Q. Please describe how overhead and underground feeder distribution mainline and URD feeder equipment repairs are prioritized and state the repair-by time limits for each prioritization.

A. **1. Distribution Maintenance in Context**

The reliability performance of Newfoundland Power's electrical system is largely a function of the condition of electrical system assets.[1] For this reason, the principal factor in the prioritization of capital and operating maintenance for all Newfoundland Power electricity network assets is the establishment of reasonable levels of overall system reliability.[2] This reliability based perspective was identified in the 1998 report to the Board on *Newfoundland Light & Power Co. Limited Quality of Service and Reliability of Supply* where it was indicated that:

"The reliability of supply to Company customers is considered to be acceptable, although lower than the average for Canadian utilities. It is important that the utility maintain and in fact seek to improve its performance in this regard."[3]

The reliability of Newfoundland Power's electrical system is examined by the Board in every Newfoundland Power general rate application.[4]

In Newfoundland Power's 2013/2014 General Rate Application, the evidence before the Board was that the reliability of the Company's service was improved from that in 1998. Newfoundland Power's SAIDI, or system average interruption duration index (excluding major events), was better than composite measures provided by the Canadian Electricity Association ("CEA") in 8 of the 10 years ended in 2011. Newfoundland Power's SAIFI, or system average interruption frequency index

[1] This is a widely accepted engineering principle. It was recognized in, amongst other places, the 1991 *Report on the Technical Performance of Newfoundland Light & Power Co. Limited*, prepared by George Baker, P. Eng., for the Board.

[2] Newfoundland Power's electricity network assets include its transmission, substation and distribution system assets.

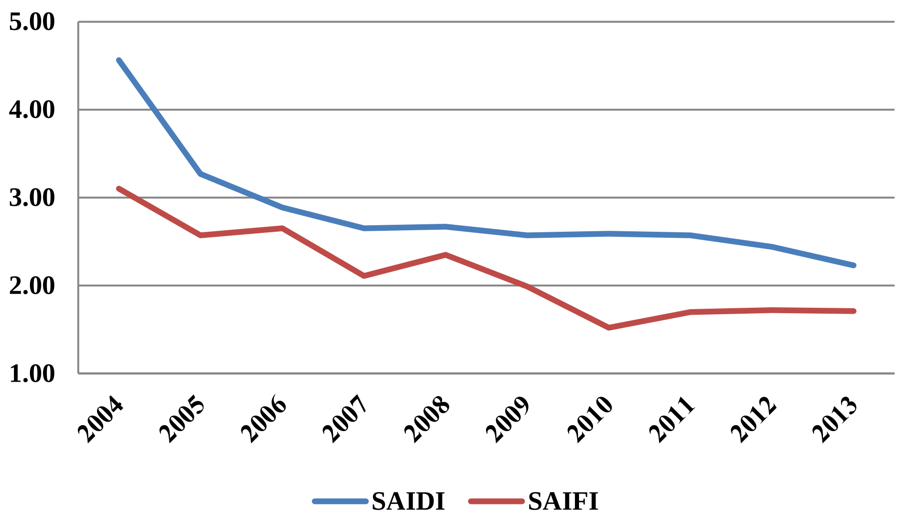
[3] See *Newfoundland Light & Power Co. Limited Quality of Service and Reliability of Supply*, prepared by D.G. Brown, P.Eng., page v.

[4] See, for example, Newfoundland Power's *2008 General Rate Application*, Company Evidence, Section 2: Customer Operations, Page 22, line 11 *et seq.* where reliability management was described, in effect, as a combination of (i) capital investment, (ii) maintenance practices and (iii) operational deployment. See also Newfoundland Power's *2010 General Rate Application*, Company Evidence, Section 2: Customer Operations, Page 2-7, line 6 *et seq.* where Newfoundland Power's evidence was that plant replacement was expected to continue to be the primary focus of capital expenditure for the Company. Finally, see Newfoundland Power's *2013/2014 General Rate Application*, Company Evidence, Section 2: Customer Operations, Page 2-3, line 8 *et seq.* where Newfoundland Power's evidence outlined the maintenance costs associated with its aging electricity system assets.

(excluding major events), was better than composite measures provided by the CEA in 4 of the 10 years ended in 2011.[5]

Graph 1 shows SAIDI and SAIFI for Newfoundland Power's electrical system from 2004 to 2013.[6]

Graph 1
SAIDI and SAIFI
2004 - 2013



Graph 1 indicates that the overall reliability of Newfoundland Power's electrical system, excluding extraordinary events, has steadily improved in the decade since 2004. This improvement reflects Newfoundland Power's overall management of the condition of its electricity network assets through the period. The condition of those network assets, including the distribution assets, is largely a function of the combination of the Company's ongoing capital investment and operating maintenance practices.[7]

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[5] Newfoundland Power's SAIDI, including all events, was better than the CEA composite in 6 of the 10 years ended in 2011; the Company's SAIFI, including all events, was better than the CEA composite in only 1 of the 10 years. See the response to Request for Information CA-NP-143 filed in Newfoundland Power's *2013/2014 General Rate Application.*

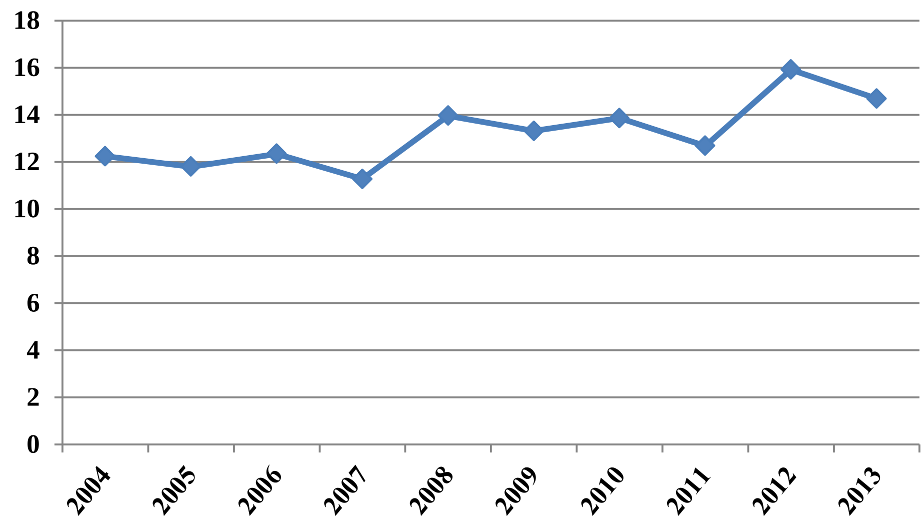
[6] SAIDI measures the average number of customer *hours* of electrical supply outage in a year. SAIFI measures the average *number* of customer outages in a year. The SAIDI and SAIFI from 2004 to 2013 shown in Graph 1 have been adjusted to remove the effects of severe weather events and major electrical system disruptions such as those experienced during the January 2-8, 2014 period.

[7] System reliability is also a reflection of Newfoundland Power's operational deployment and, in particular, its ability to respond to trouble on the electrical system in an organized and efficient manner. Since the Company's 2005 early retirement program, field operations staff and equipment deployment throughout the Company's service territory has not changed materially.

2. Distribution Plant Replacement

Approximately ½ of Newfoundland Power's overall annual capital expenditures are directed at plant replacement.[8]
Graph 2 shows Newfoundland Power's distribution plant replacement expenditures from 2004 to 2013.

Graph 2
Distribution Plant Replacement
2004 – 2013
($ millions)



Newfoundland Power's annual capital expenditures on plant replacement tend to be stable. This follows from the Board's determination that stable and predictable year over year capital budgets for Newfoundland Power are a desirable objective which assists in fostering stable and predictable rates for consumers into the future.[9]

A significant portion of Newfoundland Power annual distribution plant replacement expenditure typically is made in 3 separate distribution feeder projects. They include

[8] See the *2014 Capital Plan* filed with Newfoundland Power's *2014 Capital Budget Application* where it is indicated that for the period 2014-2018, plant replacement is forecast to account for 52% of all capital expenditures. For the period 2009-2013, plant replacement accounted for 49% of annual capital expenditure.
[9] See Order No. P.U. 36 (2002-2003), page 25.

the *Reconstruction* project, the *Rebuild Distribution Lines* project and the *Distribution Reliability Initiative*.[10] These projects are all aimed at maintaining the reliability of Newfoundland Power's distribution feeders. The *Reconstruction* project provides for annual expenditures to replace deteriorated or damaged distribution feeders and electrical equipment *on a priority basis within the calendar year*. The *Rebuild Distribution Lines* project provides for annual expenditures to rebuild sections of line or replace various line components based upon *preventative maintenance and inspections* typically undertaken on a 7-year inspection cycle.[11] The *Distribution Reliability Initiative* involves the replacement of deteriorated distribution plant based upon the *statistical frequency and duration* of power outages.[12]

The following attachments to this response to Request for Information PUB-NP-068 provide additional information related to Newfoundland Power's annual capital expenditures on distribution feeders which are aimed at maintaining or improving system reliability:

Attachment A: *Distribution Rebuild Update*, June 2012
Attachment B: *Distribution Reliability Initiative*, June 2013
Attachment C: *Distribution Reliability Initiative*, June 2012
Attachment D: *Distribution Reliability Initiative*, June 2011
Attachment E: *Distribution Reliability Initiative*, June 2010
Attachment F: *Distribution Reliability Initiative*, June 2009

Further Information concerning Newfoundland Power's utility plant can be found in its annual capital budget applications filed with the Board. These applications can be found on the Board's public website at www.pub.nf.ca.

Stable annual capital expenditures on Newfoundland Power's distribution feeders play a significant role in ensuring that the Company's distribution feeders are maintained in appropriate physical condition on an ongoing basis. This, in turn, contributes to the ongoing performance of the Company's overall electricity network. Together, it is the stable annual replacement of deteriorated and damaged equipment

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[10] See, for example, Newfoundland Power's *2014 Capital Budget Application*, where approximately $3.8 million and $3.5 million were forecast for the *Reconstruction* and *Rebuild Distribution Lines* projects, respectively. Additional expenditure for distribution plant replacement occurs annually in Company capital budgets to replace deteriorated meters, services, transformers and streetlights. Occasionally, specific distribution projects will be required, such as the 2014 capital expenditure of approximately $14.5 million approved by the Board in Order No. P.U. 43 (2013) to replace the submarine distribution cable system that supplies electricity to Bell Island.

[11] See *Distribution Rebuild Update*, June 2012 filed with Newfoundland Power's *2013 Capital Budget Application*.

[12] Newfoundland Power's *Distribution Reliability Initiative* is substantially similar to other utility distribution projects which are based upon "worst performing feeders". In each annual capital budget application, Newfoundland Power will provide the Board with a statistical analysis of its worst performing feeders. Where the statistical analysis indicates that a distribution feeder or feeders should be upgraded, the capital budget will include the required expenditure.

and the Company's operating maintenance regime that ensures the Company is in a position to deliver reliable electrical service to its customers.

3. Distribution Feeder Maintenance

Please refer to the response to Request for Information PUB-NP-067 for detailed information on priorities and time limits concerning Newfoundland Power's distribution inspection and maintenance practices.

Please refer to the response to Request for Information PUB-NP-069 for information concerning distribution feeder inspection, maintenance testing and repair jobs for 2011, 2012 and 2013.

4. Conclusion

Newfoundland Power conducts overhead and underground feeder distribution mainline and URD feeder equipment repairs so that, when taken in combination with annual capital investment in the system and current deployment of employees and equipment, reliability to customers is maintained at an acceptable level.
In the 10 years ending 2013, the overall reliability of the service provided by Newfoundland Power to its customers has materially improved.

Distribution Rebuild Update
June 2012

Distribution Rebuild Update

June 2012

Prepared by:

Byron Chubbs, P.Eng.

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NEWFOUNDLAND POWER
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1.0 Introduction

Newfoundland Power (the "Company") has over 9,000 kilometres of distribution lines in service and has an obligation to maintain this plant in good condition to safeguard employees and the public and to maintain reliable electrical service. The replacement of deteriorated distribution structures and equipment is an important part of fulfilling this obligation.

The *Rebuild Distribution Lines* project involves rebuilding sections of lines or the selective replacement of various line components based on preventive maintenance inspections or engineering reviews. This typically includes the replacement of poles, crossarms, conductor, cutouts, lightning arrestors, insulators and transformers.

This report provides an update to information provided in the 2004 Capital Budget Application in support of the *Rebuild Distribution Lines* project.

2.0 Preventative Maintenance Inspections

As part of the Company's preventative maintenance program, all overhead primary distribution lines are required to have a minimum of one detailed ground inspection every seven years.[1] The Company has a total of 303 distribution feeders throughout its operating area, and inspects approximately 43 feeders annually.

The Company's Distribution Inspection Standard outlines the requirements to complete distribution line inspections. It is a guide for inspectors and job planners to ensure consistency in the preventative maintenance program.[2] The inspection standard is regularly reviewed and updated to adapt to changes in operating procedures, outage statistics and trending, or industry practices.

Capital work identified through distribution line inspections is completed under the *Rebuild Distribution Lines* project in the following year. High priority capital work that cannot wait to the next budget year is completed under the *Reconstruction* project.[3]

Planning and scheduling of work under the *Rebuild Distribution Lines* project is done by prioritizing deficiencies. For example, items of concern related to reliability are typically addressed on the main trunks of distribution feeders before feeder taps or laterals.[4] The amount of work completed is based on the amount of work identified through the distribution line inspections, which will vary depending on the age, length and condition of the feeders being inspected. At times, unanticipated work requirements such as new customer connections, third party work requests and storm-related work requires the Company to adjust the amount of work

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[1] The Company also completes distribution vegetation inspections every three and a half years for brush clearing and tree trimming. Distribution pad mounted transformers are inspected annually. These inspections are typically completed at the same time as the distribution line inspections for feeders undergoing inspections during the same year.

[2] This includes type and frequency of inspections, qualifications of inspectors, details for job planning, and specific guidelines for identifying and prioritizing deficiencies.

[3] Deteriorated or damaged distribution structures and electrical equipment deemed to present a risk to safety or reliability are addressed through the *Reconstruction* project in the year in which they are identified.

[4] This is done because failures on the main trunks of distribution feeders will affect more customers.

to be completed under the *Rebuild Distribution Lines* project.[5] This is done by focusing on the selective replacement of high priority items.[6] In keeping with the Company's normal preventative maintenance program, the lower priority work that is not completed in the budget year will be identified during the next distribution line inspection to be completed in a future *Rebuild Distribution Lines* project.[7]

3.0 Distribution Line Deficiencies

The Company's preventative maintenance program addresses deficiencies associated with distribution structures and electrical equipment that have been identified through inspections. This typically includes the repair or replacement of poles, crossarms, conductor, insulators, switches and transformers.

Deficiencies included in the *Rebuild Distribution Lines* project are those deemed to present a risk of failure before the next scheduled inspection in seven years. Examples of such deficiencies include:

- Heavily rusted transformers showing no signs of leaking or weeping
- Rotten or damaged poles or pole cribs requiring repairs
- Rotten or broken crossarms
- Insulators, bushings or switches with cracked porcelain insulation or skirts missing
- Deteriorated conductor with broken strands

Examples of deficiencies that would be identified during distribution line inspections are shown in the figures below.

Figure 1: Damaged Wooden Pole

Figure 2: Rotten Crossarm

5 For example, in 2010 unplanned work related to the March ice storm and Hurricane Igor resulted in a significant decrease in the amount of planned distribution maintenance completed during that year.

6 Examples of higher priority work include the replacement of automatic sleeves and porcelain cutouts on the main trunk of distribution feeders.

7 Examples of lower priority work include the replacement of 2-piece insulators and porcelain cutouts not showing signs of failure, or the installation of lightning arrestors and current-limiting fuses.

Figure 3: Pole Crib Requiring Repairs

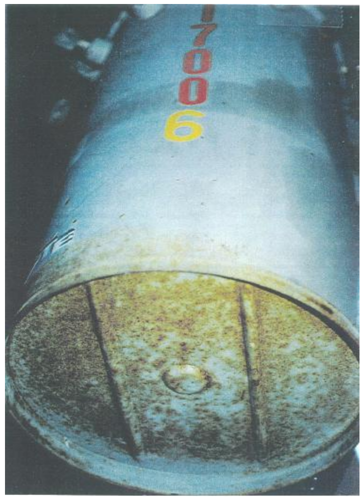

Figure 4: Rusted Transformer

4.0 Replacement Programs

The *Rebuild Distribution Lines* project includes selective replacement of specific line components to address known causes of safety and reliability issues. These programs are established based on engineering reviews of specific line components. Several replacement programs were identified in the Company's 2004 Capital Budget Application, including lightning arrestors, CP8080 and 2-piece insulators, current limiting fuses, automatic sleeves and porcelain cutouts.[8] The following is a discussion on each of the replacement programs that are currently part of the *Rebuild Distribution Lines* project.

4.1 Lightning Arrestors

Prior to the mid 1990s, Newfoundland Power did not install lightning arrestors on pole mounted distribution transformers. One of the reasons for this was that Newfoundland was not considered to be a high isokeraunic area.[9] There were also reliability and safety concerns with the porcelain housing of arrestors at the time.[10]

Over time, lightning arrestors became more reliable and less expensive. Also, arrestors became available in polymer housing, eliminating the safety concern from exploding porcelain glass. In the mid to late 1990s, the Company began installing arrestors in areas that were prone to lightning strikes. Since October 2002, Newfoundland Power has considered an arrestor to be an integral part of the transformer and all new transformer installations since that time have an arrestor included.[11]

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8 See the 2004 Capital Budget Application, Volume III, Distribution, Appendix 2 for further details.

9 The Isokeraunic Level (IKL) is a universally accepted measure to help utilities make some determination of the incidence of lightning in their service areas. It is defined as the number of days in a year (or month) that thunder is heard in a particular location.

10 Porcelain housing was a safety concern for employees because catastrophic failure of arrestors resulted in the shattering of porcelain, potentially causing serious injury.

11 See the 2004 Capital Budget Application, Volume III, Distribution, Appendix 2, Attachment B for further details on lightning arrestor requirements.

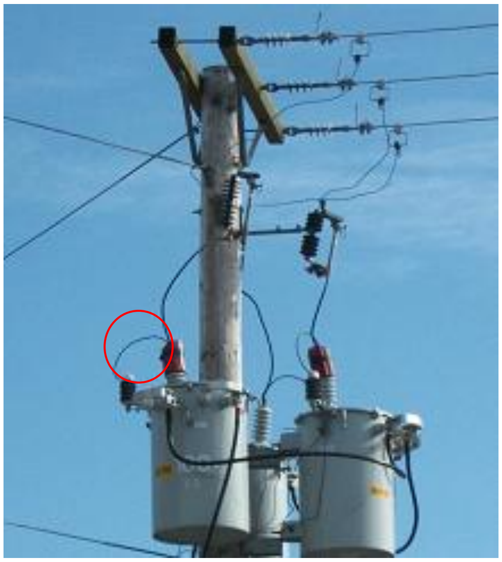


Figure 5: Lightning Arrestors In Service

4.2 CP8080 and 2-Piece Insulators

Premature failure of porcelain insulators due to “cement growth” is a known problem through the utility industry.[12] Newfoundland Power began to experience abnormal failures of porcelain insulation in the early 1980s.[13] Since that time, the Company has replaced a significant number of defective CP8080 suspension insulators and 2-Piece pin-type insulators.[14]

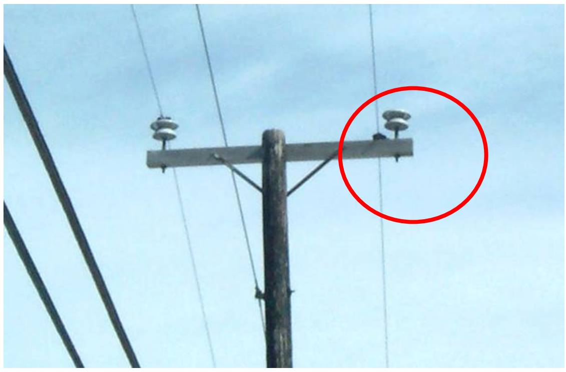


Figure 6: Broken Insulator In Service

Figure 7: Broken Insulator Removed From Service

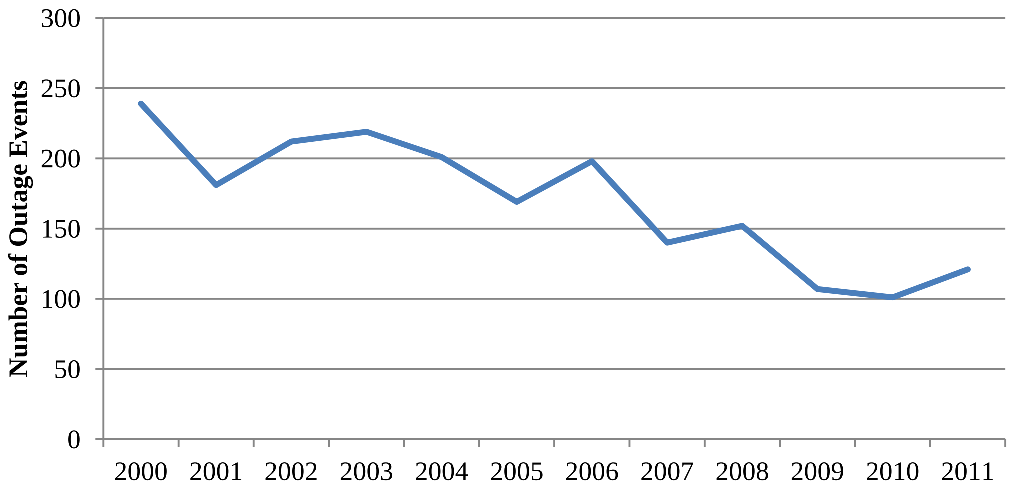
12 Since the early 1960s the term "cement growth" has been used to categorize a problem for premature failure of porcelain insulators. The volume expansion of the cement occurs in the presence of moisture and is attributed to a chemical change in the cement that occurs with age. The expansion typically occurs over 10 or more years. As the cement expands it produces stress on the porcelain that fails in tension by cracking.

13 See the 2004 Capital Budget Application, Volume III, Distribution, Appendix 2, Attachment C for further details on problem insulators.

14 CP8080 suspension insulators fail by radial cracks, which are sometimes contained inside the metal cap and are not visible. The crack causes a current path between the metal cap and pin and shorts out the insulator. Pin type and pin cap type (2-Piece) insulators fail by circumferential cracks. Failure is usually mechanical; the top shears off the insulator causing the conductor to float clear of the structure.

As shown in Graph 1 below, since 2000 the number of outages resulting from insulator failures has reduced to nearly half as a result of removing CP8080 and 2-Piece insulators from service as part of the *Rebuild Distribution Lines* project.[15] This has resulted in a positive impact on reliability.

Graph 1
Outages Caused by Insulator Failure



4.3 Current Limiting Fuses

Pole top distribution transformers are generally a very reliable component of the distribution system. However, they do eventually fail.[16] On rare occasions, transformer failures can lead to a buildup of pressure inside the tank, resulting in tank ruptures, oil spillage, or other *eventful* conditions. The probability of an eventful failure increases in locations with higher available fault current.

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15 In 2000 there were 239 outages resulting from insulator failures while in 2011 the number of outages related to insulator failure had reduced to 121, or 50.6% (121/239 = 0.506)

16 The large majority of transformer failures are uneventful, resulting in voltage abnormalities, electrical noise, power quality issues, open circuit conditions, or an electrical fault which blows the transformer protection fuse. Other types of failure may include leaking tanks, broken or cracked bushings, or other mechanical component failures.

Figure 8: Current Limiting Fuses In Service

To reduce the probability of eventful transformer failures, the Company uses Current Limiting Fuses ("CLFs") to limit the available current when a fault occurs.[17] The Company installs CLFs in the following locations:

- All fused cutouts located where fault current may exceed their maximum interrupting rating of 10,000 and 12,000 amps asymmetrical at 12.5kV and 25kV respectively.
- Transformers located in areas where fault levels exceed 5,000 amps symmetrical.
- Transformers located within 7 meters of sensitive locations where fault levels exceed 3,000 amps symmetrical.
- Other specified locations such as capacitor banks and primary metering installations.

4.4 Automatic Sleeves

Newfoundland Power adopted automatic sleeves for use as an alternative to joining conductors by means of compression sleeves.[18] This was done on a limited basis in 1993, and in 1999 the Company approved automatic sleeves for use on the entire distribution system. However after

[17] See the 2004 Capital Budget Application, Volume III, Distribution, Appendix 2, Attachment D for further detail on current limiting fuse requirements.

[18] Compression sleeves require the use of a specialized compression tool and are relatively labour intensive to install. Automatic or "quick" sleeves were quick and easy to install and did not require the use of a specialized tool. While the automatic sleeve was more expensive to purchase, the additional cost was justified by the increase in productivity.

nine years in service these automatic sleeves began showing signs of premature deterioration, in large part due to our severe environmental conditions.[19]

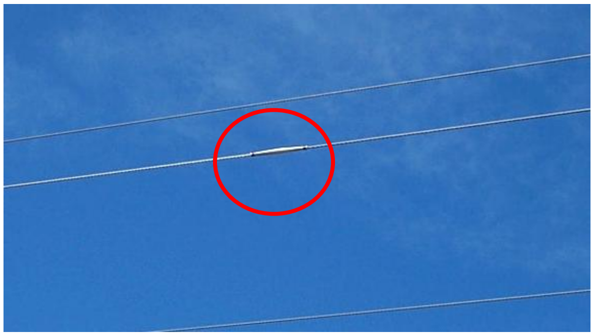


Figure 9: Automatic Sleeve In Service

Figure 10: Disassembled Automatic Sleeve Showing Corrosion

First indications of a problem surfaced in early 2002 when an automatic sleeve failed. An investigation followed which showed a high percentage of sleeves were experiencing signs of water ingress and internal corrosion.[20] The potential risks to public and employee safety, as well as system reliability prompted the Company to discontinue the use of automatic sleeves by the fall of 2002.[21]

4.5 Porcelain Cutouts

Porcelain insulated cutouts have been in use in the electrical industry for many decades.[22] Throughout that time, design and manufacturing processes have changed somewhat, but porcelain remained as the basic insulating material. In 2000 and 2001, the Company began to experience incidents of failed porcelain cutouts. Through 2002 and into 2003, hundreds of cutout failures were reported, and line personnel became increasingly concerned with the safety hazards associated with cutout failures.[23]

[19] See the 2004 Capital Budget Application, Volume III, Distribution, Appendix 2, Attachment E for further detail on automatic sleeves.

[20] In the Fall of 2002, a total of 35 sleeves were removed from various areas throughout the Company and inspected. The results indicated widespread internal deterioration of automatic sleeves. 71% of the sleeves removed showed at least some corrosion with 37% being severely corroded.

[21] Mechanical failure of a corroded automatic sleeve would result in line separation and the potential of an energized line dropping to the ground, presenting a public safety hazard. This hazard would also exist for line personnel performing energized work. In addition to mechanical failure, there is the risk of electrical failure of the sleeve creating an open circuit. This is particularly hazardous if a sleeve is on a neutral conductor. Voltage differences could be present across an electrically open sleeve on a neutral conductor that would be hazardous to line personnel. Mechanical or electrical failure of automatic sleeves can each result in customer outages.

[22] The cutout is a pole-mounted device used to disconnect or reconnect equipment to a source of electricity.

[23] Throughout the Company cutouts are opened and closed as part of regular system operations. This is typically done by line personnel positioned in the pole or the bucket of a line truck using a 10' long *hotstick*. Operating a cutout that is close to failure while it is energized may result in the cutout breaking, placing line personnel in an unsafe situation.

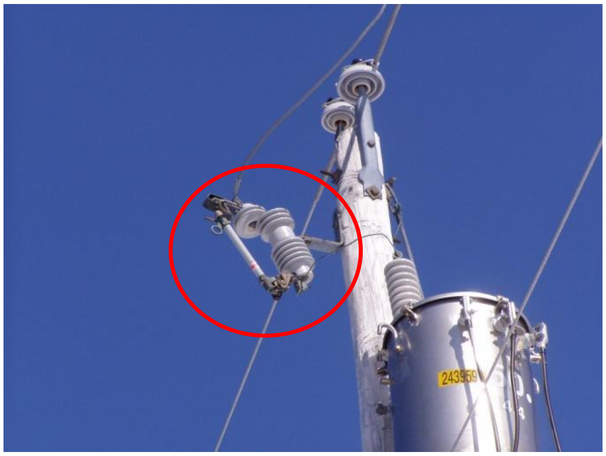


Figure 11: Broken Porcelain Cutout In Service

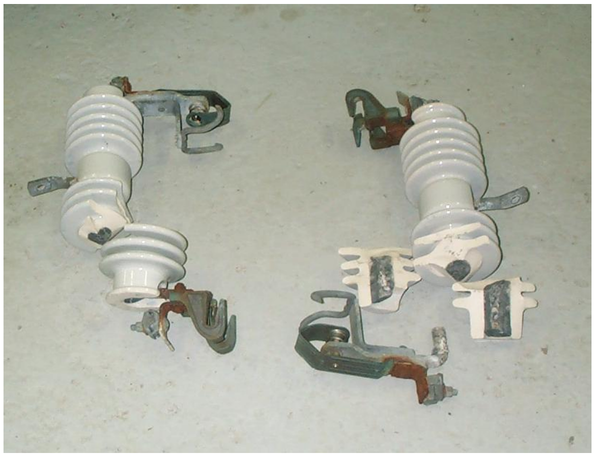
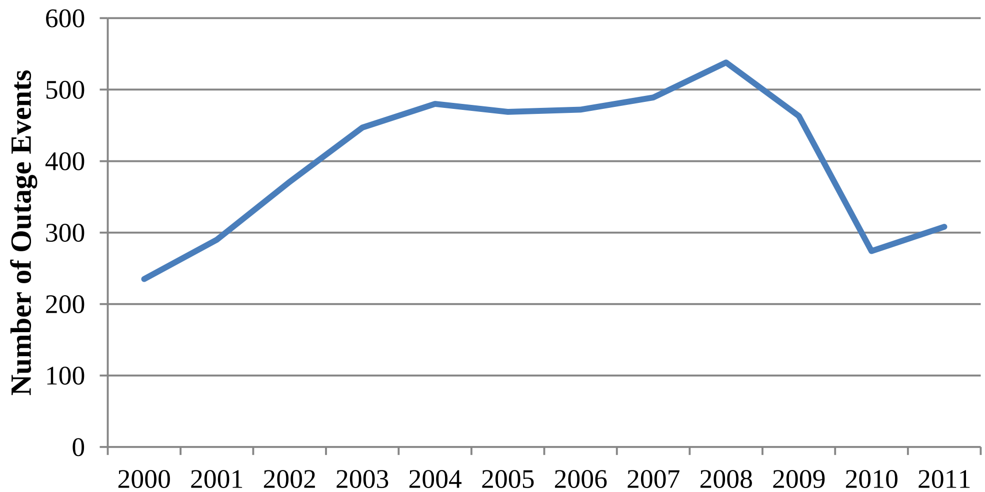


Figure 12: Two Broken Porcelain Cutouts Removed From Service

In 2003, as a result of the increasing rate of failures, the Company decided to discontinue the use of porcelain insulated cutouts and adopt the polymer insulated cutout as its new standard.[24]

Porcelain cutout failures continued to increase after 2003, and since that time, the Company has expanded the replacement program to all porcelain cutouts on the main trunk of distribution feeders, as well as lateral taps and large customers.

Graph 2
Outages Caused by Cutout Failure



As shown in Graph 2 above, the number of outages resulting from cutout failures steadily increased up until 2008, but declined in recent years as a result of removing porcelain

24 See the 2004 Capital Budget Application, Volume III, Distribution, Appendix 2, Attachment F for further detail on porcelain cutouts.

cutouts from service as part of the *Rebuild Distribution Lines* project.[25] This has improved reliability.

4.6 Stainless Steel Pole Mounted Transformer Hanging Brackets

The Company began purchasing pole mounted transformers manufactured with 316L stainless steel in 2001. This was done as a result of numerous failures due to rusting transformer tanks, largely due to higher levels of salt contamination in Newfoundland. After several years of using the new stainless steel tank design, the issue of broken hanging brackets began to surface on 25 kVA and 50 kVA transformers.[26]

Following discussions with the manufacturer it was determined that the hanging brackets were not sufficient for the mechanical forces exerted by higher wind conditions in the Newfoundland environment. To address this issue, the Company changed its specification for stainless steel transformers in 2007, requiring a hanging bracket made of a thicker gauge stainless steel.

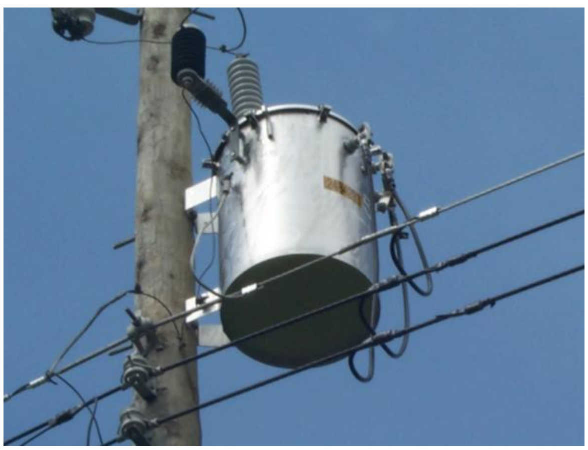


Figure 13: Stainless Steel Pole Mounted Transformer

Figure 14: Broken Stainless Steel Transformer Hanging Bracket

In total there have been 27 transformer bracket failures reported on stainless steel transformers manufactured from 2001 to 2006, inclusive.[27] As a result, the Company has worked with the manufacturer to develop a reinforcing bracket that can be installed on in-service transformers. Beginning in 2013, 25 kVA and 50 kVA transformers manufactured between 2001 and 2006 will be identified and retrofitted with a reinforcing bracket as part of the *Rebuild Distribution Lines* project.

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[25] Over the period from 2004 to 2009 the annual average number of outages caused by cutout failure was 485, peaking at 538 in 2008. By 2011 the number of outages caused by cutout failure had declined to 308.

[26] The first reported bracket failure occurred in 2003 when a lower bracket split after being in service for several months. A second reported bracket failure occurred in February 2006.

[27] Of the reported failures, 19 were 50 kVA units, 7 were 25 kVA units and 2 others did not have the size reported.

5.0 Concluding

This *Rebuild Distribution Lines* project involves the replacement of deteriorated distribution structures and electrical equipment that have been previously identified through the ongoing preventative maintenance program or engineering reviews. It is justified on the basis of the need to replace defective or deteriorated electrical equipment in order to maintain a safe, reliable electrical system.

The Company will continue its ongoing preventative maintenance program to identify damaged, broken or defective equipment, and will continue with the specific programs targeting lightning arrestors, CP8080 and 2-piece insulators, current limiting fuses, automatic sleeves and porcelain cutouts. The Company will also identify stainless steel transformers manufactured between 2001 and 2006 as part of annual distribution line inspections and retrofit these transformers with reinforcing brackets as part of the *Rebuild Distribution Lines* project.

The annual distribution line inspection program will identify:

- *Locations where transformers not equipped with a lightning arrestor in areas prone to lightning strikes*. In the year following the inspection, lightning arrestors are installed on identified transformers as part of the *Rebuild Distribution Lines* project.

- *Locations where CP8080 and 2-Piece insulators remain in service*. In the year following the inspection, insulators identified for replacement are included as part of the *Rebuild Distribution Lines* project.

- *Locations where a CLF is required and not installed*. In the year following the inspection, CLFs are installed as part of the *Rebuild Distribution Lines* project.

- *Locations where automatic sleeves remain in service*. In the year following the inspection, automatic sleeves identified for replacement are removed as part of the *Rebuild Distribution Lines* project.

- *Locations where porcelain cutouts remain in service* on the main trunk of distribution feeders, as well as lateral taps and large customers. In the following year porcelain cutouts identified for replacement are removed as part of the *Rebuild Distribution Lines* project.

- *Locations of stainless steel transformers manufactured from 2001 to 2006*. In the year following the inspection, transformers identified to be retrofitted with a reinforcing bracket will be included as part of the *Rebuild Distribution Lines* project.

Distribution Reliability Initiative
June 2013

Distribution Reliability Initiative

June 2013

Prepared by:

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1.0 Distribution Reliability Initiative

The Distribution Reliability Initiative is a capital project focusing on the reconstruction of the worst performing distribution feeders. Customers on these feeders experience more frequent and longer duration outages than the majority of customers.

Newfoundland Power manages system reliability through capital investment, maintenance practices and operational deployment. On an ongoing basis, Newfoundland Power examines its actual distribution reliability performance to assess where targeted capital investment is warranted to improve service reliability. Through this process, the Company identifies the worst performing feeders in the power system based upon reliability measures. Engineering assessments are completed for each of the worst performing feeders and, where appropriate, the Company makes capital investment to improve the reliability of these feeders.

Appendix A contains the five-year average distribution reliability data, excluding significant events, for the 15 worst performing feeders based on data for 2008 - 2012.

Appendix B contains a summary of the assessment carried out on each of the feeders listed in Appendix A.

2.0 Distribution Reliability Initiative Projects: 2012

There were no Distribution Reliability Initiative projects during 2012.

3.0 Distribution Reliability Initiative Projects: 2013

There are no Distribution Reliability Initiative projects planned for 2013.

4.0 Distribution Reliability Initiative Projects: 2014

The examination of the worst performing feeders, as listed in Appendix A and B, has determined no work is required under the Distribution Reliability Initiative at this time.

Appendix A
Distribution Reliability Data

Unscheduled Distribution Related Outages Five-Year Average 2008-2012 Sorted By Customer Minutes of Interruption				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
RRD - 09	4,381	455,051	2.89	5.00
KEN - 04	7,576	449,412	3.12	3.08
DOY - 01	4,587	413,181	2.79	4.19
DLK - 03	2,711	409,774	2.20	5.54
SUM - 01	5,355	400,223	2.96	3.69
GBY - 03	3,377	385,734	4.38	8.34
BOT - 01	2,717	382,393	1.64	3.84
GFS - 06	4,229	367,905	2.45	3.55
CAB - 01	4,526	357,907	3.65	4.81
GLV - 02	2,653	357,367	2.03	4.55
DUN - 01	3,198	351,009	3.33	6.09
GFS - 02	5,946	347,969	3.88	3.78
SLA - 09	3,700	345,623	2.60	4.05
CHA - 02	4,681	335,110	2.27	2.71
SCR - 01	2,057	321,429	2.16	5.59
Company Average	**948**	**73,961**	**1.21**	**1.58**

Unscheduled Distribution Related Outages Five-Year Average 2008-2012 Sorted By Distribution SAIFI				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
GBY - 03	3,377	385,734	4.38	8.34
GBY - 02	3,658	237,712	4.04	4.38
GFS - 02	5,946	347,969	3.88	3.78
CAB - 01	4,526	357,907	3.65	4.81
DUN - 01	3,198	351,009	3.33	6.09
MOL - 04	3,952	297,867	3.26	4.10
KEN - 04	7,576	449,412	3.12	3.08
FER - 01	1,908	182,490	3.02	4.82
BCV - 02	4,618	316,615	2.99	3.41
SUM - 01	5,355	400,223	2.96	3.69
RRD - 09	4,381	455,051	2.89	5.00
DOY - 01	4,587	413,181	2.79	4.19
HWD - 06	2,280	122,884	2.79	2.50
SCT - 02	683	81,545	2.70	5.37
MMT - 01	1,239	97,300	2.65	3.47
Company Average	**948**	**73,961**	**1.21**	**1.58**

Unscheduled Distribution Related Outages **Five-Year Average** **2008-2012** **Sorted By Distribution SAIDI**				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
GBY - 03	3,377	385,734	4.38	8.34
SUM - 02	1,407	225,689	2.31	6.18
BUC - 02	228	58,445	1.44	6.17
DUN - 01	3,198	351,009	3.33	6.09
SCR - 01	2,057	321,429	2.16	5.59
DLK - 03	2,711	409,774	2.20	5.54
SCT - 02	683	81,548	2.70	5.37
ABC - 01	1,676	233,820	2.15	5.00
RRD – 09	4,381	455,051	2.89	5.00
MKS - 01	741	140,803	1.58	4.99
FER - 01	1,908	182,490	3.02	4.82
CAB - 01	4,526	357,907	3.65	4.81
GLV - 02	2,653	357,367	2.03	4.55
GBY-02	3,658	237,712	4.04	4.38
NCH-02	960	142,190	1.46	4.25
Company Average	**948**	**73,961**	**1.21**	**1.58**

Appendix B
Worst Performing Feeders
Summary of Data Analysis

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
ABC-01	Reliability statistics were driven by a broken conductor related event in February 2010 and a faulted lightning arrestor in 2010. There was also a sleet related incident in 2011. No work is required at this time.
BCV-02	BCV-02 has had good reliability over the years. Problems with a submarine cable resulted in poor overall reliability in 2012. No further work is required at this time.
BOT-01	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. Reliability numbers in 2010 were poor due to damages caused by a vehicle accident. No further work is required at this time.
BUC-02	Reliability problems in 2008 were due to three insulator failures in 2008. Insulators were replaced in 2009. There were two incidents of broken conductor in 2011. No work is required at this time.
CAB-01	Poor statistics in 2008 were due to a broken cutout and a broken insulator. Reliability was poor in 2012 principally due to two separate tree related incidents. No work is required at this time.
CHA-02	Reliability statistics were driven by a single event, a broken insulator in June 2009. No work is required at this time.
DLK-03	Reliability statistics were driven by a broken conductor in November 2009 and a single weather related event in 2011. No work is required at this time.
DOY-01	Overall reliability statistics on this feeder have been impacted by feeder unbalance caused by a number of long single-phase taps. The poor average statistics are also driven by a single weather related issue in each of 2009, 2010 and 2012. Work is planned under the Feeder Additions for Load Growth project to address the single-phase taps issue.
DUN-01	Reliability statistics were poor in both 2007 and 2009. The statistics were driven by a broken recloser bushing in 2007 and a broken pole in 2009. Reliability improved greatly in 2010 and 2011. Poor reliability in 2012 was due to vegetation issues. No work is proposed for 2014.

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
FER-01	Reliability statistics were driven by a single tree related event in 2009. No work is required at this time.
GBY-02	GBY-02 has had good reliability over the years. A single wind related event resulted in poor overall reliability in 2012. This was an isolated event and no further work is required at this time.
GBY–03	Reliability statistics were driven by isolated weather related events in each of 2009, 2010 and 2011. This feeder had significant upgrades as part of the 2011 CBA Rebuild Distribution Lines project. No additional work is required at this time.
GFS-02	Reliability statistics were driven by a single tree related event in October 2009. No work is required at this time.
GFS-06	Reliability problems relate to tree issues in 2009 and 2011. No work is required at this time.
GLV-02	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. High customer minutes in 2010 were due to problems accessing a line through Terra Nova Park associated with a tree related event. A single sleet related issue impacted reliability in 2012. No further work is required at this time.
HWD-06	HWD-06 has had good reliability over the years. A faulty breaker resulted in poor overall reliability in 2012. This was an isolated event and no work is required at this time.
KEN-04	KEN-04 has had good reliability over the years. Two events, a pole hit by a vehicle and a lightning strike resulted in poor overall reliability in 2012. These were isolated events and no further work is required at this time.
MIL-02	The MIL-02 feeder had displayed consistently poor reliability prior to significant work being carried out in 2006. In 2008 there was a tree related outage and in 2012 a vehicle accident both of which contributed to poor reliability statistics. No work is required at this time.

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
MKS-01	Reliability statistics were driven by a single event, a broken cutout in March 2008. No work is required at this time.
MMT-01	Poor overall reliability is due to tree related events in 2009 and 2010 and a squirrel causing a fuse to operate in 2012. No work is required at this time.
MOL-04	MOL-04 has had good reliability over the years. Several weather events resulted in poor overall reliability in 2012. No work is required at this time.
NCH-02	Reliability statistics were driven by a single tree related event in September 2010. No work is required at this time.
RRD-09	Reliability problems were due to two events involving broken conductor in 2008 and 2011. No work is required at this time.
SCR-01	Reliability statistics were driven by a single wind related event in November 2011. No work is required at this time.
SCT-02	Reliability problems in 2008 were due to a storm in March. No work is required at this time.
SLA-09	Poor overall reliability is due to an underground cable fault in 2011. No work is required at this time.
SUM-01	SUM-01 has had good reliability over the years. Two events, one involving salt spray the other a broken conductor resulted in poor overall reliability in 2012. These were isolated events and no further work is required at this time.
SUM-02	Reliability statistics were driven by two tree related events in May and December 2011 and a weather event in 2012 No work is required at this time.

Distribution Reliability Initiative
June 2012

Distribution Reliability Initiative

June 2012

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1.0 Distribution Reliability Initiative

The Distribution Reliability Initiative is a capital project focusing on the reconstruction of the worst performing distribution feeders. Customers on these feeders experience more frequent and longer duration outages than the majority of customers.

Newfoundland Power manages system reliability through capital investment, maintenance practices and operational deployment. On an ongoing basis, Newfoundland Power examines its actual distribution reliability performance to assess where targeted capital investment is warranted to improve service reliability. Through this process, the Company identifies the worst performing feeders in the power system based upon reliability measures. Engineering assessments are completed for each of the worst performing feeders and, where appropriate, the Company makes capital investment to improve the reliability of these feeders.

Appendix A contains the five-year average distribution reliability data of the 15 worst performing feeders based on data for 2007 - 2011.

Appendix B contains a summary of the assessment carried out on each of the feeders listed in Appendix A.

2.0 Distribution Reliability Initiative Projects: 2011

The 2009 Capital Budget Application proposed a three year project to improve reliability on the NWB-02 feeder. The work was detailed in *4.1.1 Northwest Brook NWB-02 Feeder Study* filed with the 2009 Capital Budget Application. The project was presented as a three year project starting in 2009 with additional work planned for 2010 and 2011. In 2009 and 2010, the Company completed work project costs of $455,000 and $334,000 respectively. The project was completed in 2011 with $380,000 being spent.

3.0 Distribution Reliability Initiative Projects: 2012

There are no Distribution Reliability Initiative projects planned for 2012.

4.0 Distribution Reliability Initiative Projects: 2013

The examination of the worst performing feeders, as listed in Appendix A and B, has determined no work is required under the Distribution Reliability Initiative at this time.

Appendix A
Distribution Reliability Data

Unscheduled Distribution Related Outages Five-Year Average 2007-2011 Sorted By Customer Minutes of Interruption				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
DOY-01	3,968	449,872	2.42	4.57
DLK-03	2,379	424,122	1.93	5.73
RRD-09	3,585	412,167	2.36	4.53
GLV-02	2,651	403,396	2.02	5.13
BOT-01	2,488	376,868	1.50	3.79
DUN-01	2,092	365,749	2.18	6.34
GBY-03	2,436	338,521	3.16	7.32
CHA-02	4,397	318,688	2.13	2.58
SLA-09	3,189	317,686	2.24	3.72
GFS-06	3,130	303,334	1.81	2.93
GIL-01	2,510	297,595	2.52	4.98
HWD-07	5,906	287,310	2.53	2.05
CAB-01	3,692	284,177	2.97	3.82
HWD-08	3,184	269,213	1.30	1.84
LEW-02	1,758	268,604	1.22	3.10
Company Average	**862**	**73,885**	**1.10**	**1.58**

Unscheduled Distribution Related Outages Five-Year Average 2007-2011 Sorted By Distribution SAIFI				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
GDL-01	1,937	93,786	3.48	2.81
HOL-01	6,651	232,394	3.17	1.85
GBY-03	2,436	338,521	3.16	7.32
CAB-01	3,692	284,177	2.97	3.82
GLV-01	3,000	183,379	2.76	2.81
MOB-01	3,546	168,730	2.65	2.10
GFS-02	3,974	232,540	2.59	2.53
MMT-01	1,207	105,998	2.58	3.78
FER-01	1,619	154,662	2.57	4.09
MIL-02	3,577	249,923	2.55	2.97
GOU-01	3,771	127,398	2.54	1.43
HWD-07	5,906	287,310	2.53	2.05
GIL-01	2,510	297,595	2.52	4.98
DOY-01	3,968	449,872	2.42	4.57
RRD-09	3,585	412,167	2.36	4.53
Company Average	**862**	**73,885**	**1.10**	**1.58**

Unscheduled Distribution Related Outages Five-Year Average 2007-2011 Sorted By Distribution SAIDI				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
GBY-03	2,436	338,521	3.16	7.32
BUC-02	292	66,608	1.85	7.03
DUN-01	2,092	365,749	2.18	6.34
SCT-02	541	92,186	2.14	6.07
DLK-03	2,379	424,122	1.93	5.73
ABC-01	1,832	242,395	2.35	5.19
GLV-02	2,651	403,396	2.02	5.13
MKS-01	744	140,818	1.58	4.99
GIL-01	2,510	297,595	2.52	4.98
HOL-02	1,200	152,990	2.34	4.97
NCH-02	1,119	191,207	1.70	4.84
DOY-01	3,968	449,872	2.42	4.57
SUM-02	406	165,727	0.67	4.54
RRD-09	3,585	412,167	2.36	4.53
SCR-01	979	256,985	1.02	4.47
Company Average	**862**	**73,885**	**1.10**	**1.58**

Appendix B
Worst Performing Feeders
Summary of Data Analysis

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
GLV-02	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. High customer minutes in 2010 were due to problems accessing a line through Terra Nova Park. No further work is required at this time.
DUN-01	Reliability statistics were poor in both 2007 and 2009. The statistics were driven by a broken recloser bushing in 2007 and a broken pole in 2009. Reliability improved greatly in 2010 and 2011. No work is proposed for 2013.
BOT-01	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. Reliability numbers in 2010 were poor due to damages caused by a vehicle accident. No further work is required at this time.
SLA-09	Poor overall reliability is due to an underground cable fault in 2011. No work is required at this time.
GLV-01	Poor overall reliability is due to several insulator failures in 2007. No work is required at this time.
HOL-02	Poor overall reliability is due to a storm in March 2008. No work is required at this time.
MMT-01	Poor overall reliability is due to tree related events in 2009 and 2010. No work is required at this time.
CAB-01	Poor statistics in 2008 were due to a broken cutout and a broken insulator. No work is required at this time.
DOY-01	Overall reliability statistics on this feeder have been good. The poor average statistics are driven by a single weather related issue in each of 2009 and 2010. No work is required at this time.
MIL-02	The MIL-02 feeder had displayed consistently poor reliability prior to significant work being carried out in 2006. In 2007 and 2008 there were several tree related outages contributing to poor reliability statistics. No work is required at this time.

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
GOU-01	Overall reliability statistics on this feeder have been good. The poor average statistics were caused by isolated events, a pothead failure in 2009 and a single incidence of a failed insulator in 2010.
BUC-02	Reliability problems in 2008 were due to three insulator failures in 2008. Insulators were replaced in 2009. There were two incidents of broken conductor in 2011. No work is required at this time.
SCT-02	Reliability problems in 2008 were due to a storm in March. No work is required at this time.
GFS-06	Reliability problems relate to tree issues in 2009 and 2011. No work is required at this time.
HWD-08	Reliability problems relate to a pole fire and a broken insulator in 2007. No work is required at this time.
GDL-01	Reliability statistics were driven by isolated weather related events in 2007 and 2008. No work is required at this time.
HOL-01	Reliability problems were due to a single event, a broken cutout in January 2007. No work is required at this time.
MKS-01	Reliability statistics were driven by a single event, a broken cutout in March 2008. No work is required at this time.
RRD-09	Reliability problems were due to two events involving broken conductor in 2008 and 2011. No work is required at this time.
GIL-01	Reliability statistics were driven by a single sleet related event in March 2009. No work is required at this time.
LEW-02	Reliability statistics were driven by a single tree related event in October 2009. No work is required at this time.
GBY–03	Reliability statistics were driven by isolated weather related events in 2009 and 2010. No work is required at this time.

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
DLK-03	Reliability statistics were driven by a broken conductor in November 2009 and a single weather related event in 2011. No work is required at this time.
SCR-01	Reliability statistics were driven by a single wind related event in November 2011. No work is required at this time.
CHA-02	Reliability statistics were driven by a single event, a broken insulator in June 2009. No work is required at this time.
MOB-01	Reliability statistics were driven by a single event, broken conductor in December 2011. No work is required at this time.
FER-01	Reliability statistics were driven by a single tree related event in January 2007. No work is required at this time.
ABC-01	Reliability statistics were driven by a broken conductor related event in February 2010 and a faulted lightning arrestor in 2010. There was also a sleet related incident in 2011. No work is required at this time.
GLV-02	Reliability statistics were driven by two broken primary incidents in 2007 and a tree related event in 2010. No work is required at this time.
GFS-02	Reliability statistics were driven by a single tree related event in October 2009. No work is required at this time.
HWD-07	Reliability statistics were driven by a sleet storm in 2008 and a faulty cutout in 2010. No work is required at this time.
NCH-02	Reliability statistics were driven by a single tree related event in September 2010. No work is required at this time.
SUM-02	Reliability statistics were driven by two tree related events in May and December 2011. No work is required at this time.

Distribution Reliability Initiative
June 2011

Distribution Reliability Initiative

June 2011

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1.0 Distribution Reliability Initiative

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Newfoundland Power manages system reliability through capital investment, maintenance practices and operational deployment. On an ongoing basis, Newfoundland Power examines its actual distribution reliability performance to assess where targeted capital investment is warranted to improve service reliability. Through this process, the Company identifies the worst performing feeders in the power system based upon reliability measures. Engineering assessments are completed for each of the worst performing feeders and, where appropriate, the Company makes capital investment to improve the reliability of these feeders.

Appendix A contains the five-year average distribution reliability data of the 15 worst performing feeders based on data for 2006 - 2010.

Appendix B contains a summary of the assessment carried out on each of the feeders listed in Appendix A.

2.0 Distribution Reliability Initiative Projects: 2010

The 2009 Capital Budget Application proposed a three year project to improve reliability on the NWB-02 feeder.The work was detailed in 4*.1.1 Northwest Brook NWB-02 Feeder Study* filed with the 2009 Capital Budget Application. The project was presented as a three year project starting in 2009 with additional work planned for 2010 and 2011. In 2009 and 2010, the Company completed work project cost's of $455,000 and $334,000 respectively.

3.0 Distribution Reliability Initiative Projects: 2011

The 2011 Capital Budget Application included the third phase of the proposed work on NWB-02 as outlined in 4*.1.1 Northwest Brook NWB-02 Feeder Study* filed with the 2009 Capital Budget Application. The estimate for planned work is approximately $521,000.

4.0 Distribution Reliability Initiative Projects: 2012

The examination of the worst performing feeders, as listed in Appendix A and B, has determined no work is required under the Distribution Reliability Initiative at this time.

Appendix A

Distribution Reliability Data

Unscheduled Distribution Related Outages Five-Year Average 2006-2010 Sorted By Customer Minutes of Interruption				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
DUN - 01	2,202	499,956	2.32	8.77
GLV - 02	3,451	464,311	2.66	5.98
DOY - 01	4,259	446,376	2.67	4.66
CHA - 03	4,662	395,174	2.21	3.12
NWB - 02	2,425	375,924	2.32	6.00
BOT - 01	3,406	338,281	2.08	3.44
CAB - 01	3,589	330,722	2.98	4.57
MIL - 02	4,242	312,464	3.06	3.76
RRD - 09	2,457	310,208	1.72	3.62
HOL - 01	6,868	309,121	3.38	2.54
DLK - 03	2,005	289,714	1.73	4.18
CHA - 02	3,770	285,024	2.20	2.77
ROB - 01	1,795	269,340	1.65	4.11
KEL - 01	2,378	269,226	1.27	2.40
SUM - 01	1,527	261,362	0.85	2.43
Company Average	**871**	**70,294**	**1.00**	**1.43**

Unscheduled Distribution Related Outages Five-Year Average 2006-2010 Sorted By Distribution SAIFI				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
HOL - 01	6,868	309,121	3.38	2.54
GDL - 01	1,725	98,250	3.13	2.97
MIL - 02	4,242	312,464	3.06	3.76
CAB - 01	3,589	330,722	2.98	4.57
GLV - 01	2,937	163,410	2.79	2.59
MMT - 01	1,283	84,033	2.79	3.04
GOU - 01	3,518	107,855	2.70	1.38
GIL - 01	2,622	225,934	2.67	3.83
DOY - 01	4,259	446,376	2.67	4.66
GLV - 02	3,451	464,311	2.66	5.98
VIR - 02	968	57,446	2.64	2.62
GFS - 02	3,516	234,843	2.45	2.73
HWD - 07	6,052	259,228	2.45	1.75
HOL - 02	1,174	201,603	2.38	6.82
NWB - 02	2,425	375,924	2.32	6.00
Company Average	**871**	**70,294**	**1.00**	**1.43**

Unscheduled Distribution Related Outages Five-Year Average 2006-2010 Sorted By Distribution SAIDI				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
DUN - 01	2,202	499,956	2.32	8.77
SCT - 02	525	100,754	2.14	6.85
HOL - 02	1,174	201,603	2.38	6.82
BUC - 02	232	58,454	1.47	6.17
NWB - 02	2,425	375,924	2.32	6.00
GLV - 02	3,451	464,311	2.66	5.98
SCT - 01	1,225	204,995	1.85	5.17
COL - 02	529	95,229	1.62	4.85
MKS - 01	715	133,260	1.54	4.79
DOY - 01	4,259	446,376	2.67	4.66
CAB - 01	3,589	330,722	2.98	4.57
GBY - 03	1,630	199,339	2.15	4.37
DLK - 03	2,005	289,714	1.73	4.18
SPO - 03	765	122,188	1.55	4.14
ROB - 01	1,795	269,340	1.65	4.11
Company Average	**871**	**70,294**	**1.00**	**1.43**

Appendix B

Worst Performing Feeders
Summary of Data Analysis

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
GLV-02	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. High customer minutes in 2010 were due to problems accessing a line through Terra Nova Park. No further work is required at this time.
DUN-01	Reliability statistics were poor in both 2006 and 2007; however, the statistics were driven by a sleet storm in 2006, a broken recloser bushing in 2007 and a broken pole in 2008. Reliability performance was below average again in 2009 but improved greatly in 2010. No work is proposed for 2011 or 2012.
BOT-01	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. Reliability numbers in 2010 were poor due to damages caused by a vehicle accident. No further work is required at this time.
NWB-02	Work has been carried out in 2009 and 2010 on this feeder. Additional work is proposed for 2011. Reliability has improved and no further work is required at this time.
GLV-01	Poor overall reliability is due to several insulator failures in 2007. No work is required at this time.
HOL-02	Poor overall reliability is due to a storm in March 2008. No work is required at this time.
MMT-01	Poor overall reliability is due to tree related events in 2009 and 2010. No work is required at this time.
CAB-01	Poor statistics in 2008 were due to a broken cutout and a broken insulator. No work is required at this time.
DOY-01	Overall reliability statistics on this feeder have been good. The poor average statistics are driven by a single weather related issue in each of 2009 and 2010. No work is required at this time.
MIL-02	The MIL-02 feeder has displayed consistently poor reliability from 2002 to 2006. Significant work was carried out under the Rebuild Distribution Lines program in 2006 and there were no reliability issues since. No work is required at this time.

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
GOU-01	Overall reliability statistics on this feeder have been good. The poor average statistics were caused by isolated events, a pothead failure in 2009 and a single incidence of a failed insulator in 2010.
BUC-02	Reliability problems in 2008 were due to three insulator failures in 2008. Insulators were replaced in 2009. No work is required at this time.
SCT-02	Reliability problems in 2008 were due to a storm in March. No work is required at this time.
CHA-03	Reliability problems were due to a single event caused by broken conductor in 2006. No work is required at this time.
COL-02	Reliability statistics were driven by a single sleet related event in May 2006. No work is required at this time.
GDL-01	Reliability statistics were driven by isolated weather related events in 2007 and 2008. No work is required at this time.
HOL-01	Reliability problems were due to a single event, a broken cutout in January 2007. No work is required at this time.
MKS-01	Reliability statistics were driven by a single event, a broken cutout in March 2008. No work is required at this time.
RRD-09	Reliability problems were due to a single event, broken conductor in 2008. No work is required at this time.
GIL-01	Reliability statistics were driven by a single sleet related event in March 2009. No work is required at this time.
SCT-01	Reliability problems were due to two tree related events, one in 2008 and the other in 2009. No work is required at this time.
GBY–03	Reliability statistics were driven by isolated weather related events in 2009 and 2010. No work is required at this time.
DLK-03	Reliability statistics were driven by a single event, broken conductor in November 2009. No work is required at this time.

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
SPO-03	Reliability statistics were driven by a single weather related event in 2006 and a broken insulator in December 2008. No work is required at this time.
CHA-02	Reliability statistics were driven by a single event, a broken insulator in June 2009. No work is required at this time.
ROB-01	Reliability statistics were driven by trees and lightning in 2006 and 2007 . No work is required at this time.
KEL-01	Reliability statistics were driven by a single weather related event in 2006. No work is required at this time.
SUM-01	Reliability statistics were driven by a single lightning event in 2008. No work is required at this time.
VIR-02	Reliability problems were driven by two conductor related events in 2008. No work is required at this time.
GFS-02	Reliability statistics were driven by a single tree related event in October 2009. No work is required at this time.
HWD-07	Reliability statistics were driven by a sleet storm in 2008 and a faulty cutout in 2010. No work is required at this time.

Distribution Reliability Initiative
June 2010

Distribution Reliability Initiative

June 2010

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1.0 Distribution Reliability Initiative

The Distribution Reliability Initiative is a capital project focusing on the reconstruction of the worst performing distribution feeders. Customers on these feeders experience more frequent and longer duration outages than the majority of customers.

Newfoundland Power manages system reliability through capital investment, maintenance practices and operational deployment. On an ongoing basis, Newfoundland Power examines its actual distribution reliability performance to assess where targeted capital investment is warranted to improve service reliability. Through this process, the Company identifies the worst performing feeders in the power system based upon reliability measures. Engineering assessments are completed for each of the worst performing feeders and, where appropriate, the Company makes capital investment to improve the reliability of these feeders.

Appendix A contains the five-year average distribution reliability data of the 15 worst performing feeders based on data for 2005 - 2009.

Appendix B contains a summary of the assessment carried out on each of the feeders listed in Appendix A.

2.0 Distribution Reliability Initiative Projects: 2009

In 2009, the Company completed work under the Distribution Reliability Initiative project on sections of the NWB-02 feeder at a cost of $455,000. The work was detailed in 4*.1.1 Northwest Brook NWB-02 Planning Study* filed with the 2009 Capital Budget Application. This is a three year project with additional work planned for 2010 and 2011.

3.0 Distribution Reliability Initiative Projects: 2010

In 2010, the Company will continue the Distribution Reliability Initiative. The 2010 Capital Budget Application proposed work on the NWB-02 feeder. The work is a continuation of projects initially proposed in the 2009 Capital Budget Application. The forecasted expenditure in 2010 is $496,000.

4.0 Distribution Reliability Initiative Projects: 2011

The 2011 Capital Budget Application includes the third phase of the proposed work on NWB-02 as outlined in 4*.1.1 Northwest Brook NWB-02 Planning Study* filed with the 2009 Capital Budget Application.

Two significant pieces of work remain for 2011.

Hillview to the Hatchet Cove Tap

This 8.9 km section of single phase line consists of poles installed in the early 1960's with #2 ACSR conductor. The line is remote from the road right of way ("ROW") with long spans. In 2011, 7 km of single phase line will be relocated to the road ROW. The estimate for planned work in this section is approximately $350,000.

Hatchet Cove Tap to St. Jones Within

This 3.4 km section of single phase line consists of poles installed in the early 1960's with #2 ACSR conductor. The line is remote from the road ROW and includes long span lengths. There have been no upgrades on this section of line since the initial construction. In 2011, 3.4 km of single phase line will be relocated to the road ROW. The estimate for planned work in this section is approximately $171,000.

Table 1 details reliability statistics for the past five years.

Table 1

NWB-02 – Reliability Analysis

	2005	**2006**	**2007**	**2008**	**2009**
SAIDI	4.60	8.98	4.82	9.51	0.48
SAIFI	2.63	5.33	1.25	3.10	0.26

The 2009 reliability numbers show vastly improved reliability on the NWB-02 feeder. Efforts to date have contributed to this improvement. Work will continue as planned in the original study as condition assessments have confirmed that sections of the feeder still require work to ensure reliability continues at an acceptable level. The estimated expenditure in 2011 is $521,000.

The examination of the worst performing feeders as listed in Appendix A and B has determined, other than the proposed work on NWB-02, no work is required on other feeders under the Distribution Reliability Initiative at this time.

Appendix A

Distribution Reliability Data

Unscheduled Distribution Related Outages Five-Year Average 2005-2009 Sorted By Customer Minutes of Interruption				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
DUN-01	2,904	401,689	3.06	7.05
DOY-01	4,720	380,267	2.96	3.97
GLV-02	4,172	371,498	3.22	4.78
RRD-09	2,622	328,010	1.84	3.83
CHA-03	3,828	324,421	1.82	2.56
NWB-02	2,844	300,740	2.72	4.80
BOT-01	3,257	290,314	1.99	2.95
CAB-01	3,712	283,127	3.08	3.92
GFS-02	3,198	270,391	2.23	3.14
BCV-02	2,478	260,706	1.63	2.85
HOL-01	7,258	258,487	3.57	6.14
MIL-02	4,570	252,864	3.30	3.04
CHA-02	2,262	250,136	1.32	2.43
HWD-08	2,695	245,683	1.62	2.47
DLK-03	1,770	236,932	1.53	3.42
Company Average	**899**	**99,319**	**1.18**	**2.18**

Unscheduled Distribution Related Outages Five-Year Average 2005-2009 Sorted By Distribution SAIFI				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
GDL-01	1,980	174,131	3.59	5.26
HOL-01	7,258	258,487	3.57	6.14
VIR-02	1,228	48,354	3.36	2.20
MIL-02	4,570	252,864	3.30	3.04
GLV-02	4,172	371,498	3.22	4.78
HWD-04	2,641	199,431	3.18	3.48
CAB-01	3,712	283,127	3.08	3.92
DUN-01	2,904	401,689	3.06	7.05
FER-01	1,889	142,100	2.99	3.75
DOY-01	4,720	380,267	2.96	3.97
NWB-02	2,844	300,740	2.72	4.80
SLA-13	1,797	71,557	2.67	1.77
SCT-02	643	80,934	2.63	5.51
HOL-02	1,269	181,520	2.57	2.12
GLV-01	2,692	201.952	2.56	3.20
Company Average	**899**	**99,319**	**1.18**	**2.18**

Unscheduled Distribution Related Outages Five-Year Average 2005-2009 Sorted By Distribution SAIDI				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
DUN-01	2,904	401,689	3.06	7.05
HOL-02	7,258	258,487	3.57	6.14
SCT-02	643	80,934	2.63	5.51
GDL-01	1,980	174,131	3.59	5.26
BUC-02	230	47,262	1.45	4.99
GRH-02	1,855	235,819	2.34	4.96
NWB-02	2,844	300,740	2.72	4.80
GLV-02	4,172	371,498	3.22	4.78
SCT-01	1,094	165,374	1.66	4.17
COL-02	508	79,924	1.55	4.07
MKS-01	484	111,220	1.04	3.99
DOY-01	4,720	380,267	2.96	3.97
CAB-01	3,712	283,127	3.08	3.92
RRD-09	2,622	328,010	1.84	3.83
GIL-01	1,157	221,757	1.18	3.76
Company Average	**899**	**99,319**	**1.18**	**2.18**

Appendix B

Worst Performing Feeders
Summary of Data Analysis

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
GLV-02	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. No further work is required at this time.
DUN-01	Reliability statistics were poor in both 2006 and 2007; however, the statistics were driven by a sleet storm in 2006, a broken recloser bushing in 2007 and a broken pole in 2008. Reliability performance was below average again in 2009. No work is proposed for 2011, however the feeder's performance will be monitored closely in 2010.
BOT-01	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. No further work is required at this time.
NWB-02	Work has been carried out in 2009 and 2010 on this feeder. Additional work is proposed for 2011.
BCV-02	Problems in 2003, 2004 & 2005. This feeder was rebuilt under the Distribution Reliability Initiative in 2006. There have been no reliability issues since 2006. No work is required at this time.
HOL-02	Poor overall reliability is due to a storm in March 2008. No work is required at this time.
FER-01	Reliability statistics were poor in 2005. Work was carried out under the Rebuild Distribution Lines program in 2005; and with the exception of some sleet related outages in 2009, there have been no reliability issues since 2005. No work is required at this time.
CAB-01	Reliability statistics were poor in 2004. Work was carried out under the Rebuild Distribution Lines program in 2005 and there have been no reliability issues since 2005. Poor statistics in 2008 were due to a broken cutout and a broken insulator. No work is required at this time.
DOY-01	Overall reliability statistics on this feeder have been good. The poor average statistics are driven by a single weather related issue in 2006. No work is required at this time.

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
MIL-02	The MIL-02 feeder has displayed consistently poor reliability from 2002 to 2006. Significant work was carried out under the Rebuild Distribution Lines program in 2006 and there were no reliability issues since. No work is required at this time.
GRH-02	Reliability statistics were poor in 2004 & 2005. Work was carried out under the Rebuild Distribution Lines program in 2005; and with the exception of a weather related outage in 2009, there have been no reliability issues since 2005. No work is required at this time.
BUC-02	Reliability problems in 2008 were due to three insulator failures in 2008. Insulators were replaced in 2009. No work is required at this time.
SCT-02	Reliability problems in 2008 were due to a storm in March. No work is required at this time.
CHA-02	Reliability statistics were driven by a single event, a broken insulator in June 2009. No work is required at this time.
CHA-03	Reliability problems were due to a single event caused by broken conductor in 2006. No work is required at this time.
COL-02	Reliability statistics were driven by a single sleet related event in May 2006. No work is required at this time.
DLK-03	Reliability statistics were driven by a single event, broken conductor in November 2009. No work is required at this time.
GDL-01	Reliability statistics were driven by a single lightning related event in May 2005. No work is required at this time.
GFS-02	Reliability statistics were driven by a single tree related event in October 2009. No work is required at this time.
GLV-01	Reliability statistics were driven by two events in 2007. One involved a broken pole and the other, a broken conductor. No work is required at this time.

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
HOL-01	Reliability problems were due to a single event, a broken cutout in January 2007. No work is required at this time.
HWD-04	Reliability statistics were driven by a single weather related event in December 2007. No work is required at this time.
HWD-08	Reliability on HWD-08 has dramatically improved since 2007 principally due to work done under the Rebuild Distribution Line program. No work is required at this time.
MKS-01	Reliability statistics were driven by a single event, a broken cutout in March 2008. No work is required at this time.
RRD-09	Reliability problems were due to a single event, broken conductor in 2008. No work is required at this time.
GIL-01	Reliability statistics were driven by a single sleet related event in March 2009. No work is required at this time.
SCT-01	Reliability problems were due to two tree related events, one in 2008 and the other in 2009. No work is required at this time.
SLA-13	Reliability problems were due to two sleet related events, one in 2005 and the other in 2006. No work is required at this time.
VIR-02	Reliability problems were due to two conductor related events in 2008. No work is required at this time.

Distribution Reliability Initiative
June 2009

Distribution Reliability Initiative

June 2009

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1.0 Distribution Reliability Initiative

The Distribution Reliability Initiative is a capital project that focuses on the reconstruction of the worst performing distribution feeders. Customers on these feeders experience more frequent and longer duration outages than the majority of customers.

Newfoundland Power manages system reliability through capital investment, maintenance practices and operational deployment. On an ongoing basis Newfoundland Power examines its actual distribution reliability performance to assess where targeted capital investment is warranted to improve service reliability. Through this process the Company identifies the worst performing feeders in the power system based upon reliability measures. Engineering assessments are completed for each of the worst performing feeders and, where appropriate, the Company makes capital investment to improve the reliability of these feeders.

Appendix A contains the five-year average distribution reliability data of the 15 worst performing feeders based on data for 2004 - 2008.

Appendix B contains a summary of the assessment carried out on each of the feeders listed in Appendix A.

2.0 Distribution Reliability Initiative Projects: 2008

In 2008, the Company completed Distribution Reliability Initiative projects on sections of BOT-01 and GLV-02 feeders. Table 1 shows the cost of the work completed in 2008.

Table 1

Distribution Reliability Initiative
2008
($000s)

Feeder	**2008**
BOT–01	630
GLV–02	781
Total	**$1,411**

3.0 Distribution Reliability Initiative Projects: 2009

In 2009, the Company will continue the Distribution Reliability Initiative. The 2009 Capital Budget Application proposed work on the GLV-02 and LEW-02 feeders. The work is a continuation of projects initially proposed in the 2006 Capital Budget Application and detailed in *4.2.2 Lewisporte-02 Feeder Study* and *2.1.3 Glovertown-02 Feeders Study* filed with that application. Work was also proposed for the NWB-02 feeder. A detailed analysis was provided in 4*.2.1 Northwest Brook NWB-02 Feeder Study* filed with the 2009 Capital Budget Application. The budgeted expenditure in 2009 is detailed in Table 2.

Table 2

Distribution Reliability Initiative
2009
($000s)

Feeder	**2009**
LEW-02	313
GLV–02	457
NWB–02	496
Total	**1,266**

The 2009 Budget was prepared in early 2008. The five year reliability data available at the time covered the period from 2003 to 2007.

A revised analysis for each of the proposed 2009 projects has been completed to include 2008 data. The analysis is detailed in Tables 3, 4 and 5.

<u>LEW-02</u>

The LEW-02 project was intended to have been a two year project commencing in 2006. Upgrades started in 2006 where a substantial amount of the work was completed. Work was postponed in 2007 to accommodate the rebuild required at the Rattling Brook Hydro Plant. Work was again postponed in 2008 due to improving overall reliability statistics on the feeder and to accommodate priority work on the BOT-01 and GLV-02 feeders. Reliability has improved substantially since 2005. There have been no feeder level outages in the past 3 years. Reliability data for the most recent five year period 2004 – 2008 is shown in Table 3.

Table 3

LEW-02 – Reliability Analysis

	2004	**2005**	**2006**	**2007**	**2008**
SAIDI	12.54	19.68	0.73	1.04	3.54
SAIFI	7.55	4.36	1.02	0.41	1.22

In 2008 SAIDI did increase slightly however the increase was due to a single insulator failure caused by a lightning strike. Excluding this event the 2008 SAIDI was 1.23.

Based on the latest reliability data no further work on LEW-02 under the Distribution Reliability Initiative is required at this time.

GLV-02

The GLV-02 project was intended to be a 3 year project commencing in 2006. Upgrades started in 2006. Work was postponed in 2007 to accommodate the rebuild required at the Rattling Brook Hydro Plant and resumed in 2008. 2008 reliability shows a substantial improvement.

Table 4

GLV-02 – Reliability Analysis

	2004	**2005**	**2006**	**2007**	**2008**
SAIDI	5.87	8.46	10.44	8.77	3.22
SAIFI	4.24	3.88	3.55	3.56	3.18

While both SAIDI and SAIFI were above the company average, the larger 2008 outages were due to damages by an outside party and an unbalance during switching. Excluding these events which were not due to the age or condition of the feeder, SAIDI and SAIFI for 2008 on GLV-02 were 1.59 and 1.15 respectively.

Based on the latest reliability data no further work on GLV-02 under the distribution Reliability Initiative is required at this time.

NWB-02

The NWB-02 project is expected to be completed over 3 years commencing in 2009. The 2008 reliability numbers show continued poor overall reliability on the feeder.

Table 5

NWB-02 – Reliability Analysis

	2004	**2005**	**2006**	**2007**	**2008**
SAIDI	12.17	4.60	8.98	4.82	9.51
SAIFI	4.85	2.63	5.33	1.25	3.10

Work will proceed on this feeder as planned.

The work proposed for the LEW-02 and GLV-02 feeders under the Distribution Reliability Initiative for 2009 is cancelled. Work proposed for NWB-02 will continue as planned. A revised expenditure estimate is detailed in Table 6.

Table 6

Distribution Reliability Initiative
2009 (Revised)
($000s)

Feeder	**2009**
LEW-02	0
GLV–02	0
NWB–02	541
Total	**541**

4.0 Distribution Reliability Initiative Projects: 2010

The 2010 Capital Budget Application includes the continuation of the proposed work on NWB-02 as described in Section 3.0 of this study.

The examination of the worst performing feeders as listed in Appendix A and B has determined that other than the proposed work on NWB-02, no work is required on other feeders under the Distribution Reliability Initiative at this time.

Table 7 shows the proposed capital expenditures for the Distribution Reliability Initiative for 2010.

Table 7

Distribution Reliability Initiative
2010
($000s)

Feeder	**2010**
NWB–02	447

Appendix A

Distribution Reliability Data

Unscheduled Distribution Related Outages Five-Year Average 2004-2008 Sorted By Customer Minutes of Interruption				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
LEW-02	4,051	626,948	2.91	7.51
BOT-01	4,906	620,881	3.01	6.34
GLV-02	4,699	563,465	3.68	7.35
NWB-02	3,574	500,623	3.43	8.02
HOL-01	2,991	438,427	1.50	3.66
DUN-01	3,323	414,391	3.52	7.32
DOY-01	4,119	401,180	2.62	4.25
GFS-06	2,453	374,083	1.46	3.71
KEL-01	2,772	361,704	1.54	3.34
MIL-02	3,696	358,874	2.69	4.35
BCV-02	3,233	349,994	2.12	3.83
HWD-07	6,068	341,262	2.26	2.11
ROB-01	2,313	315,399	2.12	4.83
CAB-01	3,985	309.023	3.34	4.32
CHA-01	6,042	305,422	2.81	2.36
Company Average	**956**	**84,530**	**1.25**	**1.74**

Unscheduled Distribution Related Outages Five-Year Average 2004-2008 Sorted By Distribution SAIFI				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
GLV-02	4,699	563,465	3.68	7.35
NWB-02	3,574	500,623	3.43	8.02
GBS-02	1,538	113,420	3.41	4.19
CAB-01	3,985	309.023	3.34	4.32
BOT-01	4,906	620,881	3.01	6.34
LEW-02	4,051	626,948	2.91	7.51
GRH-02	2,267	195,926	2.87	4.13
CHA-01	6,042	305,422	2.81	2.36
MIL-02	3,696	358,874	2.69	4.35
DOY-01	4,119	401,180	2.62	4.25
FER-01	1,644	69,481	2.61	1.84
MMT-01	1,187	69,999	2.58	2.54
ROB-02	498	44,416	2.48	3.68
WES-01	958	52,884	2.47	2.27
Company Average	**956**	**84,530**	**1.25**	**1.74**

Unscheduled Distribution Related Outages Five-Year Average 2004-2008 Sorted By Distribution SAIDI				
Feeder	**Annual Customer Interruptions**	**Annual Customer Minutes of Interruption**	**Annual Distribution SAIFI**	**Annual Distribution SAIDI**
GPD-01	277	130,642	1.17	9.23
NWB-02	3,574	500,623	3.43	8.02
LEW-02	4,051	626,948	2.91	7.51
GLV-02	4,699	563,465	3.68	7.35
DUN-01	3,323	414,391	3.52	7.32
BOT-01	4,906	620,881	3.01	6.34
ROB-01	2,313	315,399	2.12	4.83
PJN-01	186	38,603	1.34	4.63
BUC-02	295	43,048	1.88	4.57
MIL-02	3,696	358,874	2.69	4.35
CAB-01	3,985	309.023	3.34	4.32
SCT-02	420	62,504	1.72	4.27
DOY-01	4,119	401,180	2.62	4.25
HOL-02	881	121,145	1.84	4.22
GBS-02	1,538	113,420	3.41	4.19
Company Average	**956**	**84,530**	**1.25**	**1.74**

Appendix B

Worst Performing Feeders
Summary of Data Analysis

Worst Performing Feeders Summary of Data Analysis	
Feeder	**Comments**
GPD-01	Reliability statistics were poor in 2003 & 2004. Work was carried out under the Rebuild Distribution Lines program in 2005 and there have been no reliability issues since that time. No work is required at this time.
GLV-02	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. No further work is required at this time.
LEW-02	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. No further work is required at this time.
DUN-01	Reliability statistics were poor in both 2006 and 2007 however the statistics were driven by a sleet storm in 2006 and a broken recloser bushing in 2007 and a broken pole in 2008. No work is required at this time.
ROB-01	The ROB-01 feeder has displayed consistently poor reliability from 2004 – 2006 however the issues have been primarily related to trees and lightning. Trees have been cut under the vegetation management program and lightning arrestors have been installed on distribution equipment. Reliability improved in 2008. No work is required at this time.
BOT-01	A substantial amount of work was completed on this feeder since 2006. Reliability has improved considerably. No further work is required at this time.
NWB-02	The NWB-02 feeder has displayed consistently poor reliability over the past five years. The issues experienced have been due to a variety of issues related to the age and condition of the line. This feeder should be scheduled for work under the Distribution Reliability Initiative.
WES-01	Reliability statistics were poor in 2007. Work was carried out under the Rebuild Distribution Lines program in 2008 and there have been no reliability issues since that time. No work is required at this time.

BCV-02	Problems in 2003, 2004 & 2005. This feeder was rebuilt under the Distribution Reliability Initiative in 2006. There have been no reliability issues since 2006. No work is required at this time.
HOL-02	Poor overall reliability is due to a storm in March 2008. No work is required at this time.
FER-01	Reliability statistics were poor in 2005. Work was carried out under the Rebuild Distribution Lines program in 2005 and there have been no reliability issues since 2005. No work is required at this time.
GBS-02	Reliability statistics were poor in 2004. Work was carried out under the Rebuild Distribution Lines program in 2004 and there have been no reliability issues since 2005. No work is required at this time.
CAB-01	Reliability statistics were poor in 2004. Work was carried out under the Rebuild Distribution Lines program in 2005 and there have been no reliability issues since 2005. Poor statistics in 2008 were due to a broken cutout and a broken insulator. No work is required at this time.
DOY-01	Overall reliability statistics on this feeder have been good. The poor average statistics are driven by a single weather related issue in 2006. No work is required at this time.
GFS-06	Reliability statistics were poor in 2005. Work was carried out under the Rebuild Distribution Lines program in 2006 and there have been no reliability issues since 2006. No work is required at this time.
MIL-02	The MIL-02 feeder has displayed consistently poor reliability from 2002 to 2006. Significant work was carried out under the Rebuild Distribution Lines program in 2006 and there were no reliability issues in 2007 or 2008. No work is required at this time.
CHA-01	Reliability statistics were poor in 2004 & 2005. Work was carried out under the Rebuild Distribution Lines program in 2005 and there have been no reliability issues since 2005. No work is required at this time.
KEL-01	Reliability statistics were poor in 2006. Work was carried out under the Rebuild Distribution Lines program in 2006 and there have been no reliability issues since then. No work is required at this time.
HWD-07	HWD-07 overall reliability statistics are good but due to the large number of customer on the feeder ranks high on the list sorted by customer minutes. No reliability work is required at this time.

GRH-02	Reliability statistics were poor in 2004 & 2005. Work was carried out under the Rebuild Distribution Lines program in 2005 and there have been no reliability issues since 2005. No work is required at this time.
MMT-01	Reliability statistics were poor in 2006. Work was carried out under the Rebuild Distribution Lines program in 2006 and there have been no reliability issues since then. No work is required at this time.
ROB-02	Reliability statistics were poor in 2004. Work was carried out under the Rebuild Distribution Lines program in 2005 and there have been no reliability issues since then. No work is required at this time.
BUC-02	Reliability problems in 2008 were due to three insulator failures in 2008. No work is required at this time but the feeder will be inspected in 2009.
PJN-01	Reliability statistics were poor in 2005 & 2006. Work was carried out under the Rebuild Distribution Lines program in 2007 and there have been no reliability issues since then. No work is required at this time.
SCT-02	Reliability problems in 2008 were due to a storm in March. No work is required at this time.