IN THE MATTER OF
the *Electrical Power Control Act*, RSNL 1994,
Chapter E-5.1 (the "*EPCA*") and the
Public Utilities Act, RSNL 1990,
Chapter P-47 (the "*Act*"), as amended;

AND

IN THE MATTER OF
an Application by Newfoundland and Labrador Hydro ("Hydro") for an Order:

1) approving its 2012 capital budget, pursuant to s.41(1) of the *Act*;
2) approving its 2012 capital purchases, and construction projects in excess of $50,000, pursuant to s.41(3)(a) of the *Act*;
3) approving its leases in excess of $5,000 pursuant to s. 41(3) of the *Act;*
4) approving its estimated contributions in aid of construction for 2012, pursuant to s. 41(5) of the *Act*; and
5) fixing and determining its average rate base for 2010, pursuant to s. 78 of the *Act*.

PUBLIC UTILITIES BOARD
REQUESTS FOR INFORMATION
PHASE III

PUB-NLH-1 to PUB-NLH-38

Issued: October 11, 2011

Report - Upgrade Transmission Line Corridor – Bay d'Espoir to Western Avalon – Vol. II, Tab 10 (the "Report")

P3-PUB-NLH-1 On p. 1 of the Report it is stated that the east and west 230kV systems from Bay d'Espoir are heavily and lightly loaded respectively. Please define what Hydro means by these terms.

P3-PUB-NLH-2 On p. 2 of the Report it is stated, "*Given that the Lower Churchill Project has yet to receive final project sanction, analysis of the Bay d'Espoir East 230 kV transmission system must consider both the continued Isolated Island Scenario and the Labrador Infeed Scenario. In effect, the proposed project must be appropriate to either an Isolated Island or Labrador-Interconnected future.*" Does this mean that any issues identified with the Bay d'Espoir East 230kV transmission system for the Isolated Island Scenario must have a solution that can be applied to correct issues identified under the Labrador Infeed Scenario?

P3-PUB-NLH-3 Further to P3-PUB-NLH-2, with reference to p. 2 of the Report, what issues have been identified with the Bay d'Espoir East 230kV transmission system: i) under the Isolated Island Scenario; and ii) under the Labrador Infeed Scenario?

P3-PUB-NLH-4 Further to P3-PUB-NLH-2, with reference to p. 2 of the Report, what are the potential solutions to the issues identified: i) under the Isolated Island Scenario; and ii) under the Labrador Infeed Scenario?

P3-PUB-NLH-5 On p. 2 of the Report, it is stated that the current report deals only with the Bay d'Espoir to the Western Avalon section of the 230kV east system and that any necessary upgrade project for the Western Avalon to St. John's section will be included in the 2013 Capital Budget. Will decisions on this latter section affect the current proposed project in any way? If so, provide details.

P3-PUB-NLH-6 On p. 2 of the Report, it is stated that the Western Avalon to St. John's section can only be considered once the decision on the Lower Churchill Project can be made and that Hydro plans to submit necessary upgrade projects with its 2013 capital budget application. Is the work on this section of the 230kV transmission system included in the 5-year Capital Plan in Section H and Appendix A to the 2012 Capital Plan?

P3-PUB-NLH-7 As the Transmission Line Corridor Upgrade is required for the Labrador Infeed Scenario, as stated on p. 6 and p. 38 of the Report, will any part of the costs be included as part of the construction costs of the Infeed Project? If not, why not?

P3-PUB-NLH-8 On p. 7 of the Report, it appears that the termination points of some transmission lines are incorrect. Please provide a revised p. 7 with the correct termination points for TL202 and TL206.

P3-PUB-NLH-9 Information contained on p. 7 and p. 8 of the Report suggests that the loadings for transmission lines TL202, TL203, TL206, TL207 and TL237 are dynamic across an ambient range of 0°C to 30°C. How does Hydro use these loadings in scheduling Holyrood Plant generation or relieving the transmission congestion on the east transmission system?

P3-PUB-NLH-10 Are transmission lines owned by Hydro, other than those listed in the Report, rated in a dynamic way or does Hydro use a static rating?

P3-PUB-NLH-11 What environmental factors, other than temperature, such as wind speed, does Hydro use in setting these dynamic ratings? Please provide the values for each factor and the basis for each.

P3-PUB-NLH-12 From the Report, it seems that Hydro is assuming that all Gas Turbines will be available to increase the amount of load that can be served from the eastern transmission system. What has been Hydro's experience with the failure to start of the Gas Turbines and how would that affect the ability to serve load?

P3-PUB-NLH-13 On p. 8 of the Report, it is stated that for Bay d'Espoir load in excess of 353MW on 15°C days, Hydro must operate generation at the Holyrood Thermal Generating Station. How many times has this occurred since 2006? List the number of incidents, the date and the duration of each.

P3-PUB-NLH-14 On p. 8 of the Report, it is stated "*In an optimal situation the generators at Holyrood would only be dispatched after all hydroelectric generators on the island are brought online (while maintaining sufficient reserve to withstand the loss of the largest unit).*" In order to ensure that the annual energy needs of the Island system are met doesn't the Holyrood Plant have to be dispatched prior to dispatching all available hydroelectric resources? How does the maintenance of reserve referred to in the quote fit with the underfrequency load shedding scheme?

P3-PUB-NLH-15 The reason given on p. 8 of the Report for utilizing generation at Holyrood is to protect against transmission overloads east of Bay d'Espoir. The guide that is used, Table 3, to dispatch Holyrood generation is not a function of transmission loading east of Bay d'Espoir but of the total system generation. Please explain.

P3-PUB-NLH-16 Referring to the guide, Table 3, can Hydro demonstrate, with the use of historical data, that the transmission system east of Bay d'Espoir will be

congested each time the guideline calls for dispatch of the Holyrood Plant?

P3-PUB-NLH-17 Referring to the guide to operate Holyrood generation, Table 3, how is the Optimal Threshold to Bring an Additional Holyrood Generator Online calculated? What makes this value optimal?

P3-PUB-NLH-18 In the Report, the operation of Holyrood generation is described as being inefficient. Please provide the cost savings that will be achieved by reducing the need to use Holyrood generation from the existing threshold to the optimal threshold.

P3-PUB-NLH-19 Please provide a revised p. 9 with the correct termination point for TL237.

P3-PUB-NLH-20 On p. 9 of the Report, Hydro states that there is "*significant exposure for unsupplied load*" in the 2011 to 2016 timeframe in certain circumstances. What is Hydro proposing to do to mitigate this exposure?

P3-PUB-NLH-21 On p. 15 of the Report, it is stated "*It should also be noted that the duration of the contingency could be quite extensive if a unit at Holyrood were to be damaged or otherwise out of service.*" Please provide details as to what is meant by "*quite extensive*".

P3-PUB-NLH-22 Please provide a system load flow for the 2012 forecasted peak and list the assumptions on which the load flow is based.

P3-PUB-NLH-23 On p. 16 of the Report, the second paragraph states that analysis performed in 2009-10 indicated that a "*violation in the firm system capacity of the transmission system east of Bay d'Espoir would not occur until the end of the five year planning horizon. A summary of this analysis is provided in Table 6*". Specifically, when was this analysis completed?

P3-PUB-NLH-24 With reference to Table 6, on p. 17 of the Report, specifically when was the analysis completed for the 2010-11 forecast year which revealed violations in the firm transmission capacity east of Bay d'Espoir occurring in 2010 and beyond?

P3-PUB-NLH-25 With reference to Table 6, on p. 17 of the Report, please provide details on the specific factors that contributed to the unexpected, major increase in load forecast over such a short period of time, and explain how they impacted Hydro's load forecast.

P3-PUB-NLH-26 On p. 16 and p. 17 of the Report, it is stated that "*Given the near-term violation of the firm transmission capacity criterion, a detailed investigation was performed to identify acceptable transmission system alternatives that will meet all technical requirements.*" When was this "*detailed investigation*" commenced and completed?

P3-PUB-NLH-27 On p. 17 and p. 18 of the Report, it is stated that "*No additional generation would be installed east of Bay d'Espoir in a continued Isolated Island scenario until the 2022 timeframe when a 170 MW combined-cycle combustion turbine (CCCT) would be installed on the Avalon Peninsula. Transmission upgrades are therefore required.*" Have any alternatives employing earlier generation additions to the Avalon Peninsula such as simple cycle gas turbines or CCCTs been considered from a cost benefit perspective under either of the two generation expansion scenarios? In responding please address how these could potentially: i) alleviate or resolve the transmission issue; ii) reduce the requirements for starting units at Holyrood early in the load forecast cycle and then operating them at a more fuel efficient, higher capacity, and iii) improving the reliability of supply to the Avalon by having generation available directly at the load center.

P3-PUB-NLH-28 It appears that for stability purposes a L-G fault is used for the Isolated Island case while a three phase fault is used for the Infeed case. Reference is made in the Infeed Scenario to assistance from the HVdc line to Nova Scotia. PUB-NLH-71 of Hydro's 2012 capital budget application, Phase I, states that the Bulk transmission planning criteria includes the following test: "*Hydro's bulk transmission is planned to be capable of sustaining the single contingency loss of any transmission element without the loss of system stability*". Please compare the criteria used for studying the transmission system upgrades for both the Infeed and Isolated scenarios, highlight any differences and provide an explanation as to why the criteria would be different.

P3-PUB-NLH-29 Figure 8, on p. 22 of the Report, demonstrates that there is an angular stability issue with increased transfers which are not solved by the addition of a shunt capacitance at Come by Chance. The reason provided but not demonstrated was that the angular stability issue was a result of a voltage stability problem. As part of the Two Generation Expansion Alternatives Review, Nalcor filed a report titled "*Lower Churchill Project DC1020 HVdc System Integration Study - Volume I*" in which one of the recommendations was that the effectiveness of power system stabilizers should be investigated, including the identification of potential new stabilizers to provide benefit to the overall stability of the system. This recommendation would suggest that angular stability problems exist in the absence of voltage instability. Please demonstrate

that this instability is a direct result of voltage instability and not angular instability.

P3-PUB-NLH-30 Has the potential application of power system stabilizers within the Newfoundland system been examined in detail? If so, when was it completed and provide a copy of the analysis.

P3-PUB-NLH-31 In the Report, on p. 28 & p. 32, it is stated that the HVdc link to the Maritimes will be capable of delivering up to 475MW to the Island in the event of a loss of the HVdc system between Labrador and the Island. Is Hydro relying on the Maritime Link in its reliability planning for the Labrador Infeed Scenario?

P3-PUB-NLH-32 Will any upgrading work be required on the section of transmission line from Western Avalon to St. John's if the Labrador Infeed does not proceed? If yes, describe the required upgrading.

P3-PUB-NLH-33 On p. 29 of the Report, reference is made to integration studies related to the Labrador Infeed. Please provide a listing of what studies where performed and their results.

P3-PUB-NLH-34 On p. 29 of the Report, reference is made to a three phase fault as being severe. Is the Isolated Island system designed to survive a three phase fault?

P3-PUB-NLH-35 On p. 32 of the Report, in the first paragraph reference is made to standby generation. Please describe the quantity of standby generation being contemplated.

P3-PUB-NLH-36 Is the cost of the 153 Mvar capacity bank for Come-by-Chance referred to on p. 34 of the Report included in this budget estimate of $209,376,300?

P3-PUB-NLH-37 Has a report been completed on the entire 230kV transmission line from Bay d'Espoir to St. John's to identify the required upgrading for the Isolated Island Option and for the Labrador Infeed scenario as part of the detailed investigation mentioned in the quote in P3-PUB-NLH-26? If yes, provide a copy. If not, why not?

P3-PUB-NLH-38 Further to P3-PUB-NLH-37 has, for any other reason, a report been completed on the entire 230kV transmission line from Bay d'Espoir to St. John's to identify the required upgrading for the Isolated Island Option and for the Labrador Infeed scenario? If yes, please provide a copy.

DATED at St. John's, Newfoundland this 11th day of October, 2011.

BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

Per _____
Cheryl Blundon
Board Secretary