newfoundland labrador hydro
a nalcor energy company

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July 3, 2015

Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, NL
A1A 5B2

ATTENTION: Ms. Cheryl Blundon
Director of Corporate Services & Board Secretary

Dear Ms. Blundon:

Re: **An Application by Newfoundland and Labrador Hydro (Hydro) pursuant to Subsection 41 (3) of the Act for the approval of the Purchase of Critical Spares: Generation Stations.**

Please find enclosed the original and 12 copies of the above-noted Application, plus supporting affidavit, project proposal, and draft order.

The proposed project involves the purchase of the following critical spares:

A. Holyrood Thermal Generating Station:
    a. Steam Seal Regulator Dump Value Control Valve Cage; and
    b. High Voltage Generator Bushings.
B. Hydraulic Generating Stations:
    a. Generator Bearing Coolers, Cat Arm;
    b. Turbine Guide Bearing Refurbishment, Bay d'Espoir Unit 7;
    c. Turbine Guide Bearing Refurbishment, Hinds Lake; and
    d. Deflector Servo Motor, Cat Arm.
C. Gas Turbine Generation:
    a. Combustion Chambers;
    b. Low Pressure Fuel Pump Assembly;
    c. High Pressure Fuel Pump Assembly;
    d. Alternator Bearings, Hardwoods;
    e. Alternator Bearings, Stephenville; and
    f. Alternator Bearings, Happy Valley.

When purchased and located Hydro's Generation Stations, these critical spares will shorten forced generation outages in the event of a failure of these components, and are necessary for the supply dependable and reliable power to the Island Interconnected System.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Tracey L. Pennell
Legal Counsel

TLP/bs

cc: Gerard Hayes – Newfoundland Power
Paul Coxworthy – Stewart McKelvey Stirling Scales
Sheryl Nisenbaum – Praxair Canada Inc.
Thomas Johnson – Consumer Advocate
Thomas J. O'Reilly, Q.C. – Cox & Palmer

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

AND IN THE MATTER OF an Application by Newfoundland and Labrador Hydro (Hydro) pursuant to Subsection 41(3) of the *Act*, for approval of the Purchase of Critical Spares: Generation Stations

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

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

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

2. Hydro is the primary generator of electricity in Newfoundland and Labrador. Hydro's generating assets consist of hydroelectric generating plants, a thermal generating plan, gas turbines and diesel plants. In addition, Hydro has a number of power purchase agreements in place with non-utility generators to supplement its own generation capacity. As part of its Critical Spares reviews, Hydro engaged in an assessment to identify items that are critical to have readily available at Hydro's key generating facilities to facilitate an expedited return to service of these key generating units in the event of an unexpected failure of an in-service critical component.

3. Hydro's critical spares assessment work has identified the need for the following:

A. Holyrood Thermal Generating Station:

a. Steam Seal Regulator Dump Value Control Valve Cage; and

b. High Voltage Generator Bushings.

B. Hydraulic Generating Stations:

a. Generator Bearing Cooler, Cat Arm;

b. Turbine Guide Bearing Refurbishment, Bay d'Espoir Unit 7;

c. Turbine Guide Bearing Refurbishment, Hinds Lake; and

d. Deflector Servo Motor, Cat Arm.

C. Gas Turbine Generation:

a. Combustion Chambers;

b. Low Pressure Fuel Pump Assembly;

c. High Pressure Fuel Pump Assembly;

d. Alternator Bearings, Hardwoods;

e. Alternator Bearings, Stephenville; and

f. Alternator Bearings, Happy Valley.

4. Experience has shown that key components of Hydro's generating facilities may experience a failure earlier than anticipated and without warning. The purchase of these critical spares will provide for an expedited return to service of a generating unit should there be a failure of critical components.

5. The estimated cost of the critical spares identified in this report is $1,536,300.

6. The Applicant submits that the proposed purchase of the above noted critical spares for the Hydro's Generating Stations is necessary to ensure that the electrical system can continue to provide service which is safe and adequate and just and reasonable as required by Section 37 of the *Act*. An Engineering Report supporting this supplemental capital application is attached.

7. Hydro therefore makes Application for an Order pursuant to section 41(3) of the Act approving the purchase of critical spares for Hydro's generating stations at an estimated capital cost of $1,536,300 as set out in this Application and in the attached project description and justification document.

DATED at St. John's, in the Province of Newfoundland and Labrador, this 3rd day of July, 2015.

Tracey L. Pennell
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A Report to
The Board of Commissioners of Public Utilities

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

PURCHASE OF CRITICAL SPARES
GENERATION STATIONS

NEWFOUNDLAND AND LABRADOR HYDRO

JULY 3, 2015

newfoundland labrador hydro
a nalcor energy company

Table of Contents

1.0 INTRODUCTION

In this Capital Budget Supplemental Application, Newfoundland and Labrador Hydro (Hydro) proposes to purchase spare critical equipment for generating facilities. The critical spare equipment will facilitate an expedited return to service of generating facilities, should a facility experience an outage due to the failure of an in-service critical component identified in this report. These critical spares were identified during ongoing critical spares evaluations undertaken by Hydro. It is the intention of Hydro to purchase these critical spares and have them on site to provide ongoing, reliable service to customers.

To date, Hydro has identified critical items that, when purchased and located at the generating facilities, will shorten forced generation outages in the event of a failure of the existing component. The components in this report were identified as critical if they met certain factors: impact on generating capacity, lead time for delivery, operating condition of in-service components and previous experience of failed components.

Hydro's current application for capital critical spares includes the following:

1. Holyrood Thermal Generating Station;
    a. Steam Seal Regulator Dump Control Valve Cage; and
    b. High Voltage Generator Bushings.
2. Hydraulic Generating Stations:
    a. Generator Bearing Cooler, Cat Arm;
    b. Turbine Guide Bearing Refurbishment, Bay d'Espoir Unit 7;
    c. Turbine Guide Bearing Refurbishment, Hinds Lake; and
    d. Deflector Servo Motor, Cat Arm.
3. Gas Turbine Generation:
    a. Combustion Chambers;
    b. Low Pressure Fuel Pump Assembly;
    c. High Pressure Fuel Pump Assembly;
    d. Hardwoods Alternator Bearings;

e. Stephenville Alternator Bearings; and

f. Happy Valley Alternator Bearings.

The estimated cost of the critical spares identified in this report is $1,536,300.

Ongoing reviews continue in subsequent years and may result in further capital applications for critical spares.

2.0 BACKGROUND

Hydro is the primary generator of electricity in Newfoundland and Labrador. Hydro sells its power to utility, industrial and 35,000 residential and commercial customers in over 200 communities across the province. Hydro's generating assets include hydroelectric plants, a thermal generating plant, gas turbines and diesel plants. In addition, Hydro has entered into a number of power purchase agreements with non-utility generators to supplement its own generation capacity.

Critical spares reviews have identified a number of spares for its generating facilities, some of which are capital in nature. The critical spare parts that are capital in nature are discussed below.

3.0 PROJECT DESCRIPTION

The critical spares assessment completed to date has identified a number of components that are critical to have readily available in the event of a forced outage at Hydro's generating facilities. The availability of the parts contributes significantly to an expedited return to service of a generator or its support systems.

3.1 Holyrood Thermal Generating Station

Hydro has identified a Steam Seal Regulator Dump Valve Control Cage and High Voltage Generator Bushings to be procured as critical spares for the Holyrood Thermal Generating

Station (HTGS). Purchase of these critical spares for HTGS would decrease downtime in the event of a failure of the in-service components, and therefore faster reinstatement of generating capacity than if the critical parts had to be procured post failure.

3.1.1 Steam Seal Regulator Dump Control Valve Cage

Generating units at the HGTS require a supply of steam to the turbine to maintain sealing. The steam space of each turbine section is sealed against steam leakage to the atmosphere where the shaft passes through the turbine shell as well as in cases where adjacent sections are located in the same shell and the shaft is sealed against internal steam leakage from one section to the other. The flow of sealing steam is provided by the Steam Seal Regulator and for this system to operate, and a dump control valve is required. Loss of the dump control valve would result in a unit outage until repairs could be effected.

Selected parts for the steam seal regulator dump control valve have been identified for purchase as critical spares following the Asset Criticality and Critical Spares reviews, notably the valve cage. As the cage has a 25 week delivery time, high asset criticality and only one supplier, procurement of a critical spare would greatly reduce the unit downtime in the event of a failure.

3.1.2 High Voltage Generator Bushings

Each of the generators on the units at the Holyrood Thermal Generating Station require high voltage bushings to insulate and electrically isolate the conductors from the generator housing, permitting the electrical connection of the stator through the housing to the isolated phase bus. There are three bushings per generator, one on each phase. All three bushings are required to operate the generator. Failure of a high voltage bushing on a generator would result in an outage, forcing the generating unit off until the bushing could be replaced. Due to the construction of the high voltage bushings at HTGS, these bushings cannot be repaired and must be replaced in the event of a failure. A failure event could involve multiple phases. A generator requires a set of three bushings as critical spares.

Following the Asset Criticality and Critical Spares reviews, the high voltage bushings on the generators have been identified as critical spares due to high criticality, a long lead time of 20-25 weeks and a limited number of suppliers. As a result of the design differences between stage 1 (units 1 and 2) and stage 2 (unit 3) at HTGS, two sets of bushings are required as critical spares; one set for each stage with each set consisting of three bushings.

3.2 Hydraulic Generating Stations

3.2.1 Generator Bearing Cooler, Cat Arm

Bearing coolers are critical to the hydraulic generation process as they control the temperature of the bearing oil, and thus the bearing segments, that are submersed in the oil. Cold water flows through the cooler tubes and fins, extracting heat from bearing lubricating oil. In the hydroelectric generating industry, failures of coolers have resulted in water getting into bearing oil which can result in an environmental spill of the lubricating oil and also cause damage to the bearing. Various protections are in place at Hydro's facilities to mitigate these risks, such as when water is detected in the oil, the generating unit will trip off line. Once a unit has tripped due to cooler failure, the unit is out of service until a repair is complete and a repaired cooler or a new cooler is installed.

Often when a bearing cooler fails, water will contaminate the oil, requiring the disposal of the oil and reinstallation of new oil. After oil has been drained (can be as much as 690 gallons as is used in Bay d'Espoir Unit 7), the repair or replacement process of the failed cooler begins. Repairing as opposed to replacing the cooler is normally a short term solution to getting the unit back on line. The repaired cooler will eventually fail again, as the initial failure is an indication the cooler is nearing end of life. If there is no spare cooler on site, repairing a failed cooler and then reinstalling it in the unit takes 1-3 days longer than installing a new cooler (or repaired spare cooler) that is on site and ready to install.

In order to reduce the generating unit outage duration, Hydro proposes to purchase spares coolers for the Cat Arm hydroelectric facility in this capital application. The spare on site for these units is a used, repaired spare that is showing signs of corrosion, indicating the spare may not be reliable. The coolers that are currently in service in the bearing are experiencing similar corrosion.

3.2.2 Turbine Guide Bearing Refurbishment, Bay d'Espoir Unit 7

Bay d'Espoir Unit 7 is the largest hydraulic generation unit on the island interconnected system and critical to overall system generation capacity. The turbine guide bearing is used to maintain concentricity of the shaft in the generating unit, with the guide bearing ensuring tolerances of 0.012-0.016" for proper operation of the unit. In the event of a failure of the turbine guide bearing, the unit would be forced off line for an extended period of time.

While a spare is currently on site, Hydro has determined the spare requires refurbishment before it can be placed in-service. With a spare usable bearing on site, the return to service time for the generating unit would be approximately one week. Without a spare usable bearing on site, the outage time would be approximately two months while a bearing is refurbished in an expedited manner.

3.2.3 Turbine Guide Bearing Refurbishment, Hinds Lake

Hinds Lake is an 80MW single unit generating station. It has a turbine bearing that is a 10 segment babbitted bearing manufactured by Bofors Nohab. During the 2014 major inspection/overhaul, the bearing was replaced with the original spare bearing. The bearing that was removed was retained to be rehabilitated as a critical spare. Additional engineering will be required to rehabilitate this bearing given that Bofors Nohab is no longer is business and drawing details for this bearing require additional work to ensure an exact match.

3.2.4 Cat Arm deflector servomotor

The Cat Arm generating units have been in service since 1985 and the deflector servomotors

are original equipment. The purpose of this servomotor is to operate a deflector mechanism to deflect the water coming from the needle away from the runner in an emergency situation. In normal operation of the turbines, water needles direct the flow of water toward the buckets on the runner which causes the unit to spin. In a shut-down or trip situation, the deflector servomotor pushes the deflector into the water stream to stop the water flow to the turbine. If this servomotor failed when required, it would lead to an over speed or run-away condition which could cause catastrophic damage to the unit and the powerhouse. These servomotors are operated utilizing water and oil. The water side of the servomotors has corroded over time showing that they are reaching the end of their useful life.

Historically, Hydro has been unable to source parts for these servomotors. These servomotors are currently experiencing leakage due to corrosion. An appropriate replacement for this servomotor has an eighteen week delivery.

Due to the condition of the servomotors, Hydro is proposing in its 2016 Capital Budget Application to replace both servomotors in Cat Arm. The spare in this application will be a spare for the existing motors before new ones are placed in service, as well as a spare for the new ones, proposed by Hydro, to be placed in service.

3.3 Gas Turbines

3.3.1 Combustion Chambers

All gas turbines consist of a combustion section where compressed air and fuel are mixed and ignited. In Hardwoods and Stephenville, this section consists of a set of eight (8) matched interconnected combustion chambers. Due to the high pressures and temperatures in this section of the gas turbine, the combustion chambers experience fouling and cracking over time. When these conditions are found, repairs can be completed onsite without removing the whole unit from its enclosure. While repairs are being completed the plant will be de-rated from 50MW to 25MW. With spare combustion chambers onsite, the unit can be

returned to service in one week. Without a spare set of combustion chambers on site, the typical outage can be expected to be 6-8 weeks in duration.

3.3.2 Fuel Pump Assemblies

The gas turbines in Hardwoods and Stephenville have high pressure (HP) and low pressure (LP) on-engine fuel pumps that deliver liquid fuel to the combustion section of the gas turbine. The pumps can wear from use, or become damaged by external forces. The fuel pumps are easily accessible and can be replaced without removing the engine from the enclosure. The failure of either of the fuel pumps would result in a gas turbine outage, resulting in a de-rating of the plant from 50MW to 25MW. With spare HP and LP fuel pumps onsite, the unit can be returned to service in one week. Without spare HP and LP fuel pumps onsite, the typical outage can be expected to last 6-8 weeks.

3.3.3 Gas Turbine Alternator Bearings

The alternators at all hydro's gas turbine plants are supported by two journal bearings and coated with babbit (soft metal). The clearance between the bearing and the rotating shaft is between 0.008"-0.010". Any interruption to the normal operation of the alternator will result in the major damage to the bearings, resulting in the total outage of the gas turbine plant. Without a spare bearing onsite, the procurement and repair of the bearing can take between 10-12 weeks. A set of spare bearings is proposed for each gas turbine facility (Happy Valley, Hardwoods and Stephenville) as the alternator bearings are different at each site and are different on each side of the alternator.

3.4 Summary of Generation Spare Components

To summarize, the critical components proposed for purchase and the associated generating units are listed in table 1. Provided as well is the expected capacity interruption during an outage should the component fail.

Table 1:

Unit	Generating Capacity (MW)	Proposed Critical Component	Expected Capacity with Component Failed (MW)
Holyrood Unit 1 or 2	175, 175	Steam Seal Regulator Dump Control Valve Cage	0
Holyrood Unit 1, 2 or 3	175, 175, 150	High Voltage Generator Bushing	0
Bay d'Espoir Unit 7	154	Turbine Guide Bearing	0
Cat Arm Unit 1 or 2	68.2	Generator Bearing Cooler	0
Cat Arm Unit 1 or 2	68.2	Deflector Servomotor	0
Hinds Lake	80	Turbine Guide Bearing	0
Hardwoods or Stephenville	50	Combustion Chambers	25
Hardwoods or Stephenville	50	HP Fuel Pump Assembly	25
Hardwoods or Stephenville	50	LP Fuel Pump Assembly	25
Hardwoods	50	Alternator Bearings	0
Stephenville	50	Alternator Bearings	0
Happy Valley	25	Alternator Bearings	0

4.0 PROJECT ALTERNATIVES

The purpose of this application is to purchase spares and thereby reduce down time for key generating units in the event of a critical component failure. Purchase of critical spares allows for expediting the return to service of the affected generating facilities to its normal capacity.

Alternatives to the purchase of the spares noted in this application include: to repair, where possible, the existing component; when not possible to repair, to procure post failure, required replacement components; or to replace all critical components under planned future capital investments.

4.1 Alternative 1: Purchase spare critical components

The benefits of purchasing critical spares identified in this report have been discussed in the

previous sections. Purchasing spare critical parts to maintain at generating facilities will expedite the return to service the facility's maximum generating capacity following a failure of the identified critical component.

4.2 Alternative 2: Repair failed components at time of failure

Risks associated with this alternative include additional down time incurred while undergoing component repair when compared to having a component ready to install, being unable to easily procure parts, and putting back in service a component that then has known failure, and the failure may be an indication of end of life for the component is nearing. In some instances, repairing components may be more cost effective that purchasing select spares, however, the risks associated with this alternative will result in generating facilities being out of service, and total generation capacity reduced ,for longer than if spare critical components were ready on site.

4.3 Alternative 3: Procure new components post failure

Risks associated with this alternative include long lead time for delivery of replacement critical components and increased costs associated with expedited delivery of component parts. These risks could increase the time Hydro's system operates with reduced capacity at a generating facility than if a spare was on site. In addition, there is generally increased cost associated with urgent component delivery requests, due to higher labour costs for manufacturing of components (i.e. overtime to make the component quickly) and also higher shipping costs associated with expedited shipping.

4.4 Alternative 4: Replace critical components under planned future investments

Risks associated with this alternative include failures occurring before the planned project can be completed, as well as removing from service components that are not yet at the end of their service life.

Alternatives to purchasing spares to locate at the various generating facilities are discussed above, along with the alternative's risks to generation availability. If the critical components discussed do fail and no spare is on site, there will be an increase in generating facility down time and correspondingly, decreased generating capacity for a longer period of time than if a spare had been maintained on site. Additionally, increased costs for procurement of critical components can be expected when seeking components on short notice.

Hydro has selected the alternative to purchase spare critical components for storage at its facilities.

5.0 PROJECT COST

The estimated cost to complete all work associated with purchasing the identified critical spares for the various generating facilities is $1,536,300. Table 2 provides a breakdown of the proposed component purchases.

Table 2:

Critical Component	Estimate
Steam Seal Regulator Dump Control Valve Cage – Holyrood	$51,000
High Voltage Generator Bushings – Holyrood	$309,300
Hydraulic generator bearing cooler – Cat Arm	$93,000
Hydraulic turbine bearings – Unit 7 Bay d'Espoir and Hinds Lake	$107,000
Deflector servomotor – Cat Arm	$92,000
Combustion Chambers – Hardwoods / Stephenville	$55,000
HP Fuel Pump Assembly – Hardwoods / Stephenville	$74,000
LP Fuel Pump Assembly – Hardwoods / Stephenville	$74,000
Hardwoods Alternator Bearing	$228,000
Stephenville Alternator Bearing	$193,000
Happy Valley Alternator Bearing	$165,000
Labour	$40,000
Contingency	$55,000
Total	**$1,536,300**

6.0 PROJECT SCHEDULE

It is Hydro's intention to procure and have the identified critical components on site as soon

as possible. A number of the components have manufacture and delivery time, post order, of many weeks. For some components, quotations have been obtained and purchase orders issued to expedite the procurement process upon approval of this application.

7.0 JUSTIFICATION

The ongoing review of critical spares identified several that are capital in nature. Due to the timing of this phase of the review, the items identified in this report were not included in the 2015 Capital Budget. Hydro is proposing to purchase these spares prior to the 2016 Capital Budget application and approval so that the spares can be on site for the 2015 / 2016 winter operating season. Including them in the capital budgeting process for 2016 will not allow for time to have the items delivered before the next winter season. Therefore, the current application is required to be submitted as a 2015 Supplemental Capital Expenditure.

Hydro proposes the procurement of the identified critical spares cannot be deferred until the next budgeting cycle as there are risks to generating capacity in the event of a failure of one of the identified items in service. This is illustrated by the recent failure of a critical motor at HTGS on December 26th, 2013 and associated de-rating of 100 MW of capacity. In order to return generating stations to expected operating capacity, it is appropriate to procure the identified spares.

A net present value of alternatives discussed in section 4 was not completed. The selection of alternative is based on reliability, specifically, restoring maximum possible generating capacity following an outage, thereby delivering on-going, reliable service to customers.

8.0 CONCLUSION

Experience has shown that key components of Hydro's generating facilities may experience a failure earlier than anticipated and without warning. Expedited return to service following equipment failure is an expectation of customers. To expedite return to service, critical

spares availability is vital and one of the most important aspects of provision of reliable service.

Through a critical spares review for generating facilities, Hydro identified critical components to procure and be located at generating stations. Purchasing and locating these spares at the generating stations will provide for expedited return to service of a generating unit should there be failures of critical components. The spares that require capitalization are included in this application.

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

AND IN THE MATTER OF an Application by Newfoundland and Labrador Hydro (Hydro) pursuant to Subsection 41(3) of the *Act*, for approval of the Purchase of Critical Spares: Generation Stations

AFFIDAVIT

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

I, Paul W. Humphries, Professional Engineer, of St. John's in the Province of Newfoundland and Labrador, make oath and say as follows:

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

2. I have read and understand the foregoing Application.

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

SWORN at St. John's in the Province of Newfoundland and Labrador this 3rd day of July, 2015, before me:)

Barrister - Newfoundland and Labrador

Paul W. Humphries

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

AN ORDER OF THE BOARD

NO. P.U. __ (2015)

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

AND IN THE MATTER OF an Application by Newfoundland and Labrador Hydro (Hydro) pursuant to Subsection 41(3) of the Act, for approval of the Purchase of Critical Spares: Generation Stations

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

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

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

without prior approval of the Board; and

WHEREAS in Order P.U. 50(2014) the Board approved Hydro's 2015 Capital Budget in the amount of $76,832,900; and

WHEREAS on July 3, 2015 Hydro applied to the Board for approval to purchase critical spares for its Generation Stations (the "Application"); and

WHEREAS the Board is satisfied that the 2015 supplemental capital expenditure for the approval to purchase critical spares for Hydro's Generation Stations is necessary to allow Hydro to provide service and facilities which are reasonably safe and adequate and just and reasonable.

IT IS THEREFORE ORDERED THAT:

1. The proposed capital expenditure of $1,536,300 to purchase critical spares for the Hydro's Generating Stations is approved.

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

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

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