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David, as discussed.

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## Other Assurance Reviews

In fulfilling its mandate, throughout the construction period the Committee will examine issues such as whether management processes and controls are well designed and followed. The Committee provides the following update:

### 1. Project Controls for Cost and Schedule

Under the reporting protocols established with Nalcor, the Committee has access to a significant amount of Project information, including contractor reports, reports prepared for senior management and the Board of Directors, risk reports and reports of the Independent Engineer. To supplement these sources of information, the Committee also meets regularly with Project senior officials to pose questions regarding observations and to discuss overall Project progress. As part of the Committee's due diligence, as noted in the September 2014 Committee Report, Ernst & Young, LLP (EY), in its role as consultant to the Committee, was engaged to undertake a review of the Project Controls for Cost and Schedule which included an assessment of the:

- adequacy of Nalcor's cost and schedule management processes and controls as it manages and reports on the execution of the Project;
- consistency of Nalcor's use of these processes and controls in key areas of the Project; and
- extent of reliance the Committee could place on Nalcor's reporting for cost and schedule forecasts.

The scope of work did not include a review of the estimating processes and cost baseline process, the accuracy of the forecasted costs or schedule dates for the contractors or the Project as a whole or change management and risk management processes. EY has completed execution of this work and has finalized their report outlining key observations and recommendations to the Committee.

The report acknowledges that:

- Key project control processes have been developed;
- Project reporting is in place summarizing key information on construction cost and schedule;
- Nalcor continues efforts to work with contractors on maintaining a disciplined approach to project management, control and reporting;
- Proactive measures are taken to manage potential claims;
- There is active formalized management of cost and schedule issues and risks arising during the Project;

- A matrix organizational structure has been established, responsible for managing the Project; and
- Nalcor is using a set of conventional management processes and controls for the Project.

The report, however, also outlines some key aspects of the management processes and controls that at the time of EY's review were not fully developed and deployed as follows.

#### **Key Schedule Management Process and Control Risks and Issues**

1. *For three of five of the samples selected, contractor Control Schedule Baselines Documents and Schedule Development and Control Plans were incomplete and/or did not meet the criteria defined in Nalcor's processes.*
2. *A majority of contractors' schedule updates included in the Sample were not systematically rolled up into the Nalcor Integrated Project Schedule (IPS).*
3. *A completion date has not been established for finalizing an integrated baseline of contractor and IPS schedules to correct the issues noted in #1 and #2 above.*
4. *The IPS development and maintenance process is not fully documented.*

#### **Key Cost Management Process and Control Risks and Issues**

1. *The conditions and processes for rebaselining cost and schedule are not defined in the Project's control processes and procedures. The Oversight Committee's understanding of such conditions and processes is an important foundation, as it conducts its oversight activities.*
2. *Nalcor uses a relatively basic approach to contingency forecasting which in our (EY) experience is not consistent with the expected practices for a project of this scale and complexity. It is not clear whether the cost contingency forecasts for the Project are adequate.*
3. *The Project does not define thresholds for variance management, reporting, and escalation purposes. We would normally expect these to be in place as they assist in giving clear indications of the severity of issues and the need to escalate to key stakeholders, such as the Oversight Committee.*
4. *A fully quantified risk or trend has not been documented for the most significant challenges related to work performed by a key contractor included in the Sample. The scale of potential challenges is not quantified in the summary reporting made available to the Oversight Committee.*

The report advises that until such time as the noted management process and controls risks and issues are addressed, the completeness and accuracy of Project schedule and cost forecasting status reporting to the Committee cannot be fully verified. The Committee has directed Nalcor to define corrective action in response to these observations and the Committee will continue to monitor implementation of these actions.

## Nalcor Response to the Observations

Nalcor Energy executes its management of the Muskrat Falls Project through its Owners Project Management Team (Owners Team). The Owners Team is in place to directly oversee and manage contractor performance and ensure current and outlook information is provided to senior management, the Boards of Directors, the Oversight Committee, the Independent Engineer, Canada and members of government on a timely basis.

There are multiple processes and inputs into the Owners Team to enable them to assess project performance for decision making and ongoing management of the Project. One of these inputs is contractor supplied cost, schedule, safety and quality data. The Owners Team overlays analysis and perspective on the information available to them, uses this information to oversee and manage the project on an ongoing, real time basis, ensuring that commercial considerations do not cloud actual performance, and information reported reflects such perspective.

Due to the significant commercial sensitivity of multiple interactions with contractor(s) on an ongoing basis, it is critical to ensure that the Oversight Committee and members of government are informed of developments and outlooks on a timely basis, while at the same time ensuring formal documentation provided to the oversight process and available to the public, and thus accessible to contractors, is not available publically until such time any related commercial issues are resolved with contractors. The intent is to ensure oversight participants are aware of unfolding events on a timely basis, while at the same time ensure commercially sensitive information is not shared with contractors in a manner which could be used against the Project in an unacceptable manner. The two key channels for oversight information is verbal interaction at Oversight Committee meetings and ongoing discussion on a regular basis covering all topics. This is supplemented by regular printed reports and documentation provided on a monthly basis prepared in such a way that commercially sensitive information is not available to the contractor until such commercial sensitivity has passed.

The Oversight Committee has direct access to both Nalcor and LCP leadership, engages in regular meetings and Site Visits to review and discuss project progress and emerging risks, and also has the benefit of the Project's Independent Engineer to advise on relevant technical issues. We observe that E&Y advocates inclusion of these types of "strategic" risks in 'project' level reporting, but our management approach, consistent with the advice provided by our Risk Consultant has been to separate them and to discuss strategic risks at the most senior leadership level. As such risks materialize, disclosure and discussion at the leadership level is a more appropriate way to evaluate and discuss strategies to address such issues than to provide 'reporting' on a project basis.

In reviewing the key findings, LCP believes that E&Y has generally described LCP's project control management processes for cost and schedule. LCP has not implemented a full

Earned Value Management System for LCP, but rather has focused its use of such a process on construction progress for the Project. E&Y has advocated for the use of a full Earned Value Management System, which would include supplier procurement, engineering, and fabrication processes. LCP made a conscious decision not to implement such a process for the following reasons:

- a) At the most fundamental level, such value is not truly 'earned'. Unlike construction activities, where concrete is placed at the owner's site, or transmission towers are erected, the project owner has no title to activities undertaken by a supplier at their premises. Internal supplier engineering and fabrication have no value until they result in a completed product and are shipped to site. Supplier progress is measured by the LCP project team directly, and estimates of supplier progress are completed by the LCP project team directly.
- b) From a commercial perspective, LCP has no claim to partially completed internal work and would not be in a position to realize partially earned value in the event of a dispute.
- c) To the extent that we rely on suppliers to report on their progress, visibility into contractors' progress would be clouded by the fact they are reporting on their own progress.

For these reasons, LCP has elected to measure suppliers' progress through direct progress reporting and an assessment of their ability to achieve key milestones.

In specific response to the issues raised above by Ey, Nalcor provides the following response:

1. For three of five of the samples selected, contractor Control Schedule Baseline Documents (CSBD) and Schedule Development and Control Plans (SDCP) were incomplete and/or did not meet the criteria defined in Nalcor's processes.

Response: These are contractor documents, and LCP has identified deficiencies that must be corrected until they can be accepted by LCP.

2. A majority of contractors' schedule updates included in the sample were not systematically rolled up into the Nalcor IPS.

Response: Referring to observation 1, incomplete or otherwise non-compliant schedules would not be accepted into the IPS. Issues with them must be resolved before they can be included. Two of the five contracts

were awarded in late 2014, and the respective contractors had not completed their schedule input during the test period. One other contract (Astaldi), has not completed an acceptable schedule for input into the IPS. Nalcor is working diligently with this Contractor and all Contractors to provide schedules which meet the contractual obligations. This is an ongoing effort.

3. A completion date has not been established for finalizing an integrated baseline of contractor and IPS schedule to correct the issues noted in #1 and #2 above.

Response: LCP is working diligently and cooperatively with each of its contractors to achieve complete, accurate, and up-to-date information for inclusion in the IPS. Nalcor is working with the Contractors at senior management levels and at site level to assist them to produce acceptable schedules which comply with the contract milestone dates, until such time as an acceptable schedule is developed and accepted by Nalcor the IPS baseline schedule will be used. Nalcor is working towards a re-baseline of the IPS in Q4 of 2015, ensuring a comprehensive outlook with appropriate mitigation activities incorporated, ensuring commercial considerations are appropriately considered.

4. The IPS focuses on three domains, namely construction, commissioning, and operations start-up. The IPS does not include information on three other domains, namely, engineering, procurement, and fabrication.

Response: Nalcor has decided to focus on the construction, commissioning and startup activities in the IPS for the following reasons. Engineering as performed mainly by SNC-L has been completed with only follow-on engineering remaining. Procurement is largely complete and the few remaining procurement activities are being managed effectively and inclusion in the IPS would not provide any appreciable benefit. The remaining activities which fall under engineering, procurement and fabrication are being performed under EPC type contracts and as such are being managed at the Contract level and Nalcor considers this to be managed more effectively outside of the IPS

In relation to contractor earned value, E&Y advocates that it would provide additional useful information to the Oversight Committee. LCP disagrees with this position. As previously discussed, the contractor efforts in engineering, procurement, and fabrication are not truly earned, and LCP believes that a direct assessment by project management team members

of contractors' progress in these areas and their ability to achieve critical project milestones is a more useful approach than an arbitrary view of contractor progress through an 'earned value' lens.

The detailed comments and observations provided in relation to the schedule management process compliance provide further detail regarding the 4 key findings noted above, with one addition. Reference is made to reported progress "... could be viewed as subject to interpretation and not wholly objective." Given the nature of the differences presented in Appendix C, there is no basis to assert the reporting is not objective. LCP acknowledges the process is necessarily subjective, and requires appropriate insight and experience to properly interpret and report contractors' progress.

LCP agrees that it is important to have complete and accurate contractor reporting. It is also essential that the Project Team have its own assessment of contractor progress on all components of the Project in order to have a first-hand viewpoint of each contractor's progress.

Consideration the design of the LCP cost management process, LCP offers the following comments regarding E&Y cost management process design:

1. Cost variance thresholds are not defined. These thresholds are used to establish a permissible variation from budget before documented corrective action must be taken. Variance thresholds are also used to define what constitutes a variance requiring escalation for senior management's attention.

Response: While a threshold is not defined, a trigger is. Changes to quantities or costs in excess of the approved control budget amount require change control board approval at the AFE level, if final forecast cost information is forthcoming which results in any of the LIL, LTA or MF approved AFE's being exceeded then a revised AFE will be produced and submitted for Board approval. The Project team cannot commit to costs which exceed the approved AFE.

2. The conditions and processes for rebaselining are not defined in the Project's control processes and procedures. Management indicated that rebaselining of the program was at their discretion and dependent on a variety of factors including forecast and rate of drawdown on contingency.

Response: LCP agrees this is a project team management decision. A decision to rebaseline the project is a significant management decision that requires consideration of multiple factors. These factors include but are not limited to potential AFE exceedance, as described in 1 above, if a final forecast cost indicates potential exceedance of an Approved AFE then this would call for a cost rebaseline. Schedule rebaselines

are only carried out when there is an accumulation of changes that justify such an action. Nalcor is currently working towards a schedule rebaseline. The decision to carry out a cost or schedule re-baseline is not a Project Control process rather such a decision is made at Senior Leadership levels based on the factors explained above.

3. Detailed checklists have not been developed for the use of Nalcor cost controllers to validate contractor costs and ensure review consistency.

Response: The contractor cost validation and payment terms are explicitly defined in the contracts that cost controllers are expected to manage. Nalcor considers that the existing cost validation methods are suitable however will consider the use of checklists if there is an identified consistency concern. Nalcor internal audit will address this issue.

4. The shape of the contingency curve is conventionally defined by aggregation of the forecasted materialization of estimate uncertainties or tactical risks. The current basis of the forecast contingency drawdown curve did not include quantified material risks. This shortcoming significantly limits the ability to compare the rate of realized cost risks versus original forecast, and assess the need for additional contingency or the rebaselining of the Project's cost and schedule.

Response: Assessment of the need for additional contingency or re-baselining cost and schedule are management decisions. In relation to material risks, these risks are discussed and reviewed directly with the Oversight Committee by Project Leadership, and are not incorporated in the official IPS and project budget until the applicable change control processes have been complete.

The potential for additional capital requirements or schedule impacts are discussed directly at the leadership level, and once a decision to adjust the project budget or schedule is approved, then working documents for the Project are updated accordingly through the re-baseline process.

With respect to the detailed findings, Astaldi's performance and slow start up has been discussed with the Oversight Committee directly by Project leadership. LCP does not consider it appropriate to deal with strategic issues through management level reporting, particularly given their commercial sensitivity, until the commercial sensitivity has been addressed.



LCP does not universally use contractors' forecasts as the basis for the FFC, and verifies contractor reporting through other methods, including direct quantity estimates and progress reporting. LCP believes this is prudent from a management and commercial perspective. It provides the project team with first-hand information to validate and confirm contractors' performance and also ensures the project team is equipped with the information necessary to address any commercial disputes.

In summary, LCP's processes address the key reporting needs of the project, and provide a suitable basis for management decision making. In conjunction with the other processes used to inform the Oversight Committee, the Oversight Committee is provided with the information necessary to understand project performance and also to understand risks that could affect it. The Project Controls processes used by the Project Team have been extensively reviewed previously by Navigant, Manitoba Hydro International, Internal Audit and most recently by the Independent Engineer who reviews the Project Management role of the Nalcor Project team on an ongoing and monthly basis. All reports so far have been of a positive nature and indeed, if any of the Project Controls processes were deemed insufficient, the Independent Engineer would have identified such a deficiency to Canada, none have been reported or identified by the Independent Engineer to date. Whilst Nalcor considers all advice in these matters, the responsibility for Project Management resides with the Nalcor Project Team and Nalcor is satisfied that the Project Controls processes currently in place are suitable, adequate and reasonable and are being deployed appropriately for the purposes of project cost and schedule reporting.

A full copy of this report can be found at [insert link on our website].