

1 Q. What level of control during a system emergency does Hydro have over generation
2 that it does not own on the Island?

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5 A. As indicated in Hydro's response to PUB-NLH-070, Hydro has a Generation Shortage
6 Protocol that it follows for normal generation loading sequences and in the event
7 that there is a generation shortage on the Island Interconnected System. This
8 Protocol has been updated and is attached as CA-NLH-008 Attachment 1.

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10 Under the normal generation loading sequence, Hydro will first maximize its own
11 hydroelectric generation and the generation at the Nalcor facilities on the Exploits
12 River and Star Lake¹. Hydro will then request that Newfoundland Power (NP) and
13 Deer Lake Power (DLP) maximize their hydroelectric generation. Hydro has this
14 ability through the respective generation credit arrangements with each of these
15 Customers². Following requests to NP and DLP, Hydro will then call on all other
16 hydroelectric Non-Utility Generators (NUGs)³ to maximize their generation to the
17 extent that it may be available. These steps occur early in the sequence and are
18 taken prior to increasing Holyrood generation to levels higher than what would
19 otherwise be required for transmission support for the Avalon Peninsula.

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21 Following the steps of loading Holyrood its maximum capability and calling on
22 customers to interrupt non-firm (Industrial Customers) and curtailable (NP) load,
23 Hydro will then dispatch standby generation. As the protocol indicates, Hydro and

¹ Hydro monitors and has full control to dispatch the generation at Exploits and Star Lake as if it were owned by Hydro.

² Deer Lake Power is owned and operated by Corner Brook Pulp and Paper Limited.

³ The non-hydroelectric NUGs (the wind farms and the Corner Brook Pulp and Paper Co-gen) are non-dispatchable.

- 1 NP standby units are started and loaded in order of increasing average energy
- 2 production cost with due consideration for unit start-up time. Again, Hydro has the
- 3 ability to call on NP standby generation through the generation credit arrangements
- 4 with that Customer.



NEWFOUNDLAND AND LABRADOR HYDRO - SYSTEM OPERATING INSTRUCTION

Title: Generation Reserves[*], ^{**}	Instruction Number: Station: Revision Number:	T-001 ENV, ERP, General 8
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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*¹ 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*²

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 + *Purchases*³) *plus*

Available Generation of NP (Hydro + Standby) *plus*

Available Generation of DLP (Hydro) *less* Forecasted Peak NLH+NP+CBPP demand

¹ *Generation Reserves* are defined as the quantity of available generation supply that is in excess of demand. It is equal to Available Generation Supply less Current / Forecasted Demand.

² *Available Generation Reserves* are associated with generation that is in service or can be placed in service within one hour.

³ *NLH Purchases* includes wind for the current day, but does not include wind for the following four days.

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>ECC Response</u>	<u>Expected Action</u>	<u>Level</u>
> Largest Generating Unit	Normal Operations	-	0
< Largest Generating Unit	Advise Stakeholders	Load Reduction	1
< ½ Largest Generating Unit	Advise Stakeholders	Conservation	2
Zero/deficit; hold f=59.8 Hz	Advise Stakeholders	Rotating Outages	3

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, 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 or 3 notice.
- Level 1 - 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 possible load reduction strategies to maintain sufficient *spinning reserves* ⁴, if the generation shortfall is not corrected.
- Level 2 - 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 possible conservation strategies to help maintain sufficient spinning reserves, if the generation shortfall is not corrected.
- Level 3 - 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 possible rotating outages to help maintain frequency near the 60 Hertz standard, if the generation shortfall is not corrected.

⁴ *Spinning reserves are* defined as unloaded generation that is synchronized to the power system and ready to serve additional demand.

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 load, through procedures such as public conservation notices, voltage reductions, curtailing interruptible loads and non-essential firm loads.

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 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.
10. Request Newfoundland Power to curtail any interruptible loads (up to 10 MW).
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. [Being developed].

* 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
8	2014-06-04	To calculate available reserves and notify stakeholders when reserves less than largest available unit.

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