Q. On page 9, line 13 of the Energy Supply Risk Assessment Report, Hydro discusses refined protocols and rigorous guidelines "for managing the electric system and adverse events." Please provide copies of such guidelines and the dates upon which they became, or will become, effective.

A. To manage severe weather events, Hydro has a severe weather preparedness document and a severe weather checklist. Based on the criteria outlined in the documents, System Operations will send out a notification to all key stakeholders with the corresponding weather event. If it is anticipated that the event can have a major impact on system reliability, a standardized meeting occurs prior to the weather event to ensure readiness for all key response personnel across the province. The meeting includes representatives from System Operations, Hydro Generation, Thermal Generation, TRO Eastern and Western, TRO Northern, TRO Labrador, Corporate Communications, Customer Service and Project Execution and Technical Services. The severe weather checklists are completed prior to the meeting. See PUB-NLH-612 Attachment 4 for information in the severe weather checklist.

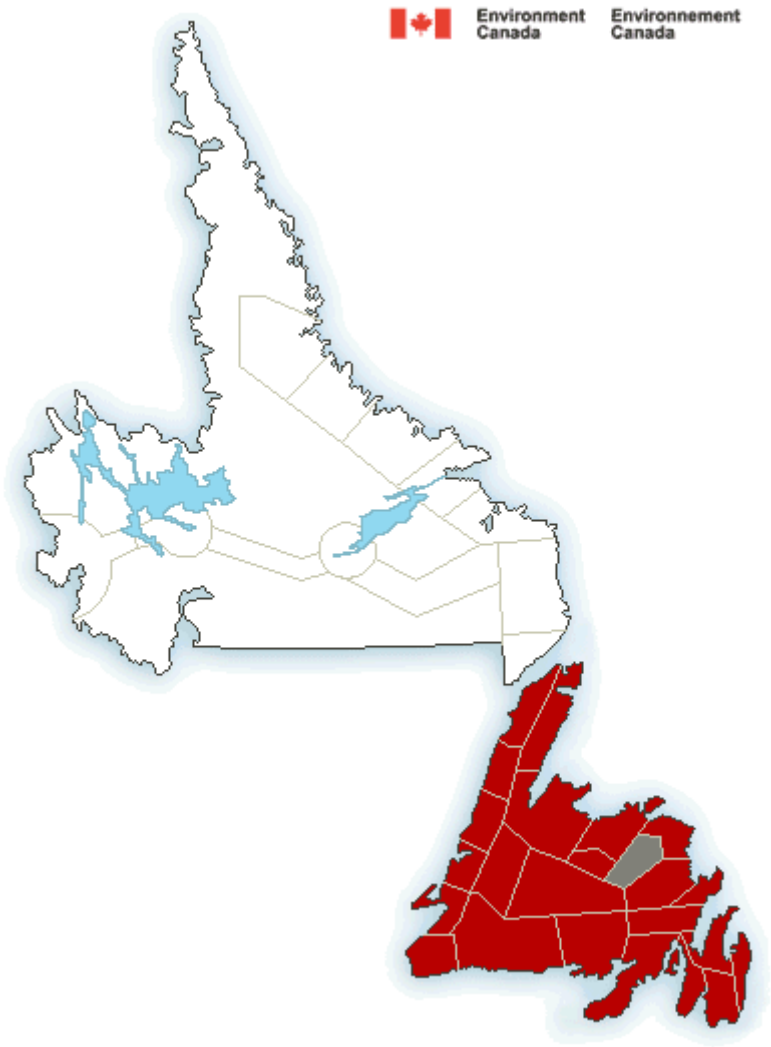
Each day, there is also a system status meeting. At that meeting, an assessment of the island and Avalon reserves is discussed. Based on the load forecast and available reserves, a determination will be made as to the requirements to run standby generation for reliability (spinning reserves). This is documented in the system status notes and sent out to all required stakeholders. In addition to this, a formal notification is sent to the asset owners responsible for the standby generation and the Energy Control Centre (ECC) to ensure full understanding of the requirements.

For examples of these documents, please refer to PUB-NLH-612 Attachment 1 Daily System Status Meeting, Attachment 2 Standby Generation Request, Attachment 3 Severe Weather Preparedness, Attachment 4 Severe Weather Checklist, and Attachment 5 Hydro Severe Weather Checklist.

	Daily System Status Meeting - Notes		
	Topic	**Lead**	**Notes**
1	**Safety Moment and Key Messages**		http://www.nlhydro.com/winter/power-outage-safety Move towards our gaps as immediate opportunities to improve our performance and resiliency Open and honest discussion on risks and how we mitigate them Visible leadership supporting awareness and demonstrating a heightened sense of urgency
2	**System Risk/Watch**		HRD Unit #2 to come offline for cell replacement on VFD B Phase. **Water Management** Thermal generation to follow the guidelines below based on current outlook of low reservoir storage, low snowpack, and low inflows. When 2 units are available at Holyrood, the total Holyrood + Standby output shall be 400 MW. When 3 units are available at Holyrood, the total Holyrood + Standby output shall be 460 MW. *Note:* 3 units considered available when Unit 2 is available at 70 MW. **Hydrology position as of Thursday, February 4:** Total system energy storage is at 48% and all reservoirs are continuing to decline Exploits Generation is currently at 55% of normal, Red Indian Lake is 45% full and continuing to decline Fall/winter Inflows fourth lowest in 65 years

			Inflows year to date at 26% average Snowpack is at 30 - 50% of typical end of winter maximums Thermal generation has been increased for water management Holyrood generation is at maximum Standby generation increased for reliability and energy Holyrood plus standby generation averaged 431 MW over last 7 days The Avalon peak for today is 655 MW in the evening. Based on this forecast and maintaining current wind generation (2 MW) the Avalon reserves for this evening would be 265 MW with no alert. Western Avalon T5: Please see notes below in section 6b.
3	**Previous Day's Events**	System On-Call / Sys Ops	VBN T1 was taken out of service at 1732 hour due to due to burnt CT block. CBC C1 was taken out of service as the 487 relay is showing failed.
4	**Labrador Operations**	System Operations	Unit G7 HVY will be returned to service today at approximately 6pm. The unit in Postville (573) is unavailable for operation due to white smoke coming from the stack yesterday afternoon. The unit was shut down immediately and tagged out. They are currently arranging for a crew to get into Postville today from Nain where there is currently a Mechanical crew. Update Feb 03: The unit in Postville will require a partial dismantle to assess the issue. They are suspecting a broken liner so want to ensure they

			have enough time to assess the problem this week and order the repair parts by before weeks end. If damage is not too significant the unit should be up and running sometime next week depending on delivery of parts.
5	**Weather Outlook and Notifications**	Sys Ops/ Corp Relations	**Wind warning in effect for:** Avalon Peninsula North Avalon Peninsula Southeast Avalon Peninsula Southwest Boniest Peninsula Bay of Exploits Clareville and vicinity St. John's and vicinity Terra Nova Strong winds that may cause damage are expected or occurring. A low pressure system is forecast to track through central Newfoundland early on Saturday. Northwesterly winds gusting up to 110 km/h are expected along parts of the coast on Saturday behind this system. **Rainfall warning in effect for:** Avalon Peninsula Southeast Burgeo-Ramea Burin Peninsula Rain, heavy at times is expected. A low pressure system is expected to approach from the southwest today and will cross central Newfoundland early on Saturday. Rain ahead of this system will begin near noon today and will persist into Saturday morning.



Total rainfall accumulations of 25 to 35 millimetres are expected before the rain tapers off by noon on Saturday.

Winter storm warning in effect for:

Corner Brook and vicinity
Deer Lake -Humber Valley
Green Bay-White Bay
Gros Morne
Northern Peninsula East
Parson's Pond-Hawke's Bay
Port Saunders and the Straits

Hazardous winter conditions are expected. A low pressure system is forecast to track across central Newfoundland early on Saturday. Snow ahead of this system will spread northward across western Newfoundland this afternoon into this evening becoming heavy at times tonight. Total snowfall accumulations of up to 35 centimetres are expected before the snow tapers off on Saturday.
In addition, strong northerly winds are expected to develop early Saturday morning. These winds will combine with the freshly fallen snow to give reduced visibilities in blowing snow. Conditions are expected to improve Saturday afternoon.

Special weather statement in effect for:

Gander and vicinity

A low pressure system is forecast to track through central Newfoundland early on Saturday. This system will bring warm temperatures and rain to

			northeastern Newfoundland tonight into Saturday morning. Total rainfall amounts are expected to be near 20 mm before the rain tapers off on Saturday.
6a	**Equipment Outages and Notifications - <u>Planned</u>**	Sys Ops/ Corp Relations	Outage is required to remove two of the mobile diesels from HRD. HRD to review and send in a detailed plan to system operations. This work will wait until HRD Unit #2 is back online.
6b	**Equipment Outages and Notifications - <u>Ongoing</u>**	Sys Ops/ Corp Relations	BDE Unit #2: It has been requested by P&C engineering that this unit not be shut down due to a start/stop relay. TL 227 remains out of service from BHL to SCV due to a landslide in the area. Section of line was taken out to be proactive and prevent possible outages and equipment damage. No customers were lost. Area assessment, extent of damage and recovery plan will be further developed when weather conditions permit and it is safe to access area. Corporate communications have been talking to parks Canada. Update Feb 05: Stantec has completed the geotechnical assessment for Parks Canada and will provide the assessment today. This will confirm the safe distance for the relocation. A detailed work plan and resources are being developed. The work will be coordinated with system operations to minimize impact to customers. Engineering design is ongoing, with surveying crews in the field, materials acquisition. All activities are being coordinated with Parks Canada. Western Avalon T5 still out of service. Work will be rescheduled next week based on the performance of HRD Unit#1.

7	**Island Capability / Reserves and Notifications**	Sys Ops/ Corp Relations	Island reserves are adequate at 515- 705 MW for the next 7 days. Continue to watch for Frazil ice at GCL, USL and HLK. Exploits are generating at 39 MW. Exploits generation will be adjusting output to 40 MW through discussions with System Operations. Also watching situation at Badger Wesleyville GT is out of service. There is a bearing issue and it has to be replaced. It will be out for about 6 weeks NP reported 70 MW of total hydraulic capability.
8	**Avalon Capability / Reserves and Notifications**	Sys Ops/ Corp Relations	Avalon reserves are at 235- 350 MW for the next 7 days. Three HRD units are available and unit# 2 will go offline tonight. HWD GT and HRD CT are available NP reported 41 MW of Avalon hydraulic capabilities.
9	**Standby Unit Staffing / Operation Requirements**	System Operations	This outlook reflects: Three HRD units are available and unit #2 will go offline tonight. HWD GT and HRD CT are available All Avalon transmission lines are in service.
10	**Communications - Stakeholders and Public**	Corporate Relations	
11	**Other**		

Here is the Avalon Capability with all HRD Units available

Avalon Resource Status:

HRD Unit 1 @ 120 MW
HRD Unit 2 @ 120 MW
HRD Unit 3 @ 150 MW
HRD CT @ 123.5 MW
HWDGT @ 40 MW
HRD Diesels available

Sustained Load **=950 MW**
Load Under Worst Case Contingency **=805 MW**
HRD CT Operation **>735 MW**
Hardwoods (one end) and Black Start Diesels Operation **>710 MW**
Hardwoods Staffing **>685 MW**

For this evening, based on the current Avalon load forecast (630 MW), we don't require any standby staffing or running.

For tomorrow morning, based on the current Avalon load forecast (595 MW), we don't require any standby staffing or running.

As always, this is a forecast and will be monitored for changes.

NEWFOUNDLAND AND LABRADOR HYDRO

Severe Weather Preparedness

September 28, 2014

newfoundland labrador hydro
a nalcor energy company

Purpose

The severe weather preparedness document outlines NL Hydro's 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 NL 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

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

1 INTRODUCTION

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

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

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

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

2 HEALTH SAFETY AND ENVIRONMENT

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

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

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

3 ROLES AND RESPONSIBILITIES

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

1. Senior Management/Executives
    a. Set expectations for safety, reliability and operational performance.
    b. Ensure that a winter weather preparation procedure exists for each operating location.
    c. Consider a fleet wide annual winter preparation meeting, training exercise or both to share best practices and lessons learned from the previous year.
    d. Share insights across the fleet and through industry associations.

2. Regional/Plant Manager
    a. Ensure On-Call supervisors are made aware of pending storm.
    b. Evaluate the storm forecast and determine if employees need to be stationed in critical locations including for Protection and Controls resources.
    c. Ensure contact information is available for Protection and Controls Engineering for possible evaluation of fault traces.
    d. Submit suggested revisions to this document to the Chair of the AOC for consideration at the next scheduled meeting.
    e. Ensure proper execution of the winter weather preparation procedure.
    f. Conduct a plant readiness review prior to an anticipated severe winter weather event.

g. Encourage plant staff to look for areas at risk due to winter conditions and bring up opportunities to improve readiness and response.
h. Following each winter, conduct an evaluation of the effectiveness of the winter weather preparation procedure and incorporate lessons learned.
i. Ensure additional inspections of equipment and vehicles are completed prior to the forecasted event to ensure full functionality and full gas tanks.

3. Energy Control Center

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

4 PROCESSES AND PROCEDURES

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

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

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

While these everyday tasks go a long way to preparing Hydro for severe weather conditions, other activities are necessary to ensure an effective response. For potential generation shortfall, Hydro ensures that staff is dispatched to certain remote Hydro plants and standby generation locations. In addition, in the case of a severe weather event, Hydro's response

includes any or all of the following activities, depending on the expected severity of the event:

1. Pre-event coordination call to coordinate response activities

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

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

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

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

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

   In the case of generating stations, the majority of Hydro's large generating units are located in the Bay d'Espoir area or in Cat Arm and Hinds Lake, close to the home base

location of the work crews that support those facilities. Similarly, for TRO, Hydro's crews' home office or depot are purposely located throughout the province in central locations with facilities to provide fast response to interruptions. For these reasons, the deployment of work crews to specific sites other than their home offices in advance of a weather event is not a common activity, but is one that is considered in advance of each major forecasted weather event which includes P&C resources.

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

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

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

   This occurs routinely in accordance with the operating instruction: A-003 Notification of Weather Warnings and Lightning Activity, attached to this report as Appendix B. This heightened sense of awareness ensure that on-call personnel are ready to mobilize should the need arise.

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

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

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

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

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

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

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

5 EVALUATION OF POTENTIAL PROBLEM AREAS

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

1. This includes equipment that has the potential to:
    a) Initiate an automatic unit trip,
    b) Impact unit start-up,
    c) Initiate automatic unit runback schemes and/or cause partial outages,
    d) Cause damage to the unit,
    e) Adversely affect environmental controls that could cause full or partial outages,
    f) Adversely affect the delivery of fuel or water to the units,
    g) Cause other operational problems such as slowed or impaired field devices, or
    h) Create a weather related safety hazard

2. Based on previous cold weather events, a list of typical problem areas are identified below. This is not meant to be an all inclusive list. Individual entities should review their plant design and configuration, identify areas with potential exposure to the elements, ambient temperatures, or both and tailor their plans to address them accordingly.
    a) Level transmitters
        i. Drum level transmitters and sensing lines
        ii. Condensate tank level transmitters and sensing lines
        iii. De-aerator tank level transmitters and sensing lines
        iv. Hotwell level transmitters and sensing lines
        v. Fuel oil tank level transmitters / indicators
    b) Pressure Transmitters
        i. Gas turbine combustor pressure transmitters and sensing lines
        ii. Feed water pump pressure transmitters and sensing lines

iii. Condensate pump pressure transmitters and sensing lines

iv. Steam pressure transmitters and sensing lines

c) Flow Transmitters

i. Steam flow transmitters and sensing lines

ii. Feed water pump flow transmitters and sensing lines

iii. High pressure steam attemperator flow transmitters and sensing lines

d) Instrument Air System

e) Motor-Operated Valves, Valve Positioners, and Solenoid Valves

f) Drain Lines, Steam Vents, and Intake Screens

g) Water Pipes and Fire Suppression Systems

i. Low/no water flow piping systems

3. Potential vulnerabilities associated with emergency generators, including Blackstart generators, should be evaluated when developing the site specific winter weather preparation procedure as they may provide critical system(s) backup.

6 TRAINING

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

1. The Asset Owners technical Council will hold a winter readiness meeting on an annual basis to highlight preparations and expectations for severe cold weather.
2. Operations personnel should review all applicable emergency response plans in the Environmental Management System and Safety and Health Program prior to December 1.
3. Operations personnel should ensure all equipment specific training is up to date.

7 COMMUNICATIONS

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

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

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

APPENDIX A

Severe Weather Preparation Checklist

Severe Weather Preparedness Checklist

Date:	**Location:**
Current and Forecasted Weather:	

Things to think about before preparing

- ☐ Do workers know and understand the tasks?
- ☐ Have all workers been given orientations? (Is there an orientation or training for working in severe weather?)
- ☐ Ensure Tailboards are completed prior to start of work
- ☐ Communicate forecasted weather conditions to all employees. Keep employees updated on changing conditions
- ☐ Are all proper tools available for job?
- ☐ Ensure employees have Proper PPE for working in extreme weather conditions
- ☐ Will employees be working alone? If yes, circulate the working alone procedure for review.
- ☐ Have environmental aspects been considered?

Emergency Information

Emergency response plan(s) in place? ☐ **Yes**

Has it been communicated to all required personnel? ☐ **Yes**

Nearest medical facility:

Emergency Contact Numbers	
1.	**3.**
2.	**4.**

Severe Weather Preparedness

Safety	**Trucks**

☐ Consider holding safety briefings with available staff
☐ Ensure workers are familiar with the safety tools and procedures associated with severe weather
  ☐ Tailboard
  ☐ Step Back 5x5
  ☐ Proper PPE for Weather conditions
	☐ Fuel all vehicles
	☐ Ensure Distribution line trucks are stocked with critical spare parts and consumables
	☐ Equip trucks with special tools and equipment as required
	☐ Ensure distribution line workers and distribution front line supervisors have company vehicles at home
	☐ Provide on call supervisors with a company vehicle
	☐ Consider having other staff take company vehicles home
	☐ Ensure truck radios are working

Tools and Equipment	**Buildings**
☐ Test portable generators, standby duiesels and gas turbines ☐ Test tools as required ☐ Ensure fuel supply available	☐ Schedule additional snow removal ☐ Consider renting portable generators for buildings not equipped with a backup ☐ Check ability to alter temperature controls in buildings to override normal after-hour temperature settings
Substation and Generation	**Stores – Not sure this applies to us (or maybe diff name)**
☐ Consider location and availability of portable generation and portable substations. Re-deploy as required ☐ Ensure fuel Supply for system generators	☐ Ensure all stores have proper staffing levels ☐ Check stock levels for items likely needed during storms ☐ Consider confirming the supply of poles on the island

Operations Staff	**Transportation**
☐ Notify Staff of forecasted storm. Consider scheduling staff to work outside of normal working hours to ensure quick response ☐ Equip Supervisors with up to date staff listings and contact information ☐ Consider re-deploying staff to areas most likely impacted by the severe weather ☐ Put technical staff on notice of pending storm ☐ Ensure support and costumer service staffs are aware if the forcasted weather ☐ Consider enhancing staff levels at ECC and other control rooms ☐ Ensure IS support team is in place ☐ Ensure Protection and Control Engineering are aware of the pending weather and that contact information is available	☐ Where possible, put a rush on maintenance or repair work for any company vehicle ☐ Complete inspections of additional equipment and vehicles (four wheel drive trucks, snowmobiles, ATVs and specialized vehicles) ☐ Notify garages and mechanics of forecasted storm ☐ Confirm after hour contacts with government departments in the event that permits are required to re-locate portable equipment, or obtain permits in advance ☐ Confirm the availability of tractors or other equipment to relocate portable equipment ☐ Arrange for any necessary escorts
Communications	**System Security**
☐ Hold a pre-event coordination call to coordinate response activities ☐ Consider additional communication with on-call personnel to ensure rediness to respond ☐ Contact NF Power for generation Status ☐ Check availability of Satellite Phones, ensure they are charges and working ☐ Ensure appropriate staff have cell phones. Ensure adequate cell phone chargers and spare batteries are available ☐ Charge and test portable radios ☐ Test area office base station radios	☐ Make extra effort to correct any adnormal system conditions ☐ Where practical consider suspending construction on capital jobs to return the system to normal ☐ Consider developing a contingency plan for any abnormal conditions that cannot be corrected ☐ Consider protection changes above normal settings
Contractors	**Customer Service and Communications Hub**
☐ Put contractors on notice of pending storm and ask that they prepare ☐ Confirm Contractor's emergency contact information ☐ Confirm their available resources and their ability to assist ☐ Ensure Snow clearing contractors are on alert and available	☐ Confirm area connections to the communications hub. Ensure an area person is assigned to communicate with the hub ☐ Consider assigning a communications hub member to the ECC ☐ Communicate with Customer Service to determine their requirement for remote ☐ Check the availability of local Costumer Service Staff
Accommodations	**Finance**
☐ Contact local hotels to determine availability of rooms in the event that crews are moved into the area. Consider reserving a block of rooms.	☐ Arrange for numbers to be used for charging the storm. Communicate to staff
Government	**Other Utilities**
☐ Prior to the storm, confirm contacts for emergency snow clearing with the Department of Transportation ☐ Ensure updates contact lists are available for surrounding municipalities ☐ Prior to the storm, confirm ferry schedules and contact information	☐ Coordinate response with Newfoundland Power

APPENDIX B

A-003 Notification of Weather Warnings and Lightning Activity

newfoundland labrador hydro
a nalcor energy company

SYSTEM OPERATING INSTRUCTION

STATION:	GENERAL	**Inst. No.**	A-003
TITLE:	Notification of Weather Warnings and Lightning Activity	**Page** 1	**of** 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.

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.

newfoundland labrador hydro
a nalcor energy company

SYSTEM OPERATING INSTRUCTION

STATION:	GENERAL	**Inst. No.**	A-003
TITLE:	Notification of Weather Warnings and Lightning Activity	**Page** 2	**of** 2

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. Vegetation Control Specialist
6. Newfoundland Power Control Centre
7. Muskrat Falls personnel
8. Churchill Falls Control Room
9. Menihek Powerhouse
10. Industrial Customers; and
11. Exploits Grand Falls Control Room

**Part of the Emergency Response Plan

REVISION HISTORY

Version Number	Date	Description of Change
0	2004-08-23	Original Issue
3	2016-04-28	Added parties to be notified by ECC to align with the corporate Lightning Safety Standard

PREPARED: Jason Tobin	**APPROVED:**

APPENDIX C

T-051 Diesel Testing Instructions

newfoundland labrador hydro
a nalcor energy company

SYSTEM OPERATING INSTRUCTION

STATION:	St. Anthony, Hawke's Bay, Holyrood and Happy Valley	**Inst. No.**	T-051
TITLE:	Diesel Testing	**Page**	1 **of** 2

Introduction

The St. Anthony and Hawke's Bay diesels have the capability to be operated locally, or remotely from the Energy Control Centre. Remote operation from the Control Centre is generally done only when there are problems on the system that require these units to be placed in service. The Holyrood and North Plant diesels only have the capability to be operated locally.

There is a requirement to operate these diesels monthly[1] throughout the year. Testing the diesel plants ensures that operations and maintenance personnel can do the necessary monitoring of asset health, System Operations can record the unit availability and plant capacity, and the Energy Control Centre staff maintains competence in the remote operation of the plants (for St. Anthony and Hawkes Bay). 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, on the first Wednesday of the month.

2. All diesel units at both St. Anthony and Hawke's Bay plants shall be started and loaded to their maximum gross continuous rating from the Energy Control Centre. All diesel units at Holyrood and North Plant shall be started locally and loaded to their maximum gross continuous rating.

3. The diesels shall remain at their maximum loading for one hour.

4. The local operator shall be present while the diesels are being exercised.

[1] Diesels may also be requested to be tested for storm preparation.

newfoundland labrador hydro
a nalcor energy company

SYSTEM OPERATING INSTRUCTION

STATION:	St. Anthony, Hawke's Bay, Holyrood and Happy Valley	**Inst. No.**	T-051
TITLE:	Diesel Testing	**Page**	2 **of** 2

Procedure (cont'd.)

5. A record shall be kept in the Energy Control Centre diary noting when the diesels were exercised and the maximum loading achieved. The Energy Control Centre operator shall adjust the Automatic Generation Control (AGC) plant ratings accordingly.

REVISION HISTORY

Version Number	Date	Description of Change
0	2006-05-12	Original Issue
3	2016-01-26	Revised the weekly testing requirement in the period of Dec 1 – March 31 to monthly through consultation with TRO Northern

PREPARED: Jason Tobin	**APPROVED:**

APPENDIX D

T-054 Gas Turbine Instructions

newfoundland labrador hydro
a nalcor energy company

SYSTEM OPERATING INSTRUCTION

STATION:	Hardwoods, Stephenville, and Happy Valley	**Inst. No.**	T-054
TITLE:	Gas Turbine Testing	**Page** 1	**of** 2

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 weekly during the winter period, December 1 to March 31, and monthly during the remainder of the year according to the procedure below.

Procedure

1. Testing shall be performed weekly on Wednesdays, during December 1 to March 31; and monthly, on the first Wednesday, for the remainder of the year
2. Prior to all testing, ensure the Gas Turbine Operator is present at the gas turbine site.
3. Gas turbines shall be started from the Energy Control Centre in the following sequence: End A to its maximum continuous rating, then End B to its maximum continuous rating and maintain the plant at this loading for one hour.

   Note that there is one gas generator at Happy Valley. End A / B apply to Hardwoods and Stephenville.

newfoundland labrador hydro
a nalcor energy company

SYSTEM OPERATING INSTRUCTION

STATION:	Hardwoods, Stephenville, and Happy Valley	**Inst. No.**	T-054
TITLE:	Gas Turbine Testing	**Page** 2	**of** 2

Procedure (cont'd.)

4. In addition to the above test, the following checks shall be made with the unit at a low output level:
   a. With unit initially in Synchronous Condense Mode, switch to Generate Mode using end A
   b. With unit initially in Synchronous Condense Mode, switch to Generate Mode using end B
   c. With unit initially in Synchronous Condense Mode, switch to Generate Mode using ends A and B
   d. With unit initially shut down, select Generate Mode on end A and start End A, and then shut down the unit
   e. With unit initially shut down, select Generate Mode on end B and start End B, and then shut down the unit
   f. With unit initially shut down, select Generate Mode on ends A and B and start Ends A and B, and then shut down the unit
   g. Verify MW and MVar setpoints

5. A record shall be kept in the Energy Control Centre diary noting when the gas turbines were exercised, the results of testing and the maximum loading achieved. The Energy Control Centre operator shall adjust the Automatic Generation Control (AGC) plant ratings accordingly.

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

REVISION HISTORY

Version Number	Date	Description of Change
0	2006-05-12	Original Issue
2	2014-12-12	Incorporate weekly testing during the winter period and minor wording changes

PREPARED: Jason Tobin	**APPROVED: Bob Butler**

Severe Weather Preparedness Checklist

Date:	**Location:**
Current and Forecasted Weather:	

Things to think about before preparing

- ☐ Do workers know and understand the tasks?
- ☐ Have all workers been given orientations? (Is there an orientation or training for working in severe weather?)
- ☐ Ensure Tailboards are completed prior to start of work
- ☐ Communicate forecasted weather conditions to all employees. Keep employees updated on changing conditions
- ☐ Are all proper tools available for job?
- ☐ Ensure employees have Proper PPE for working in extreme weather conditions
- ☐ Will employees be working alone? If yes, circulate the working alone procedure for review.
- ☐ Have environmental aspects been considered?

Emergency Information

Emergency response plan(s) in place? ☐ **Yes**

Has it been communicated to all required personnel? ☐ **Yes**

Nearest medical facility:

Emergency Contact Numbers	
1.	**3.**
2.	**4.**

Severe Weather Preparedness

Safety	**Trucks**

☐ Consider holding safety briefings with available staff
☐ Ensure workers are familiar with the safety tools and procedures associated with severe weather
  ☐ Tailboard
  ☐ Step Back 5x5
  ☐ Proper PPE for Weather conditions
	☐ Fuel all vehicles
	☐ Ensure Distribution line trucks are stocked with critical spare parts and consumables
	☐ Equip trucks with special tools and equipment as required
	☐ Ensure distribution line workers and distribution front line supervisors have company vehicles at home
	☐ Provide on call supervisors with a company vehicle
	☐ Consider having other staff take company vehicles home
	☐ Ensure truck radios are working

Tools and Equipment	**Buildings**
☐ Test portable generators, standby duiesels and gas turbines ☐ Test tools as required ☐ Ensure fuel supply available	☐ Schedule additional snow removal ☐ Consider renting portable generators for buildings not equipped with a backup ☐ Check ability to alter temperature controls in buildings to override normal after-hour temperature settings
Substation and Generation	**Stores – Not sure this applies to us (or maybe diff name)**
☐ Consider location and availability of portable generation and portable substations. Re-deploy as required ☐ Ensure fuel Supply for system generators	☐ Ensure all stores have proper staffing levels ☐ Check stock levels for items likely needed during storms ☐ Consider confirming the supply of poles on the island

Operations Staff	**Transportation**
☐ Notify Staff of forecasted storm. Consider scheduling staff to work outside of normal working hours to ensure quick response ☐ Equip Supervisors with up to date staff listings and contact information ☐ Consider re-deploying staff to areas most likely impacted by the severe weather ☐ Put technical staff on notice of pending storm ☐ Ensure support and costumer service staffs are aware if the forcasted weather ☐ Consider enhancing staff levels at ECC and other control rooms ☐ Ensure IS support team is in place ☐ Ensure Protection and Control Engineering are aware of the pending weather and that contact information is available	☐ Where possible, put a rush on maintenance or repair work for any company vehicle ☐ Complete inspections of additional equipment and vehicles (four wheel drive trucks, snowmobiles, ATVs and specialized vehicles) ☐ Notify garages and mechanics of forecasted storm ☐ Confirm after hour contacts with government departments in the event that permits are required to re-locate portable equipment, or obtain permits in advance ☐ Confirm the availability of tractors or other equipment to relocate portable equipment ☐ Arrange for any necessary escorts
Communications	**System Security**
☐ Hold a pre-event coordination call to coordinate response activities ☐ Consider additional communication with on-call personnel to ensure rediness to respond ☐ Contact NF Power for generation Status ☐ Check availability of Satellite Phones, ensure they are charges and working ☐ Ensure appropriate staff have cell phones. Ensure adequate cell phone chargers and spare batteries are available ☐ Charge and test portable radios ☐ Test area office base station radios	☐ Make extra effort to correct any adnormal system conditions ☐ Where practical consider suspending construction on capital jobs to return the system to normal ☐ Consider developing a contingency plan for any abnormal conditions that cannot be corrected ☐ Consider protection changes above normal settings
Contractors	**Customer Service and Communications Hub**
☐ Put contractors on notice of pending storm and ask that they prepare ☐ Confirm Contractor's emergency contact information ☐ Confirm their available resources and their ability to assist ☐ Ensure Snow clearing contractors are on alert and available	☐ Confirm area connections to the communications hub. Ensure an area person is assigned to communicate with the hub ☐ Consider assigning a communications hub member to the ECC ☐ Communicate with Customer Service to determine their requirement for remote ☐ Check the availability of local Costumer Service Staff
Accommodations	**Finance**
☐ Contact local hotels to determine availability of rooms in the event that crews are moved into the area. Consider reserving a block of rooms.	☐ Arrange for numbers to be used for charging the storm. Communicate to staff
Government	**Other Utilities**
☐ Prior to the storm, confirm contacts for emergency snow clearing with the Department of Transportation ☐ Ensure updates contact lists are available for surrounding municipalities ☐ Prior to the storm, confirm ferry schedules and contact information	☐ Coordinate response with Newfoundland Power

Integrated Severe Weather Preparation
March 17 - 18 2016 Event

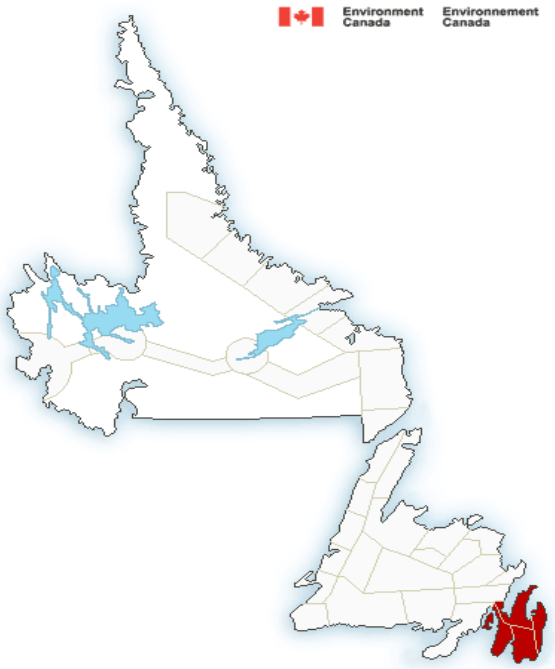
March 17 2016 Update

Boundless Energy

newfoundland labrador hydro
a nalcor energy company

Severe Weather Context, Areas of Concern

A low pressure system will track southeast of the Avalon Peninsula tonight spreading snow across the area starting this evening and ending Friday morning. The forecast track of this low is trending further offshore and as a result, the higher snowfall amounts have shifted eastward. Snowfall accumulations are now expected to be in the 10 to 20 cm range over eastern sections of the Avalon Peninsula. Further west, especially near Trinity Bay and Placentia Bay, forecast snowfall amounts are less certain and might need to be lowered even more later this evening. Strong northeasterly winds will develop overnight tonight then shift to strong northwesterlies Friday morning resulting in poor visibilities at times in blowing snow.



Key Integrated Preparedness Areas – People, Process, Equipment, Supply Chain

- Local execution of severe weather protocols and checklist completion, ongoing change management
- System integrated preparedness for production and delivery to customers, ongoing change management (this document)
- Response crews on standby in appropriate locations
- On call people and process, leadership channels
- Asset status/health, ability to operate and maintain effectively throughout event, risk awareness and mitigation plans, includes curtailable, NP generation, NUGS, etc.
- Fuel, lube oil, chemicals, water storage levels and resupply plans including transport and road clearing support
- Mobile equipment stocked and fueled, located appropriately
- Sites/facilities secured appropriately for oncoming weather
- Standard spares on hand
- Snow clearing, flood response, road clearing escort arrangements
- Effective communications (radios, phone, email)
- Customer communications and support

Severe Weather Protocol & Preparations Status

Region	Protocol Executed	Plans in Place	RYG
TRO Central	Complete	Yes	
TRO Northern	Complete	Yes	
Exploits	Complete	Yes	
Hydro Generation	Complete	Yes	
Holyrood Thermal	Complete	Yes	
Gas Turbines	Portion included in TRO complete, Alberta has confirmed plans for staffing & fuel, watching snow/rain	Yes	
Sys Ops & Other Supply	Regular process followed, other suppliers, etc. engaged	9 am morning meeting updates	
Churchill Falls	Complete	Equipment ready, Support available	
Technical Services	Resources identified	P&C arranged(Alex Lau and Craig Warren)	

NL Hydro Production Status & Notable Risks

- Holyrood Thermal Plant & Diesels
  - Three units currently online.
    - Unit # 1 @ 110 MW
    - Unit #2 @ 110 MW
    - Unit#3 @ 135 MW (Issue with fuel pump. Will be resolved by tomorrow evening)
- Combustion Turbines (HRD, HWDS, SVL, HVY)
  - HWD GT available.
  - HRD CT available
  - SVL GT available
  - HVY GT available
- Hydro Generation
  - All units available
- Exploits Generation
  - Plant production at about 61 MW
- Other (St. Anthony, Hawke's Bay)
  - 2 MW unit at SDP not available. HBY fully available

NL Hydro Production Notable Preparations

- Holyrood Thermal Plant & Diesels
  - Check sheets are completed
  - Vehicles fueled and available
  - Operator has been scheduled for the HRD diesels for 6:00 AM
  - Snow clearing arranged and boiler service contractor informed
  - Electricians and mechanics will be in the plant this evening
- Combustion Turbines
  - Fuel levels are good at HWD, SVL and HRD
  - Arrangements have been made for HRD CT to be online for 6:00 AM. Operator has been informed

NL Hydro Production Notable Preparations Contd.

- Hydro Generation
  - Checklists completed
  - Access roads are clear and vehicles are ready.
  - Sites reviewed today for any issues. All good
- Exploits Generation
  - Checklists have been reviewed and staff are aware of event. Weather not impacting area but are ready to respond
- Northern (St. Anthony, Hawke's Bay)
  - SDP diesel plants were online the last couple of days for outage on TL259
  - HBY was last tested on March 4th for a weather event. Please note that this event is not affecting the Northern Peninsula but are ready to respond

NL Hydro Delivery System Status & Notable Risks

- TRO Central
  - System OK
- TRO Northern
  - TL259: The line is out of service but will be returned today
- TRO Labrador
  - System OK

NL Hydro Delivery Notable Preparations

- TRO Central
  - People aware, watching situation.
  - Contractor crews ready if there are any vegetation issues on transmission.
  - Mobile equipment ready, stocked and fueled, people aware. Checklists completed.
  - Extra strapping put up around WAV T5 as it is out of service and being worked on
- TRO Northern
  - Mobile equipment ready, stocked and fueled, people aware and ready to respond
  - Severe weather checklists completed
- TRO Labrador
  - People aware, watching situation

NL Hydro System Ops, NP, NUGS, Customer Services, Corp Comms, CERP

- Daily System Status update completed at 9:00 AM and conference call on storm preparation held at 3:30PM (March 17th)
- Reserves forecasted to be good.
  - Island forecast is 1270 MW this evening and 1445 MW tomorrow morning
    - Reserves are 710 MW for this evening and 535 MW for tomorrow morning
  - Avalon forecast is 630 MW for this evening and 750 MW for tomorrow morning
    - Reserves are 350 MW for this evening and 230 MW for tomorrow morning. There are no alert levels
- NP generation, curtailable & NUG's reported okay
- ECC are fully engaged and ready to respond
- Customer Services have been contacted about weather and are ready to respond as required
- Susanne Hiller (on call) for Corp Communications
- PETS contacts circulated in email by Paul Dillon

Gov't Transportation Support

Per Mike Whelan - Response from Dave McCormack 729-3703, Director Emergency Services with FES:

- TCH travel between Come By Chance and Holyrood spans two (2) TW regions - Eastern and Avalon (Whitbourne is the dividing line between the regions)
- There is scheduled 24-hour service for the TCH from Sunday night to Friday evening
- With respect to the Doe Hills area – TW will monitor road conditions and if a closure is anticipated, they will let public know – detour on paved, secondary roads between Bellevue and Chapel Arm
- TW recommends that the best process to follow is to call their Central Dispatch at 709-729-7669, which is staffed 24/7 during the winter months
- Through this approach Central Dispatch can contact the appropriate TW Superintendent (or alternate) in the applicable TW region to then connect with NLH regarding any issue/request

Phone Numbers Redacted

Notes

- Preparedness plans to be updated daily, or with significant change, typically after the morning System Status Meeting and updated forecast
- Contact ECC for current local on-call, system on-call and executive on-call names
- Alex Lau (XXX-XXXX) and Craig Warren (XXX-XXXX) are available for PC&C technical support
- CERP Incident Deputy Commander – Rob Henderson
- Supply Chain Mike Whelan
- Corporate Communications Susanne Hiller
- Customer Service – Tony Lye (XXX-XXXX)
- Regional/Facility Leadership Contacts
  - Lev Kearley and Alvin Crant HG, Jeff Vincent HRD, Alberta Marche CT/GT/SVL, Rick Kennedy TROL, Wade Hillier TRON, Mike Churchill TROC, Peter Robbins Exploits, Dave Hicks
- Senior Leadership Contacts
  - Terry Gardiner, Jim Keating PETS; Darren Moore, Scott Crosbie, John MacIsaac NLH