IN THE MATTER OF the *Electrical Power Control Act,* RSNL 1994, Chapter E-5.1 (the EPCA) and the *Public Utilities Act*, RSNL 1990, Chapter P-47 (the Act), and regulations thereunder;

AND IN THE MATTER OF an Application by Newfoundland and Labrador Hydro pursuant to Subsection 41(3) of the *Act*, for the approval of the replacement of insulators on Transmission Lines TL-201 and TL-203.

TO: The Board of Commissioners of Public Utilities (the Board)

THE APPLICATION OF NEWFOUNDLAND AND LABRADOR HYDRO (Hydro) STATES THAT:

1. Hydro is a corporation continued and existing under the Hydro Corporation Act, 2007, is a public utility within the meaning of the Act and is subject to the provisions of the Electrical Power Control Act, 1994.

2. Transmission lines TL-201 and TL-203 are 230 kV transmission lines located on the Avalon Peninsula and are part of the Island Interconnected System. TL-201 is approximately 81 kilometres and runs from the Western Avalon Terminal Station to the Hardwoods Terminal Station. TL-203 is approximately 45 kilometres in length and runs from the Sunnyside Terminal Station to the Western Avalon Terminal Station. Both TL-201 and 203 are used to supply power to major load

centres on the Avalon Peninsula. These transmission lines are critical to providing dependable service to portions of the Avalon Peninsula.

3. Since January 12, 2014, numerous insulator pin failures occurred on both transmission lines TL-201 and TL-203. A complete insulator inspection determined that TL-201 had significant corrosion on the insulator pins along the entire line and that TL-203 had isolated sections with significant corrosion.

4. Hydro is recommending that all of the insulators on TL-201 be replaced and that 30 insulators on TL-203 be replaced as this is the least cost option over the long term. Details regarding Hydro's proposal to replace the insulators are contained in the attached project proposal document.

5. The completion of the insulator replacement on transmission lines TL-201 and TL-203 is required to ensure that Hydro can continue to provide safe, reliable and adequate service to the Avalon Peninsula.

6. The estimated cost of this project is $3,632,200.

7. The Applicant submits that the proposed capital works and expenditures are necessary to ensure that these transmission lines can continue to provide service which is safe and adequate and just and reasonable as required by Section 37 of the *Act*.

8. Therefore, Hydro makes Application that the Board make an Order approving, pursuant to Subsection 41(3) of the *Act*, the capital expenditure of $3,632,200 for the replacement of the insulators on transmission lines TL-201 and TL-203 as set out in this Application and in the attached project description and justification document.

DATED at St. John's, in the Province of Newfoundland and Labrador, this 19th day of June, 2014.

Tracey L. Pennell
Counsel for the Applicant
Newfoundland and Labrador Hydro
500 Columbus Drive P.O. Box 12400
St. John's, Newfoundland and Labrador
A1B 4K7
Telephone: (709) 778-6671
Facsimile: (709) 737-1782

IN THE MATTER OF the *Electrical Power Control Act,* RSNL 1994, Chapter E-5.1 (the EPCA) and the *Public Utilities Act*, RSNL 1990, Chapter P-47 (the Act), and regulations thereunder;

AND IN THE MATTER OF an Application by Newfoundland and Labrador Hydro pursuant to Subsection 41(3) of the *Act*, for the approval of the replacement of insulators on Transmission Lines TL-201 and TL-203.

AFFIDAVIT

I, Robert J. Henderson, Professional Engineer, of St. John's in the Province of Newfoundland and Labrador, make oath and say as follows:

1. I am Vice-President of Newfoundland and Labrador Hydro, the Applicant named in the attached Application.

2. I have read and understand the foregoing Application.

3. I have personal knowledge of the facts contained therein, except where otherwise indicated, and they are true to the best of my knowledge, information and belief.

SWORN at St. John's in the Province of Newfoundland and Labrador this 19th day of June 2014, before me:)

Barrister – Newfoundland and Labrador

Robert J. Henderson

A REPORT TO
THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

	Electrical
	Mechanical
	Civil
	Protection & Control
	Transmission & Distribution
	Telecontrol
	System Planning

Insulator Replacement
TL-201 and TL-203

Newfoundland and Labrador Hydro

June 2014

newfoundland labrador hydro
a nalcor energy company

SUMMARY

During the 2014 winter season numerous insulator pin failures occurred on both transmission lines TL-201 and TL-203. As a result of the insulator failures, a complete insulator inspection was completed on both lines between January 20 and April 3, 2014. Although the lines are inspected regularly, the previous inspection method did not detect the corrosion issue that is resulting in the insulator failure. The inspection technique was modified prior to the January inspection to incorporate the use of high resolution cameras for improved analysis.

The new inspection determined that many of the insulator pins are significantly corroded and require replacement. Given the widespread extent of the corrosion found on TL-201 and the recent frequency of failures, it is recommended that all the insulators be replaced. On TL-203 the corrosion appears to be confined to a specific area and it is recommended that the insulators on 30 identified structures be replaced immediately.

It is recognized that TL-203 will experience additional corrosion of the insulator pins over time. Therefore, a planned capital budget submission will be submitted as part of Hydro's 2015 capital plan to replace the remainder of the insulators in the 2015 Capital Budget Application.

TABLE OF CONTENTS

1 INTRODUCTION

Transmission line TL-201 and Transmission line TL-203 are 230 kV lines located on the Avalon Peninsula of Newfoundland and Labrador Hydro's Island Interconnected System. Both TL-201 and TL-203 cross a section of the Avalon characterized by a maritime regional climate and are frequently affected by the low pressure systems that cross North America, as well as the maritime systems passing along the eastern seaboard. Many sections of the lines are subject to high winds and icing from this frequent low pressure.

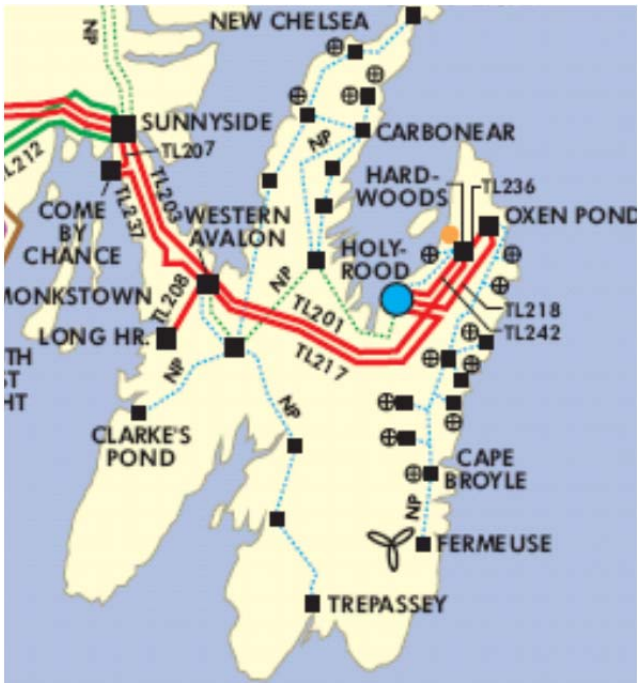

Figure 1: Route Photo of TL-201 & TL-203

TL-201 was commissioned in 1966 and consists of 2-pole tangent structures (H-Frame knee-braced and cross-braced) with 3-pole dead end and angle structures. It runs from the Western Avalon Terminal Station to the Hardwoods Terminal Station, a distance of approximately 81 km. The conductor is primarily a 636 Kcmil ACSR 26/7 with a rated strength of 25,000 lb.

TL-203 was commissioned in 1965 and consists of 2-pole tangent structures with 3-pole dead end and angle structures. It runs from the Sunnyside Terminal Station to the Western Avalon Terminal Station, a distance of approximately 45 km. The main conductor is a special aluminum alloy 562.5 Kcmil AACSR 30/19 with a rated strength of 53,000 lb. Another smaller section of line contains a 636 Kcmil ACSR 26/7 conductor with a rated strength of 25,000 lb.

Although inspections have been performed over the years for both lines, they did not detect that the insulators have corroded past their threshold for safe reliable use, specifically the originally installed glass Pilkington insulators. This defect became evident when the frequency of insulator pin failures increased for both lines during the winter of 2014. This prompted a change to the inspection technique to include the use of high resolution cameras to better detect the corrosion issue. Using this inspection technique, it was determined that TL-201 had significant corrosion on the insulator pins along the entire length of line while the inspection of TL-203 found isolated sections with significant corrosion and others showing the onset of corrosion.

Through the findings of the inspections it is recommended that TL-201 undergo a complete insulator replacement and TL-203 undergo insulator replacement on selectively identified structures.

There is no relevant data or issue for the following items in this report:

- Legislative or Regulatory Requirements;
- Environmental Performance;
- Forecast Customer Growth;
- Energy Efficiency Benefits;
- Economic Analysis;
- Development of Alternatives; and
- Evaluation of Alternatives.

2 PROJECT DESCRIPTION

A concern with the Pilkington insulators became first evident in August 27, 2009 on TL-203. An insulator pin failure occurred on the center phase of Structure 167 causing an insulator string separation. Inspections were carried out in the general area and no other corrosion issues were identified so it was considered to be an isolated event.

Throughout the 2013-2014 winter season, high winds and adverse weather conditions were experienced on many transmission lines in Hydro's system. These weather conditions resulted in insulator pin failures on both TL-201 and TL-203. The first failure of the winter season occurred on Structure 163 (TL-203) on January 12, 2014. See Figure 2 below.

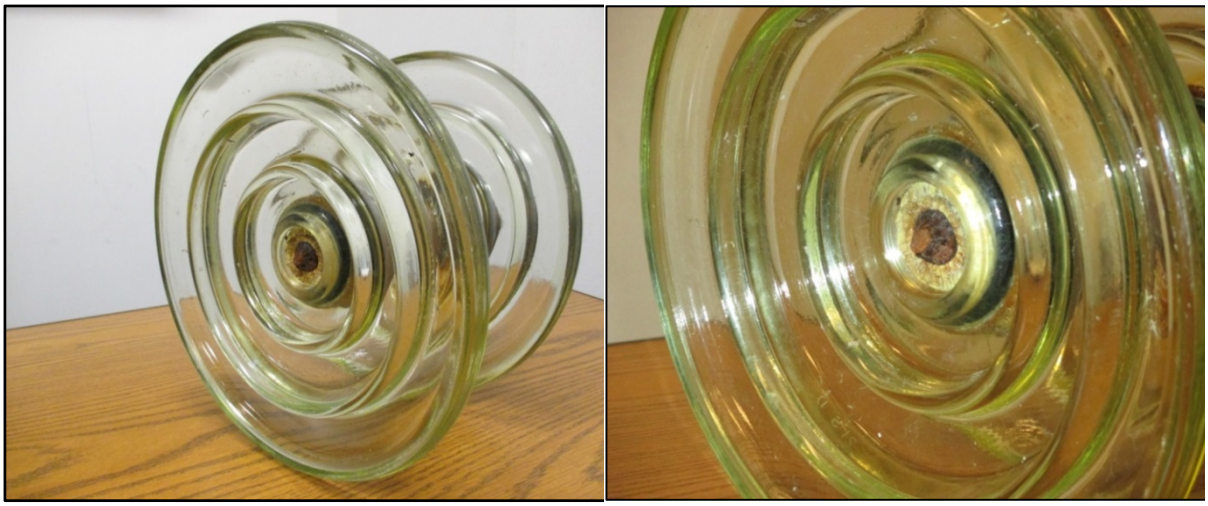

Figure 2: TL-203 – Structure 163 Pilkington Insulator Pin Corrosion

Inspection of both lines began immediately after this failure and continued until April 3, 2014. Since the first reported incident in 2009, TL-201 and TL-203 have experienced four separate line trips due to Pilkington insulator pin failures. These all occurred during this past winter season. See Section 3.2 for complete details regarding these failures.

Through the inspection of TL-201, a total of 153 structures were identified with corrosion

issues, while 30 structures were identified on TL-203.

Given the widespread extent of the corrosion and frequency of previous failures on TL-201, it is recommended that all insulators on this line be replaced. It is also recommended that TL-203 undergo insulator replacement on the identified structures. This will reduce the probability and risk of future failures and the associated safety concerns. Transmission line outages will be required; therefore any proposed work will have to consider this restriction.

The project scope of work is as follows:

- Replace all insulators on TL-201 structures; and
- Replace identified corroded insulators on TL-203 structures.

All work will be carried out through coordinated transmission line outages.

3 JUSTIFICATION

Through the inspections of TL-201 and TL-203, many of the insulator pins were determined to have significant corrosion. An insulator replacement is justified, based on the requirement to replace failing or deteriorated infrastructure in order for Hydro to provide safe, least-cost, reliable electrical service.

The reduced integrity of the insulators negatively affects the reliability of the line and the system as a whole, and could result in increased failure costs. Insulator string separation can also create safety issues and hazards for Hydro personnel and for the general public.

3.1 Existing System

TL-201, constructed in 1966, has a total of 362 H-frame wooden structures. Table 1 below provides a summary of the structure types on TL-201.

Table 1: TL-201 Structure Type Summary

Structure Type	Quantity	Percent Total
A	294	81.2%
GA	12	3.3%
B	4	1.1%
C	9	2.5%
D	17	4.7%
GD	3	0.8%
DD	1	0.3%
E	4	1.1%
F	17	4.7%
GG	1	0.3%

TL-201 was originally designed for a “Normal Loading Zone” (See Table 2 for basic design load conditions). To date, this line has experienced two major failures due to heavy icing in 1984 and 1995. In 1988, the line was upgraded at selected locations (Hawke Hill and Brigus Junction) to withstand increased ice loading (3.00 inches of radial glaze ice) by adding more

"in span" structures and reconductoring with a 795 Kcmil 26/7 ACSR conductor. After the 1994 failure, the line was further upgraded near Western Avalon Terminal Station by installing 1192 Kcmil ACSR 54/19 conductor with a rated strength of 42,000 lb. A summary of major work and upgrades on TL-201 can be found in Table 3.

Table 2: TL-201 and TL-203 Basic Design Wind and Ice Loads

Load Zone	Radial Ice		Gust Wind Speed		Temp		Max Cond.
	inch	mm	mph	(km/hr)	0°F	(-°C)	Tension %
Normal Zone	1.0	25.0	0.0	0.0	0.0	-18.0	70.0
	0.5	13.0	73.0	117.0	0.0	-18.0	50.0
	0.0	0.0	110.0	176.0	0.0	-18.0	50.0
Ice Zone	1.5	38.0	0.0	0.0	0.0	-18.0	70.0
	1.0	25.0	73.0	117.0	0.0	-18.0	50.0
	0.0	0.0	110.0	176.0	0.0	-18.0	50.0

Table 3: Major Work and Upgrades TL-201

Year	Major Work/Upgrade	Comments
1984	**Repaired 38 structures,five conductor miles**	**29 day duration of repairs**
1988	**Upgraded section (Hawke Hill and Brigus Junction)**	**Added "in span" structures and re-conductored with a 795 Kcmil 26/7 ACSR conductor**
1994	**Repaired eight structures, six conductor miles**	**14 day duration**
1995	**Upgrade section near Western Avalon Station**	**Re-conductored with 1192 Kcmil ACSR 54/19**

TL-203, constructed in 1965, has a total of 185 H-frame wooden structures. Table 4 below gives a summary of the structure types on TL-203.

Table 4: TL-203 Structure Type Summary

Structure Type	Quantity	Percent Total
A	45	24.3%
GA	4	2.16%
B	1	0.54%
D	2	1.08%
GD	2	1.08%
F	5	2.70%
GG	1	0.54%
HA	83	44.86%
HAX	1	0.54%
HD	34	18.38%
HE	2	1.08%
HF	2	1.08%
HHD	3	1.62%

TL-203 was originally designed for two loading zones: "Ice Zone" and "Normal Zone" (refer to Table 2). In the Ice Zone section, the conductor is aluminum alloy 562.5 Kcmil AACSR 30/19 while in the Normal Zone section, the conductor is a 636 Kcmil ACSR 26/7. It was also recognized that a 17 mile area immediately southeast of Sunnyside was noted for severe ice storms. Therefore, a 2 inch (50 mm) radial ice and a 73 mph (117 km/hr) gust design ratings were used in this section. To date, this line has experienced only one major failure due to heavy icing, occurring in 1970. A summary of the major work and upgrades to TL-203 can be found in Table 5 below.

Table 5: Major Work and Upgrades TL-203

Year	Major Work/Upgrade	Comments
1970	Repaired 28 structures, eight conductor miles	50 day duration of repairs

3.2 Operating Experience

TL-201 and TL-203 are two of the oldest transmission lines in Hydro's system. They are critical lines, supplying electrical service to the most densely populated areas of the province. Significant portions of the lines traverse very rough terrain which is subject to high

winds and icing conditions.

The frequency of recent insulator failures makes the reliability of the line of concern and additional failures are likely. Insulator replacement on both lines is necessary to ensure the reliability of the system.

3.2.1 Reliability Performance

The following section will outline in detail the recent outages to TL-201 and TL-203 resulting from insulator pin failures.

3.2.1.1 Outage Statistics

TL-203 first experienced line separation in August 2009 and also experienced a failure on January 12, 2014. Three separate line failures have been experienced on TL-201 since January 15, 2014. The outage statistics below provide the details surrounding the outages due to insulator pin failures for both transmission lines. An outage to either line is of particular concern from a reliability standpoint as it results in the unavailability of one of the two parallel 230 kV transmission paths supplying the major load centers on the Avalon. This leads to the potential requirement for customer curtailment to prevent an overload on the remaining in-service line. A significant and widespread customer outage can also result if the remaining line trips unexpectedly.

Table 6: 2014 TL-201 and TL-203 Outage Details Resulting From Insulator Failure

Date	Transmission Line	Time	Failure	Structure No.	Phase
8/27/2009	203	22:25	Insulator Pin	147	Center
1/12/2014	203	12:43	Insulator Pin	163	Left
1/15/2014	201	09:09	Insulator Pin	157	Left and Center
3/27/2014	201	02:16	Insulator Pin	267	Center
4/9/2014	201	04:11	Insulator Pin	321	Center

3.2.2 Legislative or Regulatory Requirements

Legislative or regulatory requirements are not applicable for this project.

3.2.3 Safety Performance

Even though precautionary measures, like the Wood Pole Line Management Program (WPLM), were taken to determine structural and mechanical failures before they occur, the extent of the corrosion to the insulators on TL-201 and TL-203 was not identified through the visual WPLM inspection method.

There are numerous issues associated with inadequate structural strength of insulator pins. The reduced integrity of the insulators affects the reliability of the line and the system as a whole and creates safety issues and hazards for Hydro personnel and for the general public. These lines are currently experiencing a high probability of failure and therefore expedited insulator replacement is necessary.

3.2.4 Environmental Performance

Environmental performance is not applicable for this project.

3.2.5 Industry Experience

Industry Experience is not applicable for this project.

3.2.6 Vendor Recommendations

After the extent of corrosion on the insulator pins was confirmed, Kinectrics was contacted to perform mechanical tensile tests on thirty-two (32) insulator strings and to make subsequent recommendations. The testing is currently ongoing and a report will be provided from Kinectrics by the second quarter of 2014. The following will be provided:

1. Photographs of each insulator to show the extent and prevalence of the pin corrosion.

2. Results of the mechanical tensile tests to failure on all 32 of the units.

3. Records of the failing load and the failure mode with sample photos.

4. A comparison of the results with the guidance given in the CIGRE report; *Guide for the Assessment of Old Cap & Pin and Long-Rod Transmission Line Insulators Made of Porcelain or Glass: What to Check and When to Replace*, prepared by C. de Tourreil (FR), B. Staub (CH) and V. Sklenicka (CZ).

Although the analysis is not complete at this time, Kinectrics has advised, through preliminary discussion, that their recommendation is to change out the insulators as soon as possible or Hydro can expect an increase in line failures. Therefore, an expedited insulator replacement is necessary.

3.2.7 Maintenance History

In accordance with the WPLM program, both TL-201 and TL-203 have been inspected. Under the regular inspection method the extent of corroded insulators on the lines was not identified. Most recent WPLM inspections for TL-201 started in June 2013. Structures 10-170 were completed within the calendar year. The remainder of inspections for the line (Structures 1-9 and 171-362) will be completed during the summer of 2014. Inspection of TL-203 under WPLM commenced in June 2011 and the entire line was inspected by the end of 2012.

As previously indicated, the inspection technique has been modified to include high resolution cameras specifically focused towards detecting corroded insulator pins. The images taken allow for much better analysis versus visual inspection alone. This technique was used immediately after the failures on TL-201 and TL-203 to inspect the insulators on both lines. (See Section 3.3)

The five-year maintenance history for TL-201 is shown in Table 7. Although work is not complete, the estimated maintenance cost is also included to the end of 2014.

Table 7: TL-201 Five-Year Maintenance Costs History

Year	Preventive Maintenance ($000)	Corrective Maintenance ($000)	Total Maintenance ($000)
2014	80.9	406.5	487.4
2013	100.9	30.3	131.2
2012	-	-	-
2011	-	1.5	1.5
2010	-	16.9	16.9

The five-year maintenance history for TL-203 is shown in Table 8. Although work is not complete, the estimated maintenance cost is also included for the end of 2014.

Table 8: TL-203 Five-Year Maintenance Costs History

Year	Preventive Maintenance ($000)	Corrective Maintenance ($000)	Total Maintenance ($000)
2014	-	746.4	746.4
2013	-	15.5	15.5
2012	195.3	142.7	338.0
2011	118.8	2.2	121.0
2010	-	2.8	2.8

3.2.8 Anticipated Useful Life

With no treatment or refurbishment, the typical life-span of a wood pole structure and its hardware is approximately 40 years. Through proper inspection, maintenance and refurbishment, the life of a transmission structure can be extended to over 50 years.

3.3 Insulator Inspection Results

Through the inspection of TL-201 using high resolution cameras, one or more phases on 153

structures were identified as having significant insulator corrosion issues. The inspection of TL-203 identified 30 structures with significantly corroded insulator pins. Detailed inspection results for both lines can be found in Appendix A.

3.4 Forecast Customer Growth

Customer load growth does not affect this project.

3.5 Development of Alternatives

No other viable alternatives are available.

3.5.1 Energy Efficiency Benefits

There are no energy efficiency benefits that can be attributed to this project.

3.5.2 Economic Analysis

An economic analysis was not performed for this project.

4 CONCLUSION

During the 2014 winter season numerous insulator pin failures occurred on both transmission lines TL-201 and TL-203. As a result of these insulator failures, a complete insulator inspection was completed on both lines between January 20 and April 3, 2014. The inspections determined that many of the insulator pins are significantly corroded and require replacement. In order to ensure the continued safe and reliable operation of the power system, the following are the recommendations contained in this project proposal:

1. **Corrosive Pilkington Insulator Replacement**

   Given the widespread extent of the corrosion and the recent failures, it is recommended that all insulators on TL-201 be replaced and that TL-203 undergo insulator replacement on selectively identified structures. This will reduce the risk of future failures and the associated safety and reliability concerns.

2. **Capital Submission for 2015**

   The remaining TL-203 insulators still have potential of detrimental corrosion in the near future. A project to replace the remaining insulators on TL-203 will be included in the 2015 Capital Budget Application.

4.1 Budget Estimate

The budget estimate for this project is shown in Table 9.

Table 9: Project Budget Estimate

Project Cost:*($ x1,000)*	**2014**	**2015**	**Beyond**	**Total**
Material Supply	920.1	0.0	0.0	920.1
Labour	218.1	0.0	0.0	218.1
Consultant	0.0	0.0	0.0	0.0
Contract Work	1,684.2	0.0	0.0	1,684.2
Other Direct Costs	180.0	0.0	0.0	180.0
Interest and Escalation	29.3	0.0	0.0	29.3
Contingency	600.5	0.0	0.0	600.5
TOTAL	**3,632.2**	**0.0**	**0.0**	**3,632.2**

4.2 Project Schedule

The anticipated project schedule is shown in Table 10. The entire project is scheduled to be completed within the calendar year. In general, the engineering and material procurement will take place from May to August with the construction scheduled from September to November.

Table 10: Project Schedule

Activity		**Start Date**	**End Date**
Planning	Engineering Design and Planning	May 2014	Aug. 2014
Procurement	Procurement of Insulators and Hardware	May 1st , 2014	Aug. 31st, 2014
Construction	Insulator Replacement	Sept. 1st, 2014	Nov. 30st, 2014
Closeout	Project Closeout	Dec. 1st, 2014	Dec. 31st, 2014

APPENDIX A

Detailed Insulator Inspection Results

TL 201 Detailed Inspection Results

Str. Number	Type	Pole Height	Phases with Significant Corrosive Insulator Pins
10	A	70	C-Phase, R-Phase
12	A	60	L-Phase, R-Phase
16	A	75	L-Phase, R-Phase
17	A	70	C-Phase
22	A	60	C-Phase
23	A	60	C-Phase
24	A	65	R-Phase
25	A	70	C-Phase, R-Phase
27	A	75	L-Phase, C-Phase
28	A	75	C-Phase, R-Phase
29	A	70	C-Phase
30	A	60	C-Phase, R-Phase
33	A	65	C-Phase
34	A	65	C-Phase
35	A	75	L-Phase
51	AG	70	L-Phase, C-Phase, R-Phase
54	AG	65	L-Phase, C-Phase, R-Phase
55	AG	65	C-Phase, R-Phase
56	AG	65	L-Phase, C-Phase, R-Phase
65	A	60	L-Phase
71	A	50	L-Phase
72	A	55	C-Phase
73	A	60	L-Phase, C-Phase
74	A	50	R-Phase
75	A	50	C-Phase
76	A	50	R-Phase
77	A	75	C-Phase, R-Phase
78	A	65	R-Phase
79	A	50	L-Phase
81	A	60	L-Phase, C-Phase,R-Phase
83	A	60	C-Phase, R-Phase
85	A	65	L-Phase
86	A	65	L-Phase, R-Phase
87	A	55	C-Phase, R-Phase
88	A	60	L-Phase, C-Phase, R-Phase
91	A	50	C-Phase
93	A	60	L-Phase

95	A	55	L-Phase
96	A	60	L-Phase, C-Phase, R-Phase
97	A	65	C-Phase
98	E	70	L-Phase, C-Phase, R-Phase
99	E	70	R-Phase
100	A	55	L-Phase, C-Phase
102	A	60	R-Phase
103	A	55	L-Phase, C-Phase
104	A	50	L-Phase, C-Phase, R-Phase
107	A	50	L-Phase, C-Phase, R-Phase
108	A	50	L-Phase, C-Phase, R-Phase
109	A	65	L-Phase
110	A	75	C-Phase, R-Phase
111	A	75	L-Phase
112	A	55	R-Phase
113	A	55	C-Phase, R-Phase
141	A	65	C-Phase
158	A	60	L-Phase
160	A	55	L-Phase, C-Phase, R-Phase
161	A	60	L-Phase, R-Phase
163	A	70	L-Phase, R-Phase
164	A	70	L-Phase, C-Phase, R-Phase
165	A	70	L-Phase, R-Phase
167	A	65	L-Phase, C-Phase, R-Phase
168	A	65	L-Phase
170	A	50	L-Phase
171	A	55	L-Phase, C-Phase
172	A	55	L-Phase, C-Phase, R-Phase
173	A	65	C-Phase, R-Phase
174	A	65	L-Phase, R-Phase
175	A	65	L-Phase, R-Phase
176	A	70	L-Phase, C-Phase, R-Phase
178	A	55	L-Phase, C-Phase, R-Phase
179	A	50	L-Phase, C-Phase, R-Phase
181	A	80	L-Phase, C-Phase, R-Phase
183	A	50	C-Phase, R-Phase
184	A	50	L-Phase, C-Phase, R-Phase
185	A	50	C-Phase, R-Phase
187	A	65	L-Phase, C-Phase, R-Phase
188	A	65	C-Phase, R-Phase
190	A	55	L-Phase, C-Phase, R-Phase

191	A	55	L-Phase, C-Phase, R-Phase
192	A	65	L-Phase, C-Phase, R-Phase
193	A	65	L-Phase, C-Phase, R-Phase
195	A	65	C-Phase, R-Phase
196	A	65	C-Phase, R-Phase
200	A	60	C-Phase
211	A	65	L-Phase
220	A	55	C-Phase
222	A	50	C-Phase
226	A	65	C-Phase
249	A	70	R-Phase
250	A	60	R-Phase
252	A	55	C-Phase
254	A	65	C-Phase, R-Phase
256	A	55	C-Phase
257	A	60	L-Phase
258	A	60	C-Phase
261	A	60	C-Phase, R-Phase
263	A	60	C-Phase
264	A	50	C-Phase, R-Phase
267	A	60	R-Phase
270	A	65	C-Phase, R-Phase
271	A	55	C-Phase, R-Phase
272	A	60	L-Phase, R-Phase
273	A	60	C-Phase
274	A	65	L-Phase, C-Phase, R-Phase
275	A	65	L-Phase, C-Phase, R-Phase
276	A	65	L-Phase, C-Phase, R-Phase
278	A	55	L-Phase, C-Phase, R-Phase
279	A	60	L-Phase, C-Phase, R-Phase
280	A	55	C-Phase, R-Phase
281	A	50	L-Phase, R-Phase
282	A	55	C-Phase, R-Phase
285	A	55	C-Phase
287	A	55	L-Phase, C-Phase, R-Phase
288	A	60	L-Phase, C-Phase, R-Phase
290	A	50	L-Phase, C-Phase, R-Phase
291	A	60	C-Phase
292	A	55	C-Phase
293	A	55	L-Phase
300	A	60	L-Phase

304	E	65	C-Phase, R-Phase
305	E	60	L-Phase, C-Phase, R-Phase
306	A	60	R-Phase
307	A	60	C-Phase
308	A	55	L-Phase, C-Phase, R-Phase
309	A	65	C-Phase
310	A	55	C-Phase, R-Phase
313	A	55	L-Phase, C-Phase, R-Phase
314	A	55	L-Phase
315	A	65	C-Phase
316	A	60	C-Phase
317	A	60	C-Phase
319	A	65	L-Phase, C-Phase
321	A	55	L-Phase, C-Phase, R-Phase
322	A	65	L-Phase, C-Phase, R-Phase
323	A	70	L-Phase, C-Phase
324	A	60	L-Phase, C-Phase
325	A	55	L-Phase, C-Phase
326	A	65	L-Phase, C-Phase, R-Phase
327	A	60	C-Phase, R-Phase
328	A	55	L-Phase
329	A	65	C-Phase, R-Phase
330	A	60	L-Phase, C-Phase, R-Phase
331	A	55	L-Phase
334	A	60	C-Phase
335	A	65	L-Phase, C-Phase
336	A	60	C-Phase, R-Phase
337	A	65	C-Phase, R-Phase
338	A	70	L-Phase, C-Phase, R-Phase
339	A	60	C-Phase, R-Phase
341	A	60	L-Phase
350	A	65	L-Phase, R-Phase
356	DA	70	C-Phase

TL 203 Detailed Inspection Results

Str. Number	Type	Pole Height	Phases with Corrosive Insulator Pins
15	A	65	R-Phase
16	A	65	L-Phase
19	A	70	C-Phase
38	HA	60	R-Phase
39	HA	65	R-Phase
48	HA	75	C-Phase
50	HA	50	L-Phase
62	HA	75	C-Phase
68	HA	60	C-Phase
85	HA	75	L-Phase
91	HE	75	C-Phase
113	HA	70	L-Phase
114	HA	65	L-Phase, C-Phase
122	HA	50	C-Phase
128	HA	60	C-Phase
145	A	50	C-Phase, R-Phase
146	A	55	L-Phase, C-Phase
148	A	55	L-Phase, C-Phase
149	A	55	L-Phase, C-Phase
153	A	55	L-Phase, C-Phase
156	A	60	L-Phase, C-Phase
159	A	60	L-Phase, C-Phase
160	A	50	L-Phase
169	A	50	L-Phase
172	A	60	C-Phase
175	A	65	C-Phase
177	A	65	C-Phase, R-Phase
178	A	60	C-Phase
179	A	55	R-Phase
180	A	65	C-Phase

(DRAFT ORDER)
NEWFOUNDLAND AND LABRADOR
BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

AN ORDER OF THE BOARD

NO. P.U. __ (2014)

IN THE MATTER OF the *Electrical Power Control Act,* RSNL 1994, Chapter E-5.1 (the EPCA) and the *Public Utilities Act*, RSNL 1990, Chapter P-47 (the *"Act"*), and regulations thereunder;

AND

AND IN THE MATTER OF an Application by Newfoundland and Labrador Hydro pursuant to Subsection 41(3) of the *Act*, for the approval of the replacement of insulators on Transmission Lines TL-201 and TL-203.

WHEREAS Newfoundland and Labrador Hydro ("Hydro") is a corporation continued and existing under the *Hydro Corporation Act, 2007*, is a public utility within the meaning of the Act, and is subject to the provisions of the *EPCA;* and

WHEREAS Subsection 41(3) of the Act requires that a public utility not proceed with the construction, purchase or lease of improvements or additions to its property where:

a) the cost of construction or purchase is in excess of $50,000; or
b) the cost of the lease is in excess of $5,000 in a year of the lease,

without prior approval of the Board; and

WHEREAS in Order No. P.U. 42(2013) the Board approved Hydro's 2014 Capital Budget; and

WHEREAS on June 19, 2014 Hydro applied to the Board for approval to replace all insulators on transmission line TL-201 and 30 insulators on transmission line TL-203 (the "Application"); and

WHEREAS the Board is satisfied that the 2014 supplemental capital expenditure for the replacement of all insulators on transmission line TL-201 and 30 insulators on transmission line TL-203 is necessary to allow Hydro to provide service and facilities which are reasonably safe and adequate and just and reasonable.

IT IS THEREFORE ORDERED THAT:

1. The proposed capital expenditure of $3,632,200 for the replacement of the insulators on transmission line TL-201 and 30 insulators on transmission line TL-203 is approved.

2. Hydro shall pay all expenses of the Board arising from this Application.

DATED at St. John's, Newfoundland and Labrador, this day of , .

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