
Newfoundland & Labrador

BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

IN THE MATTER OF

**A PRUDENCE REVIEW BY THE BOARD
OF CERTAIN PROJECTS AND EXPENDITURES OF
NEWFOUNDLAND AND LABRADOR HYDRO**

**DECISION AND ORDER
OF THE BOARD**

ORDER NO. P.U. 13(2016)

BEFORE:

**Andy Wells
Chair and Chief Executive Officer**

**Darlene Whalen, P.Eng.
Vice-Chair**

**Dwanda Newman, LLB
Commissioner**

**James Oxford
Commissioner**

EXECUTIVE SUMMARY

Background

This Decision and Order arises from the Board's review of the prudence of certain decisions and actions by Newfoundland and Labrador Hydro ("Hydro") related to certain projects and operating expenditures for which Hydro is seeking cost recovery from customers.

The prudence review was undertaken as part of the Board's consideration of Hydro's amended general rate application which was filed on November 10, 2014, and was conducted in accordance with a Terms of Reference issued in February 2015. The Board engaged The Liberty Consulting Group ("Liberty") to provide expert assistance. Liberty's report *Prudence Review of Newfoundland and Labrador Hydro Decisions and Actions* was filed on July 6, 2015. Following additional information filings from Hydro and Liberty the Board held public hearings over a two-week period in the fall of 2015 and received submissions from Liberty and Hydro as well as the intervenors in the proceeding: the Consumer Advocate, Newfoundland Power Inc., Vale Newfoundland and Labrador Limited, the Industrial Customer Group (Corner Brook Pulp and Paper Limited, North Atlantic Refining Limited, Teck Resources Limited), and Danny Dumaresque.

Projects and Expenditures Reviewed

The Terms of Reference set out the regulatory framework and standards to be used in the prudence review and directed Liberty to review the decisions and action (or inaction) of Hydro and associated costs related to the following projects and expenditures:

1. restoration of the Unit 1 turbine generator at the Holyrood Thermal Generating Station ("Holyrood") following a January 2013 outage
2. black start capability at Holyrood
3. purchase and installation of a new combustion turbine at Holyrood
4. repair and replacement of equipment at the Sunnyside terminal station following extensive damage from a January 4, 2014 transformer failure and a subsequent fire
5. replacement of the T5 tap changer at the Western Avalon terminal station and associated transformer work due to damage from a transformer fault on January 5, 2014
6. overhauls of Sunnyside B1L03 and Holyrood B1L17 230 kV air-blast circuit breakers, which failed in early January 2014
7. repair of the Unit 3 forced-draft fan motor at Holyrood, which failed on December 26, 2013
8. additional supply costs as a result of capacity constraints on the Island Interconnected system during the first quarter of 2014 as a result of the January 2014 outages
9. extraordinary maintenance work on transformers and breakers as a result of an accelerated program in 2014 to complete outstanding work
10. over-budget expenditures associated with the project to increase capacity at the Labrador City terminal station
11. restoration of the Black Tickle diesel plant to service following a 2012 fire

Liberty was also asked to review the impact of its prudence findings for the above projects on Hydro's 2014 revenue deficiency calculation of \$45.9 million.

Prudence Review Standard

The regulatory standard for prudence used in this review requires that utility management act prudently in making decisions and taking (or deciding not to take) actions that involve or affect assets, personnel and operation related to the provision of safe, adequate, reliable and least-cost service to customers. The factors considered in assessing prudence include:

1. information that was known or ought to have been known at the time of the decision or action (or inaction)
2. whether a utility applied reasonable foresight; perfect foresight is not required
3. whether the solution selected was within a range of reasonable alternatives

Prudence Findings

Hydro's decision to defer certain scheduled preventative maintenance on its transformers and air-blast circuit breakers was a significant issue in this review. Hydro acknowledged the need for an effective preventative maintenance program to ensure reliable supply to customers. However between 2010 and 2013 Hydro decided to defer certain scheduled transformer and breaker maintenance to provide resources to what it considered more critical repairs and improvements. This deferral of preventative maintenance on aging equipment critical to reliable supply was not in accordance with accepted utility practice and exposed customers and the system to unnecessary risk and potentially serious consequences. As a result the Board made the following prudence findings:

- Hydro's decision to defer scheduled preventative maintenance in the circumstances at the time of the decision was imprudent.
- Hydro's imprudence in deferring preventative maintenance caused the transformer and air-blast circuit breaker failures at the Sunnyside and Western Avalon Terminal Stations in January 2014 and resulted in significant costs to repair and replace the damaged equipment.
- Hydro's imprudence in deferring preventative maintenance resulted in the need for extraordinary transformer and breaker maintenance in 2014 and 2015, and additional costs.

Hydro's maintenance practices for an air-blast circuit breaker at Holyrood were also found to be imprudent, and resulted in an outage of Unit 1 at Holyrood during January 5-8, 2014.

The Board also found Hydro's decisions and actions with respect to the maintenance of black start capability at Holyrood and the planning and execution of the project to increase capacity at the Labrador City Terminal Station were imprudent.

Following the hearing Hydro accepted responsibility for the cost consequences associated with the failure and repair of Unit 1 at Holyrood in January 2013.

The Board found Hydro's decisions and actions with respect to the following projects and expenditures were prudent:

- the procurement and installation of the new combustion turbine at Holyrood
- the failure and repair of the Holyrood Unit 3 forced draft fan motor
- the restoration of the Black Tickle plant

Imprudence Disallowances

The Board has determined that certain costs should not be allowed to be recovered from customers. These include the capital and/or operating costs associated with the following:

1. overhauls of Sunnyside B1L03 and Holyrood B1L17 breakers
2. the portion of the Sunnyside terminal station equipment repairs and replacement associated with imprudence
3. Western Avalon T5 tap changer replacement and transformer repairs
4. extraordinary transformer and breaker repairs in 2014 and 2015
5. additional supply costs associated with the 2014 failure of Holyrood breaker B1L17 and the resulting outage of Holyrood Unit 1
6. additional operating expenses related to professional services - consulting fees, salary transfers, and overtime associated with the Board's investigation into the January 2014 outages and the projects found to be imprudent
7. Holyrood Unit 1 turbine failure in 2013

The Board has also found that it is appropriate to disallow an amount of \$500,000 to recognize Hydro's serious deficiencies in managing black start capability at Holyrood.

Hydro will be required to file a detailed reconciliation of the capital and operating costs for 2014 and 2015 associated with the disallowances, including any incremental costs associated with overtime, salary transfers and professional fees associated with these projects or expenditures, as well as the costs incurred for the review of the prudence of these expenditures. The actual amount of these disallowances and the resulting impacts on rates will be finalized in the Board's consideration of Hydro's amended general rate application.

Conclusion

The findings by the Board of imprudence by Hydro are significant; they reflect a failure on the part of Hydro management to exercise the reasonable standard of care expected with respect to those projects and expenditures reviewed. The consequences of this imprudence for customers are significant, both in terms of service adequacy and reliability as experienced during the outages of January 2013 and 2014, and in terms of costs. While Hydro is entitled to recover its prudently incurred costs, customers should not bear the costs of Hydro's imprudent actions. The Board will require that Hydro revise its 2014 revenue requirement and 2015 test year costs so that rates do not reflect expenditures which were imprudently incurred.

TABLE OF CONTENTS

EXECUTIVE SUMMARY**PART ONE: BACKGROUND**

1.0	Introduction	1
2.0	Projects Identified for Prudence Review	1
3.0	2014 Revenue Deficiency	3
4.0	Prudence Review Scope and Approach	4
4.1	Regulatory Framework	4
4.2	Engagement of The Liberty Consulting Group	5
4.3	Terms of Reference.....	5
4.4	Prudence Review Standard	6
4.5	Review Approach Used by Liberty	7
5.0	Procedural Matters	8

PART TWO: EVIDENCE REVIEW – PRUDENCE

6.0	Liberty’s Findings and Hydro’s Reply Evidence	10
6.1	Prudent Projects	10
6.1.1	Purchase and Installation of the New Holyrood Combustion Turbine	10
6.1.2	Holyrood Unit 3 Forced-Draft Fan Motor Failure and Repair.....	13
6.1.3	Black Tickle Plant Restoration	14
6.2	Imprudent Projects.....	15
6.2.1	Holyrood Unit 1 Turbine Failure and Repair.....	15
6.2.2	Black Start Capability at Holyrood.....	16
6.2.3	Sunnyside Terminal Station Equipment Replacement and Repair	18
6.2.4	Western Avalon T5 Tap Changer Replacement and Transformer Repair	24
6.2.5	Overhauls of the Sunnyside B1L03 and the Holyrood B1L17 Breakers	24
6.2.6	Extraordinary Transformer and Breaker Maintenance	26
6.2.7	Additional Supply-Related Costs (Partial).....	27
6.2.8	Labrador City Terminal Station Project Costs	29
7.0	Testimonial Evidence	29
8.0	Submissions	29
8.1	Consumer Advocate.....	30
8.2	Newfoundland Power	30
8.3	Vale.....	31

8.4	Industrial Customer Group	31
8.5	Danny Dumaresque	32
8.6	Hydro	33
8.6.1	Written Submission.....	33
8.6.2	Reply Submission	35

PART THREE: DISCUSSION AND BOARD FINDINGS

9.0	Prudence Review Standard and Recent Jurisprudence	37
10.0	Deferral of Preventative Maintenance	39
11.0	Deferred Maintenance and Equipment Failures (Causation).....	48
12.0	Prudence Findings.....	51
12.1	Sunnyside Terminal Station Equipment Replacement	51
12.2	Western Avalon T5 Tap Changer Replacement (Breaker B1L37).....	52
12.3	Holyrood B1L17 Breaker	52
12.4	Extraordinary Transformer and Breaker Maintenance	53
12.5	Black Start Capability at Holyrood.....	54
12.6	Holyrood Unit 1 Turbine Failure and Repair.....	58
12.7	Labrador City Terminal Station Project Costs.....	59
12.8	Procurement and Installation of New Holyrood Combustion Turbine.....	59
12.9	Additional Supply-Related Costs.....	60
12.10	Holyrood Unit 3 Forced-Draft Fan Motor Failure and Repair.....	61
12.11	Black Tickle Plant Restoration	61
13.0	Regulatory Treatment of Replacement Assets (Betterment)	62
14.0	Imprudence Disallowances	64
14.1	Equipment Replacement and Overhauls.....	64
14.2	Extraordinary Maintenance.....	66
14.3	Additional Supply-Related Costs.....	67
14.4	Black Start Capability at Holyrood.....	68
14.5	Holyrood Unit 1 Turbine Failure.....	71
14.6	Additional Operating Expenses	72
14.6.1	Professional Services-Consulting Fees	72
14.6.2	Salary Transfers	73
14.6.3	Incremental Overtime	74
14.6.4	Additional Operating Disallowances for 2014.....	74
14.6.5	2015 Additional Expenses	75
14.7	Summary of Disallowances	75

15.0 2014 Revenue Requirement and 2015 Test Year Costs76
16.0 Conclusion77

PART FOUR: ORDER

1 **PART ONE: BACKGROUND**

2
3 **1.0 Introduction**

4
5 This review was undertaken as part of the Board's consideration of an amended general rate
6 application, filed by Newfoundland and Labrador Hydro ("Hydro") on November 10, 2014, and
7 examines the prudence of Hydro's actions and decisions related to 11 projects and expenditures
8 for which Hydro is seeking cost recovery from customers. Nine of the projects and expenditures
9 reviewed result from the January 2013 and January 2014 outages on the Island Interconnected
10 system. Two other projects not related to these outages but which the Board had identified as
11 requiring further review before a determination on cost recovery were also examined for
12 prudence in this review.

13
14 The Board's findings in this prudence review will determine the final amounts for these costs to
15 be included in Hydro's compliance filing following the conclusion of Hydro's general rate
16 application. The following summary of these projects and expenditures provides context for the
17 scope of this prudence review.

18
19 **2.0 Projects Identified for Review of Prudence**

20
21 January 2013 Outages

22
23 A terminal station failure on January 11, 2013 during extreme weather caused problems on the
24 transmission system that resulted in isolation and tripping of all three units at the Holyrood
25 thermal generating plant ("Holyrood") and significant damage to Unit 1. The primary cause of
26 this outage was determined to be the failure of the DC lube oil system on Unit 1 to function as
27 intended. In Order No. P.U. 14(2013), the Board approved an application from Hydro for capital
28 expenditures of \$12,809,700 for the repair of the Unit 1 turbine but did not allow for the
29 inclusion of these expenditures in rate base pending further review.

30
31 The lack of black start capability at Holyrood was also an issue during this outage. The existing
32 15 MW gas turbine at the plant, which was intended to provide black start capability, had
33 deteriorated so much that it was inoperable. Hydro's chosen alternative for black start capability,
34 the Hardwoods gas turbine, was also unavailable because the transmission system was not
35 available during the outage. The Board subsequently directed Hydro to provide black start
36 capability. In Order No. P.U. 38(2013), the Board approved Hydro's application for capital
37 expenditures of \$1,263,400 and deferred lease costs of \$5,763,200 to lease and install eight 1.825
38 MW diesel generators, with the cost recovery to be determined following further review.

39
40 January 2014 Outages

41
42 In late December 2013 and early January 2014 the Island Interconnected system experienced
43 significant generation shortfalls and equipment failures, resulting in system disruptions and
44 rotating outages during the period January 2-8, 2014. The Board began an investigation and
45 hearing into these events on January 10, 2014 and received an interim report from its technical

1 consultants on April 24, 2014.¹ The Board released an interim report of its preliminary findings
2 on May 15, 2014 that identified the immediate actions needed to reduce the risk of similar events
3 on the Island Interconnected system for the coming winter.²

4
5 In its interim report the Board addressed the issues raised by its consultants about Hydro's
6 forecasting and generation reserve planning, generation availability, transmission system
7 equipment testing and maintenance, inter-utility coordination, and customer communication. The
8 Board set out the key priority actions that Hydro should complete by December 1, 2014 in
9 generation asset readiness, terminal station transformers, air-blast circuit breakers, protection and
10 control systems, and inter-utility coordination. The Board directed Hydro to give the highest
11 priority to completing preventative maintenance and testing on its transmission system and
12 terminal stations.

13
14 The events leading up to and during the outages of January 2014 and Hydro's response to them,
15 as well as the consultants' investigation and interim report and the Board's interim findings,
16 resulted in applications from Hydro in 2014 for approval of supplementary capital expenditures.
17 The applications and resulting Board orders are set out below:

- 18
19 1. an application for approval of \$119,000,000 to purchase and install a 100 MW (nominal)
20 combustion turbine at Holyrood [Order No. P.U. 16(2014)]
- 21 2. an application for approval to add \$680,000 to the Allowance for Unforeseen Items to
22 overhaul on an urgent basis both the Sunnyside 230 kV breaker B1L03 and Holyrood
23 breaker B1L17, and \$82,687 to repair the Holyrood draft fan motor on Unit 3 [Order No.
24 P.U. 23(2014)]³
- 25 3. an application for approval of \$8,424,200 in capital expenditures to replace fire-damaged
26 equipment and install an additional 230 kV breaker with breaker failure protection at the
27 Sunnyside terminal station [Order No. P.U. 29(2014)]
- 28 4. an application for approval of \$1,452,500 in capital expenditures to replace the on-load
29 tap changer on transformer T5 at the Western Avalon terminal station [Order No. P.U.
30 32(2014)]

31
32 Ongoing supply issues following the January 2014 outages resulted in Hydro's reliance on more
33 expensive gas turbines and diesels for energy and its call for replacement capacity from Corner
34 Brook Pulp and Paper Limited under a capacity assistance agreement. In Order No. P.U.
35 56(2014), the Board approved Hydro's application to defer expenses of \$9,650,000 for increased
36 supply costs incurred during the first quarter of 2014, with the issue of Hydro's recovery of this
37 amount to be determined in a further Board order.

38
39 In its interim report the Board identified the deferral of scheduled preventative maintenance on
40 the failed equipment as one of the causes and contributing factors to the outages. To address the
41 significant backlog of deferred maintenance for its breakers and transformers, Hydro accelerated
42 maintenance on this equipment in 2014 to bring its program back on track by the end of 2015.

¹ The Liberty Consulting Group, *Supply Issues and Power Outages Review – Island Interconnected System Interim Report, April 24, 2014.*

² *Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System - Board's Interim Report, May 15, 2014*

³ Order No. P.U. 23(2014) approved an addition of \$580,000 to the Allowance for Unforeseen Items.

1 This extraordinary maintenance work resulted in higher costs in 2014 and 2015. As part of its
2 amended general rate application, Hydro requested approval to defer and amortize over five
3 years a total of \$1.2 million in additional 2015 maintenance costs for air-blast circuit breakers
4 and transformers.

5
6 Other Projects

7
8 In Order No. P.U. 42(2013) the Board did not approve Hydro's proposed 2012 average rate base,
9 noting concerns with expenditures related to certain projects, including the restoration of the
10 Black Tickle diesel plant following a fire in 2012 and over budget expenditures for a project to
11 increase capacity at the Labrador City Terminal Station. These two projects were included in the
12 prudence review.

13
14 After a fire at the Black Tickle diesel plant in 2012, Hydro effected emergency repairs under the
15 Allowance for Unforeseen Items. The restoration cost was approximately \$1.4 million net of
16 insurance proceeds. In Order No. P.U. 31(2013), the Board denied Hydro's application to add an
17 amount to the Allowance for Unforeseen Items for these expenditures, as they were under Board
18 review. In Order No. P.U. 27(2014) approving Hydro's 2012 average rate base, the Board
19 excluded the Black Tickle expenditures because the evidence was insufficient to satisfy the
20 Board that the expenditures were reasonable and necessary and that the cost was as low as
21 possible while remaining consistent with reliable service.

22
23 In Order No. P.U. 36(2008) approving Hydro's 2009 capital budget, the Board approved an
24 expenditure of \$9.99 million to increase capacity at the Labrador City terminal station to serve
25 new loads expected from the expansion of mining operations in the area. The project, which
26 would increase the voltage for the Labrador City distribution system from 4 kV to 25 kV, was to
27 be completed in 2011. In Order No. P.U. 2(2012), the Board approved a revised project budget
28 of \$12.65 million. The project was completed and commissioned in 2013, with a final cost of
29 \$16.844 million. In Order No. P.U. 42(2013), the Board expressed concern at the manner in
30 which Hydro approached this project and denied the recovery of any costs exceeding the
31 approved budget pending further review.

32
33 **3.0 2014 Revenue Deficiency**

34
35 In its amended general rate application, Hydro updated its financial information and revised
36 some of its original proposals, including changing from a 2013 test year to a 2014 test year for
37 revenue requirement purposes and a 2015 test year for rate-setting purposes. On November 28,
38 2014 Hydro filed an application requesting approval of, among other things, the deferral and
39 recovery of \$45.9 million in forecast revenue for 2014 based on the proposals set out in the
40 amended general rate application. In Order No. P.U. 58(2014), the Board approved a deferral
41 account for this amount, but did not approve recovery of this amount pending further review.

42
43 This revenue deficiency account includes some costs associated with the projects and
44 expenditures described above that were identified as requiring further review. The review of the
45 prudence of these costs and the Board's final determination as to their recovery will affect the
46 calculation of the 2014 revenue deficiency. The issue of recovery of the 2014 revenue deficiency

1 itself will be determined as part of the consideration of Hydro's amended general rate
2 application.

4 4.0 Prudence Review Scope and Approach

6 4.1 Regulatory Framework

8 The Board regulates Hydro pursuant to the provisions of the *Electrical Power Control Act, 1994*,
9 SNL 1994, Chapter E-5.1 (the "EPCA") and the *Public Utilities Act, RSNL 1990*, Chapter P-47
10 (the "Act"). The regulatory policy framework set out by the legislation requires the Board to
11 balance the interests of Hydro and its customers. Section 4 of the EPCA requires the Board to
12 implement the power policy of the province which is set out in section 3 as follows:

- 13
- 14 (a) the rates to be charged, either generally or under specific contracts, for the supply of power
15 within the province
 - 16 (i) should be reasonable and not unjustly discriminatory,
 - 17 (ii) should be established, wherever practicable, based on forecast costs for that supply of
18 power for 1 or more years,
 - 19 (iii) should provide sufficient revenue to the producer or retailer of the power to enable it to
20 earn a just and reasonable return as construed under the *Public Utilities Act* so that it is
21 able to achieve and maintain a sound credit rating in the financial markets of the world,
 - 22 (iv) should be such that after December 31, 1999 industrial customers shall not be required
23 to subsidize the cost of power provided to rural customers in the province, and those
24 subsidies being paid by industrial customers on the date this Act comes into force shall
25 be gradually reduced during the period prior to December 31, 1999, and
 - 26 (v) should promote the development of industrial activity in Labrador;
 - 27
 - 28 (b) all sources and facilities for the production, transmission and distribution of power in the
29 province should be managed and operated in a manner
 - 30 (i) that would result in the most efficient production, transmission and distribution of
31 power,
 - 32 (ii) that would result in consumers in the province having equitable access to an adequate
33 supply of power,
 - 34 (iii) that would result in power being delivered to consumers in the province at the lowest
35 possible cost consistent with reliable service,
 - 36 (iv) that would result in, subject to Part III, a person having priority to use, other than for
37 resale, the power it produces, or the power produced by a producer which is its wholly-
38 owned subsidiary,
 - 39 (v) where the objectives set out in subparagraphs (i) to (iv) can be achieved through
40 alternative sources of power, with the least possible interference with existing contracts,
41

42 and, where necessary, all power, sources and facilities of the province are to be assessed and
43 allocated and re-allocated in the manner that is necessary to give effect to this policy;

44

45 The *Public Utilities Act* provides for the Board's general supervision of Hydro's utility
46 operations and requires Hydro to provide service which is reasonably safe and adequate.⁴ Section
47 80 of the Act entitles Hydro to the opportunity to earn annually a just and reasonable return on its
48 rate base in addition to those expenses that the Board may allow as reasonable and prudent and

⁴ *Public Utilities Act*, sections 16 and 37

1 properly chargeable to operating account. The Act does not stipulate how a determination is to be
2 made with respect to the recovery of reasonable and prudent operating expenses.

3 4 **4.2 Engagement of The Liberty Consulting Group**

5
6 The Board retained The Liberty Consulting Group (“Liberty”) to provide expert assistance in its
7 review of the prudence of certain actions and decisions taken by Hydro and whether associated
8 costs should be recovered from Hydro’s customers.⁵ The Board initially engaged Liberty in
9 January 2014 to assist in an investigation of the supply problems and outages on the Island
10 Interconnected system in late December 2013 and early January 2014. Liberty filed a Phase One
11 final report on the results of its investigation on December 17, 2014⁶ and is currently completing
12 a Phase Two study on the reliability and adequacy of power on the Island Interconnected system
13 after the interconnection with the Muskrat Falls generating station. Liberty has extensive
14 experience in all aspects of utility operations and has undertaken prudence reviews in numerous
15 other jurisdictions, including for the Nova Scotia Utility and Review Board.

16 17 **4.3 Terms of Reference**

18
19 The Terms of Reference⁷ directed Liberty to review the decisions and action (or inaction) of
20 Hydro and associated costs related to certain capital projects and operating expenses as set out
21 below:

- 22
- 23 1. restoration of the Holyrood Unit 1 turbine generator following a January 2013 outage
- 24 2. black start capability at Holyrood
- 25 3. 2014 purchase and installation of a new 120 MW combustion turbine at Holyrood
- 26 4. repair and replacement of equipment at the Sunnyside terminal station following
27 extensive damage from a January 4, 2014 transformer failure and a subsequent fire
- 28 5. replacement of the T5 tap changer at the Western Avalon terminal station and
29 associated transformer work due to damage from a transformer fault on January 5, 2014
- 30 6. overhauls of Sunnyside B1L03 and Holyrood B1L17 230 kV air-blast circuit breakers,
31 which failed in early January 2014
- 32 7. repair of the Unit 3 forced-draft fan motor at Holyrood, which failed on December 26,
33 2013
- 34 8. additional supply costs as a result of capacity constraints on the Island Interconnected
35 system during the first quarter of 2014 as a result of the January 2014 outages
- 36 9. extraordinary maintenance work on transformers and breakers as a result of an
37 accelerated program in 2014 to complete outstanding work
- 38 10. over-budget expenditures of approximately \$4.2 million associated with the project to
39 increase capacity at the Labrador City terminal station
- 40 11. restoration of the Black Tickle diesel plant to service following a 2012 fire

⁵ A full synopsis of Liberty’s team and expertise is set out on pages 4-6 of its final report *Prudence Review of Newfoundland and Labrador Hydro Decisions and Actions Final Report*, dated July 6, 2015.

⁶ The Liberty Consulting Group, *Supply Issues and Power Outages Review Island Interconnected System Report on Island Interconnected System to Interconnection with Muskrat Falls addressing Newfoundland and Labrador Hydro*, December 17, 2014

⁷ The Terms of Reference for the prudence review were issued by the Board on February 27, 2015.

1 Liberty was also asked to review the impact of its prudence findings for the above projects on
 2 Hydro's 2014 revenue deficiency calculation of \$45.9 million.

3 4 **4.4 Prudence Review Standard**

5
6 The Board set out in the Terms of Reference the regulatory framework and standards for Liberty
 7 to use in its prudence review. The regulatory framework requires that utility management act
 8 prudently in making decisions and taking (or deciding not to take) actions that involve or affect
 9 assets, personnel, and operations related to the provision of service to customers. Management's
 10 decisions and actions must focus on promoting the delivery of safe, adequate, reliable, and least-
 11 cost service to their customers. Prudent decisions and actions require that management follow
 12 specific practices:

- 13
14 1. identify all relevant information
 15 2. identify a reasonable range of alternative solutions
 16 3. test those solutions by applying criteria and values consistent with delivery of safe,
 17 adequate, reliable and least-cost service
 18 4. choose an option that falls within the range of those properly determined to be reasonable
 19 5. act with the level of dispatch and care consistent with the timing needs for making a
 20 decision or taking action
 21

22 The standards or tests for determining prudence have been discussed in several jurisdictions.
 23 While the standards may be described differently among the various jurisdictions, there are
 24 certain common principles.
 25

26 The Nova Scotia Utility and Review Board has adopted the definition of prudence that appears in
 27 a decision of the Illinois Commerce Commission:
 28

29 Prudence is that standard of care which a reasonable person would be expected to exercise
 30 under the same circumstances encountered by utility management at the time decisions had
 31 to be made. Hindsight is not applied in assessing prudence...A utility's decision is prudent
 32 if it was within the range of decisions reasonable persons might have made...The prudence
 33 standard recognizes that reasonable persons can have honest differences of opinion without
 34 one or the other necessarily being imprudent.⁸
 35

36 The Nova Scotia Utility and Review Board further determined that the definition of imprudence,
 37 while it may vary among jurisdictions, has the following fundamental principles:
 38

- 39 • Were the utility's decisions unreasonable in the context of information that was known
 40 (or should have been known) at the time?
 41 • Did the utility act in a reasonable manner and use a reasonable standard of care in its
 42 decision-making process?
 43 • The imprudence test should relate to the circumstances at the time in question and not to
 44 hindsight.

8 Information Item #44 (2015, NSUARB 9, page 7).

1 The Ontario Court of Appeal has accepted the Ontario Energy Board's approach to a "prudence
2 review,"⁹ which contains elements similar to the principles articulated by the Nova Scotia Utility
3 and Review Board:

- 4
- 5 • Decisions made by the utility's management should generally be presumed to be prudent
6 unless challenged on reasonable grounds.
 - 7 • To be prudent, a decision must have been reasonable under the circumstances that were
8 known or ought to have been known to the utility at the time the decision was made.
 - 9 • Hindsight should not be used in determining prudence, although consideration of the
10 outcome of the decision may legitimately be used to overcome the presumption of
11 prudence.
 - 12 • Prudence must be determined in a retrospective factual inquiry in that the evidence must
13 be concerned with the time the decision was made and must be based on facts about the
14 elements that could or did affect the decision at the time.

15

16 The questions of imprudence and customer impact are distinct. Because the future is unknown,
17 imprudent actions can produce either higher or lower customer costs than would have occurred
18 under a prudent course of action. Similarly, prudent actions can produce either higher or lower
19 customer costs than would have occurred under an imprudent course of action.

20

21 Following the release of the Terms of Reference, the Supreme Court of Canada issued two
22 decisions which confirmed the no-hindsight prudence test set out in the Terms of Reference as an
23 appropriate standard for regulators to use in assessing cost prudence. The Court's decision and
24 its impact on the Board's findings in this review are discussed in Section 9.0.

25 **4.5 Review Approach Used by Liberty**

26

27

28 Liberty used the above approaches to prudence reviews when it reviewed Hydro's actions and
29 decisions for the projects and expenditures identified. In determining whether an action or
30 decision was prudent, Liberty considered:

- 31
- 32 1. information that was known or ought to have been known at the time of the decision or
33 action (or inaction)
 - 34 2. whether the utility applied reasonable foresight; perfect foresight is not required
 - 35 3. whether the solution selected was within the range of reasonable alternatives
- 36

37 Where actions were found to be prudent, cost impacts were not examined. Where actions were
38 found to be imprudent, Liberty examined where and by how much costs would have differed
39 under a prudent course of action.

40

41 Liberty's work involved reviewing the information filed to date by Hydro and other parties,
42 including Hydro's applications, responses to requests for information, and relevant Board orders.

⁹ Enbridge Gas Distribution Inc. v. Ontario Energy Board, 2006Can LII 10734:41 Admin LR (4th) 69, (leave to appeal to CSC denied) and Power Workers' Union, Canadian Union of Public Employees, Local 1000 v. Ontario (Energy Board) (365 D.L.R. (4th) 247.

1 Liberty also met with Hydro to review relevant information and filed requests for information as
2 necessary.

3 4 **5.0 Procedural Matters**

5
6 On February 27, 2015 the Board advised the intervenors in Hydro's 2014 Supplementary Capital
7 Budget Application relating to the 100 MW combustion turbine generator of its decision to
8 undertake a prudence review of matters that were initially part of the Phase One supply issues
9 and outage investigation. The review would also consider rate base issues for Hydro's
10 applications for black start capability at Holyrood and the purchase and installation of the new
11 Holyrood combustion turbine. These intervenors (Danny Dumaresque, Grand Riverkeeper
12 Labrador Inc., and Sierra Club Canada) were invited to file for limited intervenor status in the
13 general rate application to participate in issues related to the prudence review only. Danny
14 Dumaresque filed for and was granted limited intervenor status in the general rate application for
15 this purpose.

16
17 The intervenors in the prudence review were:

- 18
- 19 1. Newfoundland Power Inc. ("Newfoundland Power")
- 20 2. Consumer Advocate (Thomas Johnson)
- 21 3. Industrial Customer Group (Corner Brook Pulp and Paper Limited, North Atlantic
22 Refining Limited, Teck Resources)
- 23 4. Vale Newfoundland and Labrador Limited ("Vale")
- 24 5. Danny Dumaresque
- 25

26 Over the period March 3, 2015 to June 24, 2015 a total of 186 Requests for Information (RFIs)
27 were issued to Hydro.

28
29 Liberty filed its report *Prudence Review of Newfoundland and Labrador Hydro Decisions and*
30 *Actions* on July 6, 2015 ("Liberty's Prudence Report"). Liberty's report was provided to Hydro
31 and to the intervenors in the prudence review as well as the parties in Hydro's ongoing general
32 rate application.

33
34 Additional RFIs were filed on July 20, 2015 by Hydro for response from Liberty.

35
36 On August 7, 2015 Hydro filed reply evidence addressing Liberty's findings for each of the
37 projects and expenditures reviewed ("Hydro's Reply Evidence"). This reply evidence included a
38 report from Gannett Fleming Canada ULC. ("Gannett Fleming"), which provided calculations of
39 asset betterment related to the Sunnyside and Western Avalon transformer capital additions, and
40 a report from La Capra Associates Inc. ("La Capra") setting out its opinion on Liberty's
41 prudence findings for black start capability at Holyrood and the Holyrood Unit 1 turbine failure.

42
43 Over the period August 17, 2015 to September 9, 2015 additional RFIs were issued to Hydro.

44
45 Liberty responded to Hydro's reply evidence on September 17, 2015 ("Liberty's Reply
46 Evidence").

1 Hydro filed surrebuttal evidence together with surrebuttal evidence of Gannett Fleming and La
2 Capra on October 14, 2015 (“Hydro’s Surrebuttal Evidence”).

3
4 On October 27-30, November 2-6, November 9, and November 12, 2015, the following
5 witnesses provided testimonial evidence:

6
7 Hydro:

8
9 Rob Henderson, Vice President, Hydro
10 Paul Humphries, Vice President, System Operations and Planning
11 Terence LeDrew, (former) Manager, Thermal Generation
12 Darren Moore, General Manager, Transmission and Rural Operations
13 Michael Conway, Manager, Regulatory Finance
14 John MacIsaac, Vice President, Project Execution and Technical Services
15 Larry Kennedy, Vice President, Gannett Fleming Canada
16 Philip DiDomenico, Managing Consultant, La Capra Associates
17 John Athas, Principal Consultant and Treasurer, La Capra Associates

18
19 Liberty:

20
21 John Antonuk
22 Richard Mazzini
23 Mark Lautenschlager
24 Randall Vickroy

25
26 Final submissions on the prudence review were filed as of December 23, 2015 by the Consumer
27 Advocate, Newfoundland Power, the Industrial Customer Group, Vale, Danny Dumaresque, and
28 Hydro.

29
30 Hydro filed its reply submission on January 14, 2016 (“Hydro’s Reply Submission”).

1 **PART TWO: PRUDENCE EVIDENCE REVIEW**

2
3 **6.0 Liberty's Findings and Hydro's Reply Evidence**

4
5 As a result of its review, Liberty determined Hydro's decisions and actions for the following
6 projects to be prudent:

- 7
8 1. purchase and installation of the new combustion turbine at Holyrood
9 2. failure and repair of the Holyrood Unit 3 forced-draft fan motor
10 3. restoration of the Black Tickle plant following a fire

11
12 Liberty found that Hydro's decisions and actions regarding the following projects were
13 imprudent:

- 14
15 1. Holyrood Unit 1 turbine failure
16 2. Sunnyside terminal station replacement equipment
17 3. Western Avalon terminal station T5 tap changer replacement
18 4. overhaul of the Sunnyside B1L03 and Holyrood B1L17 230 kV breakers
19 5. extraordinary transformer and breaker repairs
20 6. black start capability at Holyrood
21 7. a portion of the additional supply-related costs of \$9,650,000 to replace generation
22 capacity lost as a result of the January 2014 outages that could have been avoided in the
23 absence of imprudence
24 8. Labrador City terminal station capacity upgrades

25
26 The following sections set out the basis for Liberty's conclusions on prudence and Hydro's reply
27 evidence for each project reviewed. Submissions from Hydro and the intervenors are
28 summarized in Section 8.0.

29
30 The Board's findings on prudence and the financial consequences for Hydro in terms of potential
31 cost disallowances or penalties, as well as the impact on the 2014 revenue deficiency, are
32 discussed in Part Three: Discussion and Board Findings.

33
34 **6.1 Prudent Projects**

35
36 6.1.1 Purchase and Installation of the New Holyrood Combustion Turbine

37
38 Liberty reviewed Hydro's decisions and actions surrounding the initial decision to defer
39 installation of new generation, the decision in 2014 to purchase the combustion turbine, and
40 project execution and costs associated with the purchase and installation of the new 100 MW
41 (nominal) combustion turbine at Holyrood. Liberty examined the following issues:

- 42
43 • the quality of the underlying supply planning processes and decisions
44 • whether the new Holyrood combustion turbine should have been installed sooner
45 • the choice of machine and the strategy for installation
46 • the quality of the project management
47 • the prudence of costs expended

1 Liberty conducted a comprehensive examination of Hydro's supply planning process as part of
2 the Board's investigation into the January 2014 supply issues and outages. In its Phase One
3 Report, Liberty set out recommendations to improve supply planning, and noted that Hydro has
4 already implemented most of them. However, for the prudence review, the supply planning
5 processes and their application at the time of the key decisions being examined are relevant. In
6 that context, Liberty identified three shortcomings in supply planning:

- 7
- 8 1. the narrow focus on loss of load hours (LOLH), especially at the expense of reserve
9 requirements
- 10 2. the use of "average" weather in load forecasts
- 11 3. the failure to consider the higher losses that occur under high loads and low available
12 generation on the Avalon Peninsula
- 13

14 Liberty reported its findings on these issues in its Phase One Report and summarized its concerns
15 in the prudence findings. While the concerns are significant, Liberty found that they did not meet
16 the standard for imprudence. Liberty stated that Hydro has followed a consistent approach to
17 supply planning for many years and has consistently reported on its processes in regulatory
18 proceedings. Hydro's LOLH criteria have been regularly reviewed by consultants since 1999,
19 including those retained by the Board, and no issues were raised. The use of the P50 "average"
20 weather variable in load forecasting has also been reviewed by Hydro's external consultants
21 without challenge. Liberty noted that, since the January 2014 outages and in response to
22 recommendations arising from the investigation, Hydro has implemented the more conservative
23 P90 weather forecast as part of its sensitivity analysis in supply-related decision making, even
24 though the P50 forecast is still used as the planning base. Liberty established the use of a P50
25 load forecast as within the range of reasonable alternatives. It also determined that the
26 longstanding nature of the planning practices applied by Hydro and their frequent review make
27 their application reasonable in the context of Hydro's particular circumstances.

28

29 In terms of the unexpected system losses experienced during the January 2014 outages, Liberty
30 noted that Hydro took some time to recognize the problem and to adapt its planning and
31 operating schemes accordingly. Had Hydro accounted for these system losses in its supply
32 planning decisions, it might have recognized an increased planning peak and an earlier indication
33 of the need for new resources. Liberty found Hydro's handling of system losses in its supply
34 planning process to be "erroneous but not imprudent." There is no indication that a more
35 effective consideration of system losses would have altered decisions about new supply before
36 2014.

37

38 Regarding the timing of the new combustion turbine, Liberty noted that Hydro identified a need
39 for new generation as early as 2008 and that Hydro's own 2010 and 2012 generation planning
40 analysis indicated that the LOLH criteria would be exceeded starting in December 2014. Liberty
41 also noted Hydro's decision to defer installation of a new 50-60 MW combustion turbine to late
42 2015, leaving a gap of one year between the identified need and planned in-service date.
43 According to Hydro, the new combustion turbine could not be acquired and installed before that
44 date. Although it stated that a new combustion turbine would take three years to acquire and
45 install, Hydro took no action to support a 2015 in-service date, despite the generation shortfall
46 identified as early as 2010. Liberty did not find Hydro's explanation for this delay credible, but

1 stated that the following rationale provided by Hydro was sufficient to justify a delay in
2 acquiring the new unit:

- 3
- 4 • The need for new generation was changing; the forecasted load failed to develop.
- 5 • The planned arrival of Muskrat Falls generation in 2017 would probably defer
- 6 significantly the need for other generation.
- 7 • The history of Hydro's operations exhibited a tolerance for limited outages and
- 8 interruptions as part of its operating strategy.
- 9

10 Liberty indicated that Hydro's risk evaluation of the decision to delay adding new generation
11 deemed the risk of criteria exceedance to be low and limited to the 2015 winter period:

12
13 Hindsight showed the risk, however low, to have been real, as supply disruptions occurred
14 in January 2014. The more appropriate question, however, lies not in what hindsight makes
15 clear, but in what circumstances at the time demonstrated. It was correct for Hydro to
16 consider the customer rate impacts of a decision to proceed. Some might argue that
17 Hydro's decision was not optimum, but we cannot conclude that it was imprudent, given
18 the circumstances.¹⁰

19
20 According to Liberty, an earlier decision on new supply in 2012 would not have produced
21 different outcomes, for several reasons:

- 22
- 23 • The unit would not have been in service in time for the 2013-2014 winter.
- 24 • Based on the planning criteria, the unit was planned for the 2014-2015 winter, which is
- 25 when it went into service.
- 26 • An earlier decision might have saved some expediting costs, but Hydro would have
- 27 committed to a smaller unit, with the result that it would probably be planning for another
- 28 new unit in 2016.
- 29 • The project costs for the new combustion turbine make it unlikely that an earlier decision
- 30 would have reduced rate impacts.
- 31

32 Liberty concluded that Hydro acted prudently in the timing of the unit's acquisition and that its
33 decision resulted in no tangible economic penalties for customers.

34
35 Liberty also reviewed Hydro's decisions and actions with respect to the choice of a new unit and
36 its approach to the project. Liberty noted that, in response to its concerns regarding the
37 continuing and unacceptably high risk of supply-related emergencies until Muskrat Falls comes
38 into service, Hydro immediately made adding new generation a top priority. According to
39 Liberty, this decision resulted in Hydro's being able to secure a larger unit and an earlier in-
40 service date than was expected. The doubling of the unit's size and its earlier availability proved
41 to have considerable value. Liberty also found no major concerns with Hydro's execution of the
42 project and project management efforts, noting that, in light of the aggressive schedule, final
43 results proved very strong.

44
45 In terms of project costs, Liberty pointed out that the capital cost for the new combustion turbine
46 was approximately \$119 million, or about \$1,000 per kW. Liberty examined the reasonableness

¹⁰ Liberty's Prudence Report, page 12

1 of costs both from the perspective of quality of management and work efforts and in terms of
2 how costs compared to those of similar projects undertaken in North America. Based on its
3 review of published cost data, Liberty found the costs of the new combustion turbine at the time
4 of its review to be reasonable, falling just below the average of construction costs for comparable
5 projects.

6
7 In its reply Hydro identified Liberty's comments about its supply planning processes,
8 specifically its confirmation that improvements made by Hydro in giving more attention to
9 system reserve levels, a broader range of weather conditions, and the effects of system losses
10 were significant. Hydro referenced its February 5, 2015 response to Liberty's December 2014
11 Phase One report, where it set out the actions it had taken and proposes to take with power
12 supply planning. Hydro filed no additional evidence.

13 14 6.1.2 Holyrood Unit 3 Forced-Draft Fan Motor Failure and Repair

15
16 On December 26, 2013 a forced-draft fan motor at Holyrood's Unit 3 failed, reducing its output
17 from 150 MW to 50 MW. As a spare motor was not available, Hydro expedited repairs on the
18 motor at a local facility, with repairs completed and full power restored to Unit 3 on January 12,
19 2014. The loss of this 100 MW of generation capability for the 17-day period was a significant
20 reason for the supply shortages and resulting rotating blackouts during the January 2014 outages.

21
22 Liberty observed that the failed motor had undergone regular maintenance, was refurbished in
23 2006, and did not indicate pending failure. The root cause analysis of the failure suggested that
24 excessive dirt, resulting from the motor's location near a large door, might have contributed to its
25 failure. Liberty also noted that a consultant's report in 2011 expressed the opinion that the Unit 3
26 motors would not last for the Holyrood station's estimated remaining life of five years.

27
28 Liberty reviewed Hydro's decisions and actions regarding the Unit 3 motors, specifically
29 whether Hydro should have acted when it was advised that the motor would not reach the
30 forecasted end of life for Holyrood. Possible actions included immediate replacement and/or
31 procurement of a spare motor. Considerations at the time included the fact that the plant was
32 expected to operate for only eight more years, so a delay in procuring new motors would result in
33 decreasing value as Holyrood's retirement approached. In the meantime the risk of failure of one
34 or both of the motors was present. Hydro decided not to replace the motor while it remained
35 functional and safe. Liberty noted that Hydro appeared to make this decision to "run to failure"
36 on the basis that failure was not imminent, it might not occur for years or maybe never, and if it
37 did occur, the consequences would be minimal. Even though, in retrospect, the motor failed at
38 the worst possible time, Liberty concluded that Hydro's decision accounted for all available
39 information and that, given the risks and time horizon considered, Hydro's chosen option was
40 among those a reasonable person might have selected. Liberty found no reason to question
41 prudence in the possible cause of the failure.

42
43 Hydro concurred with Liberty's findings and did not file further evidence.

6.1.3 Black Tickle Plant Restoration

1
2
3 A fire at the diesel generating plant in the Labrador coastal community of Black Tickle resulted
4 in significant damage to all three of its units and an outage that lasted almost two days. Over the
5 following week Hydro temporarily restored power by bringing the least damaged unit back in
6 service and bringing in a mobile generator on a Coast Guard icebreaker. Hydro was also able to
7 get another unit at the plant running later in the week. While these temporary measures were in
8 place, Hydro began permanent restoration of the plant and undertook required work to return it to
9 its pre-fire condition.

10
11 Liberty's review of the prudence of Hydro's decisions and actions in undertaking this project
12 considered the following issues:

- 13
- 14 • the lack of a fire suppression system at Black Tickle and the failure to provide such a
 - 15 system as part of post-fire restoration
 - 16 • not reducing the size of the plant during restoration, given the closure of an area fish
 - 17 plant
 - 18 • the reasonableness of restoration project costs
- 19

20 Liberty noted Hydro's view that urgent action was necessary to restore the plant prior to the next
21 winter season. Based on its review Liberty agreed with Hydro's assessment of the need to act
22 quickly to restore reliability capability in the circumstances facing Hydro, and more importantly,
23 the group of isolated customers involved. Although acknowledging that Hydro could have
24 chosen to rely on the temporary repairs while it studied alternatives, Liberty did not consider it
25 imprudent for Hydro to have proceeded with a permanent solution immediately. According to
26 Liberty, "Hydro acted with a reasonable base of information from which to assess the risks of
27 proceeding on a temporary basis, and its choice to accelerate installation of a permanent solution
28 by maintaining the existing design and configuration was logical."¹¹

29

30 Liberty also found Hydro's decision to not add fire suppression capability at the time of plant
31 restoration was reasonable given the urgency of repair completion. In 2011 Hydro commissioned
32 a consultant to study its approach to not providing fire suppression systems in its isolated diesel
33 systems as a result of the high incidence of fires at these plants. Nineteen fires had been reported
34 since 1991, 10 from 2002 to 2007. This study resulted in the development of a risk matrix and
35 plan to phase in fire suppression systems at isolated plants, with Black Tickle slated to receive
36 one in 2019-2020. Liberty suggested that this study was probably overdue given the number of
37 fires but noted that, even with an earlier study and a major acceleration of suppression equipment
38 installation, Black Tickle would have remained without protection at the time of the 2012 fire.
39 Liberty also found Hydro's decision to leave the plant capacity unchanged even with the closure
40 of the community's seasonal fish plant shortly after the March 2012 fire to be prudent. Liberty
41 noted that Hydro would not have achieved material cost savings sufficient to override the
42 reliability risks of the temporary restoration and future fish plant reopening considerations.
43 Liberty found no basis to question Hydro's execution of the project and its management of
44 project costs.

¹¹ Liberty's Prudence Report, page 73

1 Hydro concurred with Liberty's findings and did not file further evidence.

2
3 **6.2 Imprudent Projects**

4
5 6.2.1 Holyrood Unit 1 Turbine Failure and Repair

6
7 The primary cause of the January 11, 2013 outage at Holyrood was the failure of a DC motor to
8 deliver adequate flow, which resulted in the failure of the Unit 1 turbine. Liberty's prudence
9 review identified the following issues:

- 10
11 • Hydro's ability to have identified and corrected technical inadequacies in the DC motor
12 by following established standards and processes
13 • a lube oil system testing weakness that allowed the inadequacy of the DC motor to go
14 undetected for years
15 • a weakness in the backup AC system that prevented it from functioning in a degraded
16 voltage situation
17 • a weakness in the lube oil protection scheme that made it vulnerable to common mode
18 failure

19
20 These issues were discussed in detail in Liberty's report. Hydro did not accept Liberty's findings
21 and, in its reply evidence, provided additional evidence from La Capra to support its position.
22 The issue was also extensively canvassed during the public hearing by the intervenors and Board
23 Hearing Counsel during the cross-examination of witnesses from Hydro, La Capra, and Liberty.

24
25 Following the public hearing Hydro wrote the Board advising of information it had recently
26 discovered about the DC lube oil testing procedures that it wished to bring to the attention of the
27 Board and the parties to the prudence review. Hydro advised that, during a review of the
28 electronic workbook associated with its asset maintenance strategy manual, the following
29 recommendation was identified as having arisen from the 2009-2010 maintenance review:

30
31 Recommend also that the back-up and DC emergency lube oil & seal oil pumps be checked
32 when the unit is off-line to ensure that they perform as required. Correct Pressure & Flow
33 cannot be determined during the on-line operational testing.¹²

34
35 As a result of this new information, Hydro stated:

36
37 Accordingly, the Hydro personnel directly involved in the 2009-2010 Holyrood
38 maintenance review did recommend that the DC emergency lube oil pump be checked
39 when the unit was off-line to ensure that it performed as required, however the
40 maintenance actions implemented did not fully address the recommendation provided. The
41 relevance and status of this line item recommendation was not fully understood by
42 management of Hydro involved in the hearing until the preparation of Undertaking 85 was
43 being carried out.

44
45 In light of this information, Hydro takes full responsibility for any cost consequences
46 attributable to the failure of the DC lube oil pumping system in January 2013...¹³

¹² Hydro, December 16, 2015 correspondence to the Board, page 2

¹³ Ibid.

1 Based on Hydro's acceptance of responsibility for the cost consequences attributable to the
2 failure of DC lube oil pumping system, it is not necessary to set out a complete summary of the
3 evidence here. These consequences are discussed in Section 12.6.

4 5 6.2.2 Black Start Capability at Holyrood 6

7 Black start capability provides for an on-site generation source to restart a unit when it is
8 disconnected from the transmission system and other generation sources. Hydro has maintained a
9 15 MW gas turbine at Holyrood since 1969 to provide black start capability to the plant. The gas
10 turbine deteriorated over time such that in March 2010 a stop-work order was issued by
11 Occupational Health and Safety inspectors. This order was lifted in February 2011 with the
12 condition that the unit be operated only in emergencies. An independent condition assessment
13 report in December 2011 revealed a risk of significant catastrophic failure of the gas turbine if it
14 was operated.¹⁴ As a result, in January 2012, Hydro prohibited any further use of the turbine. In
15 the December 2011 report, the consultant proposed options to provide black start capability,
16 including refurbishing the existing unit, installing two new or used 5 MW gas turbines, or
17 installing five new or used 2 MW diesel units, with the last recommended as the preferred
18 option.

19
20 The January 2013 outage resulted in the loss of the transmission system and the tripping of all
21 three Holyrood units. Although Hydro had identified the Hardwoods gas turbine for alternate
22 black start capability, the loss of the transmission system meant that this could not happen. The
23 lack of black start capability at Holyrood resulted in an 11-hour delay in restoring the system. As
24 a result of the significant damage to Unit 1 and the extended downtime, Newfoundland Power's
25 mobile gas turbine and a smaller diesel generator were moved to the Holyrood plant. These units
26 could feed station auxiliaries but could not provide the interim black start capability.

27
28 On January 29, 2013 the Board was made aware that the Holyrood gas turbine was not available
29 for black start at Holyrood. In March 2013, in response to a request for information following
30 this event, the Board became aware that Holyrood had been without on-site black start capability
31 since January 18, 2012. The Board subsequently directed Hydro to provide its solution for this
32 capability for the upcoming winter. In Order No. P.U. 38(2013), the Board approved an
33 application from Hydro for capital expenditures of \$1,263,400 and deferred lease costs of
34 \$5,763,200 to lease and install eight 1.825 MW diesel generators to provide black start capability
35 at Holyrood as a temporary solution and the creation of a deferral account with the recovery of
36 the costs to be determined later. Installation of the eight diesel generators was completed by mid-
37 2014.

38
39 Liberty determined, based on the following findings, that Hydro failed to act prudently in
40 managing the black start capability for Holyrood:

- 41
42
- 43 • In January 2012 Hydro rejected all of the potential solutions offered by its consultant.
 - 44 • Hydro's decision to rely on the Hardwoods combustion turbine as an off-site solution was flawed.

¹⁴ PR-PUB-NLH-002, Attachment 1

- 1 • The decision to use Newfoundland Power's equipment was marginal and Hydro's failure
- 2 to act when it proved incapable was not sound.
- 3 • Hydro has demonstrated a generally weak approach to reliability issues; the decisions
- 4 underlying its black start work lacked a good analytical basis.
- 5 • The time for which the eight units could provide black start capability was limited
- 6 because of earlier decisions and delays, giving them a limited time to prove used and
- 7 useful.

8
9 Liberty stated:

10
11 Taking these actions relating to the decision process for black start into consideration,
12 Liberty believes that they did not fall within the range of reasonable alternatives. We
13 emphasize that all these items have been evaluated and judged on the basis of what was
14 known or should have been known at the time. Our conclusions are not based on the failure
15 of Hydro's decisions; rather they are based on the inappropriateness of those decisions at
16 the time they were made.¹⁵

17
18 Hydro disagreed with Liberty's findings that the steps it took between 2010 and 2014 were not
19 appropriate based on the information available to Hydro at the relevant time periods. According
20 to Hydro, its consultant was requested to conduct a condition assessment and
21 refurbishment/replacement study for the Holyrood black start gas turbine generator and the
22 balance of the plant equipment. The consultant was not asked to examine the potential use of
23 Hardwoods for black start or consider the potential installation by Hydro of a new 50 MW
24 combustion turbine in 2015. Hydro submitted it acted prudently in obtaining this study to
25 provide additional information to Hydro in its decision making. Hydro's position was supported
26 by La Capra:

27
28 Hydro's principal shortcoming regarding its decision on Black Start is at most not doing
29 more to keep the Board informed of its decision making process and its ultimate decision
30 to accept the loss of on-site "Black Start" on an interim basis until a new CT could be
31 placed in-service at Holyrood as the permanent solution. Although there were no
32 established protocols for such communication at the time, it is reasonable to conclude that
33 given the Board's oversight role, more should have been done to keep them informed on a
34 matter that had the potential to impact system reliability.¹⁶

35
36 La Capra stated Hydro's management appears to have decided to accept the risk of not having
37 black start capability at Holyrood based on the limited times black start has been needed
38 balanced against the cost of providing this capability. La Capra also noted that Hydro's
39 management was aware of the situation and had been taking specific actions to both maintain the
40 black start capability at Holyrood and improve the reliability of Hardwoods. La Capra pointed
41 out that, even with black start capability at Holyrood, the January 2013 outage duration would
42 only have been reduced by about 11 hours, since the units at Holyrood would have been kept
43 warm. However, without the transmission system, on-site generation would not have contributed
44 to the restoration of customers' power.

¹⁵ Liberty's Prudence Report, page 52

¹⁶ Hydro's Reply Evidence, Appendix B, page 13

1 In its reply evidence Liberty reiterated that its finding of imprudence in this case was based
 2 primarily on Hydro's decision to forego black start at Holyrood for a prolonged period while
 3 relying on the Hardwoods gas turbine for black start capability. Liberty does not consider that a
 4 reasonable alternative to have pursued and, from a technical perspective, the decision to rely on
 5 Hardwoods was plainly wrong. Liberty also stated that black start at Hardwoods is not equivalent
 6 to black start at Holyrood, since there is no way to get Hardwoods power to Holyrood in the
 7 event of a transmission system failure. The events of January 2013 demonstrated that. According
 8 to Liberty, the Hardwoods solution would not be considered a black start solution by a
 9 reasonable utility manager and, even if off-site black start capability were possible, the forced
 10 outage probability for the Hardwoods gas turbine from 2008 to 2012 meant that it would not
 11 have been available for black start over 25 percent of the time. Liberty added:

12
 13 There is no evidence that Hydro conducted an accurate cost versus risk assessment in
 14 deciding to use the Hardwoods CT for black start capability. In fact, we know that Hydro
 15 apparently did not understand the risks and therefore could not have conducted an accurate
 16 assessment. In any event, Hardwoods was not a viable solution so that its costs were
 17 irrelevant.¹⁷

18
 19 La Capra took exception to Liberty's characterization of specific statements in its report, stating
 20 that Liberty failed to appropriately acknowledge that Hydro had black start plans for the Avalon
 21 Peninsula and the Holyrood station. La Capra agreed with Liberty's position that a black start
 22 plan for Holyrood that relies on grid-supplied energy, including Hardwoods, is not equivalent to
 23 having on-site generation at Holyrood. However, La Capra stated, "operating under Hydro's
 24 Black Start plan using Hardwoods in the interim, as part of an overall black start plan, to black
 25 start the Avalon Peninsula cannot be judged as an unreasonable decision made by Hydro staff."¹⁸
 26 La Capra agreed that Hydro's decision not to have on-site black start capability at Holyrood led
 27 to an extension of the January 2013 outage, but did not accept Liberty's position that Hydro
 28 knowingly took inappropriate risks in making this decision. According to La Capra:

29
 30 Hydro staff made a decision, after considering the risks, that relying on Hardwoods as part
 31 of an overall plan to black start Holyrood and the Avalon Peninsula on an interim basis was
 32 reasonable given their collective knowledge and experience of the electric system. We
 33 have seen nothing in Liberty's Final Report or Reply which suggests otherwise.¹⁹

34 35 6.2.3 Sunnyside Terminal Station Replacement Equipment

36
 37 A failure of the Sunnyside T1 transformer combined with the Sunnyside B1L03 air-blast circuit
 38 breaker's failure to open in response to the transformer fault led to a widespread outage on the
 39 Island Interconnected system beginning on the morning of January 4, 2014. A delay in clearing
 40 the transformer fault resulted in a transformer fire that damaged nearby equipment, which
 41 delayed restoration of the Sunnyside terminal station that day. Hydro replaced the fire-damaged
 42 equipment and installed an additional 230 kV breaker with breaker failure protection. The 230
 43 kV protection was also enhanced for the T1 transformer by installing a 230 kV breaker dedicated

¹⁷ Liberty's Reply Evidence, page 20

¹⁸ Hydro's Surrebuttal Evidence, Appendix B, page 5

¹⁹ Ibid., page 7

1 solely for the T1 transformer and by installing breaker failure protection for this new 230 kV
2 breaker.

3
4 Liberty reviewed the following decisions and actions of Hydro with respect to the damage to the
5 Sunnyside T1 transformer and the B1L03 breaker failures:²⁰

- 6
- 7 • the decision not to provide the T1 transformer with 230 kV breaker protection
- 8 • the decision to install a 230 kV T1 transformer breaker with breaker failure protection
- 9 following the January 2014 outages
- 10 • the failure to adhere to Hydro's own established maintenance cycles for transformers and
- 11 air-blast circuit breakers
- 12 • uncertainty about the causes of the B1L03 breaker failure
- 13 • the failure to follow up on the causes of an increase in acetylene gas observed in the
- 14 Sunnyside T1 transformer
- 15

16 According to Liberty, good utility practice calls for the installation of breaker failure protection
17 for critical transformers; this protection was not in place for the 230 kV circuit breakers at
18 Sunnyside. However, Liberty concluded that the absence of breaker failure protection was not
19 material to its finding of imprudence in this case. Instead, it determined that the equipment
20 failures at Sunnyside were the result of imprudently executed maintenance cycles for
21 transformers and breakers. Both the Sunnyside T1 transformer and the B1L03 breaker were
22 overdue for maintenance and, according to Liberty, neither was on a schedule for maintenance
23 work. The B1L03 breaker was scheduled for replacement in 2015, and in January 2014 it was
24 overdue for its regular maintenance by five months. The T1 transformer was overdue for its
25 regular maintenance by three months.

26
27 While Hydro accepts the standard utility practice of six-year maintenance cycles for transformers
28 and breakers, Liberty found that Hydro "has not, however, come close to following them".²¹
29 Hydro permitted widespread and systemic maintenance delays and backlogs to exist up to the
30 January 2014 outage. Liberty stated:

31
32 The breadth of Hydro's maintenance deferrals and the lack of identified dates for
33 performing overdue maintenance on the T1 transformer and the B1L03 air blast circuit
34 breaker call into question how long Hydro was willing to let them go without the attention
35 they needed.²²

36
37 Liberty concluded that Hydro's lack of adherence to its established maintenance standards in
38 conjunction with equipment age and a lack of breaker protection increased the risk of equipment
39 failure and "deprived the Company of the opportunity to identify and address the causes of the
40 transformer and breaker failures before they occurred".²³

²⁰ Liberty's Prudence Report, page 24

²¹ Ibid., page 26

²² Ibid., page 27

²³ Ibid., page 24

1 Liberty acknowledged that the specific cause of the failure of Sunnyside breaker B1L03 has not
2 been determined and that suggested causes have no supporting evidence. However, Liberty noted
3 a strong causal connection between conducting maintenance and avoiding malfunctions:

4
5 Where causation is not determinable, despite good faith and capable effort, it is sufficient
6 to make the categorical level connection, as exists here, between conducting maintenance
7 and avoiding malfunction. To assign no consequence of imprudence under such
8 circumstances, when adverse consequences have occurred, has the inevitable effect of
9 lessening diligence and care in operating facilities required to serve the public and for
10 which customers also bear cost responsibility.²⁴
11

12 With respect to the Sunnyside T1 transformer, Liberty noted that Hydro found that a bushing
13 failure had caused the transformer fault. Liberty states that power factor testing that would have
14 been completed during the 2013 preventative maintenance work might have provided the
15 opportunity to identify and correct the defective bushing before the transformer failed. Liberty
16 also found that Hydro's failure to undertake the investigative sampling recommended by its
17 laboratory of higher acetylene gas levels from this transformer might have pointed to pending
18 transformer failure. According to Liberty, good utility practice requires frequent and close
19 monitoring of suspicious levels of acetylene gas to determine whether to perform maintenance
20 work. Hydro, Liberty noted, did not take action because it assumed that oil leaking from the tap
21 changer compartment into the transformer oil had caused the acetylene gas level increase.
22 Liberty stated that this deprived Hydro of another opportunity to identify and address
23 transformer failure risks before the January 2014 outages occurred.
24

25 Hydro disagreed with Liberty's imprudence finding and made the following observations:

- 26
- 27 • Hydro had no indication of any specific concern with the Sunnyside T1 transformer or
 - 28 the breaker B1L03 that required time-sensitive intervention and strict adherence to the
 - 29 general six-year maintenance cycle.
 - 30 • The T1 transformer was only outside the maintenance cycle by three months at the time
 - 31 of the incident; the breaker B1L03 was outside by five months.
 - 32 • The delay in carrying out preventative maintenance within the six-year cycle was due to
 - 33 Hydro's requirement to conduct more critical maintenance activities.
 - 34 • Power factor tests did not indicate a concern with the bushings, and preventative
 - 35 maintenance identified bushing defects in only 2 percent of the transformers since 2000.
 - 36 • Gassing levels were not an identified cause of problems with the T1 transformer, and
 - 37 Hydro's actions to monitor gas levels were both reasonable and appropriate with the
 - 38 information available at the time.
 - 39 • The failure of the Sunnyside T1 transformer would have caused limited system issues.
 - 40 • Breaker B1L03 had been function-tested in 2011 and operated successfully in August
 - 41 2013; post-incident testing could not replicate the problem or identify any incomplete
 - 42 maintenance that might have caused the breaker to fail.
 - 43 • Sustained cold weather during much of the outage period could have affected circuit
 - 44 breaker performance.

²⁴ Ibid., page 28

1 Hydro noted that no causal connection has been found between the failure of the equipment in
 2 question and the fact that some of the equipment had not undergone the maintenance that was
 3 called for on the schedule at the time. Hydro disagreed with Liberty's position that, in the
 4 absence of evidence of some other cause, it is appropriate to associate the equipment failure with
 5 the lack of appropriate maintenance. According to Hydro it would be inappropriate to ascribe an
 6 unproven cause to any problem simply because the actual cause has not been determined,
 7 particularly where efforts were made to find the cause. Even where a finding of imprudence is
 8 made, Hydro stated that a cost disallowance cannot be justified unless the conduct brought into
 9 question was the real and proximate cause of additional cost to customers, which Hydro said
 10 requires proof of causation.

11
 12 In its reply evidence, Liberty asserted that the "widespread deferral of preventative maintenance
 13 work by Hydro was not well planned, carefully executed, or consistent with good utility
 14 practice."²⁵ It observed that:

- 15
- 16 • the equipment, particularly the air-blast circuit breakers, was old and therefore required
- 17 increased, not decreased, maintenance
- 18 • there is no evidentiary basis for concluding that Hydro's decision to abandon the catch-up
- 19 program for its backlogged maintenance in favour of other priorities resulted from a
- 20 structured assessment of risks, priorities, or likely consequences
- 21 • dates were not established for finally performing the deferred maintenance for breakers
- 22 and transformers
- 23

24 Liberty also stated that Hydro's reply evidence failed to make a critical distinction between
 25 preventative and corrective maintenance, noting that problems and concerns identified during
 26 preventative maintenance provide part of the basis for prioritizing corrective work and that
 27 deferral of preventative maintenance "necessarily involves deferring work without having taken
 28 appropriate actions designed to understand potential consequences."²⁶ Liberty suggested that
 29 Hydro's claim that its deferral of preventative maintenance was programmatic is not consistent
 30 with the available information, which shows "no evidence of any form of structured or
 31 significant analysis of the risks of deferring maintenance versus the rewards of redirecting
 32 expenditures elsewhere."²⁷ Liberty stated:

33
 34 Good utility practice requires that a utility routinely and consistently meet preventative
 35 maintenance schedules, with, at most occasional and moderate exception, not the ongoing,
 36 widespread, and date-unconstrained basis on which Hydro deferred preventative
 37 maintenance work. Good practice does not support deferral of preventative maintenance on
 38 a routine basis to accommodate capital or emergent work priorities. A utility should not
 39 treat preventive maintenance as having "lesser priority."²⁸

40
 41 Regarding Hydro's response to its findings on the Sunnyside transformer T1 failure, Liberty
 42 noted the following:

²⁵ Liberty's Reply Evidence, page 2

²⁶ Ibid., page 4

²⁷ Ibid., page 8

²⁸ Ibid., page 4

- 1 • The acceptable power factor testing referred to by Hydro occurred in 2007, outside the
2 applicable preventative maintenance cycle.
- 3 • The 2 percent bushing defect occurrence cited by Hydro is not as significant as the fact
4 that 14 such defects were observed, which confirms that they present real risk and can be
5 identified, making adherence to preventative maintenance cycles essential.
- 6 • The increase in gas levels for transformer T1 required action since it provides an
7 indicator of potential problems; not acting because gas exists in other transformers is
8 imprudent.

9
10 Liberty also responded to Hydro's statement that sustained cold weather during the outage period
11 can affect circuit breaker performance. Liberty acknowledged that cold weather conditions
12 existed but noted that this is a frequent occurrence in the region and should be considered in
13 designing and executing preventative maintenance strategies. Liberty stated that Hydro's
14 information indicates that there is no basis to attribute this breaker failure to cold weather.

15
16 In reply to Hydro's position on the lack of a finding on a direct linkage between maintenance
17 deferrals and equipment failures, Liberty noted:

- 18
19 • Utilities perform preventive maintenance according to established and planned
20 scopes and schedules because maintenance reduces the risk of operational failures
21 of equipment whose operation is critical to maintaining service
- 22 • Old air-blast circuit breakers require that maintenance become more diligent, not
23 more "lax"
- 24 • Hydro's deferral of maintenance remains even today unsupported by any
25 discernible analysis of risks, cost/benefits, alternatives, or other structured
26 deliberation
- 27 • Deferral was widespread, and in the case of the breakers, it occurred even though
28 Hydro had first made, but then abandoned, a plan to catch up on work already
29 behind schedule in 2010
- 30 • During the early January 2014 events, not one, but multiple pieces of equipment
31 late for preventative maintenance failed; some were far behind schedule. The
32 equipment involved was operating well beyond its expected life, thus making even
33 a short duration past generally applicable cycles a matter of concern
- 34 • Hydro, which owns and operates the failed equipment cannot, after more than a
35 year and a half and after study by external consultants, determine the cause of
36 failure supported by more than speculation
- 37 • With respect to the Sunnyside T1 transformer, its bushings' problems are among
38 the issues that scheduled preventative maintenance is designed to detect and
39 prevent²⁹

40
41 Liberty concluded that the equipment overdue for preventative maintenance failed in January
42 2014, causing extensive power outages.

43
44 In its surrebuttal, Hydro countered that the record shows that it clearly distinguishes between
45 preventative and corrective maintenance and that its decisions to defer preventative maintenance
46 were based on specific criteria and on the informed engineering judgment of individuals most

²⁹ Liberty's Reply Evidence, page 5

1 familiar with the assets and Hydro's system. Hydro also stated that it deferred preventative
2 maintenance only when it was necessary to address unplanned corrective maintenance work and
3 to ensure resources were deployed on the most critical work for customer supply. Hydro did not
4 consider it normal utility practice to always provide the necessary resources to adhere to
5 preventative maintenance cycles in addition to addressing emergent and critical capital work and
6 argued that "the simple fact of a deferral outside of a regular preventative maintenance cycle is
7 not an imprudent action."³⁰

8
9 Hydro disagreed with Liberty's view that its maintenance practices do not account for the age of
10 its assets and pointed to its condition assessments, increased capital spending, and breaker
11 replacement program as examples of its proactive approach to managing its aging asset base. It
12 drew attention to its catch-up plan to address maintenance backlogs and noted that it remains on
13 track to complete this work within the planned window. Hydro disagreed with Liberty's view
14 that finding an opportune time to take equipment outages is the only reason to deviate from a
15 preventative maintenance schedule, regardless of the nature of the break-in work that may arise
16 or the costs of critical work and preventative maintenance. According to Hydro, "This is
17 especially the case where such decisions are being made by those individuals with the experience
18 and knowledge of the assets to make reasoned engineering decisions."³¹

19
20 Regarding Liberty's comments about cold weather and preventative maintenance of the B1L03
21 breaker, Hydro asserted that the record does not indicate it ignored weather conditions in the
22 service area. According to Hydro, it did not conclude that cold weather did not necessarily cause
23 the breaker failure but it can affect breaker performance and should be taken into account,
24 especially where the breakers have operated correctly in the past. Hydro noted Liberty's previous
25 investigation findings that substation breakers on Newfoundland Power's system failed to
26 operate because the cold weather had caused "stuck" mechanisms.

27
28 In the case of the Sunnyside transformer T1, Hydro disagreed with Liberty that the maintenance
29 of this transformer was given "essentially no priority." Hydro contended that the record is clear
30 that transformer T1 was only overdue for maintenance by about three months and would have
31 been serviced in the upcoming year. Hydro restated that the failure of this transformer on its own
32 would have caused limited system issues. As for preventative maintenance and testing issues,
33 Hydro noted that the post-incident review did not show that preventative maintenance, including
34 the power factor testing, would have identified the bushing problem or resulted in the bushing's
35 replacement. Hydro also stated there is no relationship between higher levels of acetylene gas
36 and the bushing problem and that acetylene levels on this transformer have varied since the
37 1990s.

38
39 Hydro denied Liberty's claim that the record reveals "a widespread failure to adhere to prudent
40 practice." Since specific causes of the key issues related to the January 2014 outage could not be
41 determined, Hydro disagreed that a cause/effect association can be made between the equipment
42 failures and the outages. Hydro submitted that Liberty's position would require putting Hydro

³⁰ Hydro's Surrebuttal Evidence, page 3

³¹ Ibid., page 4

1 “to the test of proving a negative in order to avoid a disallowance of costs.”³² According to
2 Hydro, this standard does not have regulatory support.

3 4 6.2.4 Western Avalon T5 Tap Changer Replacement and Transformer Repairs

5
6 Following the Sunnyside transformer failure and the system-wide outage on January 4, 2014,
7 Hydro attempted to restore the Western Avalon terminal station. The Western Avalon T5
8 transformer was energized but the 230 kV B1L37 breaker tripped almost immediately, with no
9 indication of cause. Subsequent attempts to close the breaker were not successful, and the T5
10 transformer was energized a few hours later using another 230 kV breaker (L01L03). The T5
11 transformer failed again and the lockout relay tripped the transformer offline. This incident
12 damaged the tap changer for the T5 transformer at the Western Avalon terminal station.³³
13 Hydro’s investigation found that a phase-to-phase fault occurred across the Western Avalon T5
14 transformer load tap changer diverter switch. This fault also damaged the T5 transformer.
15 Subsequent investigation by Hydro attributed the cause of the T5 tap changer failure to the
16 failure of the 230 kV breaker B1L37 to close on one phase. Conditions or circumstances
17 associated with the T5 transformer itself were not found to have contributed to the tap changer
18 damage. The on-load tap changer on transformer T5 at the Western Avalon terminal station was
19 replaced in 2014, and the transformer windings were cleaned.

20
21 As with its finding on the Sunnyside breaker B1L03, Liberty concluded that imprudent
22 maintenance practices for air-blast circuit breakers contributed to the failure of the B1L37
23 breaker during the January 4, 2014 outage. The B1L37 breaker was installed in 1968 and
24 scheduled for replacement in 2018. The breaker was overhauled in 2005 and was subject to
25 Hydro’s six-year breaker maintenance cycle. However, Liberty noted that as of January 4, 2014
26 the B1L37 breaker was overdue for maintenance by about two and a half years.

27
28 Hydro noted that it could not replicate the breaker malfunction or identify its cause during
29 subsequent preventative maintenance on the breaker, and that the breaker operated successfully
30 following the event. Hydro referred to its position on the Sunnyside replacement equipment,
31 stating that it does not understand Liberty’s position to be the accepted regulatory standard,
32 especially where deferred maintenance occurred to prioritize more critical work. Hydro reiterated
33 that the breaker B1L37 operated successfully following the event and there was no evidence as
34 to why this breaker did not operate on that day, although its consultant did indicate that cold
35 weather may have affected the operation of the air-blast circuit breakers.

36 37 6.2.5 Overhauls of the Sunnyside B1L03 and the Holyrood B1L17 Breakers

38
39 On January 5, 2014, during system-wide outages caused by equipment problems at the
40 Sunnyside and Western Avalon terminal stations, the Holyrood breaker B1L17 malfunctioned,
41 causing further widespread outages. Subsequent investigation of the breaker found water, ice,
42 and rust inside the breaker’s sealed elements, which caused a control rod to stick. Hydro

³² Ibid.

³³ Liberty noted that tap changers are installed on virtually all transformers above 10 MVA to provide for voltage regulation.

1 undertook emergency repairs on the Sunnyside and Holyrood breakers in April 2014, and both
2 were replaced in October 2014.

3
4 Liberty found that the malfunction of Holyrood breaker B1L17 resulted not from deferred
5 maintenance but from a work procedure that permitted water to enter the breaker. According to
6 Liberty, Hydro had scheduled the breaker B1L17 for overhaul in 2015 and replacement in 2016.
7 However, during the January 2013 outages at Holyrood, salt contamination caused an insulator
8 flashover in this breaker. It was disassembled in February 2013; a protective rubber coating was
9 applied on its insulators and one of the interrupting heads was overhauled. The breaker was
10 reassembled on March 23, 2013 and underwent a six-year maintenance test on April 4, 2013.
11 Liberty noted that Hydro did apply waterproof covers during the work, which at the time were
12 considered sufficient to prevent the ingress of water. However, Liberty noted that these covers
13 remained in place, exposed to the weather, for about a month while Hydro addressed other more
14 critical work commitments before applying the rubber coating on the breaker insulators in the
15 shop. According to Liberty, a limit of a few days for this temporary measure would be
16 reasonable. Hydro did not take appropriate action to protect the equipment for the extended
17 period. Liberty noted that Hydro inspected the top of the receiver tanks for water before
18 reassembly but did not test the compressed air in the tank for moisture. Water freezing in the
19 receiver tank caused the breaker to mechanically seize on one phase during the January 2014
20 outage, resulting in breaker malfunction.

21
22 Liberty concluded that Hydro's actions during the B1L17 insulator coating project did not
23 conform to good utility practice and that Hydro had failed to take reasonable measures to protect
24 the equipment from the weather. Liberty found Hydro's decisions and actions to be imprudent in
25 this case because it failed to take necessary action to ensure the effectiveness of the covers used
26 to prevent the ingress of water into the breaker.

27
28 In its reply Hydro acknowledged that water apparently did somehow enter the tank:

29
30 In hindsight the cover appeared to have been inadequate to prevent moisture entering the
31 tank. However, Hydro had no reason to believe that this would happen at the time, and it
32 had taken prudent steps to prevent exposure to the weather for the duration that the breaker
33 and interrupters were removed. Hydro knew that the equipment should be protected from
34 the weather, took appropriate steps to do so, and had no indication at the relevant time that
35 there was any issue with the actions it had taken.³⁴

36
37 Hydro also noted that the breaker was tested thoroughly after being reassembled and inspected
38 visually prior to the re-installation of the insulation columns and interrupting heads. Hydro
39 further noted that it exercises its breakers prior to putting them back into service, using clean, dry
40 air from the compressed air system and that it has been performing regular dew point tests on its
41 compressed air system, consistent with the practice of other utilities. According to Hydro, based
42 on its prior experience and testing practices, it had no reason to check for moisture in the
43 receiving tank. Hydro submitted that the record does not support Liberty's finding that its actions
44 with respect to the Holyrood B1L17 breaker were imprudent.

³⁴ Hydro's Reply Evidence, pages 17-18

1 Hydro advised that it has since developed a procedure to put new drain valves at the bottom of
2 the compressed air tank on each phase of the breaker, and crews now open the drain valve as an
3 additional check for moisture.
4

5 6.2.6 Extraordinary Transformer and Breaker Maintenance

6

7 In 2010 Hydro established a program to bring its overdue planned maintenance work back on
8 track to its six-year cycle by the end of 2015. The plan was to complete the six-year maintenance
9 routine each year for one-sixth of the air-blast circuit breakers and transformers. However,
10 because of deferrals in each subsequent year, Hydro had not made substantial progress towards
11 reducing the maintenance backlog prior to the January 2014 outages. Following these outages,
12 Hydro accelerated its maintenance for transformers and air-blast circuit breakers to bring its
13 program back on track and expected that all maintenance would be completed in 2014 and 2015.
14

15 As discussed previously, Liberty found that Hydro's decisions to defer necessary preventative
16 maintenance work in the years leading up the January 2014 outage events was imprudent:
17

18 Prudent management would have maintained a cycle conforming to the six-years adopted
19 by Hydro as its standard. Had Hydro acted prudently in executing this cycle, it would have
20 needed no acceleration in 2014 and 2015. Thus, in the absence of imprudence, one would
21 expect 2015 work to include only a normal amount of maintenance activity. Instead, Hydro
22 plans to work substantially above that normal yearly amount, and has included costs for
23 such increased work in its GRA filing. Similarly, 2014 work above normal yearly levels
24 caused Hydro to incur substantial costs in that year.³⁵
25

26 In its response Hydro stated that it was unable to complete its 2010 planned target to bring the
27 maintenance of its breakers and transformers in line with its maintenance cycle by the end of
28 2015 because it needed to defer certain maintenance work to deal with other critical issues. As a
29 result, Hydro implemented a plan with associated costs to accelerate this work. Hydro submitted
30 that Liberty's objection to recovery of these additional costs "does not take account of the fact
31 that in order for Hydro to have complied strictly with its maintenance cycle Hydro would have
32 had to incur additional costs in prior years as well as in the 2014 and 2015 test years which were
33 the last two years of Hydro's recovery plan."³⁶ Hydro understood that both the Board and Liberty
34 supported its efforts to bring all transformer and air-blast circuit maintenance current within the
35 applicable maintenance cycles.
36

37 Hydro also stated that, while its annual budgeting process includes an allowance for break-in
38 work, 2013 and 2014 brought extensive unanticipated requirements. Hydro cited the need to
39 replace the Hardwoods gas turbine alternator as an example of critical work to which resources
40 had to be redeployed, since this is a critical winter readiness asset. Hydro disagreed with Liberty
41 that it is normal utility practice to always provide the resources necessary to adhere to
42 preventative maintenance schedules in addition to addressing emergent work and critical capital
43 work. This is obviously the goal but, according to Hydro:

³⁵ Liberty's Prudence Report, page 40

³⁶ Hydro's Reply Evidence, page 19

1 The very nature of corrective and break-in work that may arise from time to time is that it
2 is unplanned, and therefore engineering judgment needs to be utilized on an ongoing real
3 time basis to determine the most critical work to be done for reliability purposes. The
4 simple fact of deferral outside of a regular preventative maintenance cycle is not an
5 imprudent action.³⁷
6

7 Hydro declared that it did not, as Liberty claimed, abandon its six-year catch-up plan for
8 preventative maintenance, but that more critical reliability issues arose in that time which
9 resulted in the deferral of certain preventative maintenance procedures. Hydro stated that the
10 continued intent was ensuring timely completion of the catch-up program and that its approach
11 “balances reliability considerations, resources and cost to provide least-cost reliable service to its
12 customers, with the focus on ensuring the most critical reliability work is performed on a priority
13 basis”.³⁸
14

15 6.2.7 Additional Supply-Related Costs (Partial)

16

17 The generation shortfall and subsequent equipment failures on the Island Interconnected system
18 in late December 2013 and early January 2014 led to significant capacity constraints on the
19 system. Supply challenges persisted for the rest of the winter. As a result, Hydro relied on more
20 expensive gas turbines and diesels for energy and had to call for replacement capacity from
21 Corner Brook Pulp and Paper under a capacity assistance agreement. This resulted in additional
22 supply costs of \$9,650,000 for the first quarter of 2014, which have, with the approval of the
23 Board, been deferred with recovery to be determined following further review.
24

25 Liberty examined Hydro’s actions and decisions with respect to the increased supply costs to
26 assess whether the driving factors behind the added costs were substantially out of Hydro’s
27 control and whether the capacity agreement with Corner Brook Pulp and Paper was appropriate.
28 Liberty addressed the increased supply costs associated with the January 2014 outages and the
29 post-outage costs separately, reflecting that the problems associated with the January outages
30 were unique and contributed to the added supply costs in a different way.
31

32 Based on its review of Hydro’s supply planning decisions and actions before the January 2014
33 outages Liberty found that the planning processes contributed to the shortage of supply but were
34 prudent. Liberty also found that, while the loss of 100 MW at Holyrood Unit 3 due to the failure
35 of a forced-draft fan motor in late 2013 contributed to the supply shortage, Hydro did not act
36 imprudently in addressing the failure of that motor. However, Liberty did find that the failure of
37 breaker B1L17 at Holyrood as a result of imprudent maintenance practices contributed to the loss
38 of supply from Unit 1 during the period January 5-8, 2014. Liberty concluded that the same
39 failure caused the inability to operate Unit 1 and the need to find more expensive sources of
40 replacement power.
41

42 Liberty examined the impact of unit availability and weather on higher supply costs during the
43 post-outage period. It concluded that the unavailability of units had little impact on supply costs
44 for the period and that most of the supply replacement costs resulted from sustained extreme cold
45 conditions which, according to Liberty, were extraordinary, unexpected, and outside Hydro’s

³⁷ Hydro’s Surrebuttal Evidence, page 3

³⁸ Ibid.

1 control. As a result, Liberty found no evidence of imprudence contributing to higher supply costs
2 during the post-outage period.

3
4 Liberty also found no reason to question the prudence of Hydro's pursuing a capacity assistance
5 agreement with Corner Brook Pulp and Paper. According to Liberty, Hydro had no choice but to
6 obtain all the supply or the demand reduction that it could. Without the additional load from
7 Corner Brook Pulp and Paper, rotating blackouts would have been more extensive. Liberty
8 determined that the interruptible load contributed significantly to system reliability in this period.

9
10 Liberty concluded that the additional capacity and energy costs Hydro incurred in 2014 were
11 prudent, with the exception of costs incurred during January 5-8, 2014, when Hydro's imprudent
12 maintenance practices caused the breaker B1L17 failure and Holyrood Unit 1 generation was
13 unavailable. Liberty acknowledged that there is no straightforward process by which to calculate
14 the cost attributable to the unavailability of Holyrood Unit 1 during that period and that costs on
15 any day are affected by the unavailable capacity, temperature, load, and outages. Liberty used a
16 method based on averaging supply costs for the following four days and subtracting from the
17 actual supply costs when Unit 1 was offline. Using this methodology Liberty estimated Hydro's
18 imprudence created additional supply costs of \$2,189,110 during the period January 5-8, 2014.

19
20 Hydro disputed both Liberty's method of calculating disallowances and their argument that
21 added costs should be disallowed in relation to the unavailability of Holyrood Unit 1 due to
22 breaker B1L17 failure. According to Hydro, prudence-related disallowances cannot be made on
23 rough estimates. Hydro proposed alternate calculations that average the costs for the first and last
24 four days of the period in question, which gives an estimate of replacement costs of \$984,674.
25 Hydro also noted that there is double-counting in Liberty's estimate of \$477,647, as this amount
26 has been included in the Holyrood Unit 1 turbine failure imprudence findings.

27
28 In its reply evidence, Liberty noted that Hydro revised the underlying data and that its estimate
29 of replacement costs for the four-day period January 5-8, 2014 while Unit 1 was offline is now
30 \$2,204,317. Liberty acknowledged that there are better methods for calculating the replacement
31 supply costs but they require better information, which Hydro cannot produce. As for Hydro's
32 alternate method, Liberty noted that this estimate uses data for the period January 1-12, 2014, the
33 first four days of which were "particularly chaotic, characterized by extreme temperatures,
34 supply shortages, and manual load shedding."³⁹ Liberty submitted that its use of the last four
35 days is more representative and more accurate. Liberty accepted Hydro's evidence on the issue
36 of double-counting of costs.

37
38 Hydro responded that the lack of detailed data referenced by Liberty might suggest that a
39 different approach is warranted but does not validate Liberty's proposed rough estimate. Hydro
40 submitted that its proposal to average the costs for the four-day period before and after the
41 outage is more balanced and reasonable. Hydro also submitted that a disallowance cannot be
42 associated with a period for which the unit was available, as was the case for part of the day on
43 January 8, 2014.⁴⁰

³⁹ Liberty's Reply Evidence, page 27

⁴⁰ Hydro's Surrebuttal Evidence, page 11

6.2.8 Labrador City Terminal Station Project Costs

1
2
3 According to Liberty Hydro's execution of this project was affected by planning, design, and
4 estimating errors. In particular, Hydro did not take appropriate account of field conditions in its
5 2007 conceptual plan on which the original project scope was based. Delays in construction
6 resulted when issues related to the condition of existing terminal station facilities, which were
7 constructed by the mining company, required the installation of new stations built according to
8 Hydro's standards and requirements. Challenges related to safety, outage planning, and land
9 acquisition, along with the omission of significant work items from the conceptual plan and
10 estimate, also resulted in delays and increased costs.

11
12 Liberty found that the errors and omissions in project planning, design, and estimating for this
13 project exceeded the range of actions that a utility would reasonably have undertaken for such a
14 project. Liberty concluded that Hydro had acted imprudently in planning and executing this
15 project but that the costs would not have been materially different for 2011 or 2013 completion
16 dates.

17
18 Hydro acknowledged that the project planning, design, and estimation could have been carried
19 out more efficiently but noted that its processes have improved since then. Hydro agreed with
20 Liberty's conclusion that the expenditures were appropriate and justified. No further evidence
21 was filed.

22 23 **7.0 Testimonial Evidence**

24
25 Over a two-week period, during the public hearing of Hydro's amended general rate application,
26 witnesses for both Liberty and Hydro testified. This testimonial evidence focused primarily on
27 the projects Liberty considered imprudent. Danny Dumaresque questioned Hydro's witnesses on
28 the procurement and installation of the new gas turbine at Holyrood, which was found by Liberty
29 to be prudent. The witnesses provided additional clarification and information on the projects
30 under review. Hydro also provided written responses to several undertakings.

31
32 The Board has not provided a summary of the testimonial evidence here, but will refer to it
33 where appropriate in its discussion and findings in the next section.

34 35 **8.0 Submissions**

36
37 In written submissions the Consumer Advocate, Newfoundland Power, and Vale generally
38 supported Liberty's prudence findings for all projects. The Industrial Customer Group provided
39 submissions on the Holyrood Unit 1 turbine failure and black start, supporting Liberty's findings
40 on these projects. Danny Dumaresque offered a written submission on Hydro's efforts related to
41 the purchase and installation of the new combustion turbine at Holyrood in which he opposed
42 Liberty's findings that Hydro's decisions and actions were prudent.

43
44 Hydro's written submission addressed Liberty's findings and the testimonial evidence for those
45 projects found by Liberty to be imprudent. Hydro responded to the intervenors' submissions in
46 its own reply submission.

1 The submissions on prudence are summarized below. Further submissions on the cost
2 consequences of imprudence are discussed in Section 14.0.

3 4 **8.1 Consumer Advocate**

5
6 The Consumer Advocate argued that Liberty's evidence demonstrates that the necessity and
7 frequency of preventative maintenance increase as equipment ages and that any deferral of this
8 maintenance is risky and defeats its purpose. According to the Consumer Advocate, the evidence
9 shows that Hydro appreciates the need for consistent preventative maintenance. He noted that in
10 2010 Hydro implemented a catch-up plan to address the backlog of outstanding transformer
11 maintenance, but the backlog actually increased. Hydro also moved from a six- to a four-year
12 maintenance cycle for breakers following the 2014 outages and implemented a plan to replace all
13 air-blast circuit breakers by 2020. The Consumer Advocate submitted that Hydro's evidence
14 shows Hydro managers are more concerned with budget than reliability. Hydro's deferral of this
15 maintenance to undertake other works deemed higher priority, he argued, exposes customers to
16 increased risks to their service. He submitted that Hydro's mindset changed only after the
17 January 2014 outages.

18
19 The Consumer Advocate responded to Hydro's position that Liberty failed to establish a direct
20 link between deferral of preventative maintenance and equipment-related failure. The Consumer
21 Advocate presented a review of the laws of causation used in negligence cases, with reference to
22 specific case law. He contended that this review highlighted the concept that an "inference of
23 causation" may be established against a defendant where the evidential burden is too great for a
24 plaintiff to prove causation.⁴¹

25
26 The Consumer Advocate submitted that Liberty's findings on prudence for black start at
27 Holyrood are correct but that the record shows La Capra did not fully understand some aspects of
28 Hydro's black start plan. He pointed to specific statements Hydro made as evidence that it
29 understood the criticality of black start at Holyrood well before 2010:

30
31 The continued reliance on Hardwoods to facilitate black start increased the risk of another
32 incident as had occurred in 2013. To rely on a source of black start that had a utilization
33 forced outage probability (UFOP) which averaged 26 percent unavailability and to keep
34 consumers at risk of failure to obtain power from Holyrood as a result of the inability to
35 black start for a period of approximately 52 months is inconsistent with good utility
36 practice and, the Consumer Advocate submits, is imprudent. The Consumer Advocate
37 submits that any costs related to the leasing and installing of the eight 1.25 MW diesel
38 generators should be removed from any permitted 2014 revenue deficiency recovery and
39 the 2015 test year. Otherwise Hydro's imprudence will be without consequence to Hydro.⁴²

40 41 **8.2 Newfoundland Power**

42
43 Newfoundland Power submitted that the evidence provides a substantial basis for the Board to
44 conclude that Hydro's systematic failure to adhere to appropriate maintenance cycles for several

⁴¹ Full analysis is set out in the Consumer Advocate's Final Submission, pages 17-20 and discussed further in Section 11.0 of this Decision and Order.

⁴² Consumer Advocate's Submission, page 30

1 years resulted in the failure of the Sunnyside transformer, the Western Avalon terminal station
2 T5 tap changer, and the Sunnyside B1L03 and Holyrood B1L17 breakers. Newfoundland Power
3 argued that these failures caused Hydro to incur unnecessary capital and operating costs in
4 replacement of some equipment, extraordinary repairs to other equipment, and emergency power
5 supply. Newfoundland Power also stated:

6
7 “Direct linkages” between Hydro’s systematic maintenance deficiencies and each and
8 every equipment failure are not necessary to ground a finding of imprudence. If such
9 linkages were required, Hydro’s customers or the Board would, in effect, be forced to
10 prove that Hydro’s maintenance practices were inadequate as opposed to requiring Hydro
11 to prove them reasonable. That would not be a reasonable regulatory outcome.⁴³
12

13 Newfoundland Power submitted that the lack of black start capability at Holyrood significantly
14 extended a severe power outage in January 2013. According to Newfoundland Power, the lack of
15 black start capability was clearly the result of imprudent decision making by Hydro and there is
16 no evidence of reasonable system planning or weighing of risks by Hydro in reaching that
17 decision.
18

19 8.3 Vale

20
21 Vale submitted that Hydro failed to take reasonable steps to protect itself and ratepayers from the
22 consequences of failure by conducting preventative maintenance on schedule. Vale highlighted
23 the power factor testing that would have been completed as part of the regular maintenance
24 program on transformer T1, which might have identified the bushing failure that led to the
25 January 4, 2014 failure, and Hydro’s failure to do follow-up testing on increasing acetylene gas
26 levels in the T1 transformer. Vale stated that Hydro has not refuted Liberty’s findings of
27 imprudence or standard for establishing causation.
28

29 Vale submitted that La Capra’s position on Hydro’s decision to delay the installation of black
30 start capability is contradicted by the evidence. Regarding La Capra’s suggestion that a decision
31 to act in January 2012 would not have resulted in the installation of black start capability in time
32 to prevent the January 2013 outages, Vale pointed out that Hydro did install black start capability
33 within 8 or 9 months of the Board’s direction to act.
34

35 8.4 Industrial Customer Group

36
37 The Industrial Customer Group suggested that Hydro’s record in addressing the issue of black
38 start capability at Holyrood is one of missed options, alternatives, and opportunities to
39 implement a timely, well-considered, least-cost, reliable black start solution. It pointed out that
40 Hydro first raised the need to address the serious deficiencies in Holyrood’s black start capability
41 in the fall of 2010, in its 2011 capital budget application. The Industrial Customer Group
42 submitted that Hydro has not adequately explained why it took over 14 months after that to
43 obtain the AMEC condition assessment and why it failed to act on any of the options for
44 Holyrood’s black start identified in AMEC’s report. The Industrial Customer Group noted that
45 the solution of five 2 MW black start diesel units applied for by Hydro in November 2013 is one
46 option identified by AMEC in December 2011 that could have been in place by March 2013.

⁴³ Newfoundland Power’s Submission, pages 6-7

1 The Industrial Customer Group submitted that the initial timeline Hydro identified for
 2 implementing a black start solution was too pessimistic, as evidenced by its subsequent ability to
 3 implement, after November 2013, two separate projects for black start at Holyrood within much
 4 shorter timeframes. In addition, the Industrial Customer Group submitted that Hydro should have
 5 recognized that Hardwoods was an unreliable area restoration response to the lack of black start
 6 at Holyrood and not a true “black start” solution:

7
 8 Hydro had all the information, and the incentive given the acknowledged need for reliable
 9 black start capability at Holyrood, to have made reasonable planning decisions by early
 10 2012 that, it is probable, would:

- 11 • have allowed for the implementation of the more cost-effective, in the long term,
 12 solution of installation of 25 MW (or under 50 MW) of gas turbine generation at
 13 Holyrood before the end of 2012;
- 14 • have thereby provided reliable black start capability at Holyrood at least one year earlier
 15 (for December 2012 to January 2014) and two winter seasons when it was wholly
 16 (2012-2013) or partially (outset of 2013-2014) lacking;
- 17 • have avoided the need to implement two separate black start solutions at Holyrood,
 18 within a one year period, January 2014 to January 2015 (the leasing of the black start
 19 diesels and the installation of the 100 MW CT); and
- 20 • have rendered unnecessary the first of these solutions – the interim one of the leasing of
 21 the black start diesels.⁴⁴

22 23 **8.5 Danny Dumaresque**

24
 25 Danny Dumaresque challenged Liberty’s finding of prudence in Hydro’s decisions and actions
 26 related to the procurement of a new combustion turbine, specifically “the value for money that
 27 ratepayers of the province received, as well as the reliability of the equipment contracted.”⁴⁵
 28 According to Mr. Dumaresque, Hydro did not receive a third-party appraisal to determine fair
 29 market value for the combustion turbine package before or after purchase. In addition, Mr.
 30 Dumaresque claimed that Liberty did not complete a fair market value assessment of the package
 31 or a comparative reliability and performance analysis. Mr. Dumaresque cited several sources that
 32 provide lower costs for the same or similar combustion turbine packages, accounting for the age
 33 of the asset at the time of purchase. He also stated that the suitability of the assets was assessed
 34 on the basis of a visual inspection only and that this inspection report was not received until after
 35 the contract had been awarded. Mr. Dumaresque also questioned Hydro’s tender assessment
 36 process, particularly the zero-one assignment tool. His concerns are summarized in his final
 37 submission:

38
 39 There remains considerable concern in the minds of ratepayers about the prudence in the
 40 decision making and tender process undertaken by Hydro and what consequences this
 41 imprudent decision making will yet have on the reliability of power in the province. Even
 42 throughout this Prudency Review, it is still unclear why Hydro opted for a seven year old
 43 technology over brand new units with full Manufacturer’s Warranty, and even more so,
 44 why this option was chosen when installation costs were three times the industry standard.
 45 It is still unclear why there was no due diligence performed in terms of carrying out an
 46 internal inspection and a truly independent engineer’s report. It is still unclear why there

⁴⁴ Industrial Customer Group’s Submission, pages 15-16

⁴⁵ Danny Dumaresque’s Submission, page 2

1 was no negotiation of the final price, despite Hydro knowing the previously advertised
 2 market price of the unit was \$23 million or lower. It is still unclear why the contract was
 3 signed before a final inspection report was filed.⁴⁶

4 5 **8.6 Hydro**

6 7 8.6.1 Final Submission

8
9 Hydro's final submission reiterated its position that, in the context of a no-hindsight prudence
 10 review, its decisions and actions at the relevant points in time for the projects reviewed were
 11 within the range of reasonable alternatives. Hydro addressed Liberty's imprudence findings and
 12 the issues Danny Dumaresque raised about the procurement and installation of the 100 MW
 13 combustion turbine at Holyrood, which Liberty found to be prudent.

14 15 Black Start Capability at Holyrood

16
17 Hydro submitted that its decision to rely on Hardwoods as an interim solution for black start
 18 capability was reasonable in the circumstances and that this issue should be assessed in the
 19 context of the combustion turbine procurement and Hydro's focus on balancing costs and
 20 reliability:

21
22 In light of the very limited prior experience with the loss of all transmission into Holyrood
 23 prior to January, 2013, Hydro submits there was nothing unreasonable with the approach
 24 taken by it at the time its decisions were made and with the information then available. The
 25 record shows that in the circumstances in question, Hydro used appropriate and sound
 26 engineering and utility judgment to rely on Hardwoods as an interim least cost black start
 27 solution.⁴⁷

28
29 Hydro distinguished between the requirement for an area's restoration plan and the incorporation
 30 of on-site black start capability into this plan and emphasized that it had always intended to
 31 replace black start capability for Holyrood. Reliance on Hardwoods was an interim solution, and
 32 Hydro submitted that this decision was reasonable in the circumstances. It acknowledged that it
 33 should have kept the Board informed more regularly regarding its black start solution but
 34 supported La Capra's conclusion that "the communication issue does not mean that Hydro's
 35 underlying decision process was flawed to the point of imprudence."⁴⁸

36 37 Sunnyside Replacement Equipment

38
39 Hydro reviewed the evidence on breaker B1L03 and disputed Liberty's conclusion that where
 40 causation is not determinable it is sufficient to make a categorical connection between
 41 conducting maintenance and avoiding malfunction. Regarding the T1 transformer, Hydro
 42 reviewed the evidence on the record and, as in the case of breaker B1L03, affirmed that, based
 43 on the information available at the time, there was no reason to prioritize the maintenance of this
 44 transformer over more critical maintenance, break-in, and capital work. It submitted that

⁴⁶ Ibid., page 6

⁴⁷ Hydro's Submission, page 16

⁴⁸ Ibid., page 18

1 preventative maintenance would not have identified the bushing issue, which was ultimately
2 determined to be the cause of the failure. Hydro also noted that no party, including Liberty, has
3 suggested that the gassing levels Liberty highlighted caused the transformer issues.
4

5 Hydro submitted that its preventative maintenance practices for breakers and transformers were
6 in line with other utilities. According to Hydro strict adherence to maintenance cycles would
7 have required sufficient additional revenue to ensure that, in all circumstances, all critical break-
8 in work that arose periodically was completed in addition to scheduled preventative
9 maintenance. Hydro stated:

10
11 There has been no evidence that suggests that the critical break-in work carried out by
12 Hydro was not at a priority criticality level. The question then becomes whether strict
13 adherence to the PM cycles was required for Hydro's actions to be considered reasonable.
14 In the context of the critical break-in work that arose, the extensive increase in capital
15 spending, and the knowledge of the equipment known by Hydro's experienced engineering
16 staff, Hydro submits that the failure to strictly adhere to the PM cycle in certain
17 circumstances, cannot, and should not, in and of itself be considered imprudent.⁴⁹
18

19 Hydro noted the improvements to its processes, including tracking its annual work plans, since
20 the January 2014 outages. Hydro submitted that its preventative maintenance practices were not
21 imprudent in the overall context, considering the balance required between the competing
22 priorities of reliability and costs.
23

24 Western Avalon Terminal Station T5 Tap Changer Replacement

25
26 Hydro noted that Liberty's conclusions for the failure of breaker B1L37, which probably caused
27 the damage, are similar to those reached with breaker B1L03. Hydro submitted that these
28 conclusions are not supported and that the preventative maintenance deferral on breaker B1L37
29 in 2013 was based on its criticality assessment and was to be completed in 2014.
30

31 Holyrood Breaker B1L17

32
33 Hydro submitted that there were no imprudent actions with this breaker: the disassembled
34 breaker was covered with a waterproof cover and tested and exercised prior to going back in
35 service. Hydro acknowledged that the breaker was dismantled for longer than originally
36 anticipated but said it needed to undertake higher priority work. Hydro stated that it has since
37 modified its procedures to further enhance return-to-service moisture checks, but that this does
38 not suggest that its practices at the time were imprudent.
39

40 Extraordinary Transformer and Breaker Repairs

41
42 Hydro submitted that Liberty's conclusion that it should be denied recovery for its costs
43 associated with the catch-up maintenance work on breakers and transformers in 2014 and 2015 is
44 neither appropriate nor warranted. Liberty based its conclusion on the finding that Hydro was
45 imprudent in deferring preventative maintenance on transformers and breakers. Hydro reiterated
46 that it deferred this maintenance work only to complete higher priority work and that, in order

⁴⁹ Hydro's Submission, page 34

1 for it to have complied strictly with its preventative maintenance cycles, it would have had to
2 incur extra costs in prior years as well as in 2014 and 2015.

3
4 Other Issues

5
6 Hydro also provided submissions on recent jurisprudence, its proposal to recover certain capital
7 costs on a betterment basis, and the issues raised by Liberty regarding the 2014 revenue
8 deficiency. Hydro's submissions on these matters are summarized in the relevant sections of Part
9 Three: Discussion and Board Findings.

10
11 8.6.2 Reply Submission

12
13 Hydro asserted that the fundamental problem with the intervenors' submissions was "a lack of
14 any meaningful acknowledgement of the balance that Hydro was making between cost and
15 reliability"⁵⁰ and that they "discount both the criticality and volume of break-in work faced by
16 Hydro."⁵¹ Hydro reiterated its position that preventative maintenance was deferred only to
17 undertake more critical unanticipated work and submitted that the record is clear that, at all
18 times, Hydro was working in its customers' best interests to provide the least-cost service
19 consistent with its mandate. Hydro pointed to its significant work in asset condition assessments,
20 its increased capital works program, and its diligence in bringing preventative maintenance
21 cycles back into full compliance as evidence of its recognition of the potential impact of its aging
22 assets. As for a link between preventative maintenance deferral and the issues that caused the
23 January 2014 outages, Hydro stated that there is no basis for placing the burden on Hydro to
24 disprove causation in the manner suggested by Newfoundland Power or the Consumer Advocate.

25
26 Hydro also responded to the specific points raised by Danny Dumaresque. On the issue of fair
27 market value, Hydro noted that the project was publicly tendered to determine fair market value
28 and that the fair market value of \$23 million referenced by Mr. Dumaresque was in the context
29 of the transfer of an asset from a regulated to a non-regulated entity, which is not relevant in this
30 context. With respect to Mr. Dumaresque's concerns about project costs, Hydro noted that the
31 combustion turbine contract package price of USD\$54.7 million cited by Dumaresque is
32 incorrect; the actual contract package price is USD\$31.5 million. Costs above this amount are for
33 the installation of a step-up transformer, switch gear, diesel fuel delivery system, air inlet system,
34 snow doors, water treatment plant, SCADA (Supervisory Control and Data Acquisition) and
35 communications system, and combustion turbine black start. Hydro also noted that the awarding
36 of the EPC (Engineering, Procurement and Construction) contract was based on tender and that
37 complexities at the Holyrood site required extra work by the contractor that increased the
38 installation costs.

39
40 Hydro refuted Mr. Dumaresque's claims that it did not have inspections or reports on fitness,
41 suitability, or fair market value for the unit at the time of contract award to ProEnergy, citing the
42 documented actions and communications undertaken between Hydro staff and its consultants, as
43 well as the independent inspection reports received prior to contract award. With respect to Mr.
44 Dumaresque's issues with the tender evaluation process and his claim that the assignments in the

⁵⁰ Hydro's Submission, page 2

⁵¹ Ibid.

1 zero-one system were done arbitrarily, Hydro stated that this assertion is untrue. Hydro noted
2 that it filed numerous detailed undertakings on the evaluation process and that vendor evaluation
3 was conducted fairly, with due consideration to Hydro's project requirements. Hydro concluded:
4

5 Mr. Dumaresque has shown a continued lack of understanding of how this project has been
6 budgeted, even with the considerable evidence as noted above. Mr. Dumaresque makes
7 sweeping statements about the lack of "diligence" undertaken by Hydro in procuring the
8 new CT. Mr. Dumaresque's assertions about a lack of diligence are wholly unsupported by
9 the evidence. As previously noted, Hydro undertook an appropriate tendering process and
10 engaged its own staff and a third party to perform an inspection of the unit. The value of
11 the project arose from the tendering process with the vendor's own proposed costs, which
12 were based on the requirements of Hydro at the time of tender. Following a detailed
13 evaluation process, Hydro chose the current configuration, with a warranty. There is
14 simply nothing to indicate that Hydro failed to follow established procurement processes or
15 otherwise acted imprudently in this case. Liberty has also found the project be [sic]
16 prudent.⁵²

⁵² Hydro's Reply Submission, page 6

1 **PART THREE: DISCUSSION AND BOARD FINDINGS**

2
3 The Board has reviewed the extensive record of this proceeding and finds that several
4 overarching issues should be addressed first. These include the question of which standard or
5 methodology should be used in assessing whether certain costs are prudent, whether Hydro's
6 decision to defer preventative scheduled maintenance on transformers and breakers was prudent,
7 and, if not, whether such deferrals caused equipment failures and resulting costs that were
8 imprudent. The Board will present its discussion and findings in these key areas first, before
9 setting out its specific findings on prudence and disallowances, if any, for each of the projects
10 and programs reviewed by Liberty.

11
12 **9.0 Prudence Review Standard and Recent Jurisprudence**

13
14 Since the Board issued the Terms of Reference, and after the filing of Liberty's report, the
15 Supreme Court of Canada issued decisions in *Atco Gas*⁵³ and *Ontario (Energy Board)*⁵⁴
16 addressing the standard or methodology that regulators should apply in assessing the prudence of
17 costs a utility seeks to recover from its customers.⁵⁵ A central issue in each of these cases was
18 whether regulatory tribunals were bound to use a no-hindsight prudence test, which was the test
19 set out in the Board's Terms of Reference and applied by Liberty in its evaluation of Hydro's
20 actions and resulting costs. The Court recognized in both decisions that a prudence review is a
21 valid and widely accepted tool with which regulators assess whether costs incurred by a utility
22 are just and reasonable. The Court also confirmed that a regulatory tribunal has discretion in how
23 it chooses to assess prudence, except where the legislation under which the tribunal operates
24 expressly requires a specific methodology. Also, the Court found that, while the prudence test is
25 normally applied to capital costs, there is no reason it cannot be applied to operating costs as
26 well.

27
28 In *Ontario (Energy Board)* the Court differentiated between types of cost under review,
29 specifically whether the cost was a committed or a forecast cost:

30
31 [82] Forecast costs are costs which the utility has not yet paid, and over which the utility
32 still retains discretion as to whether the disbursement will be made. A disallowance of such
33 costs presents a utility with a choice; it may change its plans and avoid the disallowed
34 costs, or it may incur the costs regardless of the disallowance with the knowledge that the
35 costs will ultimately be borne by the utility's shareholders rather than its ratepayers. By
36 contrast, committed costs are those for which, if a regulatory board disallows recovery of
37 the costs in approved payments, the utility and its shareholders will have no choice but to
38 bear the burden of those costs themselves. This result may occur because the utility has
39 already spent the funds, or because the utility entered into a binding commitment or was
40 subject to other legal obligations that leave it with no discretion as to whether to make the
41 payment in the future.⁵⁶

⁵³ *ATCO Gas and Pipelines Ltd. v. Alberta (Utilities Commission)*, 2015 SCC 45 ("*Atco Gas*")

⁵⁴ *Ontario (Energy Board) v. Ontario Power Generation Inc.*, 2015 SCC 44 ("*Ontario [Energy Board]*")

⁵⁵ Both decisions were released concurrently on September 25, 2015

⁵⁶ *Ontario (Energy Board)*, paragraph 82 (Appendix A of Hydro's Submission)

1 Similarly, the Court stated in *Atco Gas*:

2
3 As explained in OEB, understanding whether the costs are committed or forecast may be
4 helpful in reviewing the reasonableness of a regulator's choice of methodology: see para.
5 83. Committed costs are those costs that a utility has already spent or that were committed
6 as a result of a binding agreement or legal obligation that leaves the utility with no
7 discretion as to whether to make the payment in the future: para. 82. If the costs are
8 forecast, there is no reason to apply a no-hindsight prudence test because the utility retains
9 discretion whether to incur the costs: para. 83. By contrast, the no-hindsight prudence test
10 may be appropriate when the regulator reviews utility costs that are committed.⁵⁷

11
12 In *Ontario (Energy Board)* the Court summarized its position on the use of a no-hindsight
13 prudence test:

14
15 [104] To summarize, it is not necessarily unreasonable, in light of the particular regulatory
16 structure established by the Ontario Energy Board Act, 1998, for the Board to evaluate
17 committed costs using a method other than a no-hindsight prudence review. As noted
18 above, applying a presumption of prudence would have conflicted with the burden of proof
19 in the Ontario Energy Board Act, 1998, and would therefore not have been reasonable. The
20 question of whether it was reasonable to assess a particular cost using hindsight should turn
21 instead on the circumstances of the cost. I emphasize, however, that this decision should
22 not be read to give regulators carte blanche to disallow a utility's committed costs at will.
23 Prudence review of committed costs may in many cases be a sound way of ensuring that
24 utilities are treated fairly and remain able to secure required levels of investment capital.
25 As will be explained, particularly with regard to committed capital costs, prudence review
26 will often provide a reasonable means of striking the balance of fairness between
27 consumers and utilities.⁵⁸

28
29 The Consumer Advocate submitted that the *Electrical Power Control Act* and the *Public Utilities*
30 *Act* do not outline specific provisions under which a prudence review methodology is mandated,
31 nor does the onus of proof rest with the utility. He argued that the test Liberty used in
32 determining the prudence of Hydro's projects is a less onerous standard than that which could
33 have been applied had Liberty's assessments been made on the tests outlined by the Court. In
34 such circumstances, a more stringent test is available. According to the Consumer Advocate, the
35 test Liberty used provides more forgiveness to Hydro. The Consumer Advocate did not,
36 however, submit that the Board should adopt a different standard than the one used by Liberty.

37
38 Newfoundland Power noted Liberty's statement of the standard it used to review prudence and
39 submitted that it is appropriate for the Board to use in this review. No other intervenors
40 commented on the prudence review standard.

41
42 Hydro submitted that these recent decisions by the Court support the application of a no-
43 hindsight test for prudence as set out in the Terms of Reference for this prudence review. In
44 addition, Hydro submitted that nothing in these decisions suggests that the test set out in the
45 Terms of Reference issued by the Board is less onerous than the test that the Board should apply
46 to the review of costs in this case. According to Hydro, the circumstances of a cost should

⁵⁷ *Atco Gas*, paragraph 48; Hydro's Submission, page 4

⁵⁸ *Ontario (Energy Board)*, paragraph 104 (Appendix A of Hydro's Submission)

1 determine whether that cost may reasonably be assessed in a prudence review using hindsight or
2 a no-hindsight approach. Hydro highlighted the distinction between forecast costs and committed
3 costs and addressed the impact of disallowances in each case, as discussed by the Court in
4 *Ontario (Energy Board)*. Hydro submitted that the costs under review are clearly fully
5 committed capital and operating costs, both of which should reasonably be assessed using a no-
6 hindsight approach. Hydro argued:

7
8 As such, even in light of the recent cases from the SCC, there is no basis on which this
9 Board should apply any prudence test other than that which is articulated in the Terms of
10 Reference for this review. The costs under review should therefore be reviewed based on
11 the information that was available at the time the decisions were made by Hydro to incur
12 the costs.⁵⁹
13

14 The Board has considered the recent Court decisions as they pertain to this prudence review.
15 These decisions confirm that, in the absence of statutory language providing a specific direction
16 on the methodology to apply in a prudence review, the Board may select a methodology that is
17 reasonable in the circumstances before the Board. The Board notes that there is no direction in
18 the statutory framework for utility regulation in this province requiring that any specific
19 methodology be used in a prudence review. The Board will now turn to the methodology that
20 should be applied to assess whether the particular costs Hydro proposes to recover from
21 customers are prudent.
22

23 As noted by the Supreme Court in both the *Atco* and the *Ontario (Energy Board)* cases, the type
24 of cost under review is relevant to determining the methodology of a prudence review. The costs
25 under review are, for the most part, committed capital and operating costs. Liberty conducted a
26 review of Hydro's decisions and actions and the resulting costs, using a no-hindsight approach,
27 of the conditions and circumstances at the time the decisions were made and the costs were
28 incurred. This approach is, in the Board's view, appropriate in the circumstances given the type
29 of costs being reviewed.
30

31 The Board is satisfied that a no-hindsight methodology is appropriate in reviewing the prudence
32 of the costs at issue here and that this approach is fair to both the utility and consumers. The
33 Board also notes that no party suggested another methodology or test should be applied. In
34 assessing whether particular costs are reasonable and prudent, the Board will therefore consider
35 information that was known or ought to have been known by Hydro at the time of the decision or
36 action, whether Hydro's decision or action was reasonable in the circumstances, and whether it
37 was within the range of reasonable alternatives a utility would choose. Hindsight will not be used
38 in determining the prudence of costs under review.
39

40 **10.0 Deferral of Preventative Maintenance**

41
42 Hydro's decision to defer certain preventative maintenance on its transformers and air-blast
43 circuit breakers was a significant issue in this review. Liberty's final report described the
44 importance of preventative maintenance as part of good utility practice:

⁵⁹ Hydro's Reply Submission, page 30

1 Good utility practice requires a structured and comprehensive approach to maintenance.
 2 Such an approach identifies and provides for the regular performance of inspection and
 3 repair activities designed to keep equipment in good working order, prolong its life, and
 4 protect against service failures with material consequences. Those consequences can
 5 include either or both avoidable damage to equipment and disruption of service to
 6 customers. Good practice calls for the identification of appropriate cycles for the
 7 performance of recurring maintenance activities. Those cycles need to consider factors
 8 unique to the utility's particular circumstances. Those factors include equipment
 9 configuration, its condition, and the environment in which it operates. Hydro, for example,
 10 generally operates comparatively aged equipment, which tends to decrease maintenance
 11 cycle length.⁶⁰

12
 13 Hydro acknowledged the need for an effective preventative maintenance program to ensure
 14 reliable supply to customers, both in its submissions and in testimony during the hearing. During
 15 cross-examination by Board Hearing Counsel, Mr. Moore, Hydro's General Manager of
 16 Transmission and Rural Operations, described the purpose of preventative maintenance:

17
 18 Ms. Greene: Now I'm going to ask you a question, it's a very basic question, why would
 19 you do preventative maintenance, what's the purpose of it?

20
 21 Mr. Moore: The purpose of preventative maintenance is to do an ongoing condition
 22 assessment of your assets to collect data and condition assessment data, so that you can
 23 first of all look for any defects with that asset that may need to be corrected either in the
 24 near term or to be planned for the longer term, and it's also that you gather condition data
 25 so you can trend that asset over time to determine what you may need to address your long
 26 term asset management plan.

27
 28 Ms. Greene: Would you agree that one of the reasons may be to prevent customer outages
 29 and failures, you detect the problem before it happens?

30
 31 Mr. Moore: Yes, our preventative maintenance program definitely is focused in on
 32 maintaining our assets in a suitable manner to provide that reliable service to our
 33 customers.

34
 35 Ms. Greene: And it would also help identify the corrective maintenance required and to be
 36 able to do that in a cost effective way, is that correct?

37
 38 Mr. Moore: That's correct, yes.⁶¹

39
 40 In its submission, Hydro stated that it "certainly agrees that the preference and ultimate goal was
 41 to complete PM's within the agreed upon PM cycle."⁶² Thus there is no dispute about the need
 42 for an effective preventative maintenance program.

43
 44 Hydro's practice had been to use six-year preventative maintenance cycles for transformers and
 45 breakers, which Liberty found was in accordance with industry standards. As a result of its
 46 investigation into the January 2014 outages, Liberty recommended a reduction to a four-year

⁶⁰ Liberty's Prudence Report, page 25

⁶¹ Transcript, October 27, 2015, page 151/25 to page 153/5

⁶² Hydro's Submission, page 32

1 cycle for Hydro's air-blast circuit breakers, given their age, which Hydro accepted and
 2 subsequently implemented. Hydro also recognized that there was a problem with its backlog of
 3 overdue transformer and breaker maintenance:

4
 5 Hydro had recognised as early as 2009 that it was important to bring its preventative
 6 maintenance work into better alignment with its maintenance cycles and it put in place a
 7 specific program to achieve this.⁶³
 8

9 In 2010 Hydro instituted an accelerated program to eliminate the backlogs by 2015. However,
 10 even with this accelerated plan, maintenance backlogs for transformers and breakers remained
 11 high and did not decrease significantly by the end of 2013.⁶⁴ The following tables set out the
 12 maintenance backlog for transformers and air-blast circuit breakers for the period from 2007 to
 13 2013:

Overdue Transformer Maintenance

Year	Number
2007	11
2008	16
2009	23
2010	18
2011	17
2012	17
2013	27

Overdue Breaker Maintenance

Year	Number
2007	17
2008	19
2009	13
2010	11
2011	14
2012	15
2013	18

14 Hydro explained that transformer and breaker maintenance was deferred to provide resources to
 15 address more critical issues. Liberty found that this decision was not prudent. Mr.
 16 Lautenschlager, of Liberty, responded to a question about whether it was appropriate to defer
 17 preventative maintenance for other work:

18
 19 No, it doesn't make sense. PM work should always be conducted consistent with asset
 20 management schedules or sooner because the need for CM work will not be timely
 21 identified if PMs are deferred. Resources should always be provided for PM work,

⁶³ Ibid.

⁶⁴ Liberty's Prudence Report, page 26

1 regardless of the need to address emergencies, known critical CM work and capital project
2 work. Deferring PM activities is very risky and defeats the purpose of PMs and which is to
3 timely identify deterioration that can lead to failure. Deferring PMs is like flying blind for
4 the maintenance personnel because the missed opportunity to identify the need to conduct
5 corrective maintenance may result in unexpected equipment failure. Deferring PM work
6 defeats the purpose of conducting timely PMs.⁶⁵
7

8 Mr. Lautenschlager, an expert with more than 40 years' experience in utility maintenance
9 practices, further stated:

10
11 In my years of evaluating utility substation maintenance practices, I found some utilities
12 that have deferred CMs, the corrective maintenance work, past the scheduled dates that
13 they were scheduled for sometimes, and that's an issue, but I have not found that any utility
14 systematically prioritized and substantially deferred PMs because of resource limitations.
15 It's just not done.⁶⁶
16

17 In its report Liberty affirmed that "justifying deferrals over a period of many years on the basis
18 of other planned or emergent unplanned work with higher priority does not conform to good
19 utility practice."⁶⁷ Liberty further stated:

20
21 Hydro acted imprudently in not conforming its maintenance practices sufficiently close to
22 the cycle it established. Such conformance was required, because Hydro did know or
23 should have known that timely maintenance is critical, given the age and condition of its
24 system and the connection between maintenance activities and equipment performance and
25 failure. The failure to adhere to appropriate maintenance cycles was not occasional, but
26 rather systematic. Occasional deferral of necessary and prudent maintenance work can
27 prove appropriate when justified by emergent work and consideration of its effects on
28 equipment whose work will experience delay. A long standing pattern of widespread
29 maintenance deferrals, as existed here, however, does not represent a prudent method for
30 operating equipment critical to system operation.⁶⁸
31

32 Liberty identified Hydro's systematic failure to adhere to appropriate transformer and breaker
33 maintenance cycles as a key issue in the failure of the T1 transformer and breaker B1L03 at the
34 Sunnyside terminal station and the failure of the T5 tap changer at the Western Avalon terminal
35 station.
36

37 Hydro disagreed that its maintenance practices were imprudent. Hydro submitted that the
38 intervenors did not express any meaningful acknowledgment of Hydro's balancing of cost and
39 reliability:
40

41 As was noted in detail by the Hydro witnesses, in particular Mr. Moore, and which is set
42 out in detail in Hydro's Closing Submissions, Hydro only deferred preventative
43 maintenance outside of the general preventative maintenance cycle where there was more
44 **critical** work that arose which was unanticipated. Hydro submits that the totality of the
45 record is abundantly clear that at all times Hydro was working in the best interests of its

⁶⁵ Transcript, November 12, 2015, pages 40/20 to page 41/12

⁶⁶ Ibid., pages 50/24 to 51/8

⁶⁷ Liberty's Prudence Report, page 27

⁶⁸ Ibid., page 28

1 customers to provide least cost reliable service consistent with its legislative and regulatory
 2 mandate. For 2013 and 2014 alone, the additional person time required on critical break-in
 3 work was 21,357 and 22,266 hours respectively.⁶⁹
 4

5 Liberty replied that the following are well established based on the evidence:
 6

- 7 • Utilities perform preventative maintenance according to established scopes and schedules
 8 because maintenance reduces the risk of failure in equipment whose operation is critical
 9 to maintaining service.
- 10 • Old air-blast circuit breakers require more diligent – not more lax – maintenance.
- 11 • Hydro’s deferral of maintenance remains even today unsupported by any discernible
 12 evidence of analysis of risk, costs/benefits, alternatives, or other structured deliberation.
- 13 • Deferral was widespread, even with a catch-up plan, which was not adhered to because of
 14 more critical work.
- 15 • Multiple failures occurred in crucial equipment for which maintenance had been deferred.
 16

17 In the Board’s view, the prudence of Hydro’s decision to defer preventative maintenance on aged
 18 critical equipment is one of the central matters to be addressed in this review. The Board notes
 19 that no party questioned Liberty’s expertise and that Newfoundland Power, the Consumer
 20 Advocate, and Vale supported Liberty’s findings in this regard. Uncontested evidence shows that
 21 Hydro deferred scheduled preventative maintenance on several transformers and air-blast circuit
 22 breakers between 2010 and 2013. Hydro acknowledged this, but stated that it deferred
 23 preventative maintenance only when more critical work arose unexpectedly.
 24

25 While Hydro acknowledged the importance of an effective preventative maintenance program,
 26 its execution did not support the stated goals and objectives of the program. During the hearing,
 27 Counsel for Newfoundland Power asked how decisions were made before 2010 regarding what
 28 maintenance work is done each year. Mr. Moore responded, discussing the annual work plan and
 29 highlighting the increased focus in 2010 on addressing backlogs in preventative maintenance for
 30 terminal station equipment:
 31

32 But it wasn’t until around 2008-2009 where we – like I said, we had additional focus on
 33 key aspects of asset management and established a long-term asset planning who really,
 34 you know, involved additional management oversight, I’ll say, in development of these
 35 plans to ensure that we were certainly better committed and more oversight in completion
 36 of what we had planned to do and from there, when they dug into the details, they
 37 developed a six-year recovery plan as we just talked about.⁷⁰
 38

39 Hydro’s decision to bring its preventative maintenance program for terminal station assets back
 40 on track demonstrates that it recognized the importance of completing scheduled preventative
 41 maintenance. Hydro’s six-year recovery plan was to have all outstanding preventative
 42 maintenance on transformers and breakers completed by 2015. In the Board’s view,
 43 notwithstanding the reason for the maintenance backlogs, this decision was reasonable, and
 44 consistent with Hydro’s requirement to provide reliable service to its customers. However, the

⁶⁹ Hydro’s Reply Submission, page 2

⁷⁰ Transcript, October 28, 2015, page 74/13-24

1 extent of the backlogs remained high and the number of deferrals significant, as was highlighted
2 by Liberty and as the tables above show.

3
4 The Board notes Hydro's position that there is no evidence that any of the maintenance work that
5 was deferred over this period was done so for any reason other than ensuring that more critical
6 and time-sensitive work was completed. Hydro claimed it deferred scheduled preventative
7 maintenance on critical aging assets where "it was necessary to address unplanned corrective
8 maintenance work" and to "ensure resources were deployed on the most critical work for
9 customer supply."⁷¹ The Board accepts Hydro's explanation as to why a decision was made to
10 defer certain preventative maintenance work. Hydro itself decided that the deferred preventative
11 maintenance was less important than other crucial work and allocated its resources accordingly.
12 A key consideration for the Board in assessing the reasonableness and prudence of this decision
13 then becomes the quality of the information used to make the decision and the risks and
14 alternatives that Hydro considered at the time.

15
16 The evidence does not establish that Hydro assessed the risks and possible impact on customers
17 of deferring preventative maintenance when these decisions were being made. Documentation
18 was not provided of the guidelines or criteria Hydro personnel were required to use in making a
19 decision to defer maintenance. Liberty stated:

20
21 We have seen and Hydro has supplied in its evidence, no basis for concluding that its
22 decision to abandon the catch up program in favor of other priorities resulted from a
23 structured assessment of risks, priorities, or likely consequence. As our report notes, and as
24 Hydro's reply evidence does not dispute, it did not even establish dates for finally
25 performing the maintenance deferred.⁷²

26
27 Mr. Moore confirmed that, prior to 2014, there was no written record of these decisions. He
28 explained that the result of any deferral decision would have been reflected in Hydro's
29 computerized maintenance system and that the Short Term Planning and Scheduling group kept
30 track of these changes as part of the normal maintenance planning process. During testimony, as
31 in this exchange with Board Hearing Counsel, Mr. Moore emphasized that any decisions to defer
32 preventative maintenance were undertaken by knowledgeable and experienced people who were
33 familiar with the system:

34
35 Ms. Greene: Okay, and when we talked about this back in September, if I understand that
36 no guidelines were given to these individuals who were assessing what work was to be
37 done with respect to the deferral on how to assess whether it was appropriate to defer
38 preventative maintenance, is that correct? No written guidelines were given? That's the
39 transcript of September 23rd.

40
41 Mr. Moore: Yeah, I know we talked about it at the time that, you know, at the time there
42 was no actual form in use, I guess, to document the decisions that were made, but there was
43 very, I guess, prudent and considered decision making when it comes to these people
44 tracking, you know, these are very experienced operations' engineering managers who are
45 very familiar with the assets, very familiar with the operational history of the assets and
46 certainly very familiar with our preventative maintenance and asset management program

⁷¹ PR-PUB-NLH-052

⁷² Liberty's Reply Evidence, page 2/22-27

1 and thoroughly understand the priority of work and where we need to focus the attention of
2 our resources to ensure reliable customer supply, so when they have a plan that they're
3 tracking throughout the year, they do – it's a very considered decision making process
4 when a work item comes up that our resources need to address that is of a higher priority
5 for our customer supply and reliability, so it is a very considered extensive decision
6 making process.⁷³

7
8 When Counsel for Newfoundland Power raised Liberty's observation that there was no evidence
9 of any form of structured significant analysis of the risks of deferring maintenance, Mr. Moore
10 reiterated Hydro's position that analysis took place but was not recorded:

11
12 I'll say that there was very strong discussion and analysis completed, but to the point where
13 it's actually documented on a form that could be submitted for review, that wasn't taking
14 place, but there was very strong consideration and decision making at the time.⁷⁴

15
16 The evidence does not support Mr. Moore's testimony that there was a considered assessment of
17 the condition of the equipment and the associated risks and consequences of deferral at the time
18 decisions were made by Hydro to defer preventative maintenance. The Board notes that, since
19 the 2014 outages, Hydro has changed its practices, adopting criteria for assessing whether a
20 deferral of preventative maintenance is appropriate and establishing a new target of 100 percent
21 completion of annual preventative maintenance. Hydro introduced a requirement to complete a
22 "management of change" form that documents any decisions affecting the annual work plan,
23 including deferral of preventative maintenance, and record appropriate sign-off.⁷⁵

24
25 The absence of documentation related to maintenance decisions in 2010-2013 period extended to
26 monitoring preventative maintenance, including outstanding maintenance, completed each year,
27 despite the intention to prioritize maintenance completion after 2010. Before 2014, monitoring
28 annual maintenance work consisted of verbal monthly progress reports from managers, along
29 with a report of exceptional items. Now, in contrast, a weekly written report from each of the
30 responsible managers is tracked up to the CEO level.⁷⁶

31
32 In deferring preventative maintenance, resourcing issues and its annual operating budget
33 appeared to be key considerations for Hydro. Mr. Moore stated that "managing to our budget is a
34 balanced priority along with completing our maintenance program."⁷⁷ Mr. Moore described in
35 testimony the factors that come into play when decisions on the work to be done in any given
36 year are made:

37
38 Hydro is certainly very committed to our preventative maintenance program. That being
39 said, like, when we develop an annual work plan with the preventative maintenance that's
40 due in that year, if other higher priority work comes into that year that draws upon our
41 existing resources, and bearing in mind that we're balancing costs as well - we talked about
42 how we want to manage to our operating budgets, very committed to do so, and there's
43 been a fair bit of evidence about how we develop our operating budgets and manage those

⁷³ Transcript, October 27, 2015, page 200/16 to page 201/23

⁷⁴ Transcript, October 28, 2015, page 196/22 to page 197/2

⁷⁵ Transcript, October 27, 2015, page 202/17-20

⁷⁶ Transcript, October 28, 2015, page 33/14 to page 34/25, page 79/20 to page 78/1

⁷⁷ *Ibid.*, page 126/12-13

1 operating budgets, and they play into things like trying to manage the rural deficit, for
2 example. We are very committed to least cost, but at the same time very committed to
3 completion of our preventative maintenance program, but will make decisions and balance
4 higher priority work that does come into play during that year that was unaccounted for
5 when we developed our initial annual work plan.⁷⁸
6

7 Hydro clearly faced a significant amount of additional unplanned work in 2013, mostly arising
8 from the January 11, 2013 events at Holyrood.⁷⁹ This does not, however, account for
9 maintenance deferrals leading up to 2013. On questioning from Counsel for Newfoundland
10 Power, Mr. Moore described Hydro's considerations in late 2013 of the status of its preventative
11 maintenance program and the decision to implement a plan in 2014 and 2015 to complete
12 preventative maintenance for those assets.⁸⁰ In response to a question as to why Hydro did not
13 apply to the Board for additional resources at that time, Mr. Moore responded:
14

15 I'll say that our opportunity to fully develop that application to the Board and put forward a
16 strong case was well into 2014, and in particular, after we went through the outages of
17 2014, but through 2014, we did make efforts to bring in additional resources to begin
18 completion of that recovery program in 2014. We did proceed to work on the recovery
19 programs for those PMs, realizing that they were a foundational tool for customer
20 reliability. So we did proceed to work towards achieving that objective in 2014, but the
21 application to the Public Utilities Board to include that in 2014/2015 test year became part
22 of the application that was submitted in 2014.⁸¹
23

24 Hydro stated that it is not aware that is normal utility practice to provide the necessary resources
25 to adhere to preventative maintenance schedules in addition to addressing emergent and critical
26 capital work.⁸² The Board finds this statement alarming. Hydro has the full responsibility of
27 managing its utility in a manner that will ensure an adequate, safe, and reliable supply of
28 electricity to its customers and is entitled the opportunity to earn an appropriate return in
29 exchange for this obligation. An extension of this responsibility has to include planning to ensure
30 that resources are available, or can be available, if unexpected work is necessary, as it was in
31 2013. As part of the rate setting process, the Board allows for recovery in customer rates of the
32 annual operating expenses for this work. This is the framework under which most, if not all,
33 regulated utilities operate.
34

35 The Board agrees that costs and budget resources are valid considerations in work planning, but
36 the associated risks, including the potential for service disruptions, and the requirements of good
37 utility practice must also be considered. Reasonable options were available to Hydro at the time
38 to address the identified resource issue, including hiring or contracting additional resources
39 and/or applying to the Board for relief. Hydro seems not to have pursued or even considered
40 these options until after the assets in question failed in January 2014. The Board notes that, in
41 2014 and 2015, Hydro did complete all outstanding preventative maintenance on transformers
42 and air-blast circuit breakers when directed by the Board to do so, using outside contractual
43 resources.

⁷⁸ Transcript, October 27, 2015, page 153/10-25 to page 154/1-6

⁷⁹ The list of unplanned work is detailed in PR-V-NLH-001.

⁸⁰ Transcript, October 28, 2015, page 192/13 to page 194/19

⁸¹ Transcript, October 28, 2015, page 194/3-19

⁸² Hydro's Surrebuttal Evidence, page 3

1 While additional critical work arose in 2013, the new work should not have displaced scheduled
2 preventative maintenance that was at least as important. Hydro has repeatedly expressed the
3 importance of its preventative maintenance program to the overall asset management system, but
4 its actions do not indicate this. Maintenance backlogs for transformers and air-blast circuit
5 breakers were allowed to continue, even after a deliberate strategy to reduce these backlogs was
6 put in place in 2010. In the Board's view, this is not the approach expected of a responsible
7 utility, especially considering the age of the assets and the potential impact on customers of
8 equipment failure.

9
10 The Board finds no reason to question the ability and experience of the Hydro personnel who are
11 tasked with maintaining and repairing an aging asset base, often under challenging conditions.
12 The Board is chiefly concerned about Hydro's management and execution of the asset
13 maintenance program, in particular its preventative maintenance program, especially given the
14 nature and age of the assets and the potential impact on customers of asset failure. The Board is
15 not satisfied that Hydro undertook a thorough analysis of the risks and consequences of deferring
16 preventative maintenance for transformers and air-blast circuit breakers. There is no evidence of
17 full consideration of the options available to complete the work or any assessment of the risks
18 associated with the deferrals. In addition, the deferrals were allowed to continue for several years
19 until Hydro implemented an accelerated program following the January 2014 outages to
20 complete all outstanding preventative maintenance on transformers and breakers by the end of
21 2015. In the Board's opinion, Hydro increased the risk of failure of aging equipment by failing to
22 meet its own established maintenance standards.

23
24 Hydro stated that "the failure to strictly adhere to the PM cycle in certain circumstances cannot,
25 and should not, in and of itself be considered imprudent."⁸³ While the Board agrees that isolated
26 incidents of preventative maintenance deferral may not be imprudent, the decision to take such
27 action has to be reviewed in the context of the asset itself and the circumstances of the utility at
28 the time. In this case the assets are old, as Hydro recognized, and are essential to the reliable
29 operation of the system. A decision to defer preventative maintenance for an asset that is
30 relatively new or whose failure would not cause serious consequences may be acceptable. That is
31 simply not the case here.

32
33 Based on the evidence, the Board is satisfied that Hydro's decision to defer preventative
34 maintenance exposed customers and the system to unnecessary risk and potentially serious
35 consequences. In the Board's opinion, Hydro's widespread deferral of preventative maintenance
36 was clearly not reasonable and not in accordance with accepted utility practice. The evidence
37 shows that Hydro delayed maintenance beyond utility standard cycles for aged critical equipment
38 without a full assessment of the risks associated with such deferral, and it did so in the context of
39 budgetary considerations that were inadequately assessed in the context of the potential risks.

40
41 **The Board finds that Hydro's deferral of scheduled preventative maintenance in the**
42 **circumstances at the time of the decision was imprudent.**

43
44 Having made this finding, the Board can now turn to the consequences of Hydro's imprudent
45 decision.

⁸³ Hydro's Submission, page 34

1 **11.0 Deferred Maintenance and Equipment Failures (Causation)**

2
3 In this proceeding Hydro seeks to recover certain costs and must therefore demonstrate that these
4 costs are reasonable and prudent and should be recovered from customers. The Board has
5 determined that Hydro's specific decisions and actions to defer scheduled maintenance were
6 imprudent and must now address whether this imprudence caused the costs at issue to be
7 incurred.

8
9 Hydro maintained that a "direct" or specific link must be established between the preventative
10 maintenance deferral and the equipment failures that caused the costs to be incurred. Hydro
11 argued that, despite extensive root cause analysis, no direct link has been found between deferred
12 maintenance work and the equipment failures that caused the outages under review, and that this
13 fact is not disputed:

14
15 Neither Hydro, its expert consultants or Liberty could find any direct linkage between
16 deferred maintenance work and the issues that caused the outages under review. Rather
17 than being imprudent, Hydro's actions have been considered within the context of a
18 prudent overall asset management plan and Hydro has and will continue to actively
19 monitor and adjust its plan on a regular basis.⁸⁴

20
21 Liberty's reply to Hydro's position on the absence of a direct link came in the form of a question:

22
23 Where imprudence occurs and where it concerns conduct clearly intended and universally
24 applied to prevent equipment failures, can a utility unable to establish a non-culpable
25 cause for such failures avoid responsibility and transfer to customers all the costs
26 associated with its imprudent conduct? If there is no regulatory means to impose on Hydro
27 consequences that incent the operational discipline one should expect from prudent
28 management, then what expectations may customers have about the ongoing ability of their
29 utility to exercise that discipline?⁸⁵

30
31 According to Hydro, Liberty's approach to causation is not supported in either regulatory
32 jurisprudence or Canadian law; on the balance of probabilities, the evidence must show that the
33 conduct at issue caused the cost. Hydro submitted:

34
35 There is no jurisprudential support for a finding of imprudence with respect to specific
36 equipment failures on the basis of simply not meeting a general preventative maintenance
37 cycle. To suggest otherwise would be to have Hydro forced to prove a negative; an
38 untenable regulatory or jurisprudential outcome. Proof of causation is required as noted in
39 the regulatory jurisprudence provided in Hydro's Closing Submission.⁸⁶

40
41 The Consumer Advocate suggested that, unless Hydro can offer evidence that non-deferred
42 preventative maintenance would not have affected the outcome, on the balance of the evidence
43 that is available it is more likely than not that equipment failure would have been prevented if the
44 deferred preventative maintenance had been completed. Hydro stated that evidence does not
45 support this contention.

⁸⁴ Hydro's Reply Evidence, page 4

⁸⁵ Liberty's Reply Evidence, page 6

⁸⁶ Hydro's Reply Submission, page 5

1 Newfoundland Power submitted that the evidence shows Hydro's systematic failure to follow
2 appropriate maintenance cycles for several years resulted in the equipment failures that caused
3 the 2014 power outages, and the resulting costs should be disallowed for recovery from
4 customers.

5
6 Prudence reviews are accepted regulatory tools for assessing the reasonableness of costs a utility
7 seeks to recover from customers. The Board accepts that there must be a link between the
8 imprudent action and the disallowance of costs; that is, any costs that are disallowed must have
9 flowed from the imprudent decision or action. This approach balances the interest of customers
10 and the utility by ensuring that customers pay only for those costs that are reasonably and
11 prudently incurred in serving them and that the utility recovers its prudent expenditures. The
12 Board will now turn to whether that link exists based on the facts here.

13
14 Investigations of the failures of transformer T1 and breaker B1L03 at the Sunnyside terminal
15 station and breaker B1L37 at the Western Avalon terminal station determined that a bushing
16 failure caused the failure of transformer T1, but could not determine the specific cause of the
17 failure of the two breakers.

18
19 During the hearing, Mr. Lautenschlager, of Liberty, testified that preventative maintenance
20 deferred on the Sunnyside transformer T1, which was 36 years old in 2014, included testing that
21 would have identified bushing degradation and further that, if a bushing in this transformer was
22 defective, the power factor test that was part of the maintenance procedures would have detected
23 the condition. Hydro last conducted this test in 2007 and should have completed it again in 2013
24 as part of the regular preventative maintenance. If it had done so, in Mr. Lautenschlager's
25 opinion, the deteriorated bushing could have been identified and repaired, preventing the failure
26 that caused substantial damage to the transformer.⁸⁷ Hydro's response was that the test in
27 question does not provide a pass/fail result and, while it might have shown some degradation,
28 this may not have been sufficient to indicate immediate replacement.⁸⁸

29
30 Regarding the two breakers that failed to operate, Hydro was unable to determine a specific
31 cause. Hydro speculated that cold weather might have affected their operation but did not
32 provide sufficient evidence to prove that the cold caused the failures. Liberty, on the other hand,
33 provided evidence that the breakers are designed to operate in cold weather and, when they failed
34 to operate, it was not because of the cold weather.⁸⁹

35
36 To establish whether Hydro's imprudent actions to defer preventative maintenance caused the
37 equipment failures and the subsequent costs, the Board must first consider the appropriate test to
38 use. Both Hydro and the Consumer Advocate referred in their submissions to case law on
39 negligence. While this is not a case of negligence, the issue of causation arises in considering
40 whether costs are reasonable for recovery under a utility statutory regime. The Board finds that
41 the principles relating to causation in the law of negligence provide helpful insights. In the recent
42 case of *Clements v. Clements* the Supreme Court stated that in negligence cases causation is
43 generally to be established on a balance of probabilities, which is a factual determination. The

⁸⁷ Transcript, November 12, 2015, page 44

⁸⁸ Hydro's Submission, page 39

⁸⁹ Transcript, November 12, 2015, page 97/4-20 and page 109/1-9

1 Supreme Court further stated that the causation test must be applied in “a robust common sense
2 fashion. There is no need for scientific evidence of the precise contribution the defendant’s
3 negligence made to the injury.”⁹⁰ The Board believes that this approach is appropriate in these
4 circumstances. The Board must be satisfied, using a common sense approach, that the evidence
5 establishes on the balance of probabilities that Hydro’s imprudent actions led to the costs at issue
6 here. Precise scientific evidence of a direct connection is not required.

7
8 The evidence before the Board establishes that it is prudent utility practice to develop an
9 effective asset management plan for a utility’s assets. A preventative maintenance strategy is an
10 essential element of such a plan. A preventative maintenance plan involves completing
11 maintenance activities at pre-determined times based on the asset, with certain standard times
12 being good utility practice. In accordance with good utility practice, Hydro had established
13 appropriate preventative maintenance programs for terminal station transformers and air-blast
14 circuit breakers, which are critical equipment on the transmission system. The evidence also
15 clearly establishes that Hydro fell behind in completing its preventative maintenance on
16 transformers and air-blast circuit breakers and developed a plan in 2010 to catch up but had not
17 made significant progress by the end of 2013. Widespread deferral of preventative maintenance
18 on these assets continued from at least 2010 until the equipment failures in January 2014. The
19 Board has determined that Hydro’s decision to defer preventative maintenance was imprudent.

20
21 In January 2014 there were major failures of a transformer and air-blast circuit breaker at the
22 Sunnyside terminal station and an air-blast circuit breaker at the Western Avalon terminal
23 station. Hydro had not completed scheduled preventative maintenance on this equipment.
24 Extensive service disruptions for customers resulted from these failures and significant costs
25 were incurred to repair and replace the assets. Investigations into the equipment failures
26 determined that a bushing failure had caused the transformer failure, and no cause could be
27 determined for the breaker failures. Liberty, an expert in this area, testified that the preventative
28 maintenance, if completed, would have identified bushing degradation before its failure.

29
30 This is not an isolated case of malfunction of one piece of equipment on which maintenance had
31 not been completed. Instead, Hydro systematically deferred maintenance that good utility
32 practice, as well as its own standards, required to maintain the assets, to correct problems, and to
33 prevent service disruptions. Multiple equipment failures occurred on equipment Hydro had not
34 subjected to preventative maintenance. While no cause was determined for the air-blast circuit
35 breaker failures, Liberty observed that the air-blast circuit breakers were old and required
36 increased maintenance and that the deferrals were not supported by any discernible analysis of
37 risks, cost/benefits, alternatives or other structural deliberation. The cause of the transformer
38 failure was a bushing failure, with the condition of bushings being one of the very matters
39 preventative maintenance is designed to check. Having reviewed all the evidence, the Board is
40 satisfied that, on the balance of probabilities, preventative maintenance deferral caused the
41 transformer and air-blast circuit breaker failures that occurred here, and the associated costs.

42
43 **The Board finds that Hydro’s deferral of preventative maintenance caused the failure of**
44 **the Sunnyside transformer and the air-blast circuit breakers at Sunnyside and Western**
45 **Avalon.**

⁹⁰ Clements v. Clements, 2013 SCC 32 (Appendix B of Hydro’s Reply Submission)

12.0 Prudence Findings

The Board has found that Hydro acted imprudently in deferring regular preventative maintenance on its transformers and air-blast circuit breakers at its terminal stations. The Board also found that this deferral caused the transformer and air-blast circuit breaker failures. These findings form the basis of the Board's prudence findings for the projects and expenditures associated with the failure of transformers and breakers, specifically the Sunnyside terminal station equipment replacement and breaker B1L03 overhaul, the Western Avalon T5 tap changer replacement and transformer repairs, and extraordinary transformer and breaker maintenance completed in 2014 and 2015.

In this section the Board will discuss its prudence findings for these projects as well as the remaining projects and expenditures. The Board's findings on the financial consequences of imprudence are discussed in Section 13.0.

12.1 Sunnyside Terminal Station Equipment Replacement

The Board has found that Hydro acted imprudently in deferring regular preventative maintenance on transformers and air-blast circuit breakers at its terminal stations. In January 2014 the Sunnyside T1 transformer was overdue for its regular maintenance by three months and the B1L03 breaker was overdue for its regular maintenance by five months. The Board is satisfied, based on the evidence discussed above, that Hydro's decision to defer this maintenance on the Sunnyside transformer T1 and breaker B1L03 was imprudent and caused the equipment damage at the Sunnyside terminal station.

With respect to transformer T1, which was found to have failed because of a bushing failure, the Board accepts Liberty's finding that the power factor test, which would have been part of the regular preventative maintenance, might have detected a bushing defect. Since 2000 this test has identified 14 bushing issues prior to equipment failure, which, in the Board's view, underlines the need for Hydro to perform this testing within the required maintenance cycles.⁹¹ With this knowledge, Hydro's decision at the time to postpone required preventative maintenance on this transformer was imprudent.

The Board also agrees that Hydro should have acted on its own laboratory's recommendation to investigate the higher levels of acetylene gas in the transformer oil instead of assuming that the gas resulted from oil leaking from the tap changer compartment into the transformer oil.

While Liberty explained that Hydro's failure to investigate deprived it of another opportunity to determine and address transformer failure risks, the testing would likely not have identified the bushing defect. As a result, the Board is unable to make any specific finding of imprudence with respect to Hydro's decisions or actions to address the gas levels.

The Board finds that Hydro's decisions and actions with respect to the maintenance of transformer T1 and breaker B1L03 at the Sunnyside terminal station were imprudent, and

⁹¹ Liberty's Prudence Report, page 29

1 **that this imprudence caused their failures, resulting in a transformer fire and damage to**
2 **terminal station equipment.**

4 **12.2 Western Avalon T5 Tap Changer Replacement (Breaker B1L37)**

5
6 The Board has determined that Hydro acted imprudently in deferring regular preventative
7 maintenance on its transformers and air-blast circuit breakers at its terminal stations. Hydro
8 confirmed that its investigations following the January 2014 outages showed the T5 tap changer
9 failure at the Western Avalon terminal station was caused by the failure of the 230 kV breaker
10 B1L37 to close on one phase. This breaker was overdue for its regular preventative maintenance
11 by two and a half years. Hydro states that it had been scheduled for preventative maintenance in
12 2014.

13
14 The Board notes Hydro's and Liberty's acknowledgment that the specific cause of the failure of
15 breaker B1L37 has not been determined. However, as discussed above, the Board finds that there
16 is a causal connection between conducting maintenance and avoiding malfunctions such as the
17 failure that occurred here, especially given the breaker's age. Based on the evidence, the Board is
18 satisfied that Hydro's decision to defer preventative maintenance on the B1L37 breaker at the
19 Western Avalon terminal station caused the failure of the Western Avalon T5 tap changer.

20
21 **The Board finds that Hydro's decisions and actions with respect to the maintenance of**
22 **breaker B1L37 at the Western Avalon terminal station were imprudent, and this**
23 **imprudence caused its failure, resulting in damage to the Western Avalon T5 tap changer.**

24 **12.3 Holyrood B1L17 Breaker**

25
26
27 As discussed above, the Board has found that Hydro's deferral of maintenance practices for its
28 breakers was imprudent and that this imprudence caused the failure of breaker B1L03 and
29 B1L37. The Board notes that there was no deferral of preventative maintenance for breaker
30 B1L17 at Holyrood. Its failure on January 5, 2014 was, according to Liberty, caused by poor
31 maintenance procedures.

32
33 Hydro found that the most probable cause of the B1L17 breaker failure was the presence of
34 moisture in one phase of the receiver tank. The resulting corrosion caused the breaker to
35 mechanically seize on one phase on January 5, 2014. While Hydro acknowledged that water
36 somehow entered the receiver tank and that, "in hindsight the cover appeared to have been
37 inadequate to prevent moisture entering the tank,"⁹² it did not accept that its actions with respect
38 to the breaker maintenance were imprudent. Hydro stated that a waterproof cover was installed
39 as required and there was no reason to believe at the time that it would fail to prevent water from
40 entering the tank.

41
42 The Board notes that Hydro could not detail the actual type of cover used or whether it was
43 suitable for extended use in winter conditions. This cover remained in place for about a month in
44 winter conditions while other work commitments Hydro deemed more critical were completed.
45 Liberty stated that a limit of a few days would be reasonable, and that permitting extended

⁹² Hydro's Reply Evidence, page 17

1 exposure to weather would not conform to good utility practice. Hydro stated that there is no
2 evidence as to specifically how or when the water actually entered the equipment. While this
3 may be the case, Hydro has not explained how water would have otherwise entered the tank,
4 which is normally sealed. The Board believes that it is reasonable in the circumstances to find
5 that the water ingress occurred during the time the breaker was disassembled and covered in the
6 yard. This water ingress was the direct cause of the failure of the breaker.

7
8 The question then is whether Hydro's actions were within the range a reasonable utility would
9 take to repair this breaker. Hydro could or should have known that its actions regarding the
10 maintenance of the B1L17 breaker exposed it to conditions that increased the risk of subsequent
11 failure. Given the criticality of these assets to system operations, Hydro would be expected to
12 take all the necessary steps to ensure that risks are minimized and repairs effected properly.
13 Normally the air-blast circuit breaker would have been sealed; this would have prevented the
14 entrance of water into the tank. The use of a temporary cover, even a waterproof one, would not
15 have provided the same level of protection, particularly when the breaker was stored outside for
16 an entire month in winter. According to Liberty a limit of a few days for this temporary measure
17 would be reasonable. The Board is not satisfied, based on the evidence, that an appropriate cover
18 was used. The Board finds that Hydro's maintenance practices for this breaker exposed it to
19 conditions that ultimately caused it to fail and did not meet the standard of care a reasonable
20 utility would be expected to take for such assets.

21
22 **The Board finds that Hydro's decisions and actions with respect to the maintenance of**
23 **breaker B1L17 at the Holyrood thermal generating station were imprudent and that this**
24 **imprudence caused its failure, resulting in an outage of Unit 1 at Holyrood.**

25 26 12.4 Extraordinary Transformer and Breaker Maintenance

27
28 The Board has found that Hydro acted imprudently in deferring regular preventative maintenance
29 on transformers and air-blast circuit breakers at its terminal stations. The Board has also found a
30 causal connection between conducting maintenance and avoiding malfunctions, especially given
31 the age of the assets.

32
33 After the January 2014 outages, Hydro undertook an accelerated maintenance program to bring
34 its preventative maintenance for transformers and breakers up to date by the end of 2015. Hydro
35 also shortened the maintenance cycle for breakers from six to four years in response to Liberty's
36 findings and recommendations in the outage inquiry. While the Board finds Hydro's decisions
37 and actions to bring its maintenance program back on track to be prudent, had Hydro acted
38 prudently by completing its preventative maintenance within the established cycles, there would
39 have been no need to incur these additional costs in 2014 and 2015. Based on the evidence, the
40 Board is satisfied that Hydro's decision to defer preventative maintenance on its breakers and
41 transformers resulted in additional costs associated with the accelerated maintenance program.

42
43 **The Board finds that the extraordinary transformer and breaker maintenance required in**
44 **2014 and 2015, and the associated additional costs incurred, resulted from Hydro's**
45 **imprudence in deferring maintenance on its transformers and breakers.**

12.5 Black Start Capability at Holyrood

Liberty's finding of imprudence for Hydro's decisions and actions in relation to black start capability at Holyrood was primarily based on Hydro's management of the issue and its decision to rely on Hardwoods for black start capability for a period of time. In assessing whether there should be a finding of imprudence in this case, the Board examined the information Hydro had at the time and what reasonable options were available. In doing so the Board looked first to the accepted definition of black start in utility practice and what it would mean for a utility. Liberty provided the following definitions of a black start resource:

North American Electric Reliability Corporation's (NERC):

A generating unit(s) and its associated set of equipment which has the ability to be started without support from the System.

Northeastern Power Coordinating Council (NPCC):

The ability of a generating unit or station to go from a shutdown condition to an operating condition and start delivering power without assistance from the electric system.

Both these definitions refer to a black start resource being able to start a generating unit without support from the system. Neither Hydro nor the intervenors disagreed with this definition of black start, and the Board accepts this definition as good utility practice. Hydro's 2011 Capital Budget Application proposed a project to overhaul the Holyrood gas turbine, which was used for Holyrood black start. In the project justification, Hydro stated:

The Holyrood gas turbine plant is critical to the successful operation of the Island Interconnected System. Its main function is to supply power to Holyrood during a black start. A black start of Holyrood is required when the plant is unable to attain power from the Island Interconnected grid due to an emergency outage caused by other generation sources. If the gas turbine failed to supply power to Holyrood during a black start, Holyrood would not be able to start until power was restored to the grid by alternate generation sources. This would cause an unnecessary delay in restoring full power to the grid.⁹³

This justification clearly shows that it was Hydro's view that the gas turbine at Holyrood is needed for the restart of the auxiliary equipment, which is used to start the units if the plant cannot obtain power from the grid. Hydro subsequently deferred the proposed project to overhaul the Holyrood gas turbine when a directive from Occupational Health and Safety Department restricted the operation of the gas turbine for health and safety reasons. On February 11, 2011 Hydro advised the Board that the directive had been rescinded and that the gas turbine was available for emergency use. The Board understood between February 11, 2011 and January 29, 2013 that the Holyrood gas turbine was available for black start at Holyrood. The Board had received no communication from Hydro to indicate otherwise until a meeting on January 29, 2013 between Board staff and Hydro about the system outages of January 11 and 12, 2013.

⁹³ Hydro 2011 Capital Budget Application, Volume I, page B-16; PR-PUB-NLH-173, Attachment 5, page 1 of 4

1 However, in correspondence to the Board on March 4, 2013 Hydro confirmed that the Holyrood
2 gas turbine had not been available for black start since January 18, 2012. Hydro advised at that
3 time that it was working with Newfoundland Power to install its 6 MW mobile gas turbine and
4 2.5 MW mobile diesel unit at Holyrood as an interim measure. As an alternative, the Hardwoods
5 gas turbine would be used to black start Holyrood if the transmission supply to the Avalon
6 Peninsula was interrupted.⁹⁴ This was considered a short-term measure until a new black start
7 unit was established. On August 5, 2013 Hydro advised the Board that the Newfoundland Power
8 mobile units had been removed as they could not provide black start capability. Hydro also
9 advised that it planned to apply for the installation of a 60 MW gas turbine at the Holyrood site
10 which would provide black start capability as of 2015. Hydro's plans for the intervening period
11 between 2013 and 2015 identified Hardwoods as the preferred option for black start capability.
12

13 In its August 5, 2013 correspondence to the Board, Hydro advanced the Hardwoods solution as a
14 limited temporary measure following the January 2013 outage, until the new combustion turbine
15 was installed. At that time the Board expressed significant concerns:
16

17 While the Board accepts that Hardwoods could provide black start capability, the Board
18 has concerns in relation to the reliability of this approach given the uncertainties and issues
19 cited by Hydro. The Board believes that the potential delays caused by black start using
20 Hardwoods could possibly be critical to system operation, especially as it relates to station
21 service. As set out in Hydro's correspondence dated August 5, 2013, the timely restoration
22 of station service is critical to life safety and system operations as it allows the operation of
23 forced draft fans to evacuate smoke, the restart of air compressors, operation of cooling
24 water pumps to maintain equipment temperatures, and operation of extraction pumps to
25 manage water chemistry and exhaust hood temperature.⁹⁵
26

27 According to Liberty, the decision to use Hardwoods for black start capability represented a shift
28 in the definition of black start and failed "to respond to a high priority need to keep the large and
29 important units at Holyrood warm, in order to enable them to contribute as soon as possible after
30 transmission system restoration."⁹⁶ In addition, Liberty noted that the only options provided by
31 Hydro's consultant in 2011 for black start capability at Holyrood aligned with the definition of
32 black start as set out above. Mr. Mazzini testified as follows:
33

34 I believe that that's not a decision that meets the test of prudence, does not meet the
35 reasonable decision kind of test. It fails that on a number of grounds. The first and foremost
36 I think is the most obvious, that black start is required for Holyrood when Holyrood
37 becomes isolated from the system. By definition, if Holyrood is isolated from the system, it
38 does not have access to any power from Hardwoods. So in my mind, the Hardwoods
39 solution is a non-starter from day one. It does not meet the basic criteria, the very design
40 basis for black start capability, which is that the plant has to start on its own. It's isolated
41 from the system and therefore cannot count on anything else.⁹⁷
42

43 In identifying the Hardwoods gas turbine for black start capability at Holyrood, Hydro chose to
44 pursue an option that was not in accordance with the accepted definition of black start and, more

⁹⁴ Black Start Diesel Units Application, page 3

⁹⁵ Board's letter to Hydro, October 27, 2013

⁹⁶ Liberty's Prudence Report, page 54

⁹⁷ Transcript, November 12, 2015, page 23/19 to page 24/8

1 importantly, the recognized need for black start capability at Holyrood. This meant total reliance
2 on off-site black start, which the Board finds is not consistent with good utility practice in these
3 circumstances. Further, even if Hardwoods could be accepted as a black start solution, the Board
4 questions Hydro's decision to rely on this unit for this critical use given its reliability record (it
5 was unavailable 26 percent of the time from 2008 through 2012).⁹⁸ In the Board's view, this
6 unit's unreliability makes Hardwoods inappropriate for consideration as a source of black start
7 capability.

8
9 The evidence does not show that Hydro undertook a full analysis, risk assessment, and balance
10 of costs and risks associated with the decision to use Hardwoods as an interim solution for black
11 start. Other than the consultant's December 2011 condition report, which does not propose
12 Hardwoods as a black start option, there is no other evidence on the record to support Hydro's
13 decision and considerations in relation to black start capability at Holyrood following the
14 consultant's report. Other than the relocation of Newfoundland Power's mobile diesel units in
15 the spring of 2013, which were subsequently found to be not suitable for black start, no action
16 was taken by Hydro to ensure black start capability at Holyrood. There is no evidence that
17 remedial work was performed on the existing gas turbine at Holyrood after February 17, 2011,
18 and no action was taken to acquire additional capability through the purchase or lease of other
19 on-site diesels in the intervening period. These actions are inconsistent with Hydro's claim in
20 2011 of the criticality of on-site black start capability.

21
22 There is no debate that black start capability at Holyrood is necessary. Hydro itself
23 acknowledged this need. However, Hydro failed to maintain black start capability at Holyrood
24 from at least January 18, 2012, when the existing unit was declared unfit for service, to July
25 2014. Serious problems with the existing unit were identified prior to January 2012 and were not
26 addressed by Hydro. Hydro contended that black start capability existed for the winters of 2011
27 and 2012 through the Holyrood gas turbine and Hardwoods, in 2012-2013 through Hardwoods,
28 and in 2013-2014 through Hardwoods and Newfoundland Power's mobile gas turbine/diesel at
29 the Holyrood site.⁹⁹ However, Newfoundland Power's mobile units were installed not for black
30 start capability but rather to provide additional generating capacity on the Avalon Peninsula.¹⁰⁰

31
32 Hydro had argued that "Hardwoods can meet the black start requirement at Holyrood,"¹⁰¹ but the
33 evidence does not demonstrate this to be the case. In fact, Hardwoods was unable to meet black
34 start needs in January 2013 when transmission supply was lost to the Holyrood plant, resulting in
35 an extension of the outage by 11 hours. The Board also notes that Hydro continued to rely on
36 Hardwoods for black start capability for Holyrood even after it proved an unviable black start
37 option where there is a loss of transmission. As a result the Board does not accept Hydro's
38 position that black start capability was available for this period.

39
40 The Board notes that there was an apparent shift in Hydro's position in relation to the
41 requirements of black start. Hydro referred initially to black start as on-site capability at
42 Holyrood, but later it appeared to encompass the entire Avalon Peninsula. This changed
43 understanding also appears to be the basis for La Capra's unqualified support of Hydro's actions

⁹⁸ Liberty's Prudence Report, page 54

⁹⁹ PR-PUB-NLH-003

¹⁰⁰ PR-PUB-NLH-111

¹⁰¹ Black Start Application - CA-NLH-017

1 and decisions about black start. La Capra determined that Hydro's decision to rely on
2 Hardwoods for black start was reasonable. It appears, however, this opinion was based on a
3 black start plan for the Avalon Peninsula, not for Holyrood. The Board agrees that setting aside
4 reliability issues, Hardwoods may very well meet this requirement. However, the problem is that
5 on-site black start capability at Holyrood, which had existed since 1969, was not available. The
6 January 2013 outage revealed the impact of Hydro's decision to rely on Hardwoods when
7 customers were exposed to an 11-hour delay in restoring the system because there was no on-site
8 black start capability at Holyrood. The Hardwoods gas turbine, which is about 20 kilometres
9 away from Holyrood, could not be used for black start because the loss of the transmission
10 system meant that the Hardwoods capacity was unavailable to Holyrood at the very time it was
11 needed.

12
13 The record shows that Hydro failed to take action to ensure suitable black start capability at
14 Holyrood until directed by the Board in October 2013, even though Hydro had identified
15 Holyrood's black start capability as critical and issues with the existing unit were flagged in
16 March 2010. In 2011, when Hydro withdrew its proposal for refurbishing the existing black start
17 unit, Hydro advised that an application for a new 50 MW gas turbine "would be filed in the
18 coming weeks."¹⁰² No such application was filed. In January 2012, when the existing black start
19 unit was taken out of service completely, Hydro stated that there were no immediate options
20 available for black start other than Hardwoods.¹⁰³ However, the evidence indicates there were
21 options for replacing the unit. The consultant's 2011 report suggested leasing or purchasing a
22 replacement diesel unit(s) with possible in-service dates of mid-2013. Hydro ultimately pursued
23 this possibility when the Board directed it to address black start capability at Holyrood in
24 October 2013.¹⁰⁴ It was not pursued until 22 months after the existing black start unit was
25 deemed unsafe for use. Instead, Hydro relied on Hardwoods as part of an area restoration plan as
26 opposed to on-site black start at Holyrood, based on costs and acceptance of temporarily lower
27 reliability until the new combustion turbine was in place.¹⁰⁵ The Board notes that Hydro's own
28 timeline for this proposed unit meant availability no earlier than 2015. The Board is not satisfied
29 that Hydro's decisions and actions in January 2012 were reasonable given the circumstances at
30 that time.

31
32 As a result of the above, the Board finds that Hydro's decision in January 2012 to rely on
33 Hardwoods and not pursue a suitable black start solution at Holyrood was clearly imprudent,
34 especially in light of Hydro's inaction to address the deteriorated condition of the existing unit
35 prior to January 2012. Hydro knew, or should have known, that this decision exposed customers
36 to higher risk and deviated from the level of reliability that had been required and provided in the
37 past. This decision did not offer black start capability at Holyrood and further, Hydro has not
38 demonstrated that Hardwoods would provide the level of reliability required for black start
39 capability at Holyrood.

40
41 **The Board finds Hydro's decisions and actions with respect to the provision of black start**
42 **capability at the Holyrood thermal generating station were imprudent.**

¹⁰² PR-PUB-NLH-173, Attachment 5, page 2 of 4

¹⁰³ Hydro's Submission, page 14/1-3

¹⁰⁴ PR-PUB-NLH-173, Attachment 5, page 3 of 4

¹⁰⁵ Hydro's Submission, page 14/22-24

1 **12.6 Holyrood Unit 1 Turbine Failure and Repair**

2
3 Based on a review of available information, Liberty found Hydro's actions and decisions with
4 respect to the Unit 1 turbine failure and repair in January 2013 were imprudent. As Liberty
5 noted, the factors contributing to the failure of the Unit 1 turbine were numerous and complex,
6 chief among them the failure of the DC lube oil system to function as intended. A prolonged
7 outage resulted and the capital expenditure associated with turbine repair was initially estimated
8 at \$12,809,700. Liberty reported actual expenditures as below:¹⁰⁶

Holyrood 1 Turbine Restoration Costs

	Order No. P.U. 14(2014)	Hydro 2014 Actuals	Hydro 2015 Test Period
Holyrood 1 Turbine Restoration Capital Costs	\$12,809,700	\$5,500,000 (net of insurance proceeds)	\$4,600,000 (net of insurance proceeds)
Holyrood 1 Turbine Expenses			
Contract Labour/Other	0	\$914,800	0
Depreciation Expense	0	\$1,000,000	\$1,000,000
Replacement Power	0	\$504,610	0
Operating Expense Totals	0	\$2,419,410	\$1,000,000

9 This project was the subject of considerable discussion at the hearing, as the cost consequences
10 of the failure were significant. Hydro's position throughout the review and hearing was that it
11 was not imprudent in relation to the Holyrood Unit 1 failure. On December 16, 2015, after the
12 conclusion of the hearing, Hydro filed a letter advising of additional information that had come
13 to its attention. As a result, Hydro accepted full responsibility for any cost consequences
14 attributable to the failure of the DC lube oil pumping system in January 2013.

15
16 The Board notes that, in accepting responsibility for the cost consequences, Hydro did not accept
17 Liberty's findings that its actions in this case were imprudent. The Board notes that the
18 information provided does point to issues with maintenance practices, specifically with respect to
19 adhering to recommended testing procedures. While this is of concern to the Board, especially in
20 light of the Board's imprudence finding on maintenance deferrals, Hydro has accepted
21 responsibility for the cost consequences of its actions in this case and customers will not bear any
22 costs of these actions. As a result the Board does not find it necessary to make a prudence
23 finding with respect to the failure of the Unit 1 turbine at Holyrood.

24
25 **The Board acknowledges Hydro's acceptance of the cost consequences attributable to the**
26 **failure of the DC emergency lube oil pumping system in January 2013.**

¹⁰⁶ Liberty's Prudence Report, Table 11.2, page 65

12.7 Labrador City Terminal Station Project Costs

Liberty found that Hydro's actions and decisions in project planning and execution in relation to the Labrador City terminal station project were imprudent but concluded that the additional work and costs required were necessary and that the project as finally completed was required. Even though the final costs were \$881,000 greater than the budgeted expenditure of \$15,963,000 and the project was completed two years behind schedule, Liberty found the increase justifiable and found no reason to question the reasonableness of these costs.

The Board notes that neither Hydro nor the intervenors questioned Liberty's imprudence finding for this project or its assessment that the final project costs were reasonable. Based on Liberty's review, the Board finds that Hydro was imprudent in planning and executing this project.

Notwithstanding this finding of imprudence, the Board is satisfied that customers paid no more than they would have in the absence of this imprudence. Customers experienced no adverse effects as a result of the additional time required to complete the project, as the load did not increase to the levels expected in that period. The project will offer the customers of Labrador West increased capacity and, as a result, the Board is satisfied that the final project costs should be accepted.

The Board finds that Hydro's decisions and actions with respect to the Labrador City terminal station project were imprudent but that this imprudence did not result in adverse customer impacts or additional costs.

12.8 Procurement and Installation of the New Combustion Turbine at Holyrood

Liberty concluded that Hydro acted prudently in the timing of the acquisition of the new combustion turbine at Holyrood and found no major concerns with Hydro's execution of the project. Liberty also found the project costs to be reasonable.

The only intervenor to challenge Liberty's prudence finding for this project was Danny Dumaresque. Mr. Dumaresque focussed in his questioning of Hydro and in his final submission primarily on the procurement process and costs. The Board has reviewed the information Mr. Dumaresque provided on alternatives and costs and finds that it is of limited value. It appears to be mostly third-party information taken from websites with no verification or authentication of the validity of the contents or source. No evidentiary support was provided to explain the relevance of this information to the circumstances of this project. Therefore, the Board gives this information no weight.

The Board has reviewed the record for the issues identified by Mr. Dumaresque and finds that Hydro has provided complete responses in evidence and testimony to all of his claims. Specifically the Board notes the following:

- Both the combustion turbine and the EPC contract packages were awarded as a result of a tender process.
- Hydro received independent inspection reports and staff reports on the fitness and suitability of the combustion turbine prior to contract award.

- 1 • The costs Mr. Dumaresque cited for comparison and to support his contention that
- 2 consumers did not get value for money were not for the same contract packages that
- 3 Hydro ultimately awarded.
- 4 • There is no evidence that the tender evaluation process was arbitrary or unfair.
- 5 • The claim that there is no manufacturer's warranty is unsupported by the evidence.

6
7 The Board shares Liberty's view that Hydro's flawed supply planning processes and decisions
8 prior to 2014 contributed to the need to procure additional generation on an urgent basis.
9 Particular problems included the focus on LOLH at the expense of reserve requirements, use of
10 "average" weather in load forecasts, and accounting for line losses under high load conditions on
11 the Avalon Peninsula. However, Liberty found that these shortcomings did not meet the test for
12 imprudence.

13
14 The Board notes as well that Liberty accepted Hydro's explanation of why it did not seek to
15 acquire a new combustion turbine sooner, given its own indications in 2010 and 2012 that supply
16 criteria would be exceeded in December 2014 and the knowledge that lead time for a new turbine
17 would be three years. As Liberty noted, Hydro's decision and action to buy the new combustion
18 turbine on an expedited basis resulted in a larger unit being installed in the same timeframe as
19 would have been the case if the decision had been made in 2012. During the hearing Mr. Mazzini
20 of Liberty confirmed that increases in costs for the project of about \$10.5 million identified by
21 Hydro since Liberty's review did not change its conclusion that the project costs were
22 reasonable.¹⁰⁷ The Board accepts Liberty's finding that Hydro's decisions about the new
23 combustion turbine did not result in unnecessary cost increases for customers.

24
25 **The Board finds that Hydro's decisions and actions with respect to the procurement and**
26 **installation of the new combustion turbine at Holyrood were prudent.**

27 28 **12.9 Additional Supply-Related Costs**

29
30 No intervenors argued that Liberty's finding of prudence for additional 2014 supply costs should
31 be rejected, with the exception of the supply costs associated with the failure of breaker B1L17
32 at Holyrood and the subsequent Unit 1 outage. Since the Board has found that Hydro's actions in
33 the maintenance of breaker B1L17 were imprudent, the additional supply costs associated with
34 the resulting failure of Unit 1 should also be deemed imprudent. The costs associated with this
35 breaker failure are considered in Section 12.3.

36
37 Regarding the remaining supply costs included in this project category, the Board is satisfied that
38 Hydro acted prudently to pursue capacity assistance agreements with its large industrial
39 customers and to obtain additional energy and capacity where possible so as to minimize
40 disruptions on the system, especially while restoration efforts were underway. Notwithstanding
41 the reasons for the January 2014 supply and outage events, Hydro's actions to secure additional
42 capacity accorded with its mandate to ensure an adequate supply of power to its customers, and
43 there were no other reasonable options available at the time. The Board accepts Liberty's finding
44 of prudence for the remaining additional supply costs reviewed.

¹⁰⁷ Transcript, November 12, 2015, page 34/10-22

1 **The Board finds that Hydro's decisions and actions in incurring additional supply costs**
2 **during the period January 1-12, 2014 were prudent, with the exception of the supply costs**
3 **associated with the failure of breaker B1L17 at Holyrood and the resulting outage of Unit 1**
4 **during the period January 5-8, 2014, which the Board finds were imprudent.**

6 **12.10 Holyrood Unit 3 Forced-Draft Fan Motor Failure and Repair**

7
8 Liberty found that Hydro's decision to adopt a "run to failure" strategy for the forced-draft motor
9 at Holyrood Unit 3 was a considered decision among the available options and one which
10 accounted for the risks and consequences. Neither Hydro nor the intervenors questioned
11 Liberty's prudence finding for this project. The Board notes that the remaining life of the
12 Holyrood plant was key to deciding between immediate motor replacement and maintaining the
13 existing motor. The consultant's 2011 condition assessment indicated that the motor would not
14 survive to the end of the Holyrood plant's expected life of 2020, and that the remaining life for
15 the motor was five years.

16
17 Given that Hydro had assessed the consequences of motor failure as minimal and the cost of
18 replacement as high, the Board accepts Liberty's findings that Hydro's decided course of action
19 was reasonable and prudent based on the information at the time.

20
21 The motor failed in December 2013, in advance of the January 2014 outages, which were
22 attributed to other equipment failures. This resulted in a loss of generating capacity of 100 MW
23 from Unit 3, which contributed to supply problems during that period. While the actual
24 capitalized repair cost for the motor was \$76,000, the loss of 100 MW of generation capacity
25 during January 1-12, 2014 resulted in an estimated \$2.0 million in replacement power costs.
26 However, the Board accepts that Hydro's decision in 2011 with respect to the motor was not
27 imprudent and the Board will allow these replacement power costs to be recovered.

28
29 **The Board finds Hydro's decisions and actions with respect to the Holyrood Unit 3 forced-**
30 **draft fan motor failure and repair to be prudent.**

31 **12.11 Black Tickle Plant Restoration**

32
33
34 Based on Liberty's findings and review, the Board is satisfied that Hydro's decisions in the
35 restoration of the Black Tickle plant after a fire in March 2012 were prudent. The Board notes
36 that neither Hydro nor the intervenors questioned Liberty's prudence finding for this project.

37
38 The issues identified with the restoration of the Black Tickle plant following a fire in March
39 2012 include the lack of a fire suppression system and the decision to restore the plant to its
40 original capacity despite a reduction in load of 50 percent with the closure of the local fish plant
41 shortly after the fire. The Board notes Liberty's finding that Hydro should have acted sooner on
42 fire suppression in its diesel plants, given the high incidence of fires at these plants. Hydro
43 created a plan to install fire suppression systems in its diesel plants based on a consultant's report
44 commissioned in 2011. This plan set out a priority ranking and projected a 2019-2020
45 installation date for fire suppression at the Black Tickle plant. The Board accepts that, even if
46 Hydro had installed fire suppression at all its diesel plants in an accelerated program, it likely
47 would not have been in place at Black Tickle at the time of the fire.

1 As for the plant capacity, the Board also accepts that Hydro's decision to proceed without
 2 redesign and reconfiguration was prudent. As Liberty noted, the first priority was to restore
 3 service to the community, and this action would have delayed restoration. In addition, Liberty
 4 found that no cost savings would have resulted from this delay, with the associated reliability
 5 risks of redesigning and reconfiguring the plant. In the Board's view this was a prudent and
 6 reasonable decision at the time.

7
 8 **The Board finds Hydro's decisions and actions with respect to the restoration of the Black
 9 Tickle plant to be prudent.**

10
 11 **13.0 Regulatory Treatment of Replacement Assets (Betterment)**

12
 13 Hydro proposed that the capital additions and the associated expenditures at Sunnyside and
 14 Western Avalon constitute a betterment of the assets beyond expectations of the assets when they
 15 were originally installed. Gannett Fleming's report analyzed recoverable costs for the capital
 16 additions at the Western Avalon terminal station and the Sunnyside terminal station on a
 17 betterment basis. Gannett Fleming calculated the impact of capital expenditures on the remaining
 18 life expectancy of the assets in terms of a percentage of the consumed service value of the
 19 replaced equipment which, according to Gannett Fleming, represents the estimated amount of the
 20 new capital additions that can be considered a betterment expenditure. Hydro argued that this
 21 approach is consistent with its accounting practices and results in it taking a loss on old
 22 equipment and putting into rate base the betterment portion of any equipment the Board finds to
 23 have been replaced prematurely as a result of Hydro's decisions or actions.¹⁰⁸ Hydro submitted
 24 that "the betterment approach that it has put forward appropriately deals with the situation at
 25 hand in a manner that accords with sound depreciation, plant accounting and regulatory
 26 practice."¹⁰⁹

27
 28 Liberty responded to Gannett Fleming's report stating that, while it has no argument with the
 29 general concept of betterment, it does not apply here. Liberty commented that its prudence
 30 findings allowed for the possibility that operational improvements or reduced operating costs
 31 might result "from the imprudence-induced replacement" of the transformer equipment.
 32 However, Liberty disagreed with Hydro's suggestion that customers somehow derive benefit
 33 from the life extension represented by replacing damaged equipment. Liberty stated that, had
 34 they not failed, the replaced assets would have remained in service and any revenue requirement
 35 impacts would have been calculated on the basis of remaining investment as it continued to
 36 depreciate:

37
 38 The most direct way to ensure that customers pay no more than would have occurred
 39 absent imprudence is to conclude that, absent imprudence, Hydro would not have replaced
 40 and would have made no claim for the replaced equipment (subject to the case of Breaker
 41 B1L03, discussed earlier) in this rate proceeding. In the first proceeding whose test-period
 42 post-dates the likely end of the lives of the replaced equipment, Hydro would have the
 43 opportunity to show that the equipment is used and useful and not in existence
 44 prematurely. Given that the replacement equipment at that time will have been in operation
 45 for some time, it would seem logical to begin consideration of the amount for inclusion in

¹⁰⁸ Hydro's Submission, page 48

¹⁰⁹ Ibid., page 51

1 rate base on the basis of the depreciated cost at that time. Otherwise, customers would be
2 forced to pay costs beyond those associated with the useful life of the equipment. In other
3 words, the useful life would consist of that portion that follows the end of the expected life
4 of the replaced equipment, assuming no premature retirement associated with
5 imprudence.¹¹⁰
6

7 The Consumer Advocate disagreed with Hydro's betterment approach and submitted that the
8 overriding principle in determining what ratepayers should pay as the result of an early
9 retirement of an asset should be that the ratepayers pay no more than they would have paid if the
10 utility had acted prudently. According to the Consumer Advocate, to do otherwise effectively
11 rewards Hydro for its imprudence. Newfoundland Power took a similar position and agreed with
12 Liberty that Hydro could apply, after the anticipated normal end of life of the equipment required
13 to be replaced prematurely, to have the then-depreciated value of the replacement equipment
14 admitted to rate base. Vale also agreed with Liberty's position, stating that this is consistent with
15 holding a utility accountable while ensuring that ratepayers are not held responsible for the
16 effects of a utility's imprudence.
17

18 The Board understands that Hydro's concept of betterment results in customers benefitting from
19 replacement equipment in the long term beyond the equipment which was replaced. Ordinarily
20 this principle may hold true. However, in this circumstance, the equipment at Sunnyside and
21 Western Avalon still had life expectancy but had to be replaced because of Hydro's imprudence.
22 The assets that were replaced would have, but for Hydro's imprudent decisions and actions,
23 continued in service and customers would have continued to pay for the equipment on the basis
24 of normal depreciation. This position was clearly expressed by Mr. Antonuk of Liberty in
25 response to a question from the Board Hearing Counsel on whether betterment has a role in the
26 costs that customers pay for the equipment repairs at Sunnyside and Western Avalon:
27

28 Betterment certainly has a role in some context, but it's just simply the wrong way to look
29 at the circumstances here. The right standard here is the customer should pay no more than
30 they would have in the absence of destruction and damage caused by imprudence. To the
31 contrary, the approach urged by Hydro witnesses would require customers to pay far more
32 than they would have had the damage or destroyed equipment continued to serve.
33 Customers have paid on the basis of the depreciated cost of that equipment which was
34 installed decades ago. Hydro's proposal would substitute that with a much higher cost of
35 equipment that is only needed due to imprudence, in our opinion. Even after, I'll call it
36 discount, that Hydro's betterment approach would create for that equipment, its installed
37 cost nevertheless remains far, far higher than that of the equipment lost. The resulting
38 investment that Hydro proposes to put in rate base, therefore, not only doesn't fail to keep
39 customers harmless, it actually puts them in a much worse position and causes them to pay
40 much higher costs across the duration for which rates set in this proceeding are likely to be
41 in effect.¹¹¹
42

43 The Board finds that Hydro has not demonstrated that its proposed betterment approach should
44 be applied in the circumstances. In the Board's view Hydro's approach may result in customers
45 paying higher costs now than they would have if Hydro had not acted imprudently. The Board
46 finds no basis upon which to accept an argument that somehow customers are better off in this

¹¹⁰ Liberty's Reply Evidence, page 13-14

¹¹¹ Transcript, November 12, 2015, page 59/4 to page 60/5

1 case. The new equipment would not have been required until the normal end-of-life replacement,
2 when the new asset would be recognized in rate base and Hydro would recover the associated
3 costs in rates from the customers benefitting from the new equipment. In the circumstances,
4 customers should not be expected to pay for new equipment that was not yet required, especially
5 if the new equipment was required as a result of the utility's imprudence.

6
7 In terms of the regulatory treatment that should be accepted, Mr. Antonuk suggested that Hydro
8 be required to carry the investment in any new equipment installations required as a result of
9 Hydro's imprudence for the period it would not have been needed otherwise, and then the
10 investment be placed in rate base at the then-depreciated cost at the time it becomes needed.
11 Current rates would be based on the depreciated cost of the existing equipment before
12 replacement and repair. According to Mr. Antonuk, this treatment provides a balanced approach
13 that assigns to the company a fair and proper share of the cost of its imprudence.¹¹² The Board
14 agrees that this approach is reasonable and fair to ratepayers in the circumstances of an
15 imprudent finding.

16
17 **The Board does not accept Hydro's proposed regulatory accounting treatment on a**
18 **betterment basis of the replacement assets at the Sunnyside terminal station and the**
19 **Western Avalon terminal station. Hydro will be required to adopt the approach proposed**
20 **by Liberty, which will recognize the new assets on a depreciated basis at the time of the**
21 **expected replacement date.**

22 23 **14.0 Imprudence Disallowances**

24
25 Hydro is entitled to recover its prudently incurred costs in providing service, and customers
26 should be required to pay only for those costs that are prudently incurred. As for the financial
27 consequences of Hydro's imprudence, the Board's concern is not with punishing the utility but
28 with ensuring that customers do not bear the costs of Hydro's imprudent actions. With the
29 amended general rate application currently being considered by the Board, this means that the
30 2014 revenue requirement and the 2015 test year Hydro proposed for rate setting should not
31 include any costs disallowed by the Board as a result of imprudence.

32
33 The following sections set out the Board's findings on the disallowances associated with projects
34 where the Board has found Hydro's actions and decisions to be imprudent.

35 36 **14.1 Equipment Replacement and Overhauls**

37
38 The Board has found imprudence by Hydro in maintenance deferrals and practices for its
39 breakers and transformers; specifically, this imprudence caused the failure of the Sunnyside
40 breaker B1L03 and transformer T1 as well as the tap changer at the T5 transformer at the
41 Western Avalon terminal station. This equipment failure resulted in significant fire damage at the
42 Sunnyside terminal station on January 4, 2014 and extensive power outages. In addition, on
43 January 5, 2014 a failure of breaker B1L17 at Holyrood, which resulted in further outages, was
44 found to result from imprudent maintenance practices. Overhauls of the Sunnyside B1L03 and

¹¹² Transcript, November 12, 2015, page 61/4-9

1 Holyhood B1L17 breakers were also required on an urgent basis to restore these breakers to
2 service.

3
4 The capital and operating costs incurred by Hydro as a result of these equipment failures were
5 significant. Liberty reported the actual 2014 and 2015 costs for equipment replacement and
6 overhauls associated with imprudence:

**Equipment Replacement and Overhauls
Costs (net of insurance proceeds) Related to Imprudence**

	2014 Actual Costs		2015 Test Year Costs	
	Capital	Operating	Capital	Operating
Sunnyside Replacement Equipment (including replacement of breaker B1L03)	\$3,149,184	\$879,800	\$3,911,306	\$133,285
Western Avalon T5 Tap Changer Replacement and Transformer Repair	\$1,013,900	\$41,000		\$41,000
Overhauls of Breakers B1L03 and B1L17	\$522,243	\$164,000		
Total	\$4,685,327	1,084,800	\$3,911,306	\$174,285

7 Liberty acknowledged that the equipment replaced at Sunnyside and Western Avalon had at the
8 time of failure a shorter lifespan than new equipment. Liberty observed that, while customers
9 would have been spared the cost of new equipment for some time if it had not failed in January
10 2014, maintenance costs for the new equipment might be lower than expected for the replaced
11 equipment. In this case, customers may also be spared some costs that would have been included
12 in the current general rate application filing. Liberty could not calculate the value of an
13 appropriate credit to reflect these factors based on the available information.¹¹³

14
15 The Board has found that Hydro's proposed betterment approach for cost recovery for the
16 Sunnyside and Western Avalon capital additions is not appropriate in the circumstances. As a
17 result, Hydro will not be permitted to recover the capital costs associated with the Sunnyside
18 terminal station equipment replacement or the Western Avalon T5 tap changer replacement on a
19 betterment basis. The Board recognizes that the new transformer assets are in place and may
20 benefit the system in terms of reliability and reduced maintenance costs. However, it is not
21 reasonable to expect customers to pay for equipment that had to be replaced prematurely as a
22 result of Hydro's imprudent actions.

23
24 Hydro's imprudence also resulted in the need to overhaul breakers B1L03 and B1L17 after the
25 January 2014 outages. These breakers were replaced in late 2014. Hydro suggested that the costs
26 of replacing the air-blast circuit breaker B1L03 at Sunnyside should be allowed because it
27 "would have been replaced in the next couple of years in any event as part of Hydro's air blast
28 breaker replacement program."¹¹⁴ The Board does not accept this eventuality argument. As noted

¹¹³ Liberty's Prudence Report, page 31.

¹¹⁴ Hydro's Reply Evidence, page 14

1 above, Hydro's imprudence meant that breaker replacement was required earlier than it would
2 have been.

3
4 The Board is also satisfied that the operating expenses included in the calculation of the 2014
5 revenue requirement and the 2015 test year costs related to the replacement of equipment
6 associated with these projects that have been found by the Board to be imprudent should not be
7 recovered from customers.

8
9 **The Board will not allow recovery of the capital and/or operating expenses included in the**
10 **calculation of the 2014 revenue requirement and the 2015 test year costs associated with**
11 **Hydro's imprudence in relation to the Sunnyside terminal station replacement equipment,**
12 **the Western Avalon terminal station T5 tap changer replacement and the overhauls of the**
13 **230 kV breakers B1L03 and B1L17.**

14
15 **Hydro will continue to recover the capital costs for the replaced equipment at the**
16 **Sunnyside terminal station and the Western Avalon terminal station for the remainder of**
17 **the expected lives of these assets as were determined by Hydro prior to the failure of the**
18 **assets in January 2014 and the recovery of these capital costs will be included in the 2014**
19 **revenue requirement and the 2015 test year costs. The recovery of the capital costs for the**
20 **replacement equipment will be addressed by the Board at the end of the expected lives of**
21 **the replaced equipment following a further application by Hydro. The 2014 and 2015**
22 **revenue requirement should be based on the depreciated cost of the existing equipment**
23 **before replacement and repair.**

24 25 **14.2 Extraordinary Maintenance**

26
27 Based on its review of the costs associated with the accelerated maintenance program Hydro
28 established following the January 2014 outages, Liberty found that additional costs for six-year
29 transformer maintenance of approximately \$434,752 were incurred in 2014 as a result of
30 imprudence. In addition, any amounts above \$411,870 in 2015 would be associated with
31 imprudence.

32
33 Liberty estimated that Hydro incurred additional costs of \$468,263 in 2014 for air-blast circuit
34 breaker maintenance resulting from imprudence. As of 2015, Hydro has shortened its breaker
35 maintenance cycle from six to four years. Liberty considered this change to be appropriate. For
36 2015, Liberty estimated that all costs for four-year air-blast circuit breaker maintenance in excess
37 of \$398,021 are additional costs that Hydro would not have incurred in the absence of imprudent
38 breaker maintenance deferral.

39
40 Hydro submitted that Liberty's position on the denial of recovery of these additional costs "does
41 not take account of the fact that in order for Hydro to have complied strictly with its maintenance
42 cycle Hydro would have had to incur additional costs in prior years as well as in the 2014 and
43 2015 test years which were the last two years of Hydro's recovery plan."¹¹⁵ Hydro also stated
44 that it understands that both the Board and Liberty support its efforts to bring all transformer and
45 air-blast circuit maintenance within current maintenance cycles:

¹¹⁵ *Ibid.*, page 19

1 Hydro does not believe it is appropriate or warranted to disallow costs to carry out deferred
2 work specifically desired by all parties simply because the work is outside the general
3 maintenance cycle. This is especially the case where the maintenance was deferred to carry
4 out higher priority work on a considered basis, and if the work was done previously
5 additional costs would have needed to be incurred in any event. However, Hydro does
6 agree that it is extraordinary in nature in that it is completed within the test year forecasts
7 period and therefore recommended its deferral and recovery over a five-year period.¹¹⁶
8

9 The Board does not accept Hydro's position; it has found that Hydro acted imprudently by
10 deferring scheduled preventative maintenance. While all parties supported Hydro's efforts to
11 complete the outstanding maintenance by 2015, prudent and preferred action would have been
12 for Hydro to complete the maintenance within the required schedule in the first place. In the
13 Board's view, there would not have been additional costs to complete preventative maintenance
14 work in accordance with the schedule. The issue is that Hydro diverted resources from this work
15 to other work it deemed more critical. The Board finds no reason to allow for the recovery of
16 additional costs in later years arising from decisions and actions deemed imprudent under a no-
17 hindsight prudence review.
18

19 **The Board will not allow recovery of the incremental costs associated with the**
20 **extraordinary transformer repairs in 2014 and 2015 and breaker repairs in 2014. Since**
21 **Hydro's decision to move to a four-year maintenance cycle for air-blast circuit breakers as**
22 **of 2015 was prudent, additional costs associated with that decision are justified and will be**
23 **allowed.**
24

25 14.3 Additional Supply Costs

26

27 The Board acknowledges disagreement between Hydro and Liberty on how the costs associated
28 with the additional energy and capacity required during the Unit 1 outage of January 5-8, 2014
29 should be calculated. In the absence of specific data, Liberty estimated the added costs at
30 \$1,699,707 (\$2,204,317 less \$504,610) based on an averaging of the supply costs for the
31 subsequent period January 9-12, and subtracting this from the actual costs for the period January
32 5-8. The reduction of this amount by \$504,610 accounts for the double-counting of replacement
33 power costs, which Liberty acknowledged.¹¹⁷ Hydro's estimate used Liberty's methodology but
34 averages the first four and last four days of the period to arrive at an estimate of \$984,674. Hydro
35 argued that Liberty's method is not sufficiently rigorous for the calculation of a disallowance.
36 Liberty suggested that the use of the first four days of that period as part of the calculation is not
37 reasonable since that time period was "chaotic," with extreme temperatures, supply shortages,
38 and manual load shedding. Hydro also argued that the estimate should be reduced to account for
39 the time that Unit 1 was in operation on January 8 when it went back online.
40

41 Since there are no data on which to determine the actual added supply costs for the period
42 associated with the Unit 1 outage, the Board needs to look to a proxy for this estimate. In the
43 Board's view, Liberty's methodology of averaging costs gives a reasonable estimate of the added
44 supply costs for January 5-8, 2014 associated with the failure of breaker B1L17 and the resulting
45 outage of Unit 1.

¹¹⁶ Ibid., page 19-20

¹¹⁷ Liberty's Reply Evidence, page 16

1 In terms of which period to use to determine the average costs with Unit 1 in operation, the
 2 Board does not agree that the first four days of that period (January 1-4, 2014) should be
 3 included. Unusual events occurred on the system during that period because of extreme cold,
 4 supply shortages, equipment failures, and rotating outages; that four-day span was not an average
 5 period from which to extrapolate normal costs with Unit 1 in operation. The Board finds
 6 Liberty's approach to the calculation of an appropriate disallowance for added supply costs over
 7 the period January 5-8, 2014 due to imprudence associated with the maintenance of breaker
 8 B1L17 and the resulting outage of Unit 1 at Holyrood to be reasonable.

9
 10 Liberty acknowledged that there was a double-counting of certain costs and that its estimated
 11 disallowance should be reduced by \$504,610. The Board accepts that the disallowance should be
 12 adjusted by this amount to account for double-counting and for the fact that Unit 1 was back in
 13 operation as of 3:30 pm on January 8, 2014.¹¹⁸ In the case of the latter adjustment, given the
 14 rough nature of the estimate, it is reasonable to prorate the availability hours for Unit 1 based on
 15 the four-day period Liberty used to calculate the disallowance.

16
 17 **The Board will not allow recovery of the additional supply costs associated with the failure**
 18 **of breaker B1L17 and the resulting outage of Unit 1 at Holyrood during January 5-8, 2014.**
 19 **The additional supply costs should be reduced by the amount calculated using Liberty's**
 20 **methodology, including the adjustment for double-counting, and adjusted on a prorated**
 21 **basis for Unit 1 going back online at 3:30 pm on January 8, 2014.**

22 23 **14.4 Black Start Capability at Holyrood**

24
 25 The Board has determined that Hydro's decisions and actions with respect to black start
 26 capability at Holyrood were imprudent. Liberty noted that, while problems with black start
 27 capability were identified in 2010, the solution of on-site diesels set up in response to the
 28 Board's direction to act was not in service until mid-2014. At the same time, Hydro was
 29 advancing the in-service date of the new combustion turbine for early 2015 with the expectation
 30 that it would provide black start capability later in 2015. With the pending interconnection with
 31 Muskrat Falls in 2020, Liberty suggested that the "used and useful" window for the interim black
 32 start solution goes from 10 years to about a year. Liberty suggested that this period is too short to
 33 justify recovery of the associated costs from customers and that a disallowance of these costs
 34 encourages Hydro to avoid imprudent courses of action in the future. Liberty reported that the
 35 actual costs associated with the 2014 installation of black start capability were \$762,000 in
 36 capital expenditures and \$160,000 in depreciation, fuel, and operating /maintenance costs. In
 37 2015 the deferred lease amortization is \$1.05 million with a depreciation expense of \$41,000.¹¹⁹

38
 39 Newfoundland Power submitted that the evidence does not support a disallowance for the
 40 amounts Hydro spent to install black start capability at Holyrood after January 2013. According
 41 to Newfoundland Power, the evidence does not show that these assets were not used and useful,
 42 but only that they will be used and useful for a shorter period of time. As to any sanctions that
 43 should apply to Hydro as a result of its imprudent actions, Newfoundland Power submitted:

¹¹⁸ Hydro's Submission, page 25

¹¹⁹ Liberty's Prudence Report, page 57

1 It is not appropriate for the Board to sanction a utility for imprudent conduct by
 2 disallowing any recovery of a utility investment which has not been shown to be anything
 3 but used and useful. This is because the sanction bears no reasonable nexus to the
 4 inappropriate conduct.

5
 6 The *Public Utilities Act* provides means for the Board to enforce reasonable utility
 7 management conduct. Disallowance of recovery of utility investments which are used and
 8 useful should not be a means to ensure reasonable utility decision-making.¹²⁰
 9

10 The Consumer Advocate submitted that any costs related to leasing and installing the diesels for
 11 black start should be removed from any permitted 2014 revenue deficiency recovery and the
 12 2015 test year. Otherwise, Hydro's imprudence would be without consequence to Hydro.¹²¹
 13

14 The Industrial Customer Group submitted that the evidence shows that Hydro's delay in acting
 15 on a solution for black start has created additional costs to customers:
 16

17 Bringing online an interim diesel solution, that by Hydro's own representations in the 2011
 18 Capital Budget was needed to meet a critical black start need, but only 3 years after that
 19 need was identified (per IC-NLH-026 in 2011 Capital Budget) and only after the very
 20 black start failure at Holyrood which had always been understood by Hydro to be a risk
 21 had occurred, does not meet the used and useful test for prudent expenditure, in a manner
 22 consistent with least cost reliable service. Indeed, by the time this diesel unit project was
 23 belatedly advanced in November 2013, its usefulness as an interim solution should have
 24 elapsed and it should have been superseded by the long-term black start solution that
 25 Hydro identified in early 2012 – a new Holyrood gas turbine.¹²²
 26

27 As a result, the Industrial Customer Group submitted that Hydro's customers should not bear any
 28 of the capital, lease, operational, fuel, or other costs for the eight 2 MW diesel units installed at
 29 Holyrood.
 30

31 Vale also submitted that significant weaknesses Liberty identified in the supply planning process
 32 that delayed purchase of the new Holyrood combustion turbine are relevant to the costs incurred
 33 in leasing the black start diesel generators:
 34

35 As found by Liberty, Hydro's imprudent failure over an extended period of time to
 36 maintain onsite black start capability at Holyrood resulted in the leased diesel generators
 37 having "too short a used and useful period to justify the expenditures". Vale submits that
 38 Hydro has not provided evidence or a justification to refute Liberty's findings and,
 39 therefore, any costs associated with leasing and installing the eight 1.25 mW [sic] diesel
 40 generators should be removed from any permitted 2014 revenue deficiency recovery and
 41 the 2015 test year.¹²³
 42

43 As for Liberty's proposed disallowance, Hydro acknowledged Newfoundland Power's comments
 44 that this action would not be appropriate in the context of the used and useful nature of the
 45 diesels, which it stated is in accordance with its position and that of La Capra. According to La

¹²⁰ Newfoundland Power's Submission, page 16

¹²¹ Consumer Advocate's Submission, page 30/16-20

¹²² Industrial Customer Group's Submission, page 10

¹²³ Vale's Submission, page 16

1 Capra, Liberty's logic is flawed in its conclusion that cost recovery for the addition of black start
2 should be disallowed because Hydro did not add black start generation until 2014, after the
3 outage of January 11, 2013 and a direct order from the Board. La Capra stated that, if Hydro had
4 pursued on-site generation at Holyrood at the time of the consultant's 2011 report, the effects of
5 the January 2013 outage would not have been avoided. The new generation would not have been
6 available until February 2013 at the earliest, a difference of less than a year from when the leased
7 option was put in place. La Capra stated:

8
9 We are not aware of any time requirement over which an investment needs to be utilized in
10 order to find the investment used and useful; the diesels have been in-service for a number
11 of months and will continue to be until replaced by the new 123 MW CT, which produced
12 first power on 1/2015 and is currently being prepared for Black Start.¹²⁴

13
14 Hydro noted that it is seeking recovery only for the amount it ultimately incurred to provide
15 black start capability for 2014-2015—and that Liberty has not claimed that black start capability
16 was not required during this period nor that the associated costs were excessive:

17
18 Thus, regardless of the Board's ultimate findings regarding Hydro's various actions to
19 ensure black start capability following the determination that the then existing Holyrood
20 black start turbine could not be continued to be used, with respect to the actual costs for
21 which Hydro is seeking approval there is no grounds for disallowance.¹²⁵

22
23 Hydro also identified a portion of the capital costs that are capable to be used on the new
24 combustion turbine for black start purposes, and submitted that operating expenses related to
25 Newfoundland Power's diesel units should be allowed.

26
27 In reply evidence, Liberty disagreed that customers should pay for the costs of the black start
28 project, suggesting that there should be some consequence to Hydro for its actions in allowing
29 black start deficiency to persist at Holyrood for 52 months: "Denying Hydro recovery of the
30 costs of the long belated solution is one means of attaching consequence to actions that placed
31 customers at risk for an extended period of time."¹²⁶

32
33 Hydro submitted that it is not regulatory practice to impose a disallowance in situations where no
34 specific cost consequences have been determined:

35
36 In the circumstances, it is clearly inappropriate to disallow costs with respect to used and
37 useful assets which were put in place following the Board's direction, simply on the basis
38 that these assets were not put in place earlier. This is particularly so in light of the
39 evidential record as to the context behind Hydro's decision making during the relevant
40 period and its reliance on Hardwoods as an interim solution.

41
42 Further, to the extent that the Board determines that any of Hydro's actions during the
43 relevant period with respect to black start were imprudent, that finding in and of itself will
44 be taken very seriously by Hydro.¹²⁷

¹²⁴ Hydro's Reply Evidence, Appendix B, page 15 of 39

¹²⁵ Ibid., page 27

¹²⁶ Liberty's Reply Evidence, page 22

¹²⁷ Hydro's Reply Submission, page 11/20-24 to page 12/1-3

1 The Board accepts the position of Hydro and Newfoundland Power that the diesel units installed
2 in 2014 to provide black start capability are used and useful, and a total disallowance of the costs
3 associated with their procurement and installation therefore runs counter to regulatory principles
4 and should not be ordered. Black start capability at Holyrood has been in place from July 2014 to
5 the present. The Board also noted that the new combustion turbine at Holyrood was intended to
6 provide black start capability but that, as of the time of the hearing, there has been no
7 opportunity to test this capability.¹²⁸

8
9 The Board does not accept La Capra's suggestion that, had Hydro pursued black start capability
10 at the time of its consultants' December 2011 report, the new generation would not have been
11 available until February 2013. The Board noted that, in response to a Board directive in the fall
12 of 2013, Hydro was able to have black start capability in place by the spring of 2014. Given this
13 fact the Board finds that Hydro could have avoided the outage extension in 2013 if it had taken
14 immediate steps to provide for black start capability at Holyrood.

15
16 Hydro's actions in dealing with black start capability at Holyrood, given its long accepted critical
17 role for system reliability, falls well below the actions that would be expected of a reasonable
18 utility. Hydro's actions were clearly imprudent and placed customers at risk for approximately
19 52 months. This risk materialized in January 2013 when the lack of black start capability at
20 Holyrood extended an outage by 11 hours for customers on the Island Interconnected system.
21 The Board finds that Hydro's conduct in failing to act in a timely way to ensure that critical
22 black start capability existed at Holyrood is so egregious that it is appropriate that Hydro bear
23 some financial consequence for its imprudent actions. As there are no direct means of
24 quantifying the amount to be disallowed, the Board will exercise its discretion and determines
25 that an amount of \$500,000 should not be recovered from customers. This disallowance is
26 intended to send a clear signal to Hydro that it must take responsibility for improving its
27 performance in managing system operations, including maintenance and reliability.

28
29 **The Board will not allow recovery in the 2014 revenue requirement of \$500,000 associated**
30 **with Hydro's imprudence in managing black start capability at Holyrood.**

31 32 **14.5 Holyrood Unit 1 Turbine Failure and Repair**

33
34 As Hydro has advised it accepts responsibility for the cost consequences associated with the
35 failure of the Unit 1 emergency DC lube oil pumping system in January 2013, Hydro's actions or
36 decisions concerning this project will not affect customers. Hydro will be directed to provide
37 details of the costs associated with this project. As part of the review of Hydro's compliance
38 filing the Board will ask its financial consultants to review these costs to ensure that they are
39 excluded from the 2014 revenue requirement and 2015 test year costs and not recovered from
40 Hydro's customers.

41
42 **The Board will not allow recovery of capital and operating expenses (net of insurance**
43 **proceeds) in the 2014 revenue requirement and the 2015 test year costs associated with the**
44 **January 2013 Holyrood Unit 1 turbine failure and repair.**

¹²⁸ Transcript, October 30, 2015, page 152/14 to page 159

14.6 Additional Operating Expenses

Liberty reviewed a total of \$25,788,484 in 2014 operating expenses and has recommended that \$13,404,252 of this amount be disallowed based on its prudence findings. The Board has already determined that certain capital and operating expenses associated with projects found by the Board to be imprudent should be disallowed in the 2014 revenue requirement and the 2015 test year costs, as appropriate.

Liberty identified the additional 2014 operating expenses related to professional and consulting fees, overtime, and salary transfers for the reviewed projects. Liberty has recommended that the following expenses be disallowed because of Hydro's imprudence:

\$2,552,013	Regulated Hydro Professional Services – Consulting Fees
\$ 511,000	2014 Outage Salary Transfers
\$3,584,428	2014 Regulated Operations Incremental Overtime

Liberty's recommendations are based on its review of the actual costs incurred by Hydro in 2014 in these specific areas and have not been reconciled to Hydro's calculation of the 2014 revenue deficiency, which was based on five months of actual and seven months of forecast costs. Hydro's response to Liberty's recommendations and the Board's findings appears below.

14.6.1 Professional Services – Consulting Fees

The professional services and consulting fees Liberty identified for disallowance included outage inquiry legal fees (\$876,000), Board outage inquiry costs (\$958,000), intervenor outage inquiry costs (\$250,000), Sunnyside environmental remediation fees (\$346,000), and event engineering investigation costs (\$74,000).¹²⁹

Hydro stated that there is no basis to disallow the total of the legal fees since they include costs related to matters outside the scope of the outage inquiry and also expenses related to Hydro's application for supply-related costs, which Liberty had accepted were mostly outside Hydro's control. In particular, Hydro suggested that the legal fees associated with the Phase Two inquiry to deal with post-Muskrat Falls reliability should not be disallowed as it is not directly related to the January 2014 outage inquiry. Hydro suggested that any disallowance of these costs should be limited to \$622,742, the amount Hydro identified as related to the Phase One outage inquiry. For the same reason, Hydro stated that the outage inquiry costs of the Board and intervenors should also be separated into Phase One and Phase Two costs, which are not available at this time.

With respect to the fees related to the Sunnyside environmental remediation, Hydro explained that \$335,900 of this amount had already been accounted for as part of Liberty's proposed disallowance in the Sunnyside replacement equipment 2014 net operating expenses.¹³⁰ Having received further information from Hydro, Liberty agreed.¹³¹ Liberty also agreed that an invoice

¹²⁹ Liberty's Prudence Report, page 45

¹³⁰ Hydro's Reply Evidence, pages 23

¹³¹ Liberty's Reply Evidence, pages 15

1 in the amount of \$14,301 for toxicology and chemistry analysis should be excluded, as it was
2 unrelated to the Sunnyside environmental remediation or to the Board's outage review.¹³²
3

4 The Board believes that any costs associated with the Phase One outage inquiry should be
5 disallowed on the basis that it has found that Hydro was imprudent in relation to the causes and
6 contributing factors of the January 2014 outages. While the findings of the Phase Two inquiry
7 may result in actions and decisions by the Board prior to interconnection with Muskrat Falls, the
8 Board does not find any basis to make a finding in relation to the Phase Two inquiry costs at this
9 time. The Board also notes that Liberty accepted the two issues Hydro identified in the
10 Sunnyside environmental remediation costs and agrees that these costs should not be included in
11 any amounts disallowed in this cost category. The Board also agrees that the legal fees associated
12 with the application for supply costs, which were found to be prudent, should not be disallowed.
13

14 14.6.2 Salary Transfers

15

16 In relation to the salary transfers associated with Phase Two of the outage inquiry Hydro may set
17 aside these costs to be additional in a subsequent order of the Board.
18

19 Hydro explained that some of the costs Liberty identified in this expense category were not part
20 of the 2014 test year, and that Hydro has sought recovery in the 2014 test year revenue
21 requirement of only \$424,000 for inter-company salaries.¹³³ Hydro also states that some of the
22 inter-company salaries included in the 2014 test year revenue requirement were not attributable
23 to issues related to Liberty's prudence review, so the disallowance of the total of these costs is
24 not supported. According to Hydro, Liberty indicated that most inter-company salaries related to
25 Hydro's 2014 Integrated Action Plan were either costs that Hydro would have incurred even
26 without the need to respond to the outages, or costs justified as good utility practice. The only
27 exception was the catch-up maintenance work on critical transformers and air-blast circuit
28 breakers.
29

30 In cross-examination, Mr. Conway of Hydro reiterated that actual salary transfers for 2014
31 included executive charges related to Phases One and Two of the outage investigation, the
32 integrated action plan, and other high-level executive activities that Liberty did not find to be
33 imprudent. Mr. Conway added that Hydro did not believe that any costs associated with Phase
34 Two or with the Integrated Action Plan should be considered imprudent.¹³⁴
35

36 The Board agrees that any costs considered for disallowance in this category should be limited to
37 those included in the 2014 revenue requirement calculation, and that the 2014 salary transfers
38 associated with those projects found to be prudent by the Board should not be included in the
39 disallowed amount. In addition, salary transfers associated with the 2014 Integrated Action Plan
40 will not be disallowed. In the Board's view, notwithstanding the reasons for heightened emphasis
41 on the execution and monitoring of the Integrated Action Plan in 2014, Hydro's actions in this
42 regard were prudent and necessary.

¹³² Transcript, November 9, 2015, page 72/17-25 and 73/1-10

¹³³ Hydro's Reply Evidence, page 24-25

¹³⁴ Transcript, November 9, 2015, pages 54-55

1 In relation to the salary transfers associated with Phase Two of the outage inquiry Hydro may set
2 aside these costs to be addressed in a subsequent order of the Board.

3 4 14.6.3 Incremental Overtime 5

6 Liberty recommended a disallowance of the costs associated with incremental overtime in 2014,
7 claiming the overtime would not have been required if Hydro had acted prudently. Liberty used
8 average overtime hours for 2011-2013 to establish a baseline for measuring incremental 2014
9 overtime and determined that there is significant divergence from recent experience of more than
10 81,000 hours in overtime hours for permanent employees in the Regulated Operations unit.¹³⁵
11 Liberty used information from Hydro to estimate an average cost of \$51.43 per overtime hour,
12 for a total 2014 overtime cost of approximately \$4,176,952. Liberty determined that, of that
13 amount, \$592,524 was charged to the capital projects being examined and should be removed
14 from the overtime calculation to avoid double-counting, thereby reducing the incremental
15 overtime for 2014 to \$3,584,428.

16
17 Hydro explained that it has not applied for recovery of 2014 actual overtime costs but is applying
18 for recovery based on its 2014 test year. Therefore, using Liberty's methodology and removing
19 total capital overtime from the 2014 test year forecast, Hydro estimates total incremental
20 overtime costs of \$493,145.¹³⁶ Overtime associated with the three-year preventative maintenance
21 program is not included.¹³⁷
22

23 The Board agrees that any amount of 2014 incremental overtime considered for disallowance
24 should be determined in relation to the amount that is included in Hydro's calculation of the
25 2014 revenue requirement. The Board notes that Hydro's calculation is based on Liberty's
26 methodology, with the removal of the 2014 capital overtime and the overtime associated with the
27 capital projects found to be imprudent to avoid double-counting. This approach seems
28 reasonable.
29

30 14.6.4 Additional Operating Disallowances for 2014 31

32 The Board has already found that certain capital and operating expenses associated with projects
33 found by the Board to be imprudent are to be disallowed in the 2014 revenue requirement and
34 the 2015 test year costs, as appropriate. Based on the Board's findings of imprudence set out
35 elsewhere in this report and for the reasons set out above, the Board is satisfied that a portion of
36 the associated 2014 operating expenses related to professional services consulting fees, salary
37 transfers, and overtime should not be allowed for recovery. The Board is not satisfied, however,
38 that the record allows for the determination of a specific disallowance in this decision. Hydro
39 will be required to file additional information as part of a compliance filing, incorporating the
40 Board's findings set out above.

¹³⁵ Includes Hydro Generation, Thermal Generation, and Transmission and Rural Operations

¹³⁶ Hydro's Reply Evidence, pages 23-24

¹³⁷ Transcript, November 9, 2015, page 59

1 14.6.5 2015 Additional Operating Expenses

2
3 Liberty did not review 2015 test year costs to determine if additional operating expenses were
4 included related to professional services-consulting fees, salary transfers, and overtime
5 associated with imprudence and the Board's investigation into the January 2014 outages.

6
7 The Board is not satisfied that the record is sufficiently clear to determine if the 2015 test year
8 costs include these additional operating expenses. To the extent that the 2015 test year costs
9 include any of these costs, the Board believes that they should be disallowed on the same basis as
10 the 2014 costs.

11
12 **The Board will not allow the recovery of operating expenses in the 2014 revenue**
13 **requirement and 2015 test year costs related to professional services-consulting fees, salary**
14 **transfers, and overtime associated with imprudence and the Board's investigation into the**
15 **January 2014 outages taking into account the Board's findings in relation to these costs set**
16 **out above.**

17
18 **Hydro will create a separate account into which will be transferred all professional**
19 **services-consulting fees, salary transfers, and overtime costs for 2014, 2015 and subsequent**
20 **years relating to Phase Two of the Board's investigation of the January 2014 outages, with**
21 **the recovery of the costs to be addressed in a subsequent order of the Board following a**
22 **further application by Hydro.**

23
24 **14.7 Summary of Disallowances**

25
26 The Board will not allow recovery, in the 2014 revenue requirement and/or the 2015 test year
27 costs, of the capital and/or operating costs associated with the following:

- 28
29 1. overhauls of Sunnyside B1L03 and Holyrood B1L17 breakers associated with
30 imprudence
31 2. the portion of the Sunnyside terminal station equipment repairs and replacement
32 associated with imprudence
33 3. Western Avalon T5 tap changer replacement and transformer repairs associated with
34 imprudence
35 4. extraordinary transformer and breaker repairs in 2014 and 2015 associated with
36 imprudence
37 5. additional supply costs associated with the failure of Holyrood breaker B1L17 and the
38 resulting outage of Holyrood Unit 1 associated with imprudence
39 6. Holyrood Unit 1 turbine failure in 2013
40 7. additional operating expenses related to professional services-consulting fees, salary
41 transfers, and overtime associated with the imprudence and the Board's investigation
42 into the January 2014 outages

43
44 The Board has also found that it is appropriate to disallow an amount of \$500,000 in the 2014
45 revenue requirement to recognize the impact of Hydro's imprudence in manading black start
46 capability at Holyrood.

1 The Board will allow the capital and operating costs associated with the following projects to be
 2 included in the 2014 revenue requirement calculation and/or the 2015 test year costs:

3
 4 The actual amount and impact on the 2014 revenue requirement and the 2015 test year costs will
 5 be determined by the Board following Hydro's compliance filing arising from the Decisions and
 6 Order.

- 7
 8 1. Labrador City terminal station capacity upgrade project (costs above approved budget)
 9 2. procurement and installation of the new combustion turbine at Holyrood
 10 3. restoration of the Black Tickle plant in 2012
 11 4. Holyrood forced-draft fan repair and replacement
 12

13 **15.0 2014 Revenue Requirement and 2015 Test Year Costs**

14
 15 Hydro currently has a \$45.9 million deferred asset (the 2014 Revenue Deficiency) that reflects
 16 the difference between its calculation of its 2014 revenue requirement and the 2014 revenue
 17 associated with existing rates, which were set based on a 2007 test year. This deferral account
 18 was approved by the Board in Order No. P.U. 58(2014), with the Board retaining jurisdiction to
 19 make a final determination on Hydro's recovery of any or all amounts in the account.
 20

21 During its review of costs associated with imprudence, Liberty attempted to identify the 2014
 22 capital expenditures and operating costs that would not have been incurred but for certain
 23 imprudent actions and decisions. Liberty summarized its recommended adjustments to Hydro's
 24 2014 revenue requirement calculation based on its prudence findings and its review of the
 25 capital, operating, and other costs associated with the projects found to be imprudent.¹³⁸ Liberty
 26 noted that it reviewed actual capital and operating expenditures for 2014 but was unable to
 27 reconcile these actual costs with the forecast costs used in Hydro's 2014 revenue requirement
 28 calculations.¹³⁹
 29

30 The Board has found that certain capital and operating costs associated with Hydro's imprudence
 31 should be disallowed. However, the Board is not satisfied that the record is clear or that
 32 sufficient detailed information is available on the costs associated with imprudence to permit the
 33 finding of a specific disallowance amount for each project or expenditure the Board found to be
 34 imprudent. Hydro also raised concerns with Liberty's recommended adjustments, which are
 35 based on actual costs, where the amount is higher than that included in the 2014 revenue
 36 requirement. The Board agrees that disallowances ordered should be in relation to the 2014
 37 revenue requirement as opposed to actual costs; to do otherwise may result in a disallowance of
 38 costs for which Hydro has not requested recovery from customers. On the other hand, customers
 39 should not be required to pay the costs of Hydro's imprudent actions and decisions.

¹³⁸ Liberty set out its recommended adjustments to the 2014 revenue requirement in Table 9.1 of its Final Report (page 44). Actual 2014 capital expenditures of \$112.2 million were reviewed and Liberty determined that \$10.9 million of these expenditures related to imprudent decisions and actions by Hydro. Liberty also determined that \$13.4 million of the actual 2014 operating expenses of \$25.8 million reviewed relate to imprudent decisions and actions by Hydro.

¹³⁹ In its amended general rate application, Hydro has provided its 2014 forecast revenue requirement and the calculation of the 2014 revenue deficiency based on five months of actual costs and seven months of forecast costs.

1 In the interest of fairness to both Hydro and its customers, the Board will not make a final
2 determination at this time on the specific amount of the disallowances, if any, to be ordered for
3 2014 and 2015 on the basis of imprudence. Instead, Hydro will be required to file a detailed
4 reconciliation of the capital and operating costs for 2014 and 2015 associated with the projects
5 found by the Board to be imprudent, including any incremental costs associated with overtime,
6 salary transfers, and professional fees associated with these projects or expenditures as well as
7 the costs incurred for the review of the prudence of these expenditures. The Board will provide
8 further direction to Hydro on the specific format and requirements of this filing. The Board's
9 financial consultants will be asked to review the information provided and may request any
10 necessary clarification or further information from Hydro to ensure that all costs have been
11 accounted for to the extent possible. The impact of the disallowances on Hydro's 2014 revenue
12 requirement and the 2015 test year costs will be finalized as part of the consideration of Hydro's
13 amended general rate application, which is currently before the Board.

14 15 **16.0 Conclusion**

16
17 On the basis of the evidence before it in this proceeding, the Board has found that Hydro's
18 decision to defer certain scheduled transformer and breaker maintenance between 2010 and 2013
19 was imprudent. This deferral of preventative maintenance on aging equipment critical to reliable
20 supply was not in accordance with accepted utility practice and exposed customers and the
21 system to unnecessary risk and potentially serious consequences. The Board found that Hydro's
22 imprudence in deferring scheduled preventative maintenance caused the transformer and air-blast
23 circuit breaker failures in January 2014. The Board also found that Hydro's decisions and actions
24 with respect to the maintenance practices for the air-blast circuit breaker B1L17 at Holyrood
25 were imprudent, and resulted in an outage of Unit 1 at Holyrood during January 5-8, 2014.

26
27 Hydro's decisions and actions with respect to provision of black start capability at Holyrood and
28 the planning and execution of the project to increase capacity at the Labrador City Terminal
29 Station were also found to be imprudent.

30
31 As a result of these imprudence findings and other findings set out in this Decision and Order,
32 the Board has disallowed certain capital and operating costs which will affect Hydro's
33 calculations of its 2014 revenue requirement and its 2015 test year costs. The actual amount of
34 the disallowances will be finalized as part of the Board's consideration of Hydro's amended
35 general rate application, based on a compliance filing to be filed by Hydro which will
36 incorporate the Board's findings in this Decision and Order.

37
38 This is the first time that the Board has undertaken a prudence review of this scope. The resulting
39 findings by the Board of imprudence by Hydro are significant and reflect failure on the part of
40 Hydro's management to exercise the reasonable standard of care expected in certain aspects of
41 its operations. The consequences of this imprudence for customers are significant, both in terms
42 of impact on service adequacy and reliability, as was shown during the outages of January 2013
43 and January 2014, and in terms of cost.

44
45 The findings by the Board of imprudence by Hydro are significant; they reflect a failure on the
46 part of Hydro management to exercise the reasonable standard of care expected with respect to
47 those projects and expenditures reviewed. The consequences of this imprudence for customers

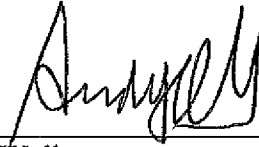
1 are significant, both in terms of service adequacy and reliability as experienced during the
2 outages of January 2013 and 2014, and in terms of costs. While Hydro is entitled to recover its
3 prudently incurred costs, customers should not bear the costs of Hydro's imprudent actions. The
4 Board will require that Hydro revise its 2014 revenue requirement and 2015 test year costs so
5 that rates do not reflect expenditures which were imprudently incurred.

1 **PART FOUR: ORDER**

2
3 **IT IS THEREFORE ORDERED THAT:**

- 4
5 1. **Hydro will not recover capital or operating expenses in the 2014 revenue requirement**
6 **and/or the 2015 test year costs associated with:**
7 1. **overhauls of the Sunnyside B1L03 and Holyrood B1L17 breakers associated with**
8 **imprudence**
9 2. **the portion of the Sunnyside Terminal Station equipment repairs and replacement**
10 **associated with imprudence**
11 3. **the Western Avalon T5 tap changer replacement and transformer repairs**
12 **associated with imprudence**
13 4. **extraordinary transformer and breaker repairs in 2014 and 2015 associated with**
14 **imprudence**
15 5. **additional supply costs associated with the 2014 failure of Holyrood breaker**
16 **B1L17 and the resulting outage of Holyrood Unit 1 associated with imprudence**
17 6. **certain expenses related to professional services-consulting fees, salary transfers,**
18 **and overtime associated with imprudence and the Board's investigation into the**
19 **January 2014 outages**
20 7. **Holyrood Unit 1 turbine failure in 2013.**
21
22 2. **Hydro will not recover in the 2014 revenue requirement \$500,000 associated with its**
23 **imprudence in managing black start capability at Holyrood.**
24
25 3. **Hydro will create a separate account into which will be transferred professional**
26 **services-consulting fees, salary transfers and overtime costs for 2014, 2015 and**
27 **subsequent years relating to Phase Two of the Board's investigation into the January**
28 **2014 outages, with the recovery of the costs to be addressed in a subsequent order of**
29 **the Board following a further application by Hydro.**
30
31 4. **Hydro will file in accordance with the subsequent direction of the Board a revised**
32 **2014 revenue requirement and revenue deficiency calculation, a revised 2015 test year**
33 **revenue requirement and revenue deficiency calculation, and supporting**
34 **documentation reflecting the findings of the Board in this Decision and Order.**
35

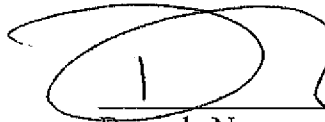
DATED at St. John's, Newfoundland and Labrador, this 26th day of April, 2016.



Andy Wells
Chair & Chief Executive Officer



Darlene Whalen, P.Eng.
Vice-Chair



Dwanda Newman, L.L.B.
Commissioner



James Oxford
Commissioner



Cheryl Blandon
Board Secretary

Newfoundland & Labrador

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