Q. Please provide copies of outage history reports and statistics from recent events and storms, including any analysis or comparison of ETR performance (estimated vs actual restoration times) and restoration time.

A. Over the period 2011 to 2014, Newfoundland Power experienced five events that were classified as significant events:

1) Wind Storm in December 2011
2) Tropical Storm Leslie in September 2012
3) Newfoundland & Labrador Hydro System Problems in January 2013
4) Winter Storm in November 2013
5) Supply Issues and Power Outages, January 2-8, 2014

Statistics pertaining to these events are detailed in Attachment A. Various reports for events 1 through 4 are provided in Attachments B through E. Details pertaining to the Supply Issues and Power Outages, January 2-8, 2014 have been provided in the Company's Interim Report which was filed with the Board on March 24th, 2014.

While Newfoundland Power does provide estimated restoration times for scheduled and unscheduled outages, no comparison of estimated to actual restoration times is done. Data on estimated outage times is not retained so it is not possible to do such comparisons retroactively.

Significant Events

2011 - 2014

Significant Events 2011 - 2014

Year	Event	Start Date	Duration	Customers (Approximate)	Customer Minutes	Areas Affected
2011	Wind Storm	Dec 8th	3 days	41,000	22 Million	Western, Central
2012	Tropical Storm Leslie	Sept 11th	5 days	135,000	59 Million	St. John's, Avalon
2013	NLH System Problems	Jan 11th	3 days	173,000	93 Million	All Areas
2013	Winter Storm	Nov 20th	4 days	12,000	8 Million	Western, Central
2014	Supply Issues and Power Outages	Jan 2nd	7 days	188,000	140 Million	All Areas

Wind Storm, December 2011

Outage Report

PUBLIC UTILITIES BOARD
POWER OUTAGE and INCIDENT ADVISORY FORM

PUB Number: 2011-NP-39-a

Section A: General Information

Company: Newfoundland Power Inc.	Date Filed: December 12, 2011
Contact Information: Patrick Ryan - Director, Regulatory Compliance	Email: pryan@newfoundlandpower.com

Section B: Initial Advisory - Details of Incident

Type of Incident: *Check all applicable*		
☒ Power Outage	☒ Damage to Company Property	☐ Damage to Customer Property
☐ Injury to Employee	☐ Injury to Member of Public	☐ Contact with Distribution system
☐ Other (explain in details)		

Date of Incident:	December 8 – 10, 2011	Time of Incident:	4:12 pm
Location of Incident:	Island wide		
Number of Customers Affected: over 20,000 at peak times			

Duration of Power Outage: Various durations

Is power outage still occurring? ☒ No ☐ Yes

If yes, give estimation when power is expected to be restored:

Description of Problem:

A severe wind storm (with gusts up to 150 kilometres per hour reported in some areas) that crossed the island from the southwest to northeast starting on Thursday, December 8, 2011 caused significant service interruptions to Newfoundland Power customers. The first power outages were reported in the Port-aux-Basques area shortly after 4:00 pm on Thursday, December 8th. Other outages occurred as the storm moved across the island on Thursday night and into Friday morning. The high winds resulted in broken poles, trees blown into power lines and salt spray contamination in coastal areas. Newfoundland Power crews worked throughout Thursday evening and into Friday and Saturday to repair the damaged lines and restore service. Restoration efforts were affected by the continued high winds on Friday and by the fact that some of the damage was in remote locations. Restoration was not completed to all customers until late on Saturday, December 10th. Appendix A, attached to this report, provides a summary of the most significant power interruptions. A final tabulation of the duration of all the individual outages has not yet been completed.

Date Board Acknowledged: 2011-12-12-B. Thistle

Section C: Final Disposition

The Board has reviewed the information filed with respect to this incident and has determined that the information filed is deemed satisfactory. The report has been filed and accepted by the Board.

_____	_____
Board Secretary or designate	Date:

Appendix A

Newfoundland Power Inc.

Summary of Significant Service Interruptions (300,000 customer minutes or greater)
December 8, 2011 Windstorm

Area Affected	Start of Interruption	Power Restoration Date	Number of Customers	No. of Customer Minutes
Port aux Basques	Dec 8 - 4:12 pm	Dec 8 – 10:12 pm	990	356,000
Gander Bay area	Dec 8 - 6:20 pm	Dec 8 – 10:23 pm	2,287	556,000
Bay of Islands area	Dec 8 - 6:29 pm	Dec 9 – 12:15 am	1,373	494,000
Cormack/Bonne Bay area	Dec 8 - 6:00 pm	Dec 10 – 5:00 pm	454	1,280,000
Baie Verte Peninsula	Dec 8 - 8:00 pm	Dec 9 – 10:33 pm	958	836,000
Lewisporte area	Dec 8 - 10:23 pm	Dec 9 – 2:00 pm	4,137	3,847,000
Bonavista Peninsula	Dec 9 – 1:39 am	Dec 9 – 5:30 pm	5,613	5,338,000

Tropical Storm Leslie
Unforeseen Capital Expenditures

September 2012

Tropical Storm Leslie
Unforeseen Capital Expenditures

September 2012

May 2, 2013

Prepared by:

Jack Casey, P. Eng.

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A. BACKGROUND

Introduction

On the morning of Tuesday, September 11th, 2012, Eastern Newfoundland experienced extreme weather related to Tropical Storm Leslie. The storm caused significant damage to Newfoundland Power's electricity system on the Avalon Peninsula.

The damage to Newfoundland Power's electricity system resulted in immediate service outages to customers. The timely restoration of service was the primary focus of Newfoundland Power's response; this required Newfoundland Power to make material operating and capital expenditures to repair damage to the Company's transmission and distribution assets.

The Company incurred capital costs of approximately $635,000 for repair of damage to the electricity system caused by Tropical Storm Leslie.[1] This cost was charged to the 2012 Allowance for Unforeseen Items capital project.[2]

The costs incurred in rebuilding the storm-damaged infrastructure on an urgent basis were necessary to restore electricity service to customers affected by Tropical Storm Leslie. It would not have been practical to delay the work until Board approval was obtained, as this would have resulted in either (i) prolonged service interruptions to customers in the affected areas, or (ii) undue risk to public safety and/or the Company's assets.

This report summarizes the customer impacts and the damage to the electricity system caused by the storm.

Tropical Storm Leslie

Early on the morning of Tuesday, September 11th, 2012, Tropical Storm Leslie came ashore on the southern tip of the Burin Peninsula. Tropical Storm Leslie was a hurricane-strength post-tropical storm with peak winds in excess of 130 kmh. There was very little precipitation associated with the storm as it passed over Newfoundland; however, the winds brought down trees and power lines.

Prior to September 9th, 2012, the storm, categorized as a hurricane at the time, had stalled south of Bermuda. On that day, a front moving off the eastern seaboard of the United States restarted the storm's movement northward. However, the relatively slow progress of the storm provided a significant amount of lead time for emergency response organizations, including Newfoundland Power, to make the necessary preparations.

[1] In addition, the Company incurred operating costs of approximately $990,000 in 2012.

[2] The original amount of $750,000 approved by the Board in Order No. P.U. 26 (2011) was supplemented by an additional $315,000 in Order No. P.U. 22 (2012) to replenish unforeseen capital expenditures related to the failure of the Bell Island submarine cable.

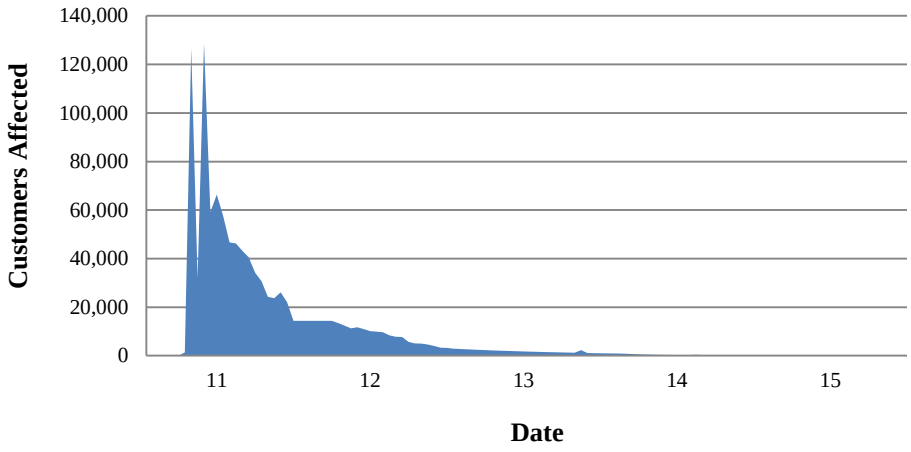
On Tuesday, September 11th, the storm raced across Eastern Newfoundland, delivering high winds but little rain. Damage included uprooted trees, broken poles, damaged buildings, broken signage, toppled fences and overturned trucks.
The immediate impact of the damage to Newfoundland Power's electricity system caused by the storm was the loss of service to a large number of Newfoundland Power's customers.

The high winds associated with Tropical Storm Leslie impacted Newfoundland Power's electricity system in a number of ways. As is often the case with very high winds, poles failed under the force exerted by the wind, or trees succumbed to the winds and came into contact with poles and conductor.[3] Unusually, however, the strong winds associated with this storm also resulted in numerous instances of airborne debris (building materials in particular) alighting on power lines and causing fault-related outages. As a result of all of these causes, there were a large number of distribution system failures, particularly in the St. John's area.

B. CUSTOMER IMPACTS

Graph 1 illustrates the number of customers without electricity service throughout the 5 days from Tuesday, September 11th, to Saturday, September 15th.

Graph 1
Customers without electricity due to Tropical Storm Leslie



The first significant outage occurred at 7:00 am on Tuesday, September 11th, with approximately 3,100 customers losing electricity in the Placentia area. Over the next hour, service outages were experienced from Bellevue to St. John's, affecting an additional 8,000 customers.

At approximately 8:10 am, the number of customers on the Avalon Peninsula affected by outages increased substantially due to the loss of Newfoundland and Labrador Hydro's ("Hydro") 230 kV transmission infeed, which resulted from faults on transmission lines TL201

[3] When high winds are experienced in Newfoundland in September, when trees still have their foliage, the trees experience significant wind loading.

and TL217. It was approximately 2 hours before the transmission infeed was restored to the Avalon Peninsula.

In total, electricity service to approximately 135,000 customers was affected by the storm, and a total of 45 million minutes of customer outage were experienced.

At the peak of the storm, on the afternoon of Tuesday, September 11th, approximately 128,700 customers were without electricity. On the morning of Wednesday, September 12th, there were approximately 15,000 customers without electricity. Service was restored to approximately 12,500 customers on Wednesday, leaving approximately 2,500 customers without service as of the morning of Thursday, September 13th. The number of customers without electricity was reduced to approximately 600 by the morning of Friday, September 14th. By Saturday, September 15th, electricity service to customers was substantially restored, with approximately 100 isolated customer trouble calls remaining unresolved.[4]

The Company answered a total of approximately 17,000 storm-related customer telephone calls during the week, not including calls handled by the interactive voice response system. Approximately 13,000 of those calls were received on Tuesday and Wednesday. This compares to normal average call volume at the Company's customer contact centre of approximately 1,200 customer calls per day.

From the onset of the storm and throughout the week, Newfoundland Power continuously communicated to customers the latest information on the progress of restoration efforts. From Tuesday, September 11th, until midnight Saturday, September 15th, Newfoundland Power's customer contact centre was in continuous operation.

The Company's website received approximately 50,000 visits from Tuesday to Saturday. Of these, almost 16,000 visits, or approximately 32%, were from customers using a smart phone.[5]

In addition to the traditional media channels such as radio, television, print and the Company web site, Newfoundland Power also used social networking as a means to communicate with customers and the media through a *Twitter* feed.[6] The Company issued over 50 tweets with over 3,500 followers on Twitter. Local media outlets re-tweeted the Newfoundland Power information on their own Twitter accounts, thereby providing the information to an even larger audience.

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4 The Company continued to experience storm-related problems beyond Saturday. Approximately 200 new trouble calls were received on Sunday, September 16th, and overnight into Monday.

5 The 50,000 website visits during Tropical Storm Leslie are approximately equivalent to the total number of website visits the Company experiences in a typical month.

6 *Twitter* is a social network and micro-blogging service enabling users to send and receive short text messages called tweets. Users subscribe to other users' tweets, with subscribers referred to as *followers*. These tweets are typically received by followers' smart phones.

C. SYSTEM DAMAGE

Customer Service Restoration

The relatively slow track of Tropical Storm Leslie up the eastern seaboard provided time for the Company and other emergency response organizations in the province to prepare.

Newfoundland Power began to mobilize its storm response on Thursday, September 6th. The Company relocated 2 portable substations and its mobile diesel generator to central locations on the Avalon Peninsula. Crews worked overtime to return lines to service that had been off for maintenance. Communications systems were tested; vehicles were fuelled and any maintenance issues were addressed; materials inventory levels were checked, and line trucks were fully stocked. Contractors and other utilities were put on notice that additional line crews might be needed. Arrangements were also made to secure special equipment such as helicopters, and customer information on outage preparation was updated.

The damage to Company plant and equipment was significant. Five of the Company's 104 transmission lines, and 74 of its 303 distribution lines, were impacted by the storm.[7] More than 100 broken poles were replaced. Vegetation-related damage to distribution lines required a labour intensive response.

Timely restoration of service required the deployment of all available Company technical and operations personnel.[8] Complementing Newfoundland Power's line crews were 3 crews from Hydro and 3 crews from Maritime Electric in PEI. In addition, all available vegetation control and pole contractors were deployed.

In accordance with normal practice, the Company's restoration efforts were organized to restore service to the greatest number of customers as soon as possible. Typically, this involves reinstating failed transmission circuits first, since transmission circuits generally serve a greater number of customers than distribution circuits. For reinstating failed distribution circuits, distribution feeder trunks are typically the first order of priority, followed by failed distribution feeder taps, failed transformers and, finally, individual customer service connections.

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[7] These impacts were varied. They included failed transmission structures on some transmission lines. On some distribution lines, the impact was limited to damaged distribution transformers, broken conductor, and damaged services. In some instances, outages resulted from temporary electrical faults caused by phases slapping together in the wind, but did not involve physical damage to the transmission or distribution line.

[8] In many cases, even when no physical damage to feeders occurred, line and/or technical staff were required to patrol feeders to ensure safe reinstatement of service. Even when there was no apparent damage to a distribution feeder, inspection by line and/or technical staff was required to ensure public safety was not compromised.

Table 2 summarizes the personnel deployed by Newfoundland Power as part of its service restoration efforts.

Table 2
Service Restoration
Personnel Deployed[9]

Position	Quantity
Power Line Technicians	106
Technicians and Inspectors	58
Support Staff [10]	91
Total Personnel	**255**

Damage Assessment

The damage caused by Tropical Storm Leslie was largely confined to the transmission and distribution systems.[11] Distribution system damage principally resulted from high winds, particularly in urban areas where mature trees grow in close proximity to aerial distribution circuits.

2012 Capital Costs

The damage to the distribution system was extensive, with the Northeast Avalon area sustaining the most damage due to high winds and falling trees. The capital cost of replacing distribution poles, transformers, service wires and streetlights was approximately $620,000. Damage to the transmission system was much less extensive, with four transmission lines on the Avalon Peninsula sustaining structural damage that cost approximately $15,000 to repair.

D. PROJECT

2012 Tropical Storm Leslie Restoration

This capital project involved the 2012 rebuilding of Company infrastructure damaged by Tropical Storm Leslie on September 11th. This includes all of the capital work completed in 2012 on the transmission, distribution and substations infrastructure damaged as a result of the storm. All work under this project was completed in 2012 under authority of the Allowance for Unforeseen Items for 2012.

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9 Does not include external vegetation and pole contractor personnel.

10 Includes personnel involved in (i) answering and following up on customer calls; (ii) electrical system control, prioritization, coordination and dispatch of work; and (iii) delivery of materials, equipment and meals. This involved a variety of staff that was diverted from normal duties to assist in the restoration effort.

11 Appendix B provides a series of photographs of electricity system damage resulting from Tropical Storm Leslie.

Project Cost

Table 3 shows the estimated capital expenditures associated with this project.

Table 3
Capital Expenditure Estimates

Class	2012 Allowance for Unforeseen Items
Distribution	$620,000
Transmission	$15,000
Total	**$635,000**

Total capital expenditures associated with Tropical Storm Leslie restoration were $635,000.

The 2012 capital expenditures associated with the restoration of service following the storm were undertaken in accordance with the Allowance for Unforeseen Items capital project approved as part of the Company's 2012 capital budget.

Project Schedule

The rebuilding of the damaged transmission, distribution and substations infrastructure within the scope of this project has been completed.

Appendix A
Weather Information

Environment Canada's Follow-up Summary of Tropical Storm Leslie

September 11, 2012 7:03 PM ADT
WOCN31 CWHX 112345

This appendix includes selected items from the *Tropical Cyclone Information Statement* for Newfoundland and Labrador issued by the Canadian Hurricane Centre of Environment Canada at 7:03 PM ADT Tuesday September 11, 2012

Figure 1 shows the track of the storm as forecast by National Hurricane Center at 11:00 AM EDT on Monday September 10, 2012.

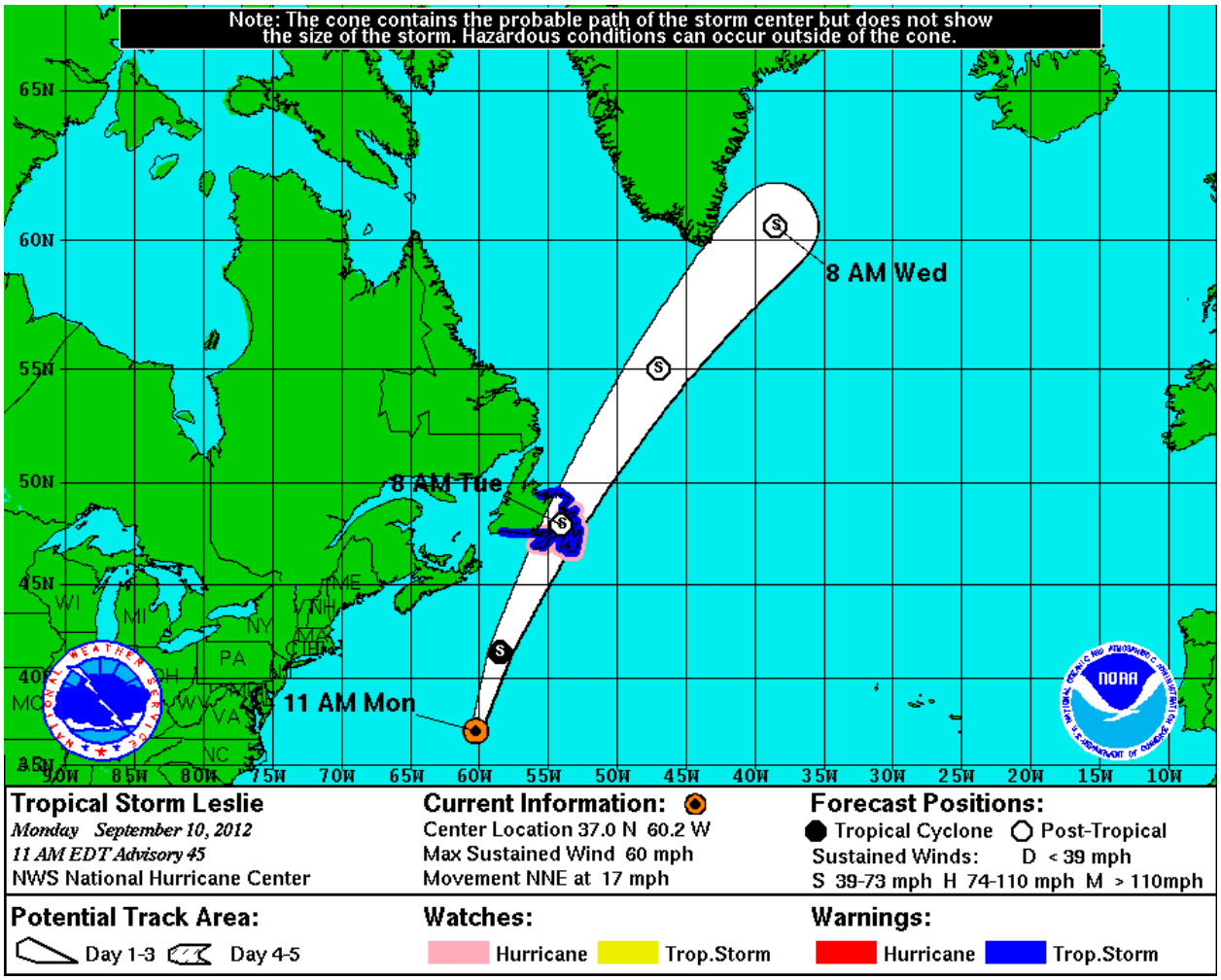


Figure 1

At landfall, Tropical Storm Leslie was officially classified as a hurricane-strength post-tropical storm with maximum winds of 120 km/h. The landfall location of the very broad storm centre was at the southern tip of the Burin Peninsula.

The winds in Newfoundland were highest in eastern and southern areas, with the highest gust of 137 km/h recorded at Cape Pine on the Avalon Peninsula.

Table A1 includes data for wind speeds experienced during Tropical Storm Leslie.

Table A1
Peak Wind Speeds from Official and Other Sources

Location	Wind Speed (km/h)	Note
Cape Pine	137	
Bell Island	132	
St. John's Airport	132	
Bonavista	124	
Long Pond	124	
Argentia	120	
Paradise	119	
Caplin Cove	116	
Cape Race	115	Lost data after 7:30 AM
St. Pierre	109	
Sagona Island	109	
Portugal Cove	108	
Twillingate	106	
Ochre Pit	101	

In Newfoundland, the highest rainfall amounts associated with Tropical Storm Leslie ranged from 60 mm to 110 mm. Rain was not a significant contributing factor to the damage to Newfoundland Power's electricity system.

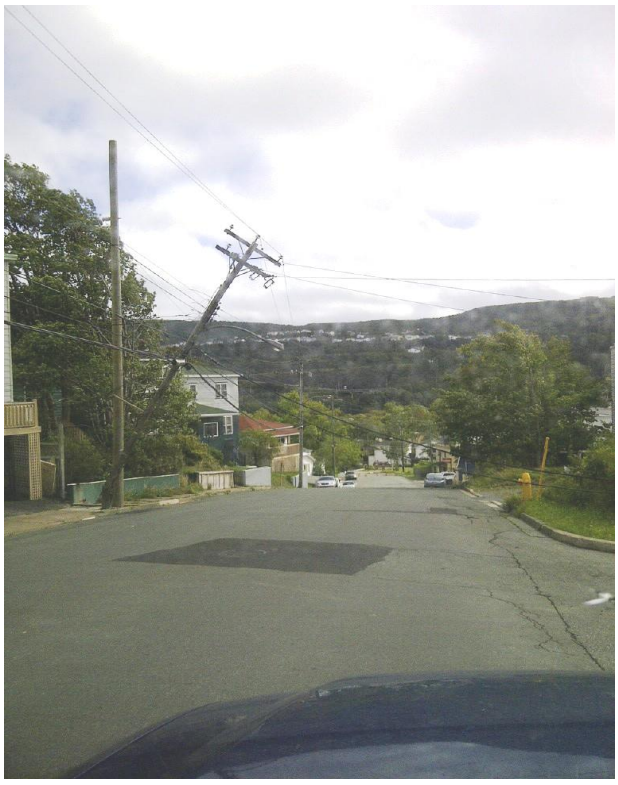
Appendix B
Photographs

Main Line Pole Cracked at Base, St. John's

Downed Poles, Ruby Line, St. John's

Crews Working on Ruby Line, St. John's

Crews Work into the Night, St. John's



Main Line Pole Leaning into Street, St. John's

Pole Cracked, Kennedy's Lane, Holyrood

Damaged Pole, Argentia

Overhead Damage, Ruby Line, St. John's

Tree in Line, St. John's

Broken Pole, Ship Cove

Broken Pole, Placentia

Broken Transmission Line Pole, 35 L, St. John's

Failed Transmission Line Pole, 35 L, St. John's

Newfoundland and Labrador Hydro System Problems, January 2013

Outage Report

PUBLIC UTILITIES BOARD
POWER OUTAGE and INCIDENT ADVISORY FORM

PUB Number: 2013-NP-03-a

Section A: General Information

Company: Newfoundland Power Inc.	Date Filed: January 14, 2013
Contact Information: Patrick Ryan - Director, Regulatory Compliance	Email: pryan@newfoundlandpower.com

Section B: Initial Advisory - Details of Incident

Type of Incident: *Check all applicable*

☒ Power Outage	☐ Damage to Company Property	☐ Damage to Customer Property
☐ Injury to Employee	☐ Injury to Member of Public	☐ Contact with Distribution System
☒ Other (explain in details) Weather-related loss of supply		

Date of Incident: January 11, 2013	Time of Incident: 6:42 am
Location of Incident: Holyrood generating facility	
Number of Customers Affected: Initially impacted in excess of 100,000 customers.	

Duration of Power Outage: Hours Minutes (varied depending on location)

Is power outage still occurring? ☒ No ☐ Yes

If yes, give estimation when power is expected to be restored:

Description of Problem:

At 6:42 am on Friday, January 11, 2013, Newfoundland and Labrador Hydro experienced an equipment problem at their Holyrood Terminal Station. This caused the Holyrood Thermal Plant to be isolated from the provincial electrical grid. The resulting loss of generation triggered the electrical system underfrequency load-shedding scheme. Subsequent instability in the electrical transmission system resulted in power interruptions across the island. The attached report provides a summary of the sequence of events and an estimate of the number of customers affected by power interruptions from Friday, January 11th through to Sunday, January 13th.

Date Board Acknowledged: 2013-01-15 – B. Sheppard

Section C: Final Disposition

The Board has reviewed the information filed with respect to this incident and has determined that the information filed is deemed satisfactory. The report has been filed and accepted by the Board.

_____ _____

Board Secretary or designate Date:

Newfoundland Power Inc.
Summary of Power Outages - January 11th to January 13th, 2013

Sequence of Events

At 6:42 AM on Friday, January 11th, there was an equipment problem at Newfoundland and Labrador Hydro's ("Hydro") Holyrood Terminal Station that caused the Holyrood Thermal Plant to be isolated from the electrical grid.

When this occurred, the 230 kV electrical grid could not supply the load, causing other breakers to operate and resulting in widespread power outages across the island. This happened automatically because of the under-frequency load shedding scheme. Other generating plants on Hydro's system, including Cat Arm and Upper Salmon, also went off-line.

Throughout Friday morning, Newfoundland Power worked with Hydro to pick up load on the electrical system as generation became available.

The initial customer impact of the loss of supply has not yet been determined. However, by midday Friday, there were approximately 100,000 customers without electricity.

Late Friday afternoon, Hydro had isolated the equipment problem at the Holyrood Terminal Station and reestablished the 230 kV connection to Holyrood Thermal Plant.

Throughout Friday, Newfoundland Power worked with Hydro to pick up additional customers as generation became available. By Friday evening, there were approximately 50,000 customers without power. As the customer load reduced Friday night, additional feeders were energized and, by 1:00 AM Saturday morning, less than 20,000 remained without electricity.

On Saturday morning, January 12th, Unit G2 at Holyrood began picking up customer load at about 4:00 AM and Unit G3 came online at about 5:00 AM. At this point, Hydro had sufficient supply available on the grid to supply all Newfoundland Power customers.

At 7:00 AM Saturday morning Newfoundland Power had approximately 7,000 customers without electricity.

At 7:00 AM Sunday morning, Newfoundland Power had 800 customers without electricity. Power had been restored to all of those customers by late Sunday evening.

Newfoundland Power Distribution System

Newfoundland Power did not experience significant damage to its electrical system as a result of the storm. There was 1 broken pole, several locations where conductor had let go from the insulator and several burned out distribution transformers. However, Newfoundland Power did experience hundreds of blown fuses on lateral lines and at individual distribution transformers.

When 50,000 customers are off line for 16 hours the normal diversity of load no longer exists; basically, all the load wants to come on at the same time. For example, most electric heat

Newfoundland Power Inc.
Summary of Power Outages - January 11th to January 13th, 2013

thermostats, hot water tanks and appliances like refrigerators and freezers will all want to cut in as soon as electricity is restored. When this potential overload condition occurs, the fuses on lateral lines and distribution transformers operate to prevent damage to utility equipment. This is normal operation with all utilities. The phenomenon is commonly referred to as "cold load pickup". Newfoundland Power is experienced in dealing with these situations. It requires sectionalizing the load and picking up small sections of load at a time by replacing the fuses on the lateral lines and transformers. This can be a slow process requiring several hours for the load to stabilize.

Company Resources

The storm was forecast to impact the Avalon, Bonavista and Burin Peninsulas. On Thursday, Newfoundland Power had crews from Central and Western Newfoundland relocated to the areas that were forecast to be affected. Newfoundland Power had all of its resources working throughout Friday as generation became available. On Saturday and Sunday, crews focused on the remaining lateral lines. Additional crews were brought to the St. John's area on Saturday and Sunday as work lessened in the other areas.

Newfoundland Power generation came on line early Friday and provided approximately 100 MW of generation to the system. This included thermal generation in Port aux Basques, Wesleyville and Grand Bank.

November 2013 Winter Storm
Central Newfoundland

November 2013 Winter Storm
Central Newfoundland

March 2014

Prepared by:

Jack Casey, P. Eng.

NEWFOUNDLAND POWER
A FORTIS COMPANY

Table of Contents

Page

1.0 Introduction

A severe winter storm struck Western and Central Newfoundland late on Wednesday, November 20th, 2013, and continued throughout Thursday, November 21st. The storm caused short duration power interruptions in Western Newfoundland and damaged portions of the electricity system in Central Newfoundland. The damage in Central Newfoundland was caused by heavy wet snow and high winds. This resulted in broken poles, conductor and crossarms.

In order to minimize the duration of service interruptions, repair work was started immediately. The completion of this essential capital work on an urgent basis is in accordance with the terms that govern the normal operation of the Allowance for Unforeseen Items. To ensure a reliable supply of electricity was restored to customers as quickly as possible, this expenditure was unavoidable.

This report summarizes the damage to the transmission and distribution infrastructure in Central Newfoundland and provides information on the costs incurred to rebuild the damaged lines.

2.0 Background

Damage Assessment
The November 2013 winter storm caused heavy wet snow to build up on poles and conductors throughout Central and Western Newfoundland. In Central Newfoundland, the wet snow and high winds caused support structures to fail and caused portions of certain transmission and distribution lines to collapse.[1] In Western Newfoundland, there was very little damage; however, there were intermittent power outages on the Port aux Port Peninsula resulting from pole fires, downed conductor, and failed cutouts and insulators.

On Thursday, November 21st, a thorough assessment of the damage to the electricity system was conducted. In order to restore power to customers as quickly as possible, work immediately commenced on reconstruction of the damaged lines.

Tables 1 and 2 identify the transmission lines and distribution feeders that required some degree of reconstruction. In some cases, this resulted in extended customer outages.

Table 1
Transmission Line Damage

Line	Description	Damage
101L	66 kV Transmission Line from Rattling Brook Plant in the east to Grand Falls Substation in the west	2 broken poles
105L	66 kV Transmission Line from Grand Falls Substation in the east to Sandy Brook Plant in the west, including under built distribution infrastructure	8 broken double circuit poles shared with GFS-06

[1] In Central Newfoundland, severe snow loading and high winds caused a total of 39 transmission and distribution poles to fail. In the Grand Falls area, significant damage was experienced from Norris Arm in the east to Springdale in the west.

Table 2
Distribution Feeder Damage

Feeder	Description	Damage
GFS-02	25 kV distribution feeder serving approximately 1,600 customers in Grand Falls-Windsor	8 broken poles in commercial district
GFS-06	25 kV distribution feeder serving approximately 1,750 customers in Grand Falls-Windsor and west along the Trans Canada Highway (TCH) towards Red Cliff, Badger and Badger Lake cabin area	13 broken poles
GFS-07	25 kV distribution feeder serving approximately 1,400 customers in Grand Falls-Windsor	1 broken pole
GFS-10	25 kV distribution feeder serving approximately 850 customers in Grand Falls-Windsor	1 broken pole
RBK-01	12.5 kV distribution feeder serving approximately 750 customers in Norris Arm North, Norris Arm South and Sandy Point	4 broken poles, necessary to operate Rattling Brook hydro plant
SPR-02	25 kV distribution feeder serving approximately 800 customers in Springdale	2 broken poles

Customer Impact
The first storm-related outage occurred at 6:04 pm on Wednesday, November 20th, with approximately 950 customers on the Port aux Port Peninsula losing service. By 1:58 am on Thursday, November 21st, the first customers in Central Newfoundland lost service when distribution feeder GFS-06 out of Grand Falls Substation tripped off. During the subsequent 4-day period, Newfoundland Power crews from across the province, with the assistance of contractors, carried out electricity restoration activities. In Badger, mobile generation was installed to assist with the restoration effort. This enabled electricity to be supplied to customers while the damaged distribution infrastructure between Grand Falls-Windsor and Badger was being rebuilt.

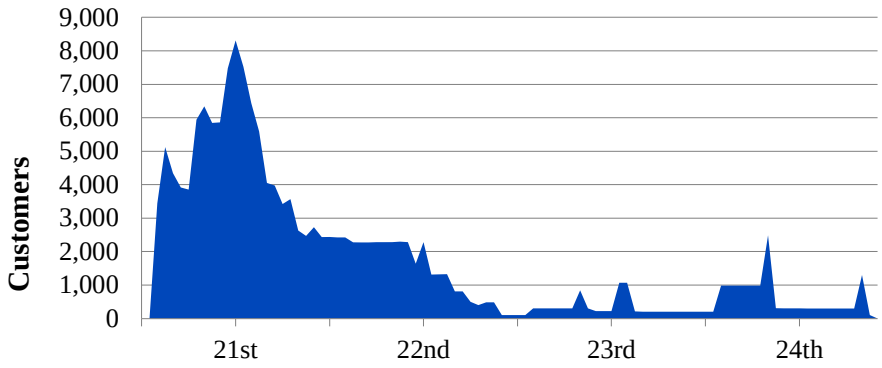
A total of 12,351 customers in Central and Western Newfoundland were impacted as a result of the storm. Customers experienced a total of approximately 8 million outage minutes. Table 3 provides an estimate of customer outage minutes and shows the number of customers affected in each of Western and Central Newfoundland.

Table 3
Outage Data

	Customer Minutes (Millions)	Customers Affected
Western Newfoundland	0.25	1,188
Central Newfoundland	7.75	11,163
Total	**8.00**	**12,351**

Graph 1 illustrates the numbers of customers without electricity from time to time throughout the 4 days from Wednesday, November 20th, to Sunday, November 24th. At the peak of the storm, a total of 8,312 customers were without electricity. By Sunday, November 24th, the only customers still without electricity were 15 customers supplied by feeder GFS-06.

Graph 1
November Storm – Customers Affected



3.0 Storm Damage

Significant storm damage in Central Newfoundland was confined to an area between Norris Arm and Springdale. The repair of some minor damage to distribution lines elsewhere required only brief interruptions in service.

The first distribution feeder to trip in Central Newfoundland was GFS-06. This happened when a section of distribution conductor fell to the ground at 1:58 am on Thursday, November 21st. By 4:00 am, there were outages affecting approximately 4,300 customers in Central Newfoundland.

Meanwhile, Newfoundland Power crews had already completed some repairs and started the process of restoring electricity supply on a section of GFS-06.

At 6:55 am, there was a coincident trip of GFS-06 and transmission line 105L.[2]

It was determined that restoration efforts to rebuild GFS-06 would take multiple days.[3] To provide a supply of electricity in Badger, it was decided to station Newfoundland Power's mobile diesel generator ("MDG") in the community. The MDG traveled from Port aux Basques to Badger on Thursday in blizzard conditions, with a Department of Transportation and Works escort.[4] The MDG arrived in Badger just before midnight the same day.

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2 Along sections of the Trans Canada Highway west of Grand Falls-Windsor distribution feeder GFS-06 is under built on transmission line 105L. The breaking of support structures along this section would result in the tripping of both GFS-06 and 105L.

3 Distribution feeder GFS-06 serves customers in Grand Falls-Windsor and then travels approximately 30 kms west along the TCH to Badger.

4 Due to poor road conditions, the escort included a snow plow in addition to the normal marked vehicles in front and behind the unit.

On Thursday, November 21st, restoration efforts focused mainly on rebuilding transmission line 105L from Grand Falls-Windsor towards Badger, and on distribution feeder GFS-06 in the same location. Crews from Grand Falls-Windsor were assigned to GFS-06 and 105L along with the 2 Botwood feeders. Crews from Gander were assigned to the Rattling Brook feeder in Norris Arm North and South. Crews from Corner Brook were assigned to the feeder in Buchans. Local crews in Springdale located the broken poles on a remote section of distribution feeder SPR-02. At 1:30 pm on November 21st, the crew was able to isolate the damaged section of line and temporarily transfer the customers downstream of the broken poles to distribution feeder SPR-01.[5]

On Friday, November 22nd, work commenced again at 6:00 am. The workforce comprised 25 Newfoundland Power line crews, including crews from Eastern Newfoundland, 6 contractor pole crews, and a separate work crew to set up and energize the MDG in Badger.

Throughout the day on Friday, restoration efforts were successful. Customers in Norris Arm South were restored at 9:36 am, Norris Arm North at 12:50 pm, Leading Tickles at 5:30 pm and Glovers Harbour at 6:05 pm. The MDG in Badger started to pick up customers at 2:30 pm, with all available customers connected to the unit by 9:30 pm.

On Saturday, the crews focused on distribution feeders GFS-02 and GFS-06, and on transmission line 105L. Crews also addressed problems on smaller sections of line to the east of Grand Falls. Service to customers in Pleasantview was restored by 10:16 am; all individual calls in Botwood had been addressed by 5:00 pm.

On Sunday, November 24th, crews completed all remaining work, with service restored to all customers by approximately 9:10 pm.[6]

4.0 Project Description

This capital project involved rebuilding sections of transmission lines and distribution feeders damaged by the severe winter storm on November 21st, 2013. This work was necessary to restore electrical service to customers in the affected areas. The rebuilding of all transmission and distribution infrastructure is now complete.

To expeditiously restore electricity to affected customers, it was necessary to carry out the work prior to receiving Board approval. The work was completed in accordance with the terms of the 2013 Allowance for Unforeseen Items capital project. Delaying the work until Board approval was obtained would have resulted in extended power outages for customers in the affected areas.

Appendix A is a collection of photographs of the damaged structures and the repair activities undertaken.

[5] The broken poles were replaced during the week of November 25th following which the distribution feeders were returned to normal configuration.

[6] Transmission line 105L was energized at 2:14 pm. GFS-06 to Badger, including all customers in Red Cliff, was restored at 8:07 pm. The furthest west section of GFS-06 at Badger Lake, an area with few year-round residents, was energized at 9:10 pm.

5.0 Project Cost

The estimated cost to complete all work associated with rebuilding the damaged distribution and transmission lines is $498,000.[7] Table 4 provides a detailed breakdown of the costs incurred in rebuilding the electricity system in Central Newfoundland.

Table 4
Cost Estimates
($000s)

Cost Category	Transmission	Distribution
Material	8	45
Labour Internal	12	132
Labour Contract	63	141
Engineering	4	38
Other	8	47
Total	**95**	**403**

Distribution support structures in the Grand Falls area are located within the Bell Aliant pole setting area. Of the 39 poles that were damaged and replaced, only 9 were joint use poles. In accordance with the Joint Use Services Agreement between Bell Aliant and Newfoundland Power, the cost of replacing these 9 poles has been allocated to Bell Aliant.

6.0 Project Schedule

The rebuilding of the damaged transmission and distribution infrastructure has been completed.

7.0 Concluding

Rebuilding the storm-damaged transmission lines and distribution feeders on an urgent basis was necessary to restore electricity service to customers affected by the November 2013 winter storm. It would not have been practical to delay the work until Board approval was obtained, as this would have resulted in prolonged service interruptions to customers in the affected areas.

[7] This amount does not include the cost associated with replacing 9 Bell Aliant poles.

Appendix A
Photographs

Cracked Pole

Contractor Crew Working to Rebuild Crib

Rebuilding Feeder GFS-06 to Badger

Broken Distribution Structure on GFS-06

Heavy Snow Loading

Heavy Snow Loading

Mobile Diesel Leaving Port aux Basques

Installing Mobile Diesel at Badger

November 2013 Winter Storm

Contractor Crew Replacing Transmission Structure on 105L

105L Transmission Structure Broken at Base of Pole

Distribution Structure Damage on GFS-06

Preparing Pole to Attach Fittings