

1 Q. Please provide an updated list of control actions available to Hydro during system  
2 emergencies being sure to show where CBPP capacity assistance and  
3 Newfoundland Power curtailable load are slotted within the hierarchy of available  
4 control actions.

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7 A. The latest revision of Hydro's Generation Reserves protocol (T-001) is attached as  
8 CA-NLH-016, Attachment 1. Upon approval, this protocol will be revised with the  
9 load reduction steps re-ordered as required, to reflect the terms of each of the  
10 Applications currently before the Board.



## SYSTEM OPERATING INSTRUCTION

<b>STATION:</b>	GENERAL	<b>Inst. No.</b>	T-001
<b>TITLE:</b>	GENERATION RESERVES *, **	<b>Page 1 of</b>	5

### INTRODUCTION

In order to ensure that customer service is maintained, the Energy Control Centre (ECC) shall exercise its authority to reduce risks to the generation supply and maintain sufficient generation reserves to meet current and anticipated customer demands. The ECC shall be prepared to deal with generation shortages and take appropriate actions in order to maintain the reliability of the Island Interconnected System.

*Generation reserves*<sup>1</sup> are required to replace generation capacity lost due to an equipment forced outage, to cover performance uncertainties in generating units or to cover unanticipated increases in demand. Sufficient generation reserves are required to meet current and forecasted demands under a contingency of the largest generating unit.

### PROCEDURE

#### A. Calculation of *Available Generation Reserves*<sup>2</sup>

Available generation reserves shall be calculated for the current day and the following four days in the manner as indicated below:

Available Generation Reserves for each day =  
 Available Generation of NLH (Hydro + Thermal + *Standby*<sup>3</sup> + *Purchases*<sup>4</sup>) *plus*  
 Available Generation of NP (Hydro + Standby) *plus*  
 Available Generation of DLP (Hydro) *less* Forecasted Peak NLH+NP+CBPP demand

<sup>1</sup> *Generation Reserves* are defined as the quantity of available generation supply that is in excess of demand, and includes spinning reserves<sup>5</sup>. It is equal to Available Generation Supply less Current / Forecasted Demand.

<sup>2</sup> *Available Generation Reserves* are associated with generation that is in service or standby generation that can be placed in service within 20 minutes. NP's mobile generation may take up to 2 hours to place in service.

<sup>3</sup> *Standby* generation includes combustion turbine / diesel generation.

<sup>4</sup> *NLH Purchases* includes wind for the current day based on actual wind output, but assumes no wind generation for the following four days.

<sup>5</sup> *Spinning reserves* are defined as unloaded generation that is synchronized to the power system and ready to serve additional demand.



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### PROCEDURE (cont'd.)

#### B. Assessment and Notification of Available Generation Reserves

The available generation reserves will be calculated for the current day and the following four days and an assessment will be made against the criteria in the table below and a notification will be issued to stakeholders when available generation reserves are below the stated thresholds.

<u>Available Reserves</u>	<u>Expected Action</u>	<u>Level</u>
> Largest Generating Unit + min. spinning reserve	none	0
< Largest Generating Unit + min. spinning reserve	Prepare for Potential Load Reduction	1
< Largest Generating Unit	Load Reduction	2
< ½ Largest Generating Unit	Conservation	3
Zero/deficit; hold f=59.8 Hz	Rotating Outages	4

Based on the assessment above, perform the following:

- Level 0 - If the available reserves are anticipated to be greater than the largest available generating unit capacity plus minimum spinning reserve, the ECC are not expected to perform any further actions, other than to advise Exec On-call (CERP), Corporate Relations and Newfoundland Power that available reserves have returned to normal following a prior Level 1, 2, 3 or 4 notice.
- Level 1 - If the available reserves are anticipated to be less than the largest available generating unit capacity plus the minimum spinning reserves, the ECC will notify Newfoundland Power's Control Centre, advising of possible requirements for load reduction to maintain sufficient spinning reserves, if the available generation reserves should decrease.
- Level 2 - If the available reserves are anticipated to be less than the largest available generating unit capacity, the ECC will notify Exec On-call (CERP), Corporate Relations and Newfoundland Power, advising of load reduction strategies to maintain sufficient spinning reserves, if the generation shortfall is not corrected



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### PROCEDURE (cont'd.)

- Level 3 - If the available reserves are anticipated to be less than half of the largest available generating unit capacity, the ECC will notify Exec On-call (CERP), Corporate Relations and Newfoundland Power, advising of customer conservation strategies to help maintain sufficient spinning reserves, if the generation shortfall is not corrected.
- Level 4 - If the available reserves are anticipated to approach zero or fall into a deficit, the ECC will notify Exec On-call (CERP), Corporate Relations and Newfoundland Power, advising of rotating outages to help maintain frequency near the 60 Hertz standard, if the generation shortfall is not corrected.

#### C. Maintaining Spinning Reserves

The ECC shall maintain sufficient spinning reserves to cover performance uncertainties in generating units, especially wind and other variable generation, and unanticipated increases in demand. The ECC will take appropriate action to maintain a minimum spinning reserve level equal to 70 MW. Such actions include the following: placing in service all available generating capacity, cancelling outages to generating units that have a short recall, deploying all available standby resources, cancelling industrial interruptible load and reducing system load, through procedures such as public conservation notices, voltage reductions, curtailing interruptible loads and non-essential firm loads.

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**PROCEDURE** (cont'd.)

The following guideline shall be followed in the sequence outlined in order to maintain sufficient spinning reserves, maintain the reliability of the Island Interconnected System and minimize service impacts to customers:

**Normal Sequence**

1. Place in service all of Hydro's available hydroelectric generation.
2. Request Newfoundland Power to maximize their hydroelectric generation.
3. Make a Capacity Request of Deer Lake Power to maximize their hydroelectric generation.
4. Request Non-Utility Generators to maximize their hydroelectric and wind generation.
5. Maximize Holyrood thermal generation.
6. Start and load standby generators, both Hydro and Newfoundland Power units, in order of increasing average energy production cost with due consideration for unit start-up time. It is important to notify customers taking non-firm power and energy that if they continue to take non-firm power, the energy will be charged at higher standby generation rates.

**Load Reduction**

7. Cancel all non-firm power delivery to customers and ensure all industrial customers are within contract limits.
8. Inform Newfoundland Power of Hydro's need to reduce supply voltage at Hardwoods and Oxen Pond and other delivery points to minimum levels to facilitate load reduction. Implement voltage reduction.
9. Request Newfoundland Power to implement voltage reduction on their system.

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**PROCEDURE** (cont'd.)**Load Reduction**

10. Request Newfoundland Power to curtail any interruptible loads (typically up to 10 MW and can take up to 2 hours to implement).
11. Request Corner Brook Pulp and Paper for Capacity Assistance (20, 40 or 60 MW). [Agreement between Hydro and Corner Brook Pulp and Paper expired on March 31, 2014.]
12. Request industrial customers to shed non-essential loads, informing them of system conditions.

**Rotating Outages**

If the spinning reserves continue to decrease below the minimum level, the system frequency should be watched closely. In order to minimize outages to customers, utilize the reserves as much as possible and maintain the system frequency at 59.8 Hz.

13. Request Newfoundland Power to shed load by rotating feeder interruptions. At the same time, shed load by rotating feeder interruptions in Hydro's rural distribution areas. Follow instruction for rotating outages, T-042.

\* Part of the Environmental Plan

\*\* Part of the Emergency Response Plan

**REVISION HISTORY**

<u>Version Number</u>	<u>Date</u>	<u>Description of Change</u>
0	1992-07-16	Original Issue
9	2014-09-16	Further feedback from utility customer
<b>PREPARED: B. Butler</b>		<b>APPROVED:</b>