

MHI DG3 Analysis – Terms of Reference

SCHEDULE "A" **SCOPE OF WORK**

Objective

MHI (the Consultant) shall review work completed by the Proponent (Nalcor) since Decision Gate 2 (DG2) in preparation for Decision Gate 3 (DG3). The review shall include an assessment of the Cumulative Present Worth (CPW) Analysis of the various components for each of the two Options, including a reasonableness assessment of all inputs into that analysis. The tests of reasonableness for this assessment are generally defined as the work following:

- (a) Good project management and execution practices, and
- (b) Good utility practices of the majority of electrical utilities in Canada while recognizing the unique electrical isolated system on the Island of Newfoundland and common accepted practice in Newfoundland and Labrador regarding the electrical system. Practices unique to Newfoundland and Labrador will be noted in the body of the MHI report.

The Consultant will also provide such advice and other services as may be required from time to time by the Government of Newfoundland and Labrador (Client).

Services

The Consultant acknowledges that the Client is relying on the skill and knowledge of the Consultant in performing the Services. The Consultant shall exercise the degree of skill, care and diligence required by customarily accepted practices and procedures for such a Contract.

The Consultant shall only use key personnel to perform the Services who have been named by the Consultant in the Proposal and who have been accepted by the Client. The Consultant may only substitute or replace the accepted key personnel with the prior written agreement of the Client.

The Consultant will enter into a Non-Disclosure Agreement with Nalcor Energy to ensure that MHI receives all the necessary information to complete the Services while protecting the commercial sensitivity and confidentiality of information it receives from Nalcor.

The Services which the Consultant shall perform or cause to be performed with diligence, skill and care include the following:

- a) A review of work performed by Nalcor related to the Muskrat Falls and Labrador Island HVdc Link (LIL) and the Isolated Island Option subsequent to DG2. The level of review shall be sufficient for the Consultant to report on whether Nalcor has performed work with the degree of skill, care and diligence required by customarily accepted professional practices and procedures completed in the performance of similar work. This work will be undertaken by examination of design reports, technical documentation or memos, in direct meetings with Nalcor, or with other data and information provided by Nalcor during meetings and working sessions.

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The review will focus on the reasonableness of existing engineering or financial documents used in the development of the CPW analysis including design documents, design studies, material and equipment specifications, cost estimates and schedules. MHI's final report will include a summary of which documents were reviewed, a summary of meeting notes with Nalcor, identification of salient points necessary for the CPW analysis, and if the various studies were reasonable, and where applicable, prepared in accordance with good practices. The technical assessment will focus on the following areas that are generally used as inputs into the CPW analysis:

- i. **Review of Load Forecast Update including:**
 - An assessment of the reasonableness of the 2012 Load Forecasts for the Island Interconnected System. Two load forecasts are being prepared, the first for the Isolated Island Option, and the second for the Interconnected Island Option.

Information required :

- Updated 2012 Load Forecasts for each option

Outcomes:

- A report on the reasonableness of the 2012 load forecast as the basis for the development of the Generation Expansions Plans and the subsequent CPW analysis.

- ii. **Review of the AC integration studies completed for the Muskrat Falls and LIL HVdc configuration options to establish the reasonableness of their use as DG3 cost inputs.**

Information required:

- AC Integration studies report

Outcome:

- A report on the reasonableness of the results of the AC integration studies as inputs required into the CPW analysis.

- iii. **Review of the Muskrat Falls GS post DG2 design changes, cost estimates, and construction schedules to determine their reasonableness as inputs to the CPW analysis.**

Information required:

- Muskrat Falls GS current basis of design
- Muskrat Falls GS updated design data and information including AC switchyards and transmission lines to Churchill Falls
- Muskrat Falls updated master cost estimate
- Muskrat Falls updated high level master project schedule

Outcome:

- A report on the reasonableness of the Muskrat Falls GS capital cost estimate and schedule as inputs to Nalcor's DG3 CPW analysis.

- iv. **Review of the HVdc Converter Stations and associated AC switchyards. This will include a review of the single line diagram, revised cost estimates, construction schedules, and DC project definition to determine their reasonableness as inputs to the CPW analysis.**

Information required:

- Information as listed above
- HVdc updated master cost estimate
- HVdc updated master project schedule
- Shore electrode cost estimates, and construction schedules.

Outcome:

- A report on the reasonableness of the transmission capital cost estimates and schedule as inputs to Nalcor's DG3 CPW analysis.

- v. **Review of the overhead HVdc transmission line and associated AC collector transmission lines including its reliability design criteria, route details and final metrology review. A review of tower and line designs, review of cost estimates, and construction schedules will be conducted to assess the reasonableness of the transmission line design parameters as inputs to the CPW analysis. MHI will work with Nalcor to obtain a common understanding of the HVdc transmission line design philosophy and it's alignment to the design details provided and operating practices. This undertaking will clarify both the business and local issues implicit in the selection of reliability return period.**

Information required:

- Information as listed in the above paragraph
- Transmission line design basis
- Transmission line updates to the master cost estimate
- Transmission line updates to the master project schedule

Outcomes:

- A report on the reasonableness of Nalcor's transmission line design and rationale of design criteria as inputs to Nalcor's DG3 CPW analysis.

- vi. **Review of the Strait of Belle Isle (SOBI) marine crossing cost estimates and construction schedule to assess their reasonableness as inputs to the CPW analysis.**

Information required:

- Marine crossing capital cost estimates
- Marine crossing master project schedule

Outcomes:

- A report on the reasonableness of Nalcor's SOBI cost estimate schedule as input to the DG3 CPW analysis.

- vii. **A review of the other changes made by Nalcor to cost inputs from DG2 to DG3 for both the isolated Island and interconnected Island alternatives.**

Information required:

- **Changes in costs between DG2 and DG3**
- **Supporting information to explain the changes in costs.**

Outcome:

- **A report on the reasonableness of Nalcor's cost inputs for the other items adjusted since DG2.**

- viii. **A review of the CPW input changes and results for the DG3 inputs for both the isolated Island and interconnected Island alternatives. The CPW analysis review will validate the results for the base case of the two options computed by Nalcor. MHI's review will include an assessment and commentary on the sensitivities on the CPW analysis:**

- **Revised capex cost variations**
- **Fuel price variations**
- **Interest Rate variations.**

Outcome:

- **A report on the reasonableness of the inputs and results of Nalcor's CPW Analysis inputs for both the isolated Island and interconnected Island alternatives, including its sensitivity analysis.**

- b) **Preparation of a final report anticipated to include, as a minimum the following:**
- **An executive summary;**
 - **A description of the Consultant's review team;**
 - **A description of the methodology used to complete the Services;**
 - **A summary of the results of the review, including a discussion of the materiality of any observations and recommendations made as well as a discussion of the steps taken to address such matters.**
- c) **Provision of ongoing support to the Client.**

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