Q. List the various transmission system studies conducted by Newfoundland Power or its consultants and whether these studies are periodic or driven by changes in the system.

A. Newfoundland Power conducts a variety of transmission system planning and engineering studies. The Company regularly conducts studies to assess the impact of load growth and aging infrastructure on the transmission system. Where required to support requests for Board approval of transmission capital projects, such studies may be produced as formal reports.

In addition, the Company may carry out engineering studies on an *ad hoc* basis to develop solutions to identified deficiencies or constraints in the existing transmission system.

Annual and periodic studies include the following:

- Newfoundland Power updates its *Transmission Line Rebuild* Capital Project each year. Typically, the engineering associated with rebuilding a transmission line includes a review of the capacity requirements for the line. These reviews consider such matters as the impact of load growth and service reliability considerations.[1]
- Each year, the Company reviews forecast loads for its substation transformers. Forecast capacity constraints are reviewed and, if necessary, a study is completed to determine what actions are required to address the constraint.[2]
- Every three to four years, the Company completes a short circuit study. This study provides electrical fault current information that can be used to size transmission equipment, as well as to provide a basis for protection coordination studies.
- Periodically, the Company carries out voltage regulation studies. These studies provide or confirm preferred settings for substation equipment used to regulate voltage.[3]

Other studies include:

- Studies to develop solutions to address forecast capacity constraints. For example, a study completed in 1991 recommended construction of a second transmission line to address the forecast overload of 31L, a 66 kV transmission line between Oxen Pond and Stamp's Lane Substations in St. John's.[4]

[1] For example, the *Bonavista Loop Transmission Planning* study, filed as part of the Company's 2006 Capital Budget Application, determined the capacity requirement for rebuilding transmission line 110L.

[2] For example, the report *2014 Additions Due to Load Growth*, filed as part of the Company's 2014 Capital Budget Application, includes information from studies completed to address forecast overload on substation transformer equipment.

[3] The most recent voltage regulation study was completed in 2010.

[4] Transmission line 70L, completed in 1993, was the last new transmission line constructed by Newfoundland Power.

- Interconnection studies associated with the addition of new load or generation to the electrical system. For example, in 2008 an evaluation was completed into the impact of connecting non-utility wind generation projects at St. Lawrence and Fermeuse to Newfoundland Power's system.