Q. Please describe Newfoundland Power's distribution system planning policy, criterion and process. Include in the response the numbers and titles of personnel involved with the distribution planning process.

A. **1.0 Policy and Process**

Distribution planning activities at Newfoundland Power ("the Company") involve two primary functions; (i) capital planning and (ii) operational planning.

Capital Planning

Capital planning activities involve the annual completion of distribution system studies and load forecasts to identify technical constraints on the distribution system that may require capital expenditure. These distribution planning studies and load forecasts provide input into the Company's five-year capital plan. During the development of the Company's annual capital budget application, identified projects are analyzed for technical merit, alternatives, least cost economics and budgeting. These planning activities are the responsibility of the Distribution Engineering section, with involvement and input as required from the regional engineering groups. These studies are completed by the Supervisor, Distribution Engineering and Standards under the direction and approval of the Superintendent of Engineering.

Operational Planning

Operational distribution planning activities involve daily analysis of the distribution system to react to changes or additions to the distribution system on a regional level. These activities typically include new load analysis, outage investigations and temporary system condition changes. These distribution planning activities are the responsibility of each regional engineering group and involve the Superintendent of Regional Engineering, Engineering Supervisors and Engineering Planning Technologists in each of the Company's three operating regions.

2.0 Criteria

Newfoundland Power's distribution planning criteria align with the Distribution Planner's Manual published by the Canadian Electricity Association ("CEA") and consist of the following system constraint factors; (i) ampacity, (ii) short circuit capacity, (iii) voltage and power quality and (iv) reliability.

Ampacity

Ampacities, or thermal loading limits, are determined for the three major system components:

- Transformers (substation transformers, voltage regulators and step-downs)
- Conductor and Cable (bare aerial conductors, aerial cables and underground cable)
- Breakers and Switches (breakers, reclosers, air switches and underground switches)

Different philosophies are used to determine ampacity ratings for each group from which a planning ampacity is derived. The planning ampacity is the maximum peak load permitted on a system component during normal operating conditions. It is recognized that under emergency or abnormal conditions, system components may be operated above the planning ampacity.

Short Circuit Capacity

The maximum clearing time of protection devices for a given fault level must be less than the short circuit withstand capability of any system component exposed to that fault. To address situations where it is determined that this is not the case, either equipment or plant with greater short circuit withstand capability is installed, or the fault level is reduced.

Voltage and Power Quality

Canadian Standards Association ("CSA") Standard C235 defines the preferred voltage levels on a 120V base for normal and extreme operating conditions. For planning purposes, action is to be initiated when voltage limits for normal operating conditions are violated. CYMDIST distribution feeder modelling software is used for distribution system voltage planning, and field measurements are obtained to confirm any inadequate line voltages identified in the modelling software.

Power quality issues such as voltage flicker, voltage unbalance, harmonics, and high frequency noise are also analyzed and addressed as required when concerns are identified.

Reliability

The consistent application of Newfoundland Power's distribution planning activities and processes help to ensure its customers receive a cost-effective, uniform and high standard of electrical service throughout the Company's service territory. Distribution planning continuously monitors issues that could have a negative impact on service reliability.

Some of these issues are cold load pickup, adequate feeder sectionalizing, feeder backup and contingency plans, and fault isolation/fuse coordination.

3.0 Technical Options and Alternatives

The following is a list of some technical options and alternatives which are used as components for developing distribution plans to address identified or forecast system constraints:

- Reconfiguration using permanent load transfers
- Convert to a higher voltage
- Reconductor
- Add voltage regulator
- Add sectionalizing switch
- Add capacitors
- Add extra phases
- Upgrade neutral conductor
- Upgrade insulation for salt contamination
- Upgrade underground cable
- Upgrade recloser to breaker
- Add substation transformer
- Add feeder
- Add substation