From: Bown, Charles W. <cbown@gov.nl.ca>
Sent: Monday, June 25, 2012 1:58 PM
To: Paul Wilson <plwilson@mhi.ca>
Subject: Re: Nalcor Visit June 18-22nd

Thanks, Paul for the very thorough report. I'll review with Walter in the morning and then we can discuss.
Charles

Sent Via BlackBerry

From: Paul Wilson
To: Bown, Charles W.
Cc: Allen Snyder (amsnyder@[redacted]) ; Mack Kast (mkast@[redacted]
Sent: Mon Jun 25 17:24:39 2012
Subject: Nalcor Visit June 18-22nd

Hello Charles, I thought I would give you an update on our activities last week during our visits to Nalcor.
Three members of the team

- Gerry Proteau (Transmission Lines)
- Al Snyder (SOBI, Wind, and Thermal)
- Tom Moffatt (Muskrat Falls Generating Station)

arrived on Sunday and began meeting with Nalcor Monday and Tuesday. For the most part these meetings went very well until Tuesday afternoon when Nalcor thought we were getting offside with the Muskrat Falls scope of work. Perhaps we were offside as my staff had an older version of the scope of work document. Craig Kellas (Load Forecast) and I arrived Tuesday night and I worked with my team to determine if they had sufficient information to continue and at this time. I believe we have sufficient information for an opinion with a high level review.
Wednesday was devoted to Load Forecast and the thermal plant reviews which went well.
Les Recksiedler and Pei Wang arrived Thursday night (HVDC Stations), these meetings were carried out Thursday with a follow-up on Friday.
Nalcor provided us with summary documents, Single Line Diagrams, Mini specifications, schedules, and high level cost estimates when we requested them. We will refer to the documents in our report; however, the detailed information if confidential and may not be disclosed.
Issues:

1) Nalcor costs have increased for both the Isolated Island and Infeed Options, in some cases substantially. However, Nalcor has also reduced the amount of contingency required to minimize the impact. This will be documented in their DG3 package. Our team has not identified anything that would appear out of the ordinary with these cost increases – they are explainable and rationalized.
2) Schedule. The load forecast won't be complete until the end of this week, and Nalcor is working hard to have the DG3 base case results available for the financial team July 5 and 6th. The availability of this base case will be confirmed this Thursday by Nalcor. We will also have a better idea on the schedule for the sensitivities once our staff are on the ground July 5/6.
3) Confidential Information. As there is confidential information being shared with MHI, it may be prudent to have Nalcor review the draft report prior to public release. I will discuss this item with you as the client and your wishes will prevail in this matter.
4) Overhead line cable selection is an identified technical issue MHI will have to find a way to address. See note below.
   MHI has reviewed the following documents supplied by Nalcor prepared by SNC Lavalin describing the methodology and selection of the optimal conductor for the HVdc lines.
   -HVdc Conductor Optimization: #505573-480A-47ER-0002
   -HVdc Conductor Selection: #505573-4622-43ER-0001
   MHI concurs with the conclusion in the reports that the conductor selected (A1 ASC 91-Strand) is the most cost

effective conductor out of the varieties studied; however, we are concerned with the use of this relatively weak all aluminum conductor in the heavy ice and combined wind loading zones found along the long range mountain ridge. While a aluminum strand conductor has good strength properties and predictable behavior under normal operating conditions, we are concerned this conductor will incur too much unrecoverable mechanical creep during the multiple ice and wind loading events expected in the region. This may lead eventually to ruptured strands or outright conductor failure sometime in the future during an extreme weather event like icing or galloping.

MHI may recommend that Nalcor revisit their conductor selection and satisfy themselves that the risk to long term reliability that the all-aluminum conductor presents is one they are prepared to take. MHI would likely recommend Nalcor study the use of stronger aluminum alloy conductors in the heavier loading regions, and perhaps consult with an expert in the overhead conductor field for another opinion.

It would be useful to have your thoughts on this. Nalcor has used the A1 conductor in the past and it has worked for them. A new conductor may add 20% to the cost of the conductor over the length applied. Note that transmission line costs have gone up substantially since DG2. This may be one of those items that fall into the common accepted practice of Newfoundland.

Our technical team is starting to draft their reports on their findings, which we will tie together with the financial teams findings July 5/6. The sensitivity part of the report will be left until those items are completed by Nalcor.

Also, MHI is preparing a revised wind study scope of work with effort and schedule this week for your consideration.

My regards,

Paul Wilson, P. Eng.
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