

October 1, 2014

The Board of Commissioners of Public Utilities  
Prince Charles Building  
120 Torbay Road, P.O. Box 21040  
St. John's, Newfoundland & Labrador  
A1A 5B2

**Attention: Ms. Cheryl Blundon**  
**Director Corporate Services & Board Secretary**

Dear Ms. Blundon:


**Re: The Board's Investigation and Hearing into Supply Issues and Power Outages  
on the Island Interconnection System**

In accordance with the Board's Interim Report dated May 15, 2014, wherein the Board required the filing of a report on today's date with respect to the above noted matter, please find enclosed the original plus 12 copies of Hydro's report entitled *An Update Report to the Board of Commissioners of Public Utilities Indicating the Winter Readiness Status of Hydro's Generation Assets*.

Should you have any questions, please contact the undersigned.

Yours truly,

**NEWFOUNDLAND AND LABRADOR HYDRO**



Tracey L. Pennell  
Legal Counsel

TLP/cp

cc: Gerard Hayes – Newfoundland Power  
Paul Coxworthy – Stewart McKelvey Stirling Scales  
Sheryl Nisenbaum – Praxair Canada Inc.  
ecc: Roberta Frampton Benefiel – Grand Riverkeeper Labrador

Thomas Johnson – Consumer Advocate  
Thomas O' Reilly – Cox & Palmer  
Danny Dumaresque

*Investigation and Hearing into Supply Issues and Power Outages on the  
Island Interconnected System*

**An Update Report to the Board of Commissioners of Public Utilities  
Indicating the Winter Readiness Status of Hydro's  
Generation Assets**

Newfoundland and Labrador Hydro

October 1, 2014



## TABLE OF CONTENTS

1.0	INTRODUCTION .....	1
2.0	GENERATION AVAILABILITY .....	2
2.1	Maintenance and Capital Project Activities .....	2
2.2	New Generation Supply .....	4
2.2.1	New Combustion Turbine Capacity .....	4
2.2.2	Securing Economically Available Interruptible Loads.....	4
2.3	Other Actions and Initiatives.....	4
2.3.1	Emergency Preparedness and Response .....	4
3.0	WINTER READINESS ASSESSMENT.....	6

### **Appendices:**

Appendix A	Master Generation Plan for Winter Preparation: Updated to September 30, 2014
Appendix B	Hydro’s Master Outage Schedule for the Balance of 2014 – Updated to September 30, 2014
Appendix C	Severe Weather Preparedness Protocol
Appendix D	Process Improvement Action Plan: Winter Readiness Self-Assessment

1 **1.0 INTRODUCTION**

2 In its Interim Report of May 15, 2014, and through additional correspondence, the Board of  
3 Commissioners of Public Utilities (the Board) requested that Newfoundland and Labrador  
4 Hydro (Hydro) submit various reports outlining the actions it is taking to improve generation  
5 and transmission equipment reliability performance.

6

7 On June 16, 2014 Hydro submitted a Generation Availability Report to the Board which  
8 outlined Hydro’s plans and schedules related to various actions to be implemented in 2014  
9 to improve generation availability and to ensure winter readiness.

10

11 On August 29, 2014, Hydro submitted its Master Generation Plan for Winter Preparation. In  
12 that Report, the Company presented a consolidated listing of the various actions and  
13 projects it is undertaking in 2014 to ensure the winter readiness of its generation assets  
14 leading into the 2014/15 winter season.

15

16 In its Interim Report, the Board requested that Hydro file an update on the winter readiness  
17 status of its generation assets on October 1, 2014. This Report is in response to that  
18 request, and is essentially an update to the comprehensive generation winter readiness  
19 report filed with the Board on August 29, 2014.

1 **2.0 GENERATION AVAILABILITY**

2 **2.1 Maintenance and Capital Project Activities**

3 Hydro’s Master Generation Plan for Winter Preparation was presented to the Board on  
4 August 29, 2014. The status of this Plan has been updated to September 30, 2014, and this  
5 update is attached to this Report as Appendix A. This Plan itemizes the various actions and  
6 projects that are in progress, and in some cases completed, to ensure generation availability  
7 and winter preparation in advance of the 2014/15 winter season. Plans and schedules  
8 related to these actions are included in various reports and updates that have been provided  
9 to the Board.

10  
11 In addition to the various operations and maintenance initiatives being actioned, Appendix A  
12 also includes the 2014 capital projects that are directly relevant to generation reliability.  
13 These are essentially a sub-set of the 2014 capital program reported to the Board on August  
14 18, 2014, the status of which was most recently reported to the Board on September 15,  
15 2014.

16  
17 A key element of Hydro’s overall planning process for winter generation availability is the  
18 Company’s master outage schedule. Many of the actions and projects being executed by  
19 Hydro require planned, short duration local outages so that the necessary work on or around  
20 energized equipment can be completed safely and effectively. This requires extensive  
21 coordination between the System Operations and Planning Department and both project  
22 managers and operations personnel in the field, with an underlying requirement that  
23 interruptions in service to customers are minimized as much as possible.

24  
25 This master outage schedule is revised from time to time to adjust to changing circumstances, but  
26 the 2014 schedule continues to remain on schedule and indicates that all outages necessary  
27 to accommodate the generation master plan shown in Appendix A will be completed prior to  
28 December 1, 2014. A copy of Hydro’s current master outage schedule for the balance of

1 2014, updated as of September 30, 2014, is attached to this Report as Appendix B. A  
2 summary of the changes to this schedule are as follows:

3 • Bay d'Espoir Unit 7

4 Outage has been extended for approximately one week due to vibration issues  
5 occurring during startup testing.

6

7 • Bay d'Espoir Unit 3 (Note 7)

8 Forced outage due to Unit Transformer oil leak which occurred on September 26,  
9 2014. The approximate return to service is late October. Hydro is currently  
10 completing plans for the repair of the unit and therefore final completion date has  
11 not yet been determined.

12

13 • Hinds Lake Unit

14 Outage has been rescheduled to start October 5, 2014 after BDE Unit 7 has been  
15 returned to service. This reschedule was necessary due to the forced outage of BDE  
16 Unit 3 and maintaining generation reserves.

17

18 • Bay d'Espoir Units 5 and 6 (Intake Work, Note 3)

19 Outage has been rescheduled to start November 3, 2014. This reschedule was  
20 necessary due to the forced outage of BDE Unit 3 and maintaining generation  
21 reserves.

22

23 • Bay d'Espoir Unit 1 (excitation transformer replacement, Note 1)

24 Outage has been compressed from five days to four days and will occur over a  
25 weekend. This allows for the rescheduling of Hinds Lake and BDE Units 5 and 6.

26

27 • Bay d'Espoir Unit 2 (excitation transformer replacement, Note 2)

28 Outage has been compressed from five days to three days and will occur over a  
29 weekend. This allows for the rescheduling of Hinds Lake and BDE Units 5 and 6.

1    **2.2    New Generation Supply**

2    **2.2.1    New Combustion Turbine Capacity**

3    Hydro has procured, and is presently installing, a new combustion turbine at the Holyrood  
4    site. This unit is four years old, but is unused, and has been verified by both Hydro and  
5    external experts as being fit for purpose. This unit has a capacity rating of approximately  
6    120 MW, and is expected to be in-service and available to Hydro’s system in December 2014.

7

8    The Board is receiving bi-weekly updates from Hydro on the status of this project.

9

10   **2.2.2    Securing Economically Available Interruptible Loads**

11   Hydro has been in contact with its larger industrial customers to discuss possible  
12   interruptible load arrangements for the 2014/15 winter season. These arrangements are  
13   intended as contingencies only, and would operate to augment Hydro’s system supply in the  
14   unlikely event of a system deficit. Hydro is working closely with two of its industrial  
15   customers and intends to have an application before the Board in October.

16

17   The Board is receiving monthly updates from Hydro on this initiative.

18

19   **2.3    Other Actions and Initiatives**

20   **2.3.1    Emergency Preparedness and Response**

21   Hydro prepares for severe weather events by maintaining effective tools and equipment in  
22   key locations; maintaining critical spare parts; locating shops and depots in strategically  
23   accessible areas throughout the Province; maintaining a supervisory on-call rotation; and  
24   ensuring clear and open communications between the operating areas and the Energy  
25   Control Centre (ECC). In March, 2014 Hydro completed a review of these procedures and  
26   developed a draft “Severe Weather Preparedness” plan and checklist to ensure that lessons  
27   learned from the system outages in 2013 and 2014 were incorporated into Hydro’s  
28   emergency preparedness and response protocol. In that process Hydro also reviewed

1 documentation from the North American Electric Reliability Corporation (NERC)<sup>1</sup> to ensure  
2 best practices from other utilities were incorporated into the preparedness plan.  
3  
4 Hydro’s draft preparedness plan was finalized by the Company’s Asset Owners Technical  
5 Council in late September, and this protocol has since been formally documented. A copy of  
6 this protocol is attached to this report as Appendix C.

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<sup>1</sup> NERC is a not-for-profit international regulatory authority whose mission is to ensure the reliability of the bulk power system in North America, and is subject to oversight by the Federal Energy Regulatory Commission and governmental authorities in Canada. NERC develops and enforces reliability standards as part of its mandate.



1 **3.0 WINTER READINESS ASSESSMENT**

2 A key priority action flowing from Hydro’s internal review of the January 2014 system events  
3 was to complete a review of the Company’s current winter readiness program in reference  
4 to industry best practices, and to formally implement and document this on a go-forward  
5 basis.

6  
7 Hydro has since developed a winter readiness self-assessment process which is modeled on  
8 industry best practices as summarized in the *Reliability Guideline for Generating Unit Winter*  
9 *Weather Readiness* published by the North American Reliability Corporation (NERC). The  
10 seven components of Hydro’s winter readiness assessment standard are organized under  
11 three general headings as follows:

12

13 1. Equipment and Operator Readiness

- 14 a) Processes and Procedures  
15 b) Testing  
16 c) Training

17

18 2. Safety and Internal Planning/Communication

- 19 a) Safety  
20 b) Winter Event Communications

21

22 3. Management and Measurement

- 23 a) Management Roles and Expectations  
24 b) Program Goals/Metrics

25

26 Hydro’s June 16 Generation Availability Report to the Board indicated that the Company  
27 would complete an assessment of its compliance with this winter readiness self-assessment

1 process by the end of July, and develop and implement an action plan for improving its  
2 winter readiness assessment process by November 30, 2014.

3

4 When Hydro filed its assessment on August 1, 2014, the Company committed to develop its  
5 process improvement action plan by September 30, 2014 indicating the changes and  
6 improvements Hydro is making to its self-assessment based on the process gaps identified as  
7 yellow in the assessment filed on August 1, 2014. This action plan has been documented  
8 and is attached to this Report as Appendix D.

**APPENDIX A**

2014 Generation Master Plan for Winter Preparation  
Updated to September 30, 2014

2014 GENERATION MASTER PLAN FOR WINTER PREPARATION - NEWFOUNDLAND & LABRADOR HYDRO									
REF		Expected Completion Date	Generation Availability Report	Integrated Action Plan	Annual Work Plan	2014 Capital Plan	Incremental Capital Plan	Critical Spares Plan	Plan for Securing Interruptible Loads
<b>THERMAL GENERATION - HOLYROOD</b>									
	<b>Operations and Maintenance Activities</b>								
1	Review of breaker maintenance tactics + refresher training	Complete	■						
2	Increased maintenance on Forced Draft (FD) fan motors	31-Oct-14	■		■				
3	Procurement decision on spare parts for additional FD fan motors	Complete	■					■	
4	Updated plan and inventory for other critical spares	30-Nov-14	■					■	
5	Major overhaul, inspection of control valve spindles - Unit #2	Complete	■		■				
6	Investigate and address vibration issues on Unit #1	31-Oct-14	■	■	■				
7	Corrective actions for turbine generator lube oil systems	30-Nov-14	■		■				
8	Expansion of Inspection Test Program on high pressure components	Complete	■		■				
	<b>Reliability Related Capital Projects</b>								
9	Replacement of an Air Compressor	19-Dec-14			■	■			
10	Install Fire Protection Upgrades	See note			■	■			
11	Replace DC Distribution Panels and Breakers	See note			■	■			
12	Upgrade Vibration Monitoring System	See note			■	■			
13	Upgrade Hydrogen System	Complete			■	■			
14	Replace Condensate Polisher Annunciator Panels	31-Oct-14			■	■			
15	Install Black Start 16 MW Diesel	Complete			■				
16	Overhaul Turbine/Generator Unit 2	Complete							
17	Overhaul Boiler Feed Pump East Unit 3	Complete							
18	Overhaul Cooling Water Pump East Unit 1	31-Oct-14							
19	Overhaul Extraction Pump South Unit 1	31-Oct-14							
<b>HYDRAULIC GENERATION</b>									
	<b>Operations and Maintenance Activities</b>								
20	Processes for planning, scheduling and executing work	30-Nov-14	■						
21	Analysis of generator vibration issues at Granite Canal	31-Oct-14	■	■					
22	Updated plan and inventory for critical spares	30-Nov-14	■					■	
	<b>Reliability Related Capital Projects</b>								
23	Rewind Stator Unit 3 – Bay d’Espoir	Complete			■	■			
24	Upgrade Generator Bearings Unit 2 – Bay d’Espoir	Complete			■	■			
25	Replace Automatic Greasing Systems Two Units– Bay d’Espoir	Complete			■	■			
26	Replace Automatic Greasing Systems Two Units – Bay d’Espoir	See note			■	■			
27	Replace Spherical Valve Bypass Valve Assemblies – Bay d’Espoir	30-Nov-14			■	■			
28	Excitation Transformer Replacement Unit 6 – Bay d’Espoir (Unforeseen)	Complete			■				
29	Replacement of Excitation Transformers – Bay d’Espoir	See note			■				
30	Automate Generator Deluge Systems Two Units – Bay d’Espoir	Complete			■	■			
31	Automate Generator Deluge Systems Two Units – Bay d’Espoir	Complete			■	■			
32	Upgrade Intake Gate Controls – Bay d’Espoir	Complete			■	■			
33	Replace Cooling Water Pumps – Bay d’Espoir	Complete			■	■			
34	Purchase Low Pressure Screw Compressor Set – Bay d’Espoir	31-Oct-14			■	■			

2014 GENERATION MASTER PLAN FOR WINTER PREPARATION - NEWFOUNDLAND & LABRADOR HYDRO									
REF		Expected Completion Date	Generation Availability Report	Integrated Action Plan	Annual Work Plan	2014 Capital Plan	Incremental Capital Plan	Critical Spares Plan	Plan for Securing Interruptible Loads
35	Replace Automatic Transfer Switch – Hinds Lake	Complete			■	■			
36	Replace Turbine/Generator Cooling Water Flow Meters – Upper Salmon	14-Nov-14			■	■			
37	Replace Generator Bearing Coolers Two Units – Bay d’Espoir	Complete			■				
38	Overhaul Turbine/Generator Units – Bay d’Espoir and Hinds Lake	See note			■				
<b>GAS TURBINES - HARDWOODS AND STEPHENVILLE</b>									
<b>Operations and Maintenance Activities</b>									
39	Review of maintenance strategy and update of PM/CM plans	30-Nov-14	■	■					
40	Identify new/additional capital work required	30-Nov-14	■	■					
41	Root cause analysis of repeat failures and identify solutions	31-Oct-14	■	■					
42	Review of fuel storage capacity and fuel management procedures	Complete	■	■					
43	Protocol for performing test starts and run-ups	31-Oct-14	■	■					
44	Updated plan and inventory for critical spares	15-Nov-14	■	■					
45	Evaluate vendor service agreements for after-hours support	31-Oct-14	■	■					
<b>Reliability Related Capital Projects</b>									
46	Upgrade Gas Turbine Plant Life Extension - Stephenville	30-Nov-14			■	■			
<b>OTHER ACTIONS/PROJECTS</b>									
47	Installation and commissioning of a new Gas Turbine at Holyrood	7-Dec-14		■			■		
48	Securing economically available interruptible loads	see note							
49	Generation winter readiness assessment action plan	Complete	■	■	■	■	■	■	■
50	Emergency preparedness and response	Complete	■						

**NOTES**

**Ref**

For capital projects generally, the "Expected Completion Date" is the date that the equipment is released for service, and not project close-out.

- 10 Two deliverables have expected completion in Nov 2014; a third deliverable has expected completion in 2015.
- 11 DC Panel replacement deferred to next Stage 1 outage in 2015.
- 12 Scope for Units 1&2 has expected completion in October 2014; scope for Unit 3 is expected to carry over into 2015, however existing vibration monitoring equipment on Unit 3 will remain in place with adequate spare parts to ensure reliable operation until full replacement in 2015.
- 20 In progress; report outlining processes will be completed as per target date.
- 21 Report and recommendations received from PETS on Sept. 16th; we are in the process of acquiring the necessary parts and we are still on track for completion as per our target date  
The plan around critical spares has not changed and we are on schedule as per
- 22 target date; two excitation transformers have been purchased as critical spares for BDE Units 1-6 as part of supplementary capital.
- 26 Scope for one unit is complete; scope for the second unit has expected completion in October 2014.
- 29 Scope for one unit has expected completion in October 2014; scope for the remaining units is planned for 2015.
- 38 The overhaul for Bay d’Espoir Unit 3 is complete; the overhaul for Hinds Lake expected completion is November 2014.
- 48 Hydro is working closely with two of its industrial customers and intends to have an application before the Board in October.

**APPENDIX B**

Hydro's Master Outage Schedule for the Balance of 2014  
As of September 30, 2014

2014 Planned Generation Outage Schedule																	
Unit	MW	Month	October					November					December				Completed Annual Maintenance Outages
		Week Starting	28	5	12	19	26	2	9	16	23	30	7	14	21	28	
Holyrood - G1	170																Commenced July 21
Holyrood - G2	170																May 21 - Sept 18
Holyrood - G3	150																April 10 - July 9
Bay D'Espoir - G1 <sup>Note 1</sup>	76.5																May 13 - May 24
Bay D'Espoir - G2 <sup>Note 2</sup>	76.5																April 14 - May 9
Bay D'Espoir - G3 <sup>Note 7</sup>	76.5																May 24 - Aug 26
Bay D'Espoir - G4	76.5																July 6 - July 29
Bay D'Espoir - G5 <sup>Note 3</sup>	76.5																
Bay D'Espoir - G6 <sup>Notes 3, 4</sup>	76.5																Feb 17 - Aug 5
Bay D'Espoir - G7	154																Commenced Sept 14
Upper Salmon	84																Sept 1 - Sept 13
Granite Canal	40																Aug 3 - Aug 14
Hinds Lake	75																
Cat Arm - G1	67																June 15 - June 26
Cat Arm - G2	67																Aug 18 - Aug 29
Paradise River	8																Sept 14 - Sept 19
Hardwoods GT	50																July 25 - Sept 25
Stephenville GT	50																Commenced June 13
Holyrood CT <sup>Note 5</sup>	120																
HBV / STA Diesels	14																
Star Lake <sup>Note 6</sup>	18																June 23 - July 5
Exploits	63																
CoGen	8																
Available Capacity	1,767	1,197	1,258	1,258	1,276	1,326	1,249	1,494	1,494	1,647	1,647	1,767	1,767	1,767	1,767		
Forecasted Gross Peak Load		770	828	885	951	1,009	1,041	1,074	1,106	1,139	1,171	1,523	1,523	1,523	1,523		
Total Reserves		427	430	372	324	317	208	420	388	508	476	244	244	244	244		
Largest Operating Unit		154	154	154	170	170	170	170	170	170	170	170	170	170	170		
n-1 Reserve		273	276	218	154	147	38	250	218	338	306	74	74	74	74		
Avalon Load		404	435	465	499	530	547	564	581	598	615	799	799	799	799		
HTGS Units Required		1	1	1	2	2	2	2	2	2	2	3	3	3	3		

Legend	
Unit Available	White
Unit Unavailable	Dark Blue

Notes:

1. The BDE Unit 1 outage (Oct 24-27) is required for excitation transformer replacement.
2. The BDE Unit 2 outage (Oct 31-Nov 2) is required for excitation transformer replacement.
3. The BDE Unit 6 outage (Nov 3-Nov 22) is required simultaneous with Unit 5 in order to perform intake work (common penstock). Units 5 & 6 outage will commence following the return of BDE Unit 2 (see note 2).
4. BDE Unit 6 was forced out of service on February 17 (excitation transformer). Annual unit maintenance was done during this extended outage.
5. The new Holyrood CT is planned to be available on December 7, 2014.
6. The Star Lake unit outage (Oct 6-17) is required for Intake Gate work.
7. BDE Unit 3 on a forced outage beginning Sept. 25

## **APPENDIX C**

### Severe Weather Preparedness Protocol



## **Severe Weather Preparedness**

**Newfoundland and Labrador Hydro**

September 28, 2014



## **Purpose**

The severe weather preparedness document outlines Newfoundland and Labrador Hydro's (Hydro) procedures and operational plans to be put in place during adverse weather conditions including snow, rain, freezing rain and wind. It is provided as a guide to follow during severe weather events and should be reviewed for each occurrence to determine applicability. The document focuses on maintaining individual unit reliability and preventing equipment downtime for electrical energy supply. As safety is the top priority for Hydro, it should be considered and incorporated into all aspects of work execution and storm preparation associated with this plan.

The document is broken down into the following sections:

- Introduction
- Health, Safety, Security and Environment
- Roles and Responsibilities
- Processes and Procedures
- Evaluation of Potential Problem Areas
- Training
- Communications

## **Table of Contents**

1 INTRODUCTION.....1

2 HEALTH SAFETY AND ENVIRONMENT .....2

3 ROLES AND RESPONSIBILITIES .....3

4 PROCESSES AND PROCEDURES.....5

5 EVALUATION OF POTENTIAL PROBLEM AREAS .....9

6 TRAINING ..... 11

7 COMMUNICATIONS..... 12

Acronyms

- AOC – Asset Owners Technical Council
- ECC – Energy Control Centre
- HSSE – Health, Safety, Security and Environment
- NERC – North American Electric Reliability Corporation
- PETS – Project Execution and Technical Services
- TRO – Transmission and Rural Operations

- Appendix A – Severe Weather Preparation Checklist
- Appendix B – A-003 Notification of Weather Warnings and Lightning Activity
- Appendix C – T-051 Diesel Testing Instructions
- Appendix D – T-054 Gas Turbine Instructions

1     **1     INTRODUCTION**

2     Newfoundland and Labrador Hydro (Hydro) is dedicated to delivering safe, reliable, least-  
3     cost power to industrial, utility and residential customers in Newfoundland and Labrador.  
4     One of the major factors that influence Hydro’s efforts is Newfoundland and Labrador’s ever  
5     changing weather. Ranging from the mild to the extreme, weather events within the  
6     province can have a disrupting effect on the service Hydro provides to its electrical energy  
7     consumers. In order to effectively respond to severe weather events, Hydro must be  
8     prepared throughout the year to deal with the unpredictable nature of Newfoundland and  
9     Labrador’s weather.

10

11     Regardless of weather type or severity, plans need to be in place to deal with potential  
12     disruptions in Hydro’s service to customers. Hydro recognizes that a dependable source of  
13     electricity is an essential part of daily life. To ensure that Hydro can continue to provide a  
14     stable and reliable source of electricity, preparations and adjustments to routine operations  
15     must be made.

16

17     In this report, Hydro’s Severe Weather Preparedness plan is defined in detail, outlining the  
18     necessary steps Hydro takes to deal with extreme weather conditions. A Severe Weather  
19     Checklist has also been created that should be reviewed and implemented before each  
20     impending storm and is attached to this report at Appendix A.

21

22     The Asset Owners Technical Council (AOC) is the owner of this document and will maintain a  
23     record of revisions in minutes of meetings. Revisions to this document will be directed to  
24     the Chair of the AOC.

1    **2    HEALTH SAFETY AND ENVIRONMENT**

2    At Hydro, safety is the number one priority and Hydro is committed to keeping employees  
3    and the public safe. To ensure work is completed safely, Hydro has developed a wide range  
4    of safety tools that are used to identify and mitigate the hazards and risks associated with  
5    the task at hand. These tools, such as the Tailboard and Step Back 5x5, should be used  
6    during the completion of any work, whether or not the task is to be completed during  
7    adverse weather. Extra precaution should be taken when completing work during severe  
8    weather conditions. Adverse weather increase the hazards associated with any job. If the  
9    hazards and risks are found to be too great, a discussion should be had with the supervisor  
10    and other coworkers to improve the overall safety of the job for all those involved.

11  
12    Corporate wide and job safety briefings should be considered during the preparation for,  
13    and in response to, a severe weather event. This will provide personnel time to plan and  
14    prepare for the anticipated working conditions so that they can complete the job safely.  
15    Safety briefings can be administered by all levels of management and through supervisor to  
16    their crews in their respective areas.

17  
18    Hydro maintains a high standard of environmental responsibility and performance through  
19    the implementation of the ISO 14001 comprehensive environmental management system.  
20    This system outlines environmental principles that guide Hydro’s environmental actions and  
21    decision-making, whether faced with adverse or ideal weather conditions. Hydro is  
22    committed to helping sustain a healthy environment for present and future  
23    Newfoundlanders and Labradorians and will follow the ISO 14001 system during its severe  
24    weather response to ensure no negative effects are felt by the environment.

1     **3     ROLES AND RESPONSIBILITIES**

2     In order to effectively administer a severe weather preparedness program clear and  
3     definitive roles must be outlined for all personnel involved. Contributions from all levels of  
4     employees are necessary and play a vital role in the overall success of Hydro. A unified group  
5     effort is required to promote and achieve the highest level of reliability for high impact  
6     weather events. The following provides a general list of responsibilities for different levels of  
7     Hydro employees. Each area of operation should tailor these roles and expectations to fit  
8     within their own structure.

9

10     1. Senior Management/Executives:

- 11         a. Set expectations for safety, reliability and operational performance;
- 12         b. Ensure that a winter weather preparation procedure exists for each operating  
13             location;
- 14         c. Consider a fleet wide annual winter preparation meeting, training exercise or  
15             both to share best practices and lessons learned from the previous year; and
- 16         d. Share insights across the fleet and through industry associations.

17

18     2. Regional/Plant Manager:

- 19         a. Ensure on-call supervisors are made aware of pending storm;
- 20         b. Evaluate the storm forecast and determine if employees need to be stationed  
21             in critical locations including for Protection and Controls resources;
- 22         c. Ensure contact information is available for Protection and Controls  
23             Engineering for possible evaluation of fault traces;
- 24         d. Submit suggested revisions to this document to the Chair of the AOC for  
25             consideration at the next scheduled meeting;
- 26         e. Ensure proper execution of the winter weather preparation procedure;

- 1           f. Conduct a plant readiness review prior to an anticipated severe winter
- 2           weather event;
- 3           g. Encourage plant staff to look for areas at risk due to winter conditions and
- 4           bring up opportunities to improve readiness and response;
- 5           h. Following each winter, conduct an evaluation of the effectiveness of the
- 6           winter weather preparation procedure and incorporate lessons learned; and
- 7           i. Ensure additional inspections of equipment and vehicles are completed prior
- 8           to the forecasted event to ensure full functionality and full gas tanks.

9

10        3. Energy Control Center:

- 11           a. Communicate storm forecast to all operational managers. Follow up with field
- 12           operations staff depending on the severity of the event or system condition
- 13           to discuss the need for additional preparations for pending weather;
- 14           b. Test Run Stand by Generation as required depending upon the nature of the
- 15           forecasted event;
- 16           c. Contact Newfoundland Power for generation status update;
- 17           d. Determine if stand by generation will be started prior to peaks and consult
- 18           with TRO to determine if Operators need to be on site; and
- 19           e. Enhance staffing levels at the ECC as needed.

1 **4 PROCESSES AND PROCEDURES**

2 Hydro’s severe weather preparedness program begins five days prior to any adverse  
3 weather. In order to provide an accurate estimate Hydro analyzes the forecasted weather  
4 conditions. Through this process any possible severe weather conditions are flagged and  
5 monitored to ensure Hydro is prepared to deal with any potential disruptions to its ability to  
6 meet system requirements.

7

8 In the days leading up to the severe weather event or forecasted system problem, ECC issues  
9 an advisory to field operations staff concerning the adverse weather or potential generation  
10 shortfall. ECC will also determine if a coordination conference call is required between  
11 System Operations, PETs and Operations. With this notification, Hydro begins the process of  
12 preparing for the adverse weather event. While a number of tasks need to be completed to  
13 prepare solely for the expected weather, everyday operational tasks completed by field  
14 operations help Hydro prepare. These include, but are not limited to:

15

- 16 • Fleet vehicles are fueled up at the end of each working day;
- 17 • On-call supervisors are equipped with all emergency plans, employee contact  
18 information and a corporate vehicle;
- 19 • Cell phones are issued to various shops and the gas turbine operators;
- 20 • All line shop and offices are stocked with critical spare parts and consumables;
- 21 • Operations (shops and trucks) are stocked with critical spare parts and consumable;  
22 and
- 23 • Distribution line workers and distribution front line supervisors have vehicles at  
24 home for quicker response times.

25

26 While these everyday tasks go a long way to preparing Hydro for severe weather conditions,  
27 other activities are necessary to ensure an effective response. For potential generation  
28 shortfall, Hydro ensures that staff is dispatched to certain remote Hydro plants and standby



1 generation locations. In addition, in the case of a severe weather event, Hydro's response  
2 includes any or all of the following activities, depending on the expected severity of the  
3 event:

4

5 1. Pre-event coordination call to coordinate response activities;

6

7 System Operations (upon receipt of warnings from Environment Canada) issues  
8 notices of weather warnings to regional and plant managers. As part of standing  
9 practice, field staff will make further coordination calls when necessary to secure the  
10 power system.

11

12 2. Enhanced staffing levels at the ECC and other control rooms as needed;

13

14 During significant disruptions to the power system or during times of high call volume  
15 to the ECC, it is regular practice to bring in extra staff. This is especially necessary  
16 when incidents occur outside of the normal working hours to reduce the delay in  
17 mobilizing the Customer Service Call Centre. Additional staffing may also be brought  
18 in to help manage complex issues.

19

20 3. Deployment of work crews to reduce response time in the event of an unplanned  
21 outage or equipment problems;

22

23 Advanced deployment of crews to specific sites prior to a storm provides benefits  
24 when the storm is predicted to occur in a particular geographical area or there are  
25 known system equipment issues at those sites which may require attention during a  
26 storm. Most often, the benefits of keeping crews at their home base and close to the  
27 center of operations outweighs the risk of having them located at a remote location  
28 where there may not be problems. There will also be times when decisions are made

1 for certain employees or supervisors to take company vehicles home for enhanced  
2 response.

3

4 In the case of generating stations, the majority of Hydro's large generating units are  
5 located in the Bay d'Espoir area or in Cat Arm and Hinds Lake, close to the home base  
6 location of the work crews that support those facilities. Similarly, for TRO, Hydro's  
7 crews' home office or depot are purposely located throughout the province in central  
8 locations with facilities to provide fast response to interruptions. For these reasons,  
9 the deployment of work crews to specific sites other than their home offices in  
10 advance of a weather event is not a common activity, but is one that is considered in  
11 advance of each major forecasted weather event which includes P&C resources.

12

13 4. Additional inspections of equipment and vehicles (four wheel drive trucks,  
14 snowmobiles, ATVs and specialized vehicles) to ensure full functionality and full gas  
15 tanks;

16

17 Having full fuel tanks and fully operational vehicles and equipment ensures no delay  
18 in crew mobilization should the need arise.

19

20 5. Additional communication with on-call personnel to ensure readiness to respond if  
21 needed;

22

23 This occurs routinely in accordance with the operating instruction: A-003 Notification  
24 of Weather Warnings and Lightning Activity, attached to this report as Appendix B.

25 This heightened sense of awareness ensure that on-call personnel are ready to  
26 mobilize should the need arise.

27

28 6. Scheduling of additional snow removal to ensure ongoing access to critical  
29 infrastructure during storm events;

1           A new addition to Hydro’s normal pre-storm planning activities is requesting  
2           additional or priority snow clearing. Hydro has snow clearing arrangements in place  
3           for all of its facilities where it is prudent to do so. By maintaining safe access to key  
4           facilities travel time is greatly reduced.

5

6           7. Test run of standby diesels and gas turbines (Interconnected).

7

8           Standby diesels and gas turbines are tested monthly to ensure availability in  
9           accordance with the following operating instructions:

- 10           • T-051 – Diesel Testing; and
- 11           • T-054 – Gas Turbine Testing.

12           These instructions are attached in Appendices C and D, respectively. In addition to  
13           the testing of standby generation, the ECC also contacts Newfoundland Power for a  
14           generation status update as well as schedule when standby generation will be  
15           needed and consults with TRO to determine if operators need to be on location to  
16           access this additional energy.

17

18           Hydro has also started the practice of running up the gas turbines in Stephenville and  
19           Hardwoods and the standby diesels in Hawke’s Bay and St. Anthony as required in  
20           advance of significant forecasted weather events. By testing and proving the full  
21           operating capability of standby generating units in advance, it allows Hydro to ensure  
22           that these assets will provide reliable service under peak load or generation shortfall  
23           conditions and during power system emergencies.

1 **5 EVALUATION OF POTENTIAL PROBLEM AREAS**

2 This section is taken from NERC guidelines and is intended for general information. Identify  
3 and prioritize components, systems, and other areas of vulnerability which may experience  
4 freezing problems or other cold weather operational issues.

5

6 1. This includes equipment that has the potential to:

7 a) Initiate an automatic unit trip;

8 b) Impact unit start-up;

9 c) Initiate automatic unit runback schemes and/or cause partial outages,

10 d) Cause damage to the unit;

11 e) Adversely affect environmental controls that could cause full or partial  
12 outages;

13 f) Adversely affect the delivery of fuel or water to the units;

14 g) Cause other operational problems such as slowed or impaired field devices; or

15 h) Create a weather related safety hazard.

16

17 2. Based on previous cold weather events, a list of typical problem areas are identified  
18 below. This is not meant to be an all inclusive list. Individual entities should review  
19 their plant design and configuration, identify areas with potential exposure to the  
20 elements, ambient temperatures, or both and tailor their plans to address them  
21 accordingly.

22 a) Level transmitters;

23 i. Drum level transmitters and sensing lines

24 ii. Condensate tank level transmitters and sensing lines

25 iii. De-aerator tank level transmitters and sensing lines

26 iv. Hotwell level transmitters and sensing lines

27 v. Fuel oil tank level transmitters / indicators

28 b) Pressure Transmitters;

- 1                    i. Gas turbine combustor pressure transmitters and sensing lines
- 2                    ii. Feed water pump pressure transmitters and sensing lines
- 3                    iii. Condensate pump pressure transmitters and sensing lines
- 4                    iv. Steam pressure transmitters and sensing lines
- 5                    c) Flow Transmitters;
- 6                        i. Steam flow transmitters and sensing lines
- 7                        ii. Feed water pump flow transmitters and sensing lines
- 8                        iii. High pressure steam attemperator flow transmitters and sensing lines
- 9                    d) Instrument Air System;
- 10                   e) Motor-Operated Valves, Valve Positioners, and Solenoid Valves;
- 11                   f) Drain Lines, Steam Vents, and Intake Screens; and
- 12                   g) Water Pipes and Fire Suppression Systems.
- 13                       i. Low/no water flow piping systems.
- 14
- 15                   3. Potential vulnerabilities associated with emergency generators, including Blackstart
- 16                       generators, should be evaluated when developing the site specific winter weather
- 17                       preparation procedure as they may provide critical system(s) backup.

1 **6 TRAINING**

2 Coordinate annual training in winter specific and plant specific awareness and maintenance  
3 training. This includes testing of emergency response plans and equipment specific training.

4

5 1. The Asset Owners Technical Council will hold a winter readiness meeting on an  
6 annual basis to highlight preparations and expectations for severe cold weather;

7 2. Operations personnel should review all applicable emergency response plans in the  
8 Environmental Management System and Safety and Health Program prior to

9 December 1; and

10 3. Operations personnel should ensure all equipment specific training is up to date.

1 **7 COMMUNICATIONS**

2 During adverse weather conditions Hydro follows A-003 Notification of Weather Warnings  
3 and Lightning Activity. The prime objective of the system operating instruction is to provide  
4 early warning of lightning activity and adverse weather. This information is to be used to  
5 improve power system security and reliability.

6

7 Clear and timely communication is essential to an effective program. Key communication  
8 points should include the following:

9

- 10 1. Before a severe weather event, ECC will decide if a coordination conference call is  
11 required between System Operations, PETs and Operations;
- 12 2. Before a severe winter weather event, plant/regional management should  
13 communicate with their appropriate senior management that the site specific winter  
14 weather preparation procedure, checklists, and readiness reviews have been  
15 completed;
- 16 3. Before and during a severe winter weather event, communicate with all personnel  
17 about changing conditions and potential areas of concern to heighten awareness  
18 around safe and reliable operations;
- 19 4. Before and during a severe winter weather event, the affected entity(ies) will keep  
20 the ECC up to date on changes to plant availability, capacity, or other operating  
21 limitations; and
- 22 5. After a generating plant trip, derate, or failure to start due to severe winter weather,  
23 Plant Management, as appropriate, should conduct an analysis, develop lessons  
24 learned, and incorporate good industry practices.

## **APPENDIX A**

Severe Weather Preparation Checklist



## Severe Weather Preparedness Checklist

<b>Date:</b>	<b>Location:</b>
<b>Current and Forecasted Weather:</b>	
<b>Things to think about before preparing</b>	
<input type="checkbox"/> Do workers know and understand the tasks? <input type="checkbox"/> Have all workers been given orientations? (Is there an orientation or training for working in severe weather?) <input type="checkbox"/> Ensure Tailboards are completed prior to start of work <input type="checkbox"/> Communicate forecasted weather conditions to all employees. Keep employees updated on changing conditions <input type="checkbox"/> Are all proper tools available for job? <input type="checkbox"/> Ensure employees have Proper PPE for working in extreme weather conditions <input type="checkbox"/> Will employees be working alone? If yes, circulate the working alone procedure for review. <input type="checkbox"/> Have environmental aspects been considered?	
<b>Emergency Information</b>	
<b>Emergency response plan(s) in place?</b> <input type="checkbox"/> Yes	
Has it been communicated to all required personnel ? <input type="checkbox"/> Yes	
Nearest medical facility:	
<b>Emergency Contact Numbers</b>	
<b>1.</b>	<b>3.</b>
<b>2.</b>	<b>4.</b>

<b>Severe Weather Preparedness</b>	
<b>Safety</b> <input type="checkbox"/> Consider holding safety briefings with available staff <input type="checkbox"/> Ensure workers are familiar with the safety tools and procedures associated with severe weather <ul style="list-style-type: none"> <li><input type="checkbox"/> Tailboard</li> <li><input type="checkbox"/> Step Back 5x5</li> <li><input type="checkbox"/> Proper PPE for Weather conditions</li> </ul>	<b>Trucks</b> <input type="checkbox"/> Fuel all vehicles <input type="checkbox"/> Ensure Distribution line trucks are stocked with critical spare parts and consumables <input type="checkbox"/> Equip trucks with special tools and equipment as required <input type="checkbox"/> Ensure distribution line workers and distribution front line supervisors have company vehicles at home <input type="checkbox"/> Provide on call supervisors with a company vehicle <input type="checkbox"/> Consider having other staff take company vehicles home <input type="checkbox"/> Ensure truck radios are working
<b>Tools and Equipment</b> <input type="checkbox"/> Test portable generators, standby diesels and gas turbines <input type="checkbox"/> Test tools as required <input type="checkbox"/> Ensure fuel supply available	<b>Buildings</b> <input type="checkbox"/> Schedule additional snow removal <input type="checkbox"/> Consider renting portable generators for buildings not equipped with a backup <input type="checkbox"/> Check ability to alter temperature controls in buildings to override normal after-hour temperature settings
<b>Substation and Generation</b> <input type="checkbox"/> Consider location and availability of portable generation and portable substations. Re-deploy as required <input type="checkbox"/> Ensure fuel Supply for system generators	<b>Stores – Not sure this applies to us (or maybe diff name)</b> <input type="checkbox"/> Ensure all stores have proper staffing levels <input type="checkbox"/> Check stock levels for items likely needed during storms <input type="checkbox"/> Consider confirming the supply of poles on the island

Appendix A

<p><b>Operations Staff</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Notify Staff of forecasted storm. Consider scheduling staff to work outside of normal working hours to ensure quick response</li> <li><input type="checkbox"/> Equip Supervisors with up to date staff listings and contact information</li> <li><input type="checkbox"/> Consider re-deploying staff to areas most likely impacted by the severe weather</li> <li><input type="checkbox"/> Put technical staff on notice of pending storm</li> <li><input type="checkbox"/> Ensure support and customer service staffs are aware if the forecasted weather</li> <li><input type="checkbox"/> Consider enhancing staff levels at ECC and other control rooms</li> <li><input type="checkbox"/> Ensure IS support team is in place</li> <li><input type="checkbox"/> Ensure Protection and Control Engineering are aware of the pending weather and that contact information is available</li> </ul>	<p><b>Transportation</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Where possible, put a rush on maintenance or repair work for any company vehicle</li> <li><input type="checkbox"/> Complete inspections of additional equipment and vehicles (four wheel drive trucks, snowmobiles, ATVs and specialized vehicles)</li> <li><input type="checkbox"/> Notify garages and mechanics of forecasted storm</li> <li><input type="checkbox"/> Confirm after hour contacts with government departments in the event that permits are required to re-locate portable equipment, or obtain permits in advance</li> <li><input type="checkbox"/> Confirm the availability of tractors or other equipment to relocate portable equipment</li> <li><input type="checkbox"/> Arrange for any necessary escorts</li> </ul>
<p><b>Communications</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hold a pre-event coordination call to coordinate response activities</li> <li><input type="checkbox"/> Consider additional communication with on-call personnel to ensure readiness to respond</li> <li><input type="checkbox"/> Contact NF Power for generation Status</li> <li><input type="checkbox"/> Check availability of Satellite Phones, ensure they are charged and working</li> <li><input type="checkbox"/> Ensure appropriate staff have cell phones. Ensure adequate cell phone chargers and spare batteries are available</li> <li><input type="checkbox"/> Charge and test portable radios</li> <li><input type="checkbox"/> Test area office base station radios</li> </ul>	<p><b>System Security</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Make extra effort to correct any abnormal system conditions</li> <li><input type="checkbox"/> Where practical consider suspending construction on capital jobs to return the system to normal</li> <li><input type="checkbox"/> Consider developing a contingency plan for any abnormal conditions that cannot be corrected</li> <li><input type="checkbox"/> Consider protection changes above normal settings</li> </ul>
<p><b>Contractors</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Put contractors on notice of pending storm and ask that they prepare</li> <li><input type="checkbox"/> Confirm Contractor's emergency contact information</li> <li><input type="checkbox"/> Confirm their available resources and their ability to assist</li> <li><input type="checkbox"/> Ensure Snow clearing contractors are on alert and available</li> </ul>	<p><b>Customer Service and Communications Hub</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Confirm area connections to the communications hub. Ensure an area person is assigned to communicate with the hub</li> <li><input type="checkbox"/> Consider assigning a communications hub member to the ECC</li> <li><input type="checkbox"/> Communicate with Customer Service to determine their requirement for remote</li> <li><input type="checkbox"/> Check the availability of local Customer Service Staff</li> </ul>
<p><b>Accommodations</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Contact local hotels to determine availability of rooms in the event that crews are moved into the area. Consider reserving a block of rooms.</li> </ul>	<p><b>Finance</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Arrange for numbers to be used for charging the storm. Communicate to staff</li> </ul>
<p><b>Government</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Prior to the storm, confirm contacts for emergency snow clearing with the Department of Transportation</li> <li><input type="checkbox"/> Ensure updates contact lists are available for surrounding municipalities</li> <li><input type="checkbox"/> Prior to the storm, confirm ferry schedules and contact information</li> </ul>	<p><b>Other Utilities</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Coordinate response with Newfoundland Power</li> </ul>

## **APPENDIX B**

A-003 Notification of Weather Warnings and Lightning Activity

**NEWFOUNDLAND AND LABRADOR HYDRO - OPERATIONS STANDARD INSTRUCTION**

<b>Title:</b>	<b>Instruction Number:</b> A-003
<b>Notification of Weather Warnings and Lightning Activity **</b>	<b>Station:</b> General
	<b>Revision Number:</b> 2

**GENERAL**

Weather warnings include extreme winds, heavy rainfalls or floods, lightning, ice storms, blizzards, and other extreme occurrences. Warnings are not the regular daily public forecasts that Environment Canada issues. Also, the Energy Control Centre operates a real time Lightning Tracking System (LTS) application to monitor the activity of lightning around Newfoundland and Labrador.

**OBJECTIVE**

Its primary purpose is to provide early warning of lightning activity and adverse weather. Use this information to improve power system security and reliability. In response to warnings, Energy Control Centre staff shall position the power system in order to guard against the impending threat of lightning and adverse weather.

**ADVERSE WEATHER:**

**Procedure**

When Environment Canada issues to the Energy Control Centre a special weather warning, the information contained in the warning shall be forwarded to regional and plant staff, who maybe potentially impacted. After hours, on-call persons shall be notified.

Use this information to improve power system security and reliability. In response to warnings, Energy Control Centre staff shall position the power system in order to guard against the impending threat of adverse weather.

Appendix B

**LIGHTNING ACTIVITY**

Similarly, others may benefit from notification of lightning activity. The Energy Control Centre shall notify other parties that may be impacted by lightning activity.

**Procedure**

Energy Control Centre staff will notify the following parties of lightning that may affect their operations or activities:

1. Hydro personnel working in switchyards or near transmission lines.
2. Bay d’Espoir Control Room
3. Holyrood Control Room
4. Northern region personnel (Manager – Generation and Terminals or Production Supervisor during normal hours and on-call after hours) of any lightning activity in the vicinity of L’Anse au Loop and Lac Robertson
5. Newfoundland Power Control Centre
6. Industrial Customers
7. Exploits Grand Falls Control Room

\*\*Part of the Emergency Response Plan

**REVISION HISTORY**

<u>Version Number</u>	<u>Date</u>	<u>Description of Change</u>
0	2004-08-23	Original Issue
2	2013-09-25	Add Exploits Grand Falls Control Room

<b>PREPARED BY:</b>  Bob Butler/NLHydro, Ross Kearley/NLHydro	<b>APPROVED/CHECKED BY:</b>  Bob Butler/NLHydro	<b>ISSUED DATE: 02/26/2008</b>
		<b>REV. DATE: 09/25/2013</b>

## **APPENDIX C**

T-051 Diesel Testing Instructions

## NEWFOUNDLAND AND LABRADOR HYDRO - SYSTEM OPERATING INSTRUCTION

<b>Title:</b>  <b>Diesel Testing</b>	<b>Instruction Number:</b> T-051 <b>Station:</b> SDP, HBY <b>Revision Number:</b> 1
--------------------------------------------	-------------------------------------------------------------------------------------------

### Introduction

The St. Anthony and Hawkes Bay diesels have the capability to be operated locally or remotely from the Energy Control Center. Remote operation from the Control Center is generally done only when there are problems on the system that requires these units to be placed in service. Such occurrences are rare, and consequently, Control Center staff may not be conversant with the operation of these units when they are required to be operated. There is also a requirement for these diesels to be operated monthly, so that operations and maintenance personnel can do the necessary monitoring, to ensure these units are available when required. Therefore, to ensure the necessary skills are kept up to date, and availability checks are performed, for the operation of these units, the following procedure has been developed.

### Procedure

1. Diesels shall be exercised monthly.
2. All diesel units at both St. Anthony and Hawke’s Bay plants shall be started and loaded to their normal maximum from the ECC.
3. The diesels shall remain at the normal maximum load for a duration of one hour.
4. The operator shall be present while the diesels are being exercised.
5. A record shall be kept, at the ECC, recording when the diesels were exercised.
6. Work orders/requests shall be submitted on any deficiencies that are noted during testing.

### REVISION HISTORY

<u>Version Number</u>	<u>Date</u>	<u>Description of Change</u>
0	1998-03-19	Original Issue
1	2011-08-25	Minor rewording

<b>PREPARED BY:</b> Bob Butler/NLHydro	<b>APPROVED/CHECKED BY:</b> Bob Butler/NLHydro	<b>ISSUED DATE:</b> 03/19/98
		08/25/2011
		<b>REV. DATE:</b>

## **APPENDIX D**

T-054 Gas Turbine Instructions



## NEWFOUNDLAND AND LABRADOR HYDRO - OPERATIONS STANDARD INSTRUCTION

<b>Title:</b>	<b>Instruction Number:</b>	T-054
<b>Gas Turbine Testing</b>	<b>Station:</b>	HWD, HVY, SVL, Undefined
	<b>Revision Number:</b>	1

### Introduction

Production from gas turbines may be required under peak load conditions or during power system emergencies or generation shortfalls. The gas turbines at Hardwoods, Stephenville and Happy Valley have the capability to be operated locally from its terminal station interface, or remotely from the Energy Control Centre. Control Centre staff place gas turbines in-service when there are problems on the power system that require support from these units. These units are expected to operate at their designed maximum continuous rating, free of constraints.

There is a requirement to regularly operate these gas turbines for operations and maintenance personnel to ensure these units are capable of delivering the rated capacity, when required.

To ensure the necessary familiarity with operating the gas turbines and capability checks are performed, the units shall be tested monthly according to the procedure below.

### Procedure

1. Prior to all testing, ensure Gas Turbine Operator is present at the gas turbine site.
2. Gas turbines shall be started, each end separately and loaded to full rating, from the ECC.
3. Each end of the gas turbine shall remain at the full rating for duration of ten minutes. Consideration shall be given to minimize fuel consumption.
4. The following checks shall be made with the unit at a low output level:
  - a. With unit in Synchronous Condense Mode, generate using end A
  - b. With unit in Synchronous Condense Mode, generate using end B
  - c. With unit in Synchronous Condense Mode, generate using end A & B
  - d. With unit shut down, select generate on end A, and then shut down
  - e. With unit shut down, select generate on end B, and then shut down
  - f. With unit shut down, select generate using A & B
  - g. Verify MW and MVar setpoints

There is one gas generator at Happy Valley. End A / B apply to Hardwoods; and End A at Stephenville.

5. Record in the system diary the tests performed and a summary of the results.
6. Generate work orders on any noted deficiencies uncovered during testing.

Note: Black start capability shall be checked annually at each gas turbine location.

**REVISION HISTORY**

<u>Version Number</u>	<u>Date</u>	<u>Description of Change</u>
0	2006-05-12	Original Issue
1	2011-08-25	Minor rewording

<b>PREPARED BY:</b> Marcus O'Keefe	<b>APPROVED/CHECKED BY:</b> Bob Butler/NLHydro	<b>ISSUED DATE: 05/12/2006</b>
		<b>08/25/2011</b> <b>REV. DATE:</b>

## **APPENDIX D**

Process Improvement Action Plan: Winter Readiness Self Assessment

PROCESS IMPROVEMENT ACTION PLAN			
Winter Readiness Self-Assessment			
Region/Facility: Hydro Generation			Completion
Ref #	Self-Assessment Criterion	Action Taken/Planned	Date
7	Senior Mgmt ensure a winter readiness preparation procedure exists for each facility/plant/region.	This "Winter Readiness Procedure" is currently being developed and will be site/plant specific for all Hydro Generation Facilities . <b>RESP: Manager - HG</b>	10-Oct-14
9	Senior Mgmt obtain and share insights learned from other jurisdictions.	Review/compare procedure with other Hydro regional operations and incorporate lessons learned. <b>RESP: Manager - Operations</b>	31-Oct-14
10	Plant/Facility/Region Management develop a winter readiness preparation procedure. Appoint a person responsible for keeping the procedure updated with company/industry best practices and lessons learned.	The Manager- Operations has been appointed as person responsible for developing, updating and communicating the procedure. This procedure will be reviewed and updated through implementation of a scheduled PM activity. Lessons learned will be incorporated into the procedure as part of the review process. <b>RESP: Manager - Operations</b>	10-Oct -14 to have activity completed
13	Plant/Facility/Region Management conduct a winter readiness review prior to winter readiness period and prior to an anticipated severe winter event.	Building on past practice, meetings will be held prior to any significant weather event and potential system demand issues (e.g. peak loading). These meetings now utilize the "Severe Weather Preparedness" procedure. A review will also be completed prior to this winter season as part of the scheduled PM activity noted above. <b>RESP: Manager - Operations</b>	16/10/2014
14	Plant/Facility/Region Management conduct a post winter period review of the effectiveness of the winter readiness preparation procedure and incorporate lessons learned.	Any equipment reliability issue affecting production through the winter season will be reviewed as it arises and with lessons learned incorporated into the "Winter Readiness Procedure". The annual review will be completed as part of a post winter season PM activity. <b>RESP: Manager - Operations</b>	10-Oct -14 to have PM activity established
25	Evaluate risks associated with emergency systems - emergency generators, black start generators, DC/UPS power systems, fire systems to ensure that they adequately can address critical backup needs if and when needed.	The Operations group has developed an annual program to check and test this equipment. The program will be executed prior to the upcoming winter season. <b>RESP: Manager - Operations</b>	10/30/2014 (Annually)
32	Review and/or simulate measures for extreme weather scenarios, including instrumentation, readings, alarms, protection and control, plan/facility/region control responses	A mock exercise of an extreme weather event will be conducted prior to Nov. 30th, with lessons learned implemented. <b>RESP: Manager - Operations</b>	15-Nov-14

PROCESS IMPROVEMENT ACTION PLAN			
Winter Readiness Self-Assessment			
Region/Facility: Hydro Generation			
Ref #	Self-Assessment Criterion	Action Taken/Planned	Completion Date
37	Are winter readiness planning / scheduling Key Performance Indicators (KPIs) in place?	Implemented cumulative, weekly, progress tracking of Annual Work Plan (AWP) activities required for winter readiness, reported to PUB monthly. <b>RESP: Manager - Work Execution</b>	Initiative completed, reporting ongoing
38	Are winter readiness KPIs goals and trends updated regularly, made available on a dashboard, and reviewed with the relevant personnel on a regular basis?	Hydro Generation reviews weekly schedule and AWP progress weekly with Operations and Work Execution groups. These charts are posted in the planning office. <b>RESP: Manager - Work Execution</b>	Initiative completed, reporting ongoing

<b>PROCESS IMPROVEMENT ACTION PLAN</b>			
<b>Winter Readiness Self-Assessment</b>			
<b>Region/Facility:</b> Holyrood			
<b>Ref #</b>	<b>Self-Assessment Criterion</b>	<b>Action Taken/Planned</b>	<b>Completion Date</b>
8	Senior Mgmt implement a system of annual winter preparation meetings, training exercises, or both to share best practices and lessons learned across the business operations.	Formalize and implement a "Winter Readiness Preparation Procedure" to ensure all Annual Work Plan activities have been compiled and all assets are verified for safe, reliable operation. <b>RESP: Manager - LTAP</b>	31-Oct-14
9	Senior Mgmt obtain and share insights learned from other jurisdictions.	Discuss the HTGS specific "Winter Readiness Preparation Procedure" with other jurisdictions and share best practices. <b>RESP: Manager - LTAP</b>	31-Oct-14
10	Plant/Facility/Region Management develop a winter readiness preparation procedure. Appoint a person responsible for keeping the procedure updated with company/industry best practices and lessons learned.	Formalize the "Winter Readiness Preparation Procedure" for HTGS and execute before upcoming winter season. PM activity to be established to trigger activity and update procedure annually. <b>RESP: Manager - LTAP</b>	31-Oct-14
11	Plant/Facility/Region Management ensure winter readiness preparation procedures includes processes, staffing, plans, timelines that direct key activities before, during and after the winter readiness period.	Finalize procedure and communicate to all departments. Execute procedure prior to winter season. <b>RESP: Manager - LTAP</b>	8-Nov-14
14	Plant/Facility/Region Management conduct a post winter period review of the effectiveness of the winter readiness preparation procedure and incorporate lessons learned.	Procedure will be reviewed annually in May to update the plan and incorporate any opportunities for improvement recognized during the previous winter operating season. PM activity to be established to trigger the review. <b>RESP: Manager - LTAP</b>	31-Oct-14
21	Ensure that Capital and Operating Projects that could affect plant operation or reliability in winter period are completed or placed in a suitable condition prior to the onset of winter readiness period.	Review monthly project progress reports from PETS to confirm projects are on schedule, follow up on projects that will not be completed prior to the winter season and ensure winter preparedness is considered in the project plan. <b>RESP: Manager - Work Execution</b>	30-Nov-14
26	Complete Planning & Scheduling Self-Assessment as it relates to work required for Winter Readiness	Conduct post mortem on 2014 execution before year end and identify any lessons learned. <b>RESP: Manager - Work Execution</b>	31-Dec-14

<b>PROCESS IMPROVEMENT ACTION PLAN</b>			
<b>Winter Readiness Self-Assessment</b>			
<b>Region/Facility:</b> Holyrood			
<b>Ref #</b>	<b>Self-Assessment Criterion</b>	<b>Action Taken/Planned</b>	<b>Completion Date</b>
30	Undertake annual training in winter readiness specific and plant/facility/region specific awareness and maintenance training, including: i) specific protection panel alarms; ii) extreme winter troubleshooting and repair; iii) identification of extreme winter affected plant/facility/region systems and equipment; iv) reviews of special inspections and checks; v) fuel and air specific issues where applicable; vi) extreme winter protection systems design awareness; and vii) lessons learned from previous experiences or from others.	Conduct a mock exercise of an extreme weather event prior to Nov. 15th; implement lessons learned. <b>RESP: Manager - Operations AND Emergency Response Coordinator</b>	24-Nov-14
32	Review and/or simulate measures for extreme weather scenarios, including instrumentation, readings, alarms, protection and control, plan/facility/region control responses	Include within mock exercise of an extreme weather event prior to Nov. 15th; implement lessons learned. <b>RESP: Manager - Operations AND Emergency Response Coordinator</b>	24-Nov-14

PROCESS IMPROVEMENT ACTION PLAN			
Winter Readiness Self-Assessment			
Region/Facility: Transmission & Rural Operations/CTs			
Ref #	Self-Assessment Criterion	Action Taken/Planned	Completion Date
14	Plant/Facility/Region Management conduct a post winter period review of the effectiveness of the winter readiness preparation procedure and incorporate lessons learned.	Any equipment reliability issue affecting production through the winter season will be reviewed as it arises and with lessons learned incorporated into the "Winter Readiness Procedure". The annual review will be completed as part of a post winter season PM activity. <b>RESP: Managers of Long Term Asset Planning, G&amp;T and T&amp;D</b>	27-Oct -14 to have PM activity established
27	Prior to the onset of winter readiness period identify and ensure that plant/facility potential winter and severe winter problem areas that should be tested (i.e. PM transformer tests) are completed.	These PM activities are included in the Annual Work Plan with progress status tracked weekly (reported to PUB monthly). Overall progress is on track for completion prior to November 30. Year to date progress on PM's by major asset classes is as follows: 1. Breakers (90%)                      2. Transformers (79%) 3. CT's (66%)                              4. PT's (40%) 5. Disconnects (59%)                  6. Reclosers (35%) 7. Transmission Lines (95%)      8. Distribution Lines (71%) Note: PM's can vary from the visual inspections of equipment, oil sampling, to function testing and more. Anything outside of accepted parameters will be corrected. <b>RESP: Managers of Operation and Work Execution, G&amp;T and T&amp;D</b>	11/30/2014 or earlier for overall program completion
28	Prior to the onset of winter readiness period identify and ensure that plant/facility low frequency tasks that are potential winter and severe winter problem areas have been exercised tested.	TROC is operating all critical system breakers and identified distribution gang operated switches. These are identified and tracked inside the Annual Work Plan. The operation of breakers tests the functionality of the breaker from both ECC and local control. The intent is to exercise breakers that are not operated frequently. Annual PM's have been created for all breakers and will be planned, scheduled, and monitored for completion throughout the year to ensure winter readiness. Gang operated distribution switches are being treated similarly. They are used to isolate sections of distribution lines during regular maintenance and during times of trouble. Correct operation allows sectionalizing of distribution lines to ensure troubled areas can be isolated while allowing the maximum number of customers to remain unaffected by the disruption. To date the following progress has been achieved: Operate Breakers (65%) Operate Distribution line Gang Switches (66%) <b>RESP: Managers of Operation and Work Execution, G&amp;T and T&amp;D</b>	11/30/2014 for overall program completion



PROCESS IMPROVEMENT ACTION PLAN			
Winter Readiness Self-Assessment			
Region/Facility: Transmission & Rural Operations/CTs			
Ref #	Self-Assessment Criterion	Action Taken/Planned	Completion Date
30	Undertake annual training in winter readiness specific and plant/facility/region specific awareness and maintenance training, including: i) specific protection panel alarms; ii) extreme winter troubleshooting and repair; iii) identification of extreme winter affected plant/facility/region systems and equipment; iv) reviews of special inspections and checks; v) fuel and air specific issues where applicable; vi) extreme winter protection systems design awareness; and vii) lessons learned from previous experiences or from others.	Formal training has been delivered to maintainers on transformer protective relay and the gas turbine DCS systems in 2014. Junior protection and control technicians are assigned to senior protection and control technicians on capital projects which include new protective relay and controls circuits for knowledge transfer and education. In addition, a junior and senior technician will investigate trips on our systems which may include transmission line trips, transformer trips and other equipment throughout the year. Settings will be changed on transformers T10 and T12 in Bay D'Espoir from Spring to Fall settings. Infrascans of electrical equipment are also being performed to identify 'hot spots' that require immediate corrective actions that could potentially cause issues through the winter. Completion is scheduled prior to November 30. <b>RESP: Managers of Operation and Work Execution, G&amp;T and T&amp;D</b>	11/30/2014 or earlier for overall program completion
37	Are winter readiness planning / scheduling Key Performance Indicators (KPIs) in place?	Planning supervisors send out monthly progress reports to be reviewed for PM completion rates. In addition, bi-weekly updates of completion rates for PM, CM, Operating Projects, and Capital Projects are created and also reviewed. Resources are adjusted accordingly to maintain schedule. <b>RESP: Managers of Operation and Work Execution, G&amp;T and T&amp;D</b>	Initiative completed, reporting ongoing
38	Are winter readiness KPIs goals and trends updated regularly, made available on a dashboard, and reviewed with the relevant personnel on a regular basis?	Hydro's KPI's are reviewed on a regular basis, circulated by the Planning Supervisor. They are updated bi-weekly and monthly. Plans, schedules and resources are adjusted throughout the year to align with changes in outages, system operating needs, etc. <b>RESP: Managers of Operation and Work Execution, G&amp;T and T&amp;D</b>	Initiative completed, reporting ongoing