

1 **Q. It is stated that Rattling Brook is a "critical black start plant". Please provide a**  
2 **copy of the relevant black start procedure indicating the role of Rattling Brook. In**  
3 **addition, please provide a list of occasions when Rattling Brook was used for black**  
4 **start purposes and identify the occasions when it failed to provide black start**  
5 **service owing to the lack of redundancy in the station service supply (page E-1,**  
6 **Appendix E, Volume 11).**

7  
8 A. A copy of the Rattling Brook Black Start Procedure is provided in Attachment A.  
9

10 Black start refers to the capability of a hydro plant to be started in the absence of an  
11 external power source. In circumstances where external power is not available to the  
12 hydro plant, such as in the case of storm damage to the transmission system, black start  
13 capability allows a hydro plant that is not already operating to be brought into service.  
14 Once the plant is operational, it is available to supply power to customers through  
15 portions of the transmission or distribution systems that are still operational.  
16

17 A system event, such as damage to a transmission line, could cause protection equipment  
18 to operate and shut down the plant. Without black start capability, the plant would be  
19 unavailable until the external power supply was restored. During a widespread winter  
20 outage on the Avalon Peninsula in December 1994, for example, the inability of  
21 Newfoundland & Labrador Hydro to black start the Holyrood Generating Facility  
22 complicated power restoration activities and prolonged the outage by many hours.  
23

24 In the case of a loss of supply from the provincial grid, the black start capability of the  
25 Rattling Brook Plant would enable the plant to be restarted to supply power to customers  
26 served by the local feeder in the Norris Arm area as well as to nearby substations such as  
27 the one in Lewisporte. In this way, electric service can be restored to customers much  
28 faster than repairs could be completed on the transmission system.  
29

30 It has not been necessary in recent memory to black start the Rattling Brook Plant under  
31 emergency conditions. However, the plant has on occasion been required to carry the  
32 Rattling Brook and Lewisporte feeders isolated from the island system when  
33 transmission lines to the local area were out of service. If the plant were to trip under  
34 such conditions, it could not be restarted without black start capability. Newfoundland  
35 Power relies on its hydroelectric facilities to provide electrical service to customers under  
36 emergency conditions affecting the electrical system.  
37

38 The proposed redundant station service at the Rattling Brook facility consists of two  
39 components. A transformer capable of serving the increased station service load will be  
40 installed in the substation to provide station service during normal operating conditions.  
41 In addition, a second, smaller station service transformer will be installed in the new  
42 switchgear to provide station service sufficient to provide black start capability at the  
43 plant when service from the substation is unavailable. This is more cost-effective than  
44 installing a single larger station service transformer as part of the plant's internal  
45 switchgear equipment.  
46

## **Rattling Brook Black Start Procedure**

NEWFOUNDLAND LIGHT & POWER CO. LIMITED



OPERATIONS MANUAL

Subject:

BLACK START MACHINE AT  
RATTLING BROOK PLANT

Bulletin No. 170-23 8.25

Date Issued: 89 10 23

Revision Date: \_\_\_\_\_

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Approved By:

Corporate Manual Reference:

**PRELIMINARY CONDITION:** Energy is available on the 125 volt control battery, i.e. relay #80LO has not caused lock-out.

**NOTE:** The following discription is mainly for Black Starting Unit #1 the Black Starting of Unit #2 being a duplicate of Unit #1.

1. Place **TRANSFER SWITCHES** in the manual position. When manual starting is used none of the automatic starting equipment is in operation and everything must be separately initiated by its manual control.

This is a list of transfer switches:

<u>SWITCH</u>	<u>LOCATION</u>
---------------	-----------------

#43-1.....	Gen.#1 control panel
#43-2.....	Gen.#2 control panel
#43-3.....	Annunciator panel
REMOTE/LOCAL.....	101L & 102L Breaker Control panel.
Local Telemetering ...	Nichols Panel

2. Check and open RBK-101L-B.
3. Check and open RBK-102L-B.
4. Check and open RBK-T1-B.
5. Check and open RBK-T2-B.
6. Block **LOW GOVERNOR OIL PRESSURE SWITCH**, located near Governor oil pump on Turbine Floor.

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7. Reset **LOCKOUT RELAY**, device 86-1.
8. Place Governor in **HAND CONTROL** by:
  1. Turning off main valve (2 1/2") on Governor oil pressure line "yellow pipe".
  2. Open by-pass valve.
  3. Engage hand gear. Lever located under large hand wheel.
  4. Check gate position closed. Pointer at "0". If pointer not at "0" release Governor Brake and adjust as required.
  5. Apply brake again after adjusting.
9. Open **PIVOT VALVE**, by pushing on device #20 PVM-1 located on Generator Breaker control panel metalclad switchgear.
10. Check **VOLTAGE ADJUSTING RHEOSTAT** device #88-1 is in the home position (white light on). If not adjust control device #88CS-1. White light will indicate normal position.
11. Close 1CS-1 to energize Governor. Check **GOVERNOR BRAKE** released.
12. Open **GOVERNOR GATES** approximately ten percent, or until unit attains synchronous speed 514.3 RPM or 60 cycles.
13. Close **GENERATOR BREAKER**, device #52CS-1. The 6.9KV Bus is now energized.

**NOTE:** Once 6.9 KV bus is energized, it will be necessary to synchronize the second Unit when it is brought on stream.
14. Check **STATION SERVICE** supply normal. Reset any tripped breakers, i.e. Governor oil pumps, station air compressor etc..
15. When Governor oil pressures are normal, return **GOVERNOR TO AUTO** operation. Close by-pass valve. Open main valve on 2 1/2" line yellow pipe. Check Unit speed and adjust to normal (speed adjusting device #15CS-1, metal clad switch panel).

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16. Check and open RBK-01-R1.
17. Close RBK-T1-B. (Energizes 66 KV Bus).
18. Close RBK-T2-B.
19. Close RBK-01-R1 and adjust speed. This will restore local power supply
20. Switch as required to restore system to normal)