and responsibilities, while fully leveraging the collective organization resources to achieve priority activities.

Leveraging the strength of Nalcor's Owner's Team, combined with the significant resources of SNC-L as EPCM Consultant, the execution model has transitioned from a pure EPCM model to an Integrated Project Team Model, or Option 2 to Option 1 in Figure 4-1. The mantra, according to Nalcor, is "One Team. One Vision." The organizational model shift is viewed as a key enabler of team effectiveness, which is considered imperative for delivery of this megaproject.

Project Delivery Methods			
Activity	Option 1	Option 2	Option 3
Oversight / Project Controls / Audit	Integrated Project Team	Nalcor	Nalcor
Detailed Engineering & Design	Engineering Consultant	EPCM Consultant	EPC Contractor
Project Management, Engineering, Procurement, Project Services			
Overall Site and Contractor Management			
Construction of the Physical Works	Construction Contractors	Construction Contractors	

Figure 4-1 Project Delivery Methods³

This Integrated Project Team, or Project Delivery Organization, consists of Nalcor and SNC-L resources as well as various third party consultants, including Hatch, AMEC, Stantec, and independent consultants. Broadening the potential sourcing base for resources has facilitated the ability to secure scarce PM and Construction Management resources within

³ Figure 4-1 Project Delivery Methods was furnished to MWH by Nalcor for use in the IER.

This section is redundant. Since we have adjusted the organizational model, which MWH endorses.

SECTION 4

Labrador/Newfoundland's heated resource-based economy. Nalcor advised MWH that within this Integrated Project Delivery Organization a Nalcor person can report to a SNC-L person, and vice versa. The objective is to avoid duplication, fully leverage available resources, right-size the project team, and ensure an organizational structure that supports empowerment, accountability, and delegation of authority, according to Nalcor.

Nalcor contends that strong project governance and leadership is achieved by the establishment of an Integrated Management Team that is led by a Project Director. The Nalcor Project Director reports to the LCP VP and Executive Committee. Figure 4-2 gives the high-level organization and governance structure for the LCP.

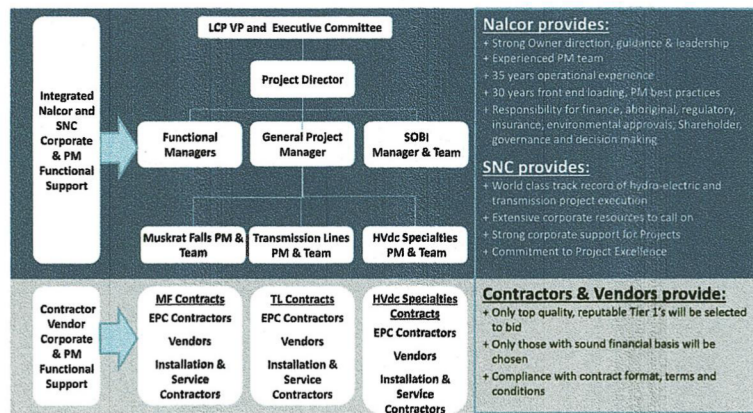


Figure 4-2 LCP Organization and Governance⁴

Consistent with the premises stated within the Overarching Contracting Strategy, this Project Delivery Organization is the Integrator of all contractor works. The Project Delivery Organization must fulfill all obligations that were previously defined for each of Nalcor and for SNC-L as EPCM Consultant.

Within the model, SNC-L remains solely responsible for the completion of all engineering and design, and for assurance of the quality of all engineering with standard engineering practice as previously stated in Section 4.1.2. The SNC-L Senior Manager has accountability to ensure SNC-L's engineering and design practices are upheld.

⁴ Figure 4-2 LCP Organization and Governance was furnished to MWH by Nalcor for use in the IER.

SECTION 4

Nalcor has advised MWH that the Project Delivery Organization relies heavily on the processes and systems offered by SNC-L, in particular as it relates to project control. SNC-L's project management enterprise system, PM+, has been fully implemented on the LCP. To that effect, SNC-L provides a substantive resource base to support the Project Delivery Organization.

As can be seen in the organization figure, the organizational design consists of three PMs reporting to a General PM. A deputy PM supports each PM, while overall delivery, including scope, cost, and schedule management, of a particular project component or physical area, is the responsibility of the Area Managers. Reporting to each Area Manager are Package Leaders (i.e., sub-Area Managers), package engineers, and contract administrators. This Area-based management approach has remained consistent since the engagement of SNC-L in early 2011, and underpins the overall delivery strategy.

The Marine Crossings Team, responsible for the SOBI work, is led by a designated PM who reports directly to the Project Director, but maintains day-to-day working relationships with the three Component PMs and all functional managers.

Figure 4-3⁵ presents the organizational chart for the Integrated Management Team reporting to the Project Director.

MWH requested Nalcor to provide a revised agreement with SNC-L for review; however, Nalcor advised that no revised agreement will be prepared.

is of the opinion that the existing EPCM contract still applies and requires minimal changes which are under consideration.

⁵ Figure 4-3 Integrated Management Team Organization Chart was furnished to MWH by Nalcor for use in the IER.

SECTION 4

4.1.7 Potential Legal Issues

Issues that the IE is aware of have surfaced in the press and in documents published by the World Bank surrounding the conduct of SNC-L representatives in Libya, Bangladesh, Montreal, and France. Allegations of bribery to win projects and aiding a banned government representative have been raised, with a senior executive of SNC-L currently imprisoned in Switzerland and the former SNC-L CEO arrested in Canada along with several senior representatives of SNC-L being forced to leave the company because of these activities. A pending billion dollar lawsuit by shareholders of the company is also being promulgated. The lawsuit alleges the bribery issues have driven the SNC-L stock price lower, which caused shareholders to lose money. All of this negative publicity associated with the possible legal problems facing SNC-L is required to be surfaced by the IE since the outcome of any legal action could affect the performance of the staff assigned to the LCP. Since the IE cannot give legal opinions, nor is required or qualified to comment on the outcome of any findings by the Royal Canadian Mounted Police or the World Bank in their preliminary findings, and the investigations are currently under way, MWH will not give any opinions on these matters other than what we have noted above. We have discussed the issue with Nalcor representatives and they recognize the need to present this information, but have noted to MWH that they are fully supportive of the SNC-L staff they have been working with on the LCP and will continue to work with them, barring any unforeseen issues that surface after investigations by legal authorities have been completed. Nalcor has recently revised the project delivery methods, as noted previously, to an Integrated Project Team working more closely with SNC-L that supports their trust in the staff working with them. In the unlikely event that SNC-L is not able to perform for any reason, there are other capable firms that could take over SNC-L's responsibilities.

4.2 BULK EXCAVATION CONTRACT REVIEW – CH0006

The Bulk Excavation Contract was started on November 9, 2012, shortly before Nalcor received notification that the LCP received Government Sanction on December 17, 2012, since a further delay due to waiting for the full Sanction would have severely delayed the start of the contract and the entire project. Contract CH0006 was awarded to a group of four contractors including the following firms, each of which is well known in Canada: HT O'Connell, EBJ, Nielson, and Kiewit. The current contract amount that was agreed to by the parties is \$112,942,295.00 (Rev 3). The reader is advised that within this report, all dollars given are Year-2012 and Year-2013 Canadian Dollars, depending on the award date. The Contract Substantial Completion Date is December 31, 2013.

Since the IE, by its Agreement with Nalcor, is only required to review certain contracts out of the 113 separate contracts currently identified (March 2013) that Nalcor and MWH believe are the main contracts that need to be reviewed as part of the IE's technical and environmental evaluations, MWH has developed a standard format that addresses the questions contained in the Agreement task descriptions to standardize its responses. Since additional information is

*Is this section necessary?
I believe it is not.*

SECTION 4

also specifically requested in other sections of the IER, some information may be repeated or expanded, as required by the Agreement.

Table 4-1
CONTRACT CH0006
BULK EXCAVATION

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
1	QUALIFICATIONS OF CONTRACTOR	EACH CONTRACTOR HAS THE FULL CAPABILITIES TO PERFORM ALL OF THE WORK ITSELF	NALCOR ADVISES THAT THE CONTRACTING GROUP PLANS TO SUBMIT A BID FOR CH0007	CONTRACTING GROUP IS SATISFACTORY
2	QUALIFICATIONS OF SUBCONTRACTORS	BLASTING CONTRACTOR IS NOT KNOWN TO MWH. NALCOR ADVISED THAT EXPLOTECH ENGINEERING IS BLASTING CONTRACTOR	'MOOSE' MORIN IS BLASTING CONSULTANT. NALCOR AND SNC-L HAVE ACCEPTED BLASTING SUB-CONTRACTOR	SATISFACTORY
3	COMPLETENESS	REVIEWED ENTIRE DOCUMENT; APPEARS TO BE COMPLETE	REPAIR OF OVER BLASTING AND HOW TO CORRECT- NO CORRECTIONS BY THIS CONTRACTOR PER NALCOR RESPONSE TO QUESTION; DEWATERING SYSTEM TO WORK SIX MONTHS AFTER CONTRACTOR LEAVES. NALCOR IS RESPONSIBLE IF ISSUES RESULT	SATISFACTORY
4	CONTRACTS PERFORMED INDEPENDENTLY	THIS CONTRACT IS LEAD CONTRACT AND IS INDEPENDENT OF OTHERS	SEE 3 ABOVE RE DEWATERING RESPONSIBILITIES	SATISFACTORY

SECTION 4

SECTION 4

Table 4-7 (cont'd)
CONTRACT CH0030

Table 4-7 (cont'd)
CONTRACT CH0030

TURBINES & GENERATORS DESIGN, SUPPLY AND INSTALL AGREEMENT

TURBINES & GENERATORS DESIGN, SUPPLY AND INSTALL AGREEMENT

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
				NALCOR ADVISED THAT AH OWNS OR IS A PRINCIPAL SHAREHOLDER IN MANY OF THE COMPANIES AND INTENDS TO MONITOR THEM CLOSELY. NO OPINION ON THE SUBCONTRACTORS WILL BE FURNISHED BY MWH.
3	COMPLETENESS	WE STILL REQUIRE ADDITIONAL DATA IN THE RESPONSE TO THE RFP THAT SHOULD BE IN THE CONTRACT. WE HAVE NOT BEEN PROVIDED WITH EXAMPLES TO CLEARLY ILLUSTRATE THAT THE LDS ARE REALISTIC AND CAN BE SUPPORTED IF AN ISSUE GOES TO COURT. WE HAVE FURNISHED A LIST OF QUESTIONS AND ARE AWAITING A RESPONSE.	NALCOR ADVISED THAT CANADIAN COURTS DO NOT SUBSCRIBE TO THE "REALISTIC" AND "SUPPORTABLE" LOGIC. MWH REQUIRES A P6-TYPE SCHEDULE.	

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
4	CONTRACTS PERFORMED INDEPENDENTLY	WE DO NOT HAVE A CPM SCHEDULE (P6) TO FULLY UNDERSTAND THE IMPACT OF DELAYS ON OTHER CONTRACTORS, BUT BELIEVE THAT FOR THE EMBEDDED ITEMS FOR THE TURBINE, A SUBSTANTIAL IMPACT TO THE POWERHOUSE CONTRACTOR COULD OCCUR. SINCE MOST OF THE MANUFACTURING WILL OCCUR IN CHINA, NECESSITATING OCEAN SHIPMENTS AS WELL AS LAND TRANSPORT, MONITORING VERY CLOSELY WILL BE VERY IMPORTANT. FIT-UP IN THE FIELD WILL DEPEND ON THE WORK PLAN THAT WE CURRENTLY DO NOT HAVE FOR REVIEW		MWH WILL NOT BE ABLE TO OFFER AN OPINION UNTIL WE BETTER UNDERSTAND HOW THE EQUIPMENT WILL BE HANDLED AND REQUIRE SUPPORT DATA INCLUDING THE P6 CPM NALCOR ADVISES THE INTEGRATED PROJECT SCHEDULE WILL BE AVAILABLE END OF 2013. THUS, IT WILL PROBABLY NOT BE AVAILABLE BEFORE FINANCIAL CLOSE. NO OPINION WILL BE GIVEN BY MWH.

This is a Contractor / Supplier deliverable.

SECTION 4

SECTION 4

Table 4-7 (cont'd)

CONTRACT CH0030

TURBINES & GENERATORS DESIGN, SUPPLY AND INSTALL AGREEMENT

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
			COURT SYSTEMS LEADS TO DIFFICULTIES WHEN LDS ARE BEING ASSESSED. NALCOR ADVISED THAT THIS WOULD APPLY TO CANADA EXPERIENCE. LC OF 15% OF CONTRACT PRICE IS REQUIRED.	
14	COMPLIANCE CONTRACTS, PERMITS, PERFORMANCE	EXHIBIT 1, ITEM 13; EXHIBIT 6, ENVIRONMENTAL AND REGULATORY COMPLIANCE REQUIREMENTS; ARTICLE 15, HEALTH, SAFETY AND ENVIRONMENTAL PROTECTION	IT WOULD BE BEST TO PROVIDE A COMPLETE LIST TO THE CONTRACTOR FOR EASE OF REFERENCE, IN OUR OPINION; ON THE LIST THOSE PERMITS AND ITEMS REQUIRED FOR THE CONTRACTORS ATTENTION SHOULD BE HIGHLIGHTED	SATISFACTORY

Table 4-7 (cont'd)

CONTRACT CH0030

TURBINES & GENERATORS DESIGN, SUPPLY AND INSTALL AGREEMENT

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
15	GUARANTEE OF EQUIPMENT	AS DISCUSSED IN 12 ABOVE, GUARANTEES ARE GIVEN	DURING OUR DISCUSSIONS IN ST. JOHN'S, THE LDS WERE NOT DESCRIBED TO SUFFICIENTLY ADDRESS MWH'S REMARKS HEREIN. WE WOULD LIKE TO REVIEW SAMPLE COMPUTATIONS FOR EACH OF THE GUARANTEES AS TO THE AMOUNTS BEING REASONABLE. NO OPINION CAN BE GIVEN AT THIS TIME. REQUIRES FURTHER REVIEW.	APPEARS TO BE SATISFACTORY.
16	CONSTRUCTION SCHEDULE	MILESTONES ARE GIVEN IN EXHIBIT; WE REQUIRE A P6 CPM	WE REQUIRE A P6 CPM BEFORE WE CAN OPINE	NO OPINION CAN BE GIVEN AT THIS TIME. NALCOR ADVISES AN IPS WILL BE AVAILABLE END 2013.
17	SCHEDULE REVIEW; ADEQUATE PROVISIONS		WE REQUIRE A P6 CPM BEFORE WE CAN OPINE	NO OPINION CAN BE GIVEN AT THIS TIME
18	CRITICAL PATHS	WE REQUIRE A P6 CPM SCHEDULE		

This is a contractor schedule -

SECTION 4

SECTION 4

Table 4-7 (cont'd)

CONTRACT CH0030

TURBINES & GENERATORS DESIGN, SUPPLY AND INSTALL AGREEMENT

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
19	LIKELIHOOD OF ACHIEVING MILESTONES	MILESTONES ARE GIVEN IN EXHIBIT 2, APPENDIX B.	WE REQUIRE THE P6 CPM TO FURNISH AN OPINION WE DO NOT HAVE THE EXPERIENCE WITH THESE SUPPLIERS' USING PRINCIPALLY CHINESE-MADE EQUIPMENT TO EXPRESS THIS OPINION ON THESE LARGE SIZE MACHINES; WE REQUIRE ADDITIONAL SUPPORT INFORMATION TO DEMONSTRATE THAT THE FABRICATION AND CASTING COMPANIES HAVE SIMILAR EXPERIENCE ON LARGE KAPLAN MACHINES AND THAT THIS IS NOT THEIR FIRST TIME IN MANUFACTURING 9M KAPLAN EQUIPMENT. NALCOR ADVISED THAT ANDRITZ HAS WORKED WITH ALL BEFORE AND	NO OPINION WILL BE GIVEN BY MWH.

Table 4-7 (cont'd)

CONTRACT CH0030

TURBINES & GENERATORS DESIGN, SUPPLY AND INSTALL AGREEMENT

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
			HAS FINANCIAL INTEREST IN SOME OF THESE COMPANIES.	

As noted previously in the discussion following Table 4-2, we have included a discussion of how we believe we can accommodate any items that remain "blank" or are as yet undesignated, that leave gaps in the table because we either do not have a contract to review, or that have not been addressed by Nalcor to allow the IE to inform the reader as to our current position regarding the review of CH0030 documents.

4.5 STRAIT OF BELLE ISLE SUBMARINE CABLE DESIGN, SUPPLY, AND INSTALL CONTRACT - LC-SB-003

Contract LC-SB-003 was awarded with a start date of December 12, 2012, and with a given substantial completion date of November 28, 2016. The early start of this contract was necessitated by the advantage Nalcor realized in favorable market conditions for the subsea cable as well as being able to schedule the manufacture of the cable early by reserving the manufacturing facilities in Japan to fabricate the cable and appurtenances associated with it. The contract amount is \$125,245,370.00. Nexans Cable is one of the three cable companies in the world that has the required experience in manufacturing and installing subsea cables, and coupled with Nippon High Voltage Cable Corp.'s experience in manufacturing subsea cables, has been critical to assuring a successful project in the opinion of Nalcor.

Listed below in Table 4-4 are the current findings and opinions of MWH pertaining to contract LC-SB-003

This is a contract schedule.

SECTION 4

SECTION 4

Table 4-8 (cont'd)

Table 4-8 (cont'd)

CONTRACT LC-SB-003

CONTRACT LC-SB-003

STRAIT OF BELLE ISLE SUBMARINE CABLE DESIGN, SUPPLY AND INSTALL

STRAIT OF BELLE ISLE SUBMARINE CABLE DESIGN, SUPPLY AND INSTALL

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
		SHALL OBTAIN AND MAINTAIN ALL OTHER AUTHORIZATION S, PERMITS, DISPENSATIONS, CONSENTS AND LICENSES, REQUIRED BY APPLICABLE LAWS TO ENABLE IT TO PERFORM THE WORK THAT CAN BE OBTAINED IN THE CONTRACTOR'S NAME.		
15	GUARANTEE OF EQUIPMENT	GUARANTEES ARE NOT FURNISHED; WARRANTY OF WORK AND MATERIAL FOR 36 MONTHS, AND AFTER REPAIR, ANOTHER 36 MONTHS OF SERVICE	WARRANTY PERIOD REVISED DOWN TO 36 MONTHS FROM ORIGINAL PROPOSED 60 MONTHS. NO GUARANTEES ARE PROVIDED. TYPICALLY, INDUSTRY REQUIRES ONLY ONE OR TWO YEARS. TESTING WILL OCCUR BEFORE AND AFTER PLACING THE ROCK FILL PROTECTION.	SATISFACTORY

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
16	CONSTRUCTION SCHEDULE	MILESTONES FURNISHED IN PART 2, EXHIBIT 11, MILESTONE SCHEDULE; P6 CPM SCHEDULE IS REQUIRED TO BE FURNISHED	MWH REQUIRES A P6 CPM SCHEDULE MWH AWAITING TO REVIEW THE P6 CPM.	NO OPINION WILL BE GIVEN BY MWH AT THIS TIME.
17	SCHEDULE REVIEW; ADEQUATE PROVISIONS	MWH REQUIRES P6 CPM SCHEDULE TO REVIEW	MWH AWAITING TO REVIEW THE P6 CPM	NO OPINION WILL BE GIVEN BY MWH AT THIS TIME.
18	CRITICAL PATHS	MWH REQUIRES P6 CPM SCHEDULE	MWH AWAITING TO REVIEW THE P6 CPM	NO OPINION WILL BE GIVEN BY MWH AT THIS TIME.
19	LIKELIHOOD OF ACHIEVING MILESTONES	NO OPINION CAN BE OFFERED AT THIS TIME	NO OPINION CAN BE GIVEN AT THIS TIME	NO OPINION WILL BE GIVEN BY MWH AT THIS TIME.

4.6 GENERATOR STEP-UP TRANSFORMERS - PH0014

The work for Contract PH0014 consists of the design, fabrication, shop testing, packaging, delivery, and warranty for 175/230 MVA ONAN/ONAF generator step-up transformers complete with 315 kV lightning arresters and accessories and one spare generator step-up transformer.

This is a contractor schedule.

SECTION 4

SECTION 4

Table 4-13 (cont'd)

Table 4-13 (cont'd)

CONTRACT PH0016 (RFP)

CONTRACT PH0016 (RFP)

SUPPLY OF GENERATOR CIRCUIT BREAKERS

SUPPLY OF GENERATOR CIRCUIT BREAKERS

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
		PERIOD. A PARENTAL GUARANTEE IS REQUIRED. A PERFORMANCE BOND FOR 50% OF THE CONTRACT AMOUNT AND A PAYMENT BOND FOR 50% OF THE CONTRACT AMOUNT IS REQUIRED IN THE RFP. COVERS 3YEARS OF DEFICIENCIES.		
14	COMPLIANCE CONTRACTS, PERMITS, PERFORMANCE	NO MENTION OF THIS SUBJECT IS GIVEN IN THE RFP. MWH REQUESTS NALCOR CONSIDER A DISCUSSION PERTAINING TO ADHERENCE TO THE ENVIRONMENTAL PERMITS		NO OPINION NECESSARY BY IE.
15	GUARANTEE OF EQUIPMENT	A PARENTAL GUARANTEE WILL BE PROVIDED	NALCOR IS REQUESTED TO FURNISH OTHER GUARANTEES REQUIRED	

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS? *	OPINION OF INDEPENDENT ENGINEER
16	CONSTRUCTION SCHEDULE	EXHIBIT 9, SCHEDULE. FOUR MILESTONES ARE GIVEN IN ADDITION TO THE CONTRACT AWARD DATE; DELIVERY OF THE GENERATOR CIRCUIT BREAKERS FOR EACH OF THE FOUR UNITS	NALCOR IS REQUESTED TO SUPPLY MORE DETAILS OF THE SCHEDULE FOR MWH TO FORM OPINIONS	
17	SCHEDULE REVIEW; ADEQUATE PROVISIONS	ONLY EXHIBIT 9 LISTS DATES. THERE IS NOT SUFFICIENT INFORMATION AVAILABLE AT THIS TIME TO REVIEW AND FORM OPINIONS	NALCOR IS REQUESTED TO SUPPLY MORE DETAILS CONCERNING THE SCHEDULE.	
18	CRITICAL PATHS	NO CRITICAL PATH SCHEDULE IS INCLUDED/ FURNISHED IN THE RFP. POSSIBLY, THE DG3 SCHEDULE AND THE INTEGRATED SCHEDULE WILL NEED TO BE USED TO FORM AN OPINION, SINCE THE IE LACKS SPECIFIC DETAILS	CRITICAL PATH P6 FORM SHOULD BE FURNISHED. CPM TO BE FURNISHED.	

This is the suppliers schedule.

an AACEI class 3 estimate reflects a level of project definition with a range of expected accuracy -10% to -20% and +10% to +30%. Nalcor engineering was approx 50% at DG3 and therefore accuracy range is 10% to 100%.

SECTION 5

CAPITAL BUDGET

5.1 TOTAL PROJECT COST ESTIMATE

5.1.1 Cost Estimate Methodology

A deterministic and risk-adjusted approach encompassing both the project's direct and indirect costs was followed by Nalcor to arrive at the project's Decision Gate 3 (DG3) Class 3 capital budget. The capital cost estimate is comprised of three primary components that follow the Association for the Advancement of Cost Engineering International (AACEI) Recommended Practice No. 17R-97.

First, a base cost estimate is established for each of the project's sub-elements (i.e., LTA, MFG, LITL) scope elements that reflect the most likely current cost known to be associated with the project's specifications, basis of design, drawings, and execution plan. The base cost estimate includes allowances for known but unquantified items.

To the base cost estimate, a risk-adjusted contingency is derived using analytical methods to account for uncertainties or variations associated with estimating accuracy. The estimated contingency allowance does not cover scope changes outside the parameters established for the project charter or control points for management of change (i.e., project execution plan and basis of design) nor does it cover force majeure issues associated with natural disasters, strikes or hyper-escalation.

Finally, an escalation allowance is developed that provides for changes in price levels that are driven by future economic conditions, including inflation. The escalation allowance is added to the base cost estimate inclusive of the estimated scope/risk contingency, and is derived using economic indices associated with similar construction endeavors.

The IE was not furnished with the actual cost estimate details as part of oversight effort. However, based on a review of the Basis-of-Estimate document that accompanies the cost estimate, generally Nalcor's cost estimate methodology is considered consistent with industry best practices for organizing, calculating, and reporting the project's current capital budget relative to a defined scope, indicated risks, and opportunities. Rather than comment directly on the cost estimate details, the IE will assess the accuracy of the project's capital cost estimate by comparing the DG3 estimated costs to the actual tendered amounts by contract. A current summary of this comparison analysis appears as Table 5-16 in this section.

Generally, the cost estimate methodology can be described as a "bottoms-up" approach relative to the level-of-detail, supporting documentation, and the implied level-of-effort. A "bottoms-up" approach is considered to be a more robust means of quantifying costs at the underlying

resource level (e.g., labor, equipment, materials, etc.) versus reliance on high level parametrics or unadjusted historical costs. Typically, at-risk contractors will price work of this nature by doing similar "bottoms-up" or detailed cost estimates to gain precision and reduce estimating errors. As well, the methodology applied to the risk analysis is considered to meet industry expectations for quantifying pricing uncertainties by modeling ranges around group subtotals for the major project elements using statistical analysis techniques.

Nalcor qualifies the DG3 cost estimate as an AACEI Class 3 effort. The IE agrees with this classification and confirms the implied accuracy range (-20% to +40%). However, as noted in the *Decision Gate 3 Capital Cost and Schedule Estimates Summary Report*, a Class 2 AACEI-compatible cost estimate is required at the time of Financial Close. The IE is not aware of any ongoing efforts by Nalcor to upgrade the capital cost estimate to support Financial Close with a higher degree of accuracy. As well, Nalcor has committed to completing a Class 1 cost estimate upgrade of the cost estimate at the mid-checkpoint of the project. The IE urges stakeholders to request these cost estimate updates from the project developer to ensure the most accurate project budget is available for inspection and proactive budget control.

While Nalcor adopted a theoretical P50 contingency based on analytical modeling (i.e., range uncertainty) of the project's sub-element summary budgets, the IE expresses the opinion that the calculated overall 6.7% scope contingency is aggressive relative to our legacy experience with similar remote heavy-civil construction endeavors that typically have a contingency reserve for known, but not specifically quantified risks approaching double to quadruple what is currently provided for LCP. The IE is not aware of a separate management reserve allowance to fund or accommodate unknown risks or changed field conditions as is typical practice for these types of projects. As per AACEI practice, the scope contingency is assumed to be spent during project execution while the management reserve is considered not to be spent in entirety during project execution.

As the project moves into full scale field execution with the award of CH0007 (Muskkrat Falls Powerhouse), the IE would advocate for re-thinking and reauthorization of the project contingency fund. ~~Due to significant overruns recently recognized with the award of CH0007, the project contingency fund is considered to be spent at this time and unavailable for future unknowns and risks associated with the field construction phase for all sub-project elements of the multi-year project.~~ The IE believes the drivers on contingency will be varied and not entirely predictable as the project unfolds over the next several years. Issues associated with budget estimate accuracy, baseline schedule accuracy, uncompetitive market conditions, directed scope changes, changed field conditions, claims, weather impacts, resource shortages, directed schedule acceleration, potential contractor defaults, incremental owner project support costs, and other unknown risks are some of the typical factors that our experience indicates will consume contingency on a remote large-scale heavy-civil endeavor.

This statement is incorrect

The I.E is aware of an uncapped amount of Contingent Equity which the Province of NL is committed to.

Remove this

This statement is incorrect and it should be removed

SECTION 5

Competition for resources is another concern and because the cost estimate for Muskrat Falls is based upon the labor rates given in the Hebron Agreement, and given that approximately 18 million person-hours of labor required, which includes Nalcor, Project Management Team (PMT) and services, the project demand will compete with other Western Canada projects for skilled and professional labor. Nalcor advises that in addition, the wages used in the estimates are slightly lower than used for Western Canada, but because Newfoundland has larger union premiums, it will result in lower take-home compensation for those employed in LCP assignments. In addition, the other large projects in Western Canada have completion bonuses that are planned and could have an impact on attracting qualified labor resources for LCP; Nalcor's LCP does not have the bonus.

Nalcor considers that there is a potential for a time or schedule risk exposure for the MF powerhouse beyond the plan they developed due to weather and the sheer magnitude of the volume of work for the powerhouse. The main concern is that the placement and curing of the 460,000 CM of powerhouse reinforced concrete over several winters will be a significant challenge for the contractor for CH0007. Additionally, the Bulk Excavation contractor (CH0006) must keep to schedule to complete its work this fall (2013) to enable the contractor for CH0007 to start its work on time.

MWH agrees with Nalcor's assessment that these are certainly risks that must be considered and accounted for in the schedule and cost estimate. MWH notes that the perceived schedule risk exposure pertaining to the Bulk Excavation contractor completing on time appears to be a non-issue, as viewed during the field trip in late September 2013, assuming that the contractor's performance continues to be satisfactory. Additionally, MWH believes that with Nalcor's acceptance of the contractor's proposal to use an all-weather enclosure for powerhouse construction as proposed by the contractor for CH0007 can work to mitigate the risk of extensive delays in the powerhouse concrete construction during the winter seasons.

With the concern that Nalcor has expressed in the uncertainties surrounding the potential cost increase due to the competition for labor and key personnel, MWH believes that this concern could have been addressed in the cost estimate and reflected in the Project Schedule by including higher more customary contingencies and a lengthened project schedule. A larger Owner's contingency could have been assumed as compared to what Nalcor used to offset the risk of overrunning the project budget and communicated timeline. In the DG2 and DG3 estimates, MWH generally follows AACEI's guidelines for projects with respect to contingencies since AACEI has a broad data base to support the contingency values and accuracy statement used for each level of the cost estimate. In addition, the schedule opinion will gain accuracy if the project's risk register is mapped to the individual line item activities and supported with an analytical uncertainty analysis using Monte Carlo simulation to discern finish date accuracy relative to desired confidence intervals.

Remove this section :-

SECTION 5

5.1.14 Price Risks

Nalcor has discussed in the contracting philosophy their methods to quantify and manage price risks due to changing market conditions, inflation, labor issues, weather and hydrology issues, manufacturing space and equipment availability, delays in meeting milestones, and competition with other projects in Canadian Provinces. The risk assessments they conducted following a multi-faceted Project Risk Management Plan using AACEI's recommended practice for price changes for major equipment they will purchase, as well as the construction and installation contracts they and SNC-L will administer, appear to be carefully performed and were taken into consideration in their economic analysis. The CPM schedule was also integrated into the analysis to arrive at appropriate unit cost pricing.

Where appropriate, LDs, LCs and performance protection have also been used to protect Nalcor as well as bonus provisions for at least one contract (CH0007) to help Nalcor achieve their development schedule.

The contingencies for each of the projects are given below in Table 5-19 for reference as follows:

Table 5-19
CONTINGENCIES DERIVED FOR EACH PROJECT

PROJECT	CONTINGENCY AMOUNT (P50)	REMARKS
MUSKRAT FALLS GENERATING STATION	\$226,700,000	See Sections 5.1.1 and 9.2.4. MWH advocates for higher basic contingency funding
LABRADOR TRANSMISSION ASSETS PROJECT	\$54,800,000	See Sections 5.1.1 and 9.2.4. MWH advocates for higher contingency funding
LABRADOR-ISLAND TRANSMISSION LINK PROJECT	\$86,500,000	MWH advocates for high basic contingency funding.
TOTAL	\$368,000,000	

5.2 DRAWDOWN SCHEDULES

In order to opine on the reasonableness of the drawdown schedules for each of the contracts that MWH is required to review and comment on, we have prepared Table 5-20 wherein we have summarized our findings for each of the contracts. We note that even where we believe we have observed some payments in favor of the contractor or vendor, since the payment schedule was considered among many items in the consideration and award of the contract, other issues may override any unbalance we may observe.

Given the -10% to +10% estimate accuracy range this exceeded outcome range should be amended to be \$5.6B to \$6.8B.

SECTION 9

indicates minimal variation between the DG3 estimate and Nalcor data for the MF and LTA projects and no variation for the LIL project estimates.

It is important to note the context for the DG3 estimate, which was prepared to verify Decision Gate 2, but also to support the Project Budget determination and provide the input to the financial pro forma models. The opinion of the IE is that the estimates for MF, LTA, and LIL are generally comprehensive to the extent that they include contractors' indirect costs, particularly important in the MF case, where the value of accommodations and site support services represent a substantial percentage of the total estimate.

As indicated in Note (3), additional costs are added to the capex figures to determine the total amounts to be financed. The additional capitalized costs include financing fees, interest during construction, debt service reserve account and a liquidity reserve account.

Differences between the DG3 Growth Allowances and the Nalcor financial models total growth allowances are all less than \$30,000 (bottom line of table), which is *de minimis*.

The DG3 total cost of the three projects as shown in Table 9-1 is about \$6.202B. Given the indication earlier that the estimate figure is representative of a range of actual outcomes ranging from -20 to +30 percent of the cost estimate, expected outcomes may be in the range of \$5.0B to \$8.0B.

SECTION 9

input into the Nalcor financial models, already in AACEI Class 3 category, differ (see Table 9-1) from those shown in DG3 ("Project Sanction" granted, milestone preceding Project Execution and EPC phase) Capital Cost and Schedule Estimate Summary Report (DG3). The differences are shown in Table 9-1.

Table 9-1
DG3 COST ESTIMATES AND FINANCIAL MODEL DATA

Line	Description		MF	LTA	LIL	Total
1	DG3 Base Estimate	(1)	\$2,511,923,504	\$601,311,778	\$2,359,610,970	\$5,472,846,252
2	DG3 Growth Allowance	(1)(2)	389,234,769	90,270,587	250,137,947	729,643,303
3	Total DG3 Capital Cost Estimate	(1)	\$2,901,158,273	\$691,582,365	\$2,609,748,917	\$6,202,489,555
4	Additional Capitalized Costs	(3)	351,231,727	\$ 80,237,635	\$587,118,063	\$1,018,587,445
5	Total Costs to be Funded		\$3,252,390,000	\$771,820,000	\$3,196,867,000	\$7,221,077,000
6	Nalcor financial models total capex		\$2,901,158,288	\$691,582,485	\$2,609,748,917	\$6,202,489,690
7	Variance Nalcor model data vs. DG3	(4)	\$ (15)	\$ (120)	\$ 0	\$ (135)
8	Growth allowance components					
9	P50 contingency		\$ 226,700,000	\$ 54,800,000	\$ 86,500,000	\$ 368,000,000
10	Escalation		162,545,000	35,441,000	163,658,000	361,643,000
11	Total		\$ 389,245,000	\$ 90,241,000	\$ 250,158,000	\$ 729,643,000
12	Variance of growth allowances	(5)	\$ 10,231	\$ (29,587)	\$ 20,053	\$ (303)

- Notes:
- (1) Source: "DG3 Capital Cost and Schedule Estimate Summary Report" Table 3, p. 15
 - (2) DG3 Growth Allowance = Estimate Contingency + Escalation Allowance
 - (3) Includes financing fees, IDC, DSRA and LRA (terms are explained in narrative)
 - (4) Total DG3 Capital Cost Estimate (line 3) - Nalcor financial models capex (line 6)
 - (5) DG3 Growth Allowance (line 2) - Total (line 11)

As of the date of the DG3 Report, the DG3 estimate is based on a fixed and firm design and on a level of engineering of over 50 percent (P50), making it an AACEI Class 3 estimate, with a level of accuracy within a -20 to +30 percent range.

Table 9-1 shows that the total DG3 estimates for the three projects consist of DG3 Base Estimates plus DG3 Growth Allowances. Growth allowances include P50 Estimate Contingencies plus an Escalation Allowance, as indicated in Note (2).

The table also includes the total capital cost data included in the Nalcor financial models. The overall "Difference between Nalcor (financial model) data and DG3" row (base plus allowances)

9.2.3 Cost Escalation

Estimated capital costs included in the DG3 estimate are costs based on 2012 values. These values were escalated in the Nalcor financial models to reflect expected cost bases in the years of construction.

The long duration of the development, construction, and operation phases of the LCP subject project costs to escalation caused by inflation and various other factors, including changes in market conditions, labor rates, productivity, etc.

As shown in Table 9-1, above, the DG3 capital cost estimates have been adjusted to reflect cost escalation and contingency allowances. The Nalcor financial models also incorporate cost escalation and contingencies as separate line items, as indicated in Table 9-1. The capital costs projected and input into the financial models also incorporate escalation in addition to contingency, which addresses separately risks of a different nature. With the assistance of external experts, Nalcor has projected cost escalation that takes into account how each sector of the economy, e.g. commodity, labor market or global economic factors, is impacted differently. In our opinion, the strategy adopted by Nalcor permits a realistic estimate of escalation. Escalation assumptions input into the MF, LTA, and LIL spreadsheets in the financial models reflect the detailed estimates prepared, and appear consistent with the trends projected for the region. Table 9-2 summarizes the annual escalation through 2018.

The AACEI Class 3 Estimate ~~is~~ reflects a level of Project Definition with a range of 10% to 40% Project definition with a corresponding range of expected accuracy of Low -10% to -20% High +10% to +30%

This is incorrect.

SECTION 10

SECTION 10

CONCLUSIONS AND INDEPENDENT ENGINEER'S OPINIONS AND RECOMMENDATIONS

The following section lists our principal conclusions and recommendations as of November 13, 2013, which are based on a site visit conducted during the week of September 23, 2013 and data, RFPs, and contracts furnished by Nalcor, the Borrower for the following three of the four projects of the LCP: MFGS; LTAP; and LIL.

10.1 CONCLUSIONS AND INDEPENDENT ENGINEER OPINIONS

10.1.1 In our opinion, and based on past experience, the Integrated Project Team consisting of SNC-L (the borrower's Engineer) and Nalcor (the borrower) are qualified to design, contract, manage, commission, operate and maintain the three projects currently under design and construction for the LCP. Furthermore, in our opinion, an amendment to the SNC-L Agreement with Nalcor should be issued to commemorate the understandings under which the Integrated Project Team is working and to clarify, where necessary, understandings with respect to responsibilities and duties.

10.1.2 The Muskrat Falls Generating site is a relatively easy site to develop from a technical and logistical point of view. The terrain is relatively flat with nearby access to a principal road in Labrador. For both the temporary structures and the permanent facilities, sufficient space is available for the project development.

10.1.3 The North Spur area has been geologically explored and studied in the past by several engineering organizations as well as during the most recent studies conducted by the Integrated Project Team to develop a satisfactory solution to reduce seepage and provide stabilization remediation procedures that should provide a useful life beyond the design life of 50-years, in our opinion. With the existing monitoring program currently being updated of seepage conditions, this update will provide a means to continue to monitor the performance of the area before, during and after pool raise. [ON HOLD PENDING ANSWERS TO QUESTIONS PREVIOUSLY SUBMITTED; ADDITIONAL QUESTIONS WILL BE FORMULATED FOR NALCOR TO RESPOND TO ONCE THE SEED AND IDRIS REPORT IS AVAILABLE FOR REVIEW.]

10.1.4 Hydrological risk in terms of generation capability is well understood as documented in the studies conducted for the project. With average annual energy of 4.93 TWH/year established by using long-term flow records, the power purchase agreement with Emera allowed Emera to claim 20 percent of the power for 35-years with the commitment to build the transmission system to Nova Scotia, and Nalcor and their special purpose companies using the rest of the power in the Labrador and Newfoundland system. Long-term generation is assured

by the WMA that provides storage at Churchill Falls and a means of operating the Churchill River to near-optimize the power production.

10.1.5 Hydrological risk in terms of construction diversion flows at Muskrat Falls have been satisfactorily studied and cofferdam heights and means of diversion have been designed to account for ice jams as well as flood flows with a return period of 20-years; 40-years for the ice jam events. Mitigation of flooding event risks beyond these normally assumed return-period events will be the responsibility of Nalcor Energy.

10.1.6 Construction safety requires contractors to supply their Health, Safety and Security Plans as part of their required submittals. They must follow the generally-high standards established by Nalcor Energy which follows a 'safety first' philosophy. We understand that Nalcor intends to strictly monitor these plans to ensure these requirements are met.

10.1.7 The risk of problems associated with transportation are mitigated to some extent by Nalcor providing storage facilities at two locations as well as providing transportation to the sites of the projects. Risk associated with transportation of materials, equipment, and supplies to these facilities is the responsibility of the contractors. Risk still exists using overseas suppliers, however, these shipments will be closely monitored as required by Nalcor's overarching transportation plan by the Integrated Project Team.

10.1.8 RFPs and Contracts reviewed to date are generally satisfactorily written and similar with respect to terms and conditions imposed on the suppliers and contractors. The contracts convey to the parties the clear responsibilities of the contractor as well as Nalcor, with no ambiguities detectable by the IE in the documents we have reviewed to date. Nalcor has established a system wherein they weigh the bid amount with the security provided (performance bond amount, letters of credit, and parent-company guarantees) to arrive at a satisfactory level of risk and to keep the price as low as practical. We normally do not see this level of balancing all factors considering risk to reduce cost on other projects we are aware of, but find the methodology employed by Nalcor to be satisfactory for the projects.

For several of the contracts that involve contractor procurement of equipment, supplies, and materials as well as the necessity to engage subcontractors, we note Nalcor has not required a Labour and Material Bond; MWH believes that further consideration of this protection be included in the contracts.

10.1.9 Based on the limited number of large contracts we have reviewed, it is our opinion that the DG3 cost estimate was robustly prepared, following the general procedures outlined in the AACEI for a Class 3 estimate. We differ from Nalcor's opinion as to the level of accuracy of the estimate in that we strictly follow the recommendations of AACEI for this level of estimate wherein they allow a -20% to a + 30% allowance for estimating accuracy.

10.1.10 Construction to date pertaining to the contracts that MWH is required to review is limited to the Bulk Excavation contract, CH0006, that currently is on, or ahead of, schedule and at

Revis 10.1.9. in in context AACEI states that a Class 3 Estimate reflects a 10% to 40% project definition with an expected accuracy range of Low -10% to +20% and +10% to +70%. Nalcor's estimate is +10%.

SECTION 10

budget levels. We are not aware of any change orders issued to this contract that Nalcor has apprised MWH of that would increase the cost above the contract amount. MWH has recently been made aware by Nalcor that an Acceleration Claim is pending and is under discussion between the parties.

We have reviewed the Integrated Project Schedule prepared by Nalcor and find that it is generally complete as far as listing contracts, but it is a simplistic Gantt chart without activity linking, critical path(s), float time, etc., and is not suitable to the level of detail we require and had expected to view to allow us to form opinions. Until we view more large contracts under construction and obtain the P6 classic CPM view of the project schedule, we cannot express an opinion as to the likelihood of the contracts being completed as scheduled.

10.2 RECOMMENDATIONS

1. Nalcor should consider including in some of the contracts the requirement for a Labour and Materials Bond (LMB), where extensive equipment will be purchased by the contractor or the use of anticipated subcontractors and suppliers is required by the contractor. A suitable analysis to support this decision to require a LMB for Nalcor's protection and overall project schedule and cost adherence should be performed to guide the decision to support the decision.
2. Within 120 days of Financial Close, Nalcor should furnish to the IE a complete P6 CPM schedule that includes the extensive task list (over 6000 tasks) to allow the IE to review the critical path schedule and float. The purpose of this review would be to independently verify schedule accuracy and determine if the currently targeted completion date is achievable.
3. Within 60 days of Financial Close, Nalcor should furnish to the IE for review the complete analysis of the North Spur including the laboratory test reports that determine the strength of the soils under the loadings that it will sustain during the life of the project and that address the questions contained in Section 2 of the IE's report that have not yet been addressed. Additionally, the IE would expect to be furnished the technical reports of Dr. Seed and Dr. Idriss as noted in Section 2 when these reports become available.
4. In accordance with the philosophy pertaining to the owner-prepared cost estimate and following AACEI, within 10 days of Financial Close, the Nalcor should furnish to the IE the AACEI Class 2 cost estimate that is required for the financing for review and comment. Within 600 days of Financial Close, an AACEI Class 1 estimate should be furnished to the IE for a mid-point check on the cost estimate.

Nalcor does not agree.

Agreement LC-PM-082 applies here & states that MWH shall:

1. Review the Project Schedule and each of the construction schedules and determine whether adequate provisions have been made for design, equipment procurement, fabrication, shipment and installation, start up, shakedown, testing and commissioning of the project. Any unknown or variable elements in the schedule will be identified along with potential risks."

MWH should limit these comments to the scope of work and not insist on anything further.

MWH should have sufficient experience to ~~assess~~ review the schedules provided to determine if Nalcor is planning the work appropriately - ~~independently~~. The detailed scheduling and CPM is the Contractor's responsibility and is clearly identified in the contracts.

This is redundant - The monthly construction reports will provide updated cost data.