newfoundland labrador hydro
a nalcor energy company

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April 18, 2017

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) for approval of Reliability Improvements at the Holyrood Thermal Generating Station.

Please find enclosed the original and 9 copies of the above-noted Application, plus supporting affidavit, project proposal, and draft order.

The Holyrood Thermal Generating Station (Holyrood) is an essential part of the Island Interconnected System and produces up to 40 percent of the Island's annual energy requirements. Hydro requires that Holyrood continue to operate reliably to provide capacity and energy to Island Interconnected customers until after interconnection to the North American grid. Units 1 and 2 have a maximum continuous rating of 170 MW and are currently de-rated to 135 MW due to boiler airflow losses around the air heaters and accumulated boiler soot and ash from heavy fuel oil combustion. Air leakage on the boiler air heaters and on expansion joints is a significant contributor to the current de-rating on Units 1 and 2. Unit 3 has a maximum continuous rating of 150 MW. While not de-rated, the Unit 3 boiler air heaters have reached the end of life due to erosion and corrosion and require replacement. Further, a number of critical pieces of equipment at Holyrood have reached, or are reaching, the end of their useful life and are at risk for failure.

Hydro is proposing to improve the reliability at Holyrood by refurbishing and replacing critical systems and equipment that are necessary for the safe and relation operation of the plant. This includes:

a. Boiler air flow and heat transfer equipment refurbishments and replacements including boiler air heaters and expansion joints;
b. Piping, valves, and heat tracing replacements related to boiler feed water, steam, and cooling water systems; and
c. Turbine and generator lubrication and control system replacements including DC lube oil, pump motor starters, and speed probes and cables.

Completing this work will reduce the risk of unplanned equipment failures, thereby improving plant availability and unit capacity until interconnection.

Therefore, Hydro is proposing to proceed with reliability improvements, including the refurbishment or replacement of the boiler heat transfer equipment, air flow equipment, and other system equipment that are at the end of life, in order to ensure the reliable operation of Holyrood. This work will occur concurrently with the planned annual maintenance outage schedules for the units in 2017. The estimated capital cost of this project is $2,610,000.

Should you have any questions, please contact the undersigned.

Yours truly,

Newfoundland & Labrador Hydro

Tracey L. Pennell
Senior Counsel, Regulatory

TLP/lb

cc: Gerard Hayes – Newfoundland Power
Paul Coxworthy – Stewart McKelvey Stirling Scales
Sheryl Nisenbaum – Praxair Canada Inc.
Dennis Browne, Q.C. – Consumer Advocate
Thomas J. O'Reilly, Q.C. – Cox & Palmer
ecc: Larry Bartlett – Teck Resources Limited

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 for approval to undertake Reliability Improvements at the Holyrood Thermal Generating Station pursuant to Subsection 41(3) of the *Act*.

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. As part of its generating assets, Hydro owns and operates the Holyrood Thermal Generating Station (Holyrood), which has three generating units with a combined generating capacity of 490 MW. Holyrood is an essential part of the Island Interconnected System and produces up to 40 percent of the Island's annual energy requirements. Hydro requires that Holyrood continue to operate reliably to provide capacity and energy to Island Interconnected customers until after interconnection to the North American grid.

3. Units 1 and 2 have a maximum continuous rating of 170 MW and are currently de-rated to 135 MW due to boiler airflow losses around the air heaters and accumulated boiler soot and ash from heavy fuel oil combustion. Air leakage on the boiler air heaters and on expansion joints is a significant contributor to the current de-rating on Units 1 and 2. Unit 3 has a maximum continuous rating of 150 MW. While not de-rated, the Unit 3 boiler air heaters have reached the end of life due to erosion and corrosion and require replacement. Further, a number of critical pieces of equipment at Holyrood have reached, or are reaching, the end of their useful life and are at risk for failure.

4. Hydro is proposing to improve the reliability at Holyrood by refurbishing and replacing critical systems and equipment that are necessary for the safe and relation operation of the plant. This includes:

    a. Boiler air flow and heat transfer equipment refurbishments and replacements including boiler air heaters and expansion joints;
    b. Piping, valves, and heat tracing replacements related to boiler feed water, steam, and cooling water systems; and
    c. Turbine and generator lubrication and control system replacements including DC lube oil, pump motor starters, and speed probes and cables.

    Completing this work will reduce the risk of unplanned equipment failures, thereby improving plant availability and unit capacity until interconnection.

5. Hydro is recommending the refurbishment or replacement of the boiler heat transfer equipment, air flow equipment, and other system equipment that are at the end of life, all which is necessary to ensure the reliable operation of Holyrood. This work will occur concurrently with the planned annual maintenance outage schedules for the units in 2017.

6. The estimated capital cost of the project is $2,610,000. The scope of work for this project is set out in the engineering report attached to the Application.

7. Hydro submits that the proposed capital expenditure is necessary to ensure that Hydro can continue to provide service which is safe and adequate and just and reasonable as required by Section 37 of the *Act*.

8. Therefore, Hydro makes Application that the Board make an Order pursuant to section 41(3) of the *Act* approving the capital expenditure of approximately $2,610,000 for reliability improvements at the Holyrood Thermal Generating Station, including the refurbishment or replacement of the boiler heat transfer equipment, air flow equipment, and other system components that are at the end of life, as more particularly described 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 18th day of April 2017.

Tracey L. Pennell
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St. John's, NL A1B 4K7
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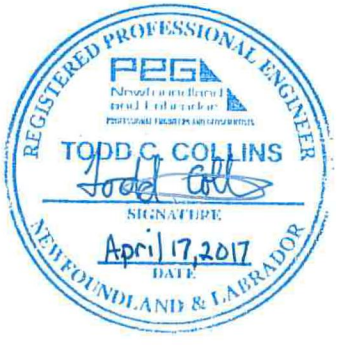

Electrical
Mechanical
Civil
Protection & Control
Transmission & Distribution
Telecontrol
System Planning

2017 Reliability Improvements

Holyrood Thermal Generating Station

April 17, 2017

A Report to the Board of Commissioners of Public Utilities

newfoundland labrador hydro
a nalcor energy company

Summary

This Supplemental Capital Budget Application is requesting the approval of a project to improve reliability and the availability of the capacity of the Holyrood Thermal Generating Station (Holyrood). This one year project includes the refurbishment and replacement of critical systems and equipment that are necessary for safe and reliable operation. The project scope includes:

1. Boiler air flow and heat transfer equipment refurbishments and replacements including boiler air heaters and expansion joints;
2. Piping, valves, and heat tracing replacements related to boiler feed water, steam, and cooling water systems; and
3. Turbine and generator lubrication and control system replacements including DC lube oil, pump motor starters, and speed probes and cables.

The reliability improvements are primarily a replacement of end-of-life equipment as well as equipment refurbishments that are necessary to ensure reliability of Holyrood to 2021. The reliability improvements included in this project were identified during planned inspections and assessments as part of the 2016 annual maintenance outages, as well as during the 2016/2017 winter operating season, and were too late for inclusion into the 2017 Capital Budget Application. Hydro requires that Holyrood continue to operate reliably to provide capacity and energy to Island Interconnected customers until after interconnection to the North American grid. To ensure the reliable operation of the facility, the proposed reliability improvement work is required.

The estimated cost of this project is $2,610,000.

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1.0 Introduction

In this Application, Newfoundland and Labrador Hydro (Hydro) is proposing a project to improve reliability and availability of the generating capacity of the Holyrood Thermal Generating Station (Holyrood). This project has two purposes, refurbishment of boiler heat transfer equipment, and replacement of various system components that are at end of life.

Hydro proposes to refurbish or replace boiler heat transfer and air flow equipment necessary for reliable operation and restoration of the capacity of Holyrood. This includes refurbishment of boiler air heaters and replacement of expansion joints on the boiler air delivery system that are at the end of life. Units 1 and 2 have a maximum continuous rating of 170 MW and are currently de-rated to 135 MW due to boiler airflow losses around the air heaters and accumulated boiler soot and ash from heavy fuel oil combustion. Air leakage on the boiler air heaters and on expansion joints is a significant contributor to the current de-rating on Units 1 and 2. The Unit 1 and Unit 2 boiler air heaters will be refurbished to reduce air leakage during operation. Expansion joints on the combustion air ductwork to the boiler that are at the end of life will also be replaced. It is anticipated that completion of this work will increase the current de-rated capacity of Units 1 and 2 by 10 MW per unit. In addition, the boiler air heaters serving Unit 3 will also be refurbished to improve reliability. Boiler fouling, another contributor to unit de-rating, is already scheduled to be addressed this summer as part of the 2017 boiler maintenance work. Hydro also proposes replacing various system components that are at end of life, including piping, valves, and turbine generator lubrication and controls systems.

The reliability improvements included in this project were identified too late for inclusion into the 2017 Capital budget application, either because of the timing of the annual 2016 maintenance and inspection outages, or detection during the current operating season. The project is proposed to occur during the 2017 planned maintenance outages to ensure 2017/2018 winter peak demands are met reliably.

2.0 Project Description

The primary scope of this project includes a refurbishment of the boiler air heaters servicing Units 1, 2, and 3. In addition, the expansion joints on the Units 1 and 2 combustion air ductwork to the boilers that are at the end of life will also be replaced. Completing this work during the annual 2017 unit outages, in conjunction with the boiler cleaning that will be completed as part of the 2017 boiler maintenance work, should allow Units 1 and 2 to be placed back in service at 170 MW prior to the winter period of 2017-2018, and will also ensure the continued reliable operation of Unit 3.

The project includes procurement, installation, and commissioning of new air heater baskets, sector plates, seals, and ductwork expansion joints. Refurbishments and replacements will occur concurrently with the planned annual maintenance outages scheduled to commence in April 2017 for Unit 3, June 2017 for Unit 1, and August 2017 for Unit 2. The duration of work is approximately four (4) weeks per unit.

A secondary aspect of this project is comprised of the replacement of end of life equipment, including valve and piping replacements, turbine speed cable replacements, No.6 fuel oil steam heat tracing replacements, and DC lube oil pump motor starter replacements. Completing this work will reduce risk of unplanned equipment failure for equipment that is at or near end of life, thereby improving plant availability and unit capacity until interconnection.

3.0 Justification

3.1 Boiler Air Heater Refurbishment and Expansion Joint Replacement

Holyrood is critical to Hydro providing reliable electrical service to customers. The primary aspect of this project is to refurbish the boiler air heaters serving Units 1, 2, and 3 and replace the leaking boiler combustion air ductwork expansion joints serving Units 1 and 2. Units 1 and 2 have a Maximum Continuous Rating[1] of 170 MW and are currently de-rated to 135 MW. Air

[1] Maximum load that the generation unit can sustain under operation

leakage on the boiler air heaters and expansion joints is contributing to the de-rating on Units 1 and 2.

During the annual Unit 1 and 2 outages in the summer and fall of 2016, Hydro contracted Howden North America Inc. (Howden), the boiler air heater original equipment manufacturer (OEM), to complete condition assessments on the air heaters to determine the cause of the de-rating on Units 1 and 2 and make recommendations for future work necessary to ensure reliable operation. Condition assessment reports were submitted to Hydro in October 2016 (the Howden Reports). As referenced in Appendices A and B, the Howden Reports indicate that the Units 1 and 2 boiler air heater radial and circumferential seal clearances are excessive due to corrosion resulting in air leakage and recommend a replacement of the seals and sector plates to restore the clearances to OEM specifications. Air heater excessive seal clearance is shown in Figure 1.

To correct this air leakage, it is necessary to install liners on the sector plates and replace the rotor seals. A cross section of a boiler air heater is shown in Figure 12. There was insufficient time in 2016 to action the work that was identified by Howden.

Figure 1: Boiler Air Heater Excessive Seal Clearance

Similarly, during the 2016 annual outages, Hydro contracted Babcock and Wilcox (B&W), the boiler service provider, to complete a condition assessment on the combustion air ductwork serving Units 1, 2, and 3 and the Unit 3 boiler air heaters. The B&W Condition Assessment indicates that many of the ductwork expansion joints serving Units 1 and 2 have developed holes due to erosion and corrosion and require replacement. Photos of leaking expansion joints are shown in Figures 2, 3, and 4.

Figure 2: Boiler Ductwork Expansion Joint

Figure 3: Boiler Ductwork Expansion Joint

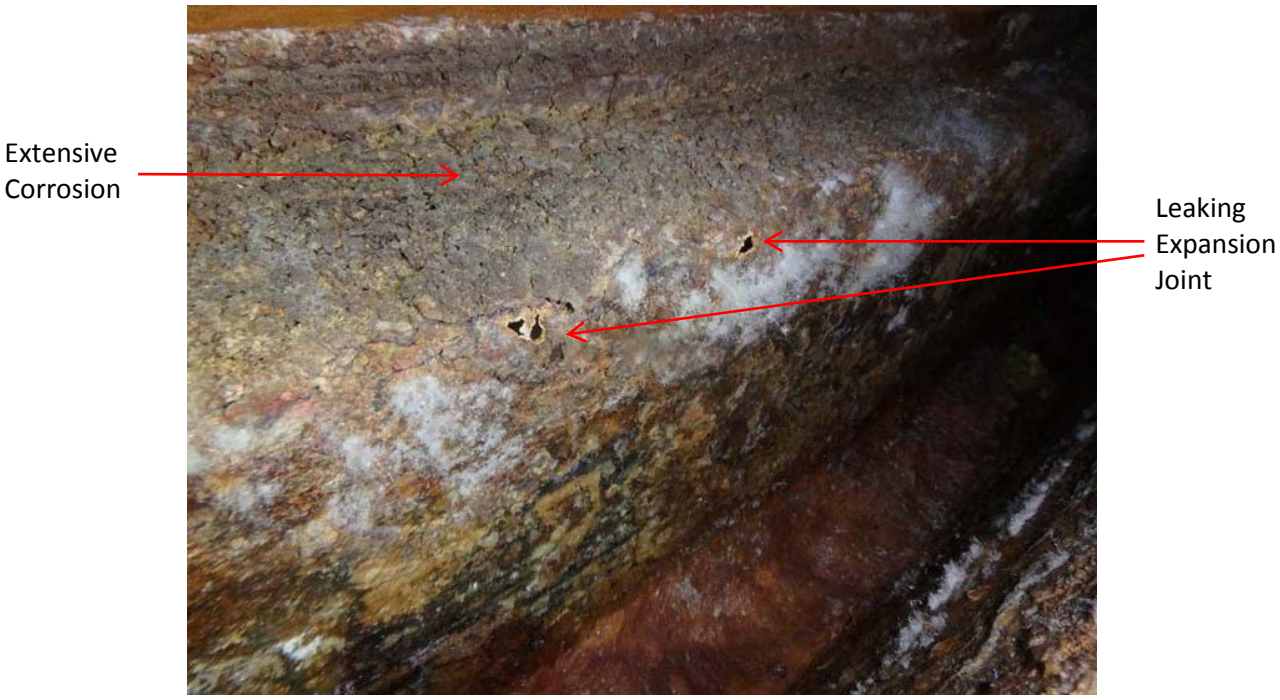

Figure 4: Boiler Ductwork Expansion Joint

The B&W Condition Assessment also indicates that the Unit 3 boiler air heater baskets have reached the end of life and require replacement. The baskets are extremely thin due to erosion and corrosion and are dropping out of position on the rotor. Deteriorated baskets can increase fouling and block air flow during operation causing air heater leakage and a reduction in combustion air flow to the boiler. Air pressure drop across the boiler air heaters has been a recent concern on Unit 3, indicating replacement is required this summer. Unit 3 has a Maximum Continuous Rating of 150 MW. B&W indicates that if replacement of the air heater baskets is delayed, there is a risk of de-rating Unit 3 due to boiler air flow issues. Photos of deteriorated Unit 3 air heater baskets are shown in Figures 5, 6, and 7.

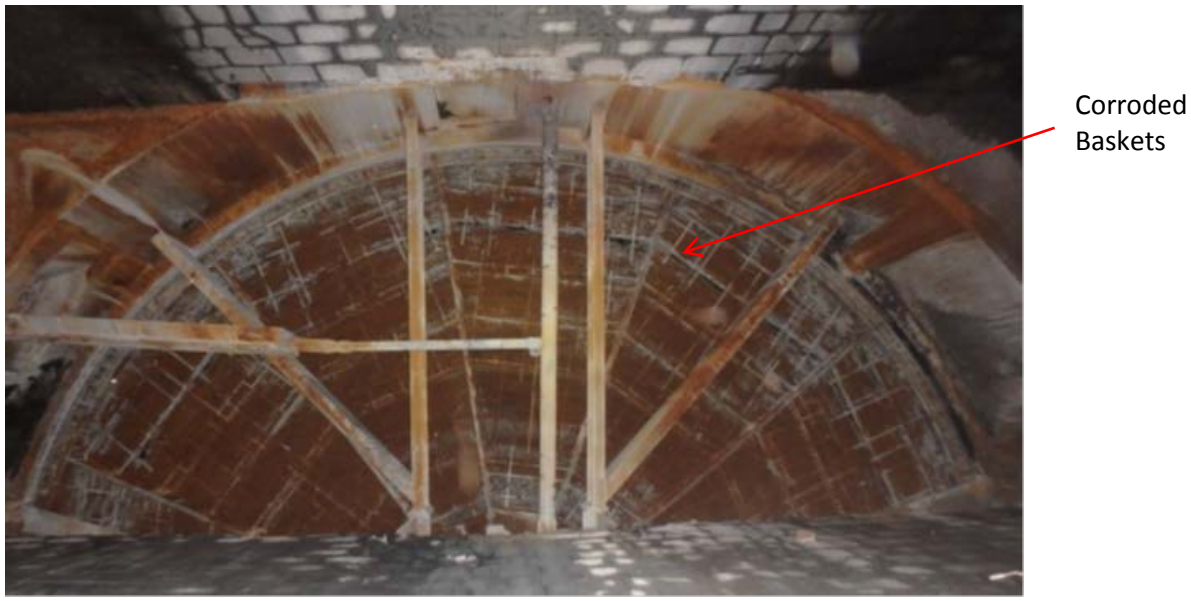

Figure 5: Unit 3 Boiler Air Heater Rotor

Figure 6: Deteriorated Unit 3 Air Heater Baskets

Figure 7: Deteriorated Unit 3 Air Heater Baskets

Boiler air heaters and combustion air ductwork expansion joints must be functional to sustain operation and output of the generating unit. Based on the condition assessments completed by Howden and B&W, refurbishment of boiler air heaters and replacement of expansion joints must be completed to ensure reliability and availability of the capacity of Units 1, 2, and 3.

3.2 Equipment Replacement

Hydro is continuously evaluating asset condition and forecast requirements. As an outcome of this evaluation, Hydro is proposing an additional aspect of this project, which is to replace various pieces of critical equipment, such as valves, cooling water piping, turbine speed cable replacements, No.6 fuel oil steam heat tracing replacements, and DC lube oil pump motor starter replacements. These replacements are required due to age, and condition assessment that indicates the various components could be at risk of failure. Addressing these risks now will mitigate the risk of unplanned outages in winter of 2017-2018.

Replacements will include the following:

1. Valves. Hydro has identified a number of valves related to steam, boiler feed water and compressed air systems that have reached the end of life and require replacement. These valves are either leaking process fluid externally or are passing through internally and can no longer provide isolations. A photo of a typical valve leaking condensate is shown in Figure 8.

Figure 8: Leaking Valve

2. Turbine condenser cooling water piping. The Holyrood steam turbine condensers utilize sea water to condense steam when it exits the low pressure stage of the turbine. Cooling water enters the condenser on the bottom side via two (2) 36 inch diameter steel pipes, condenses the turbine steam, and exits on the sides of the condenser. The Unit 1 condenser cooling water outlet piping has reached the end of life due to corrosion and requires replacement. A recent thickness survey indicates that he piping has less than 1/3 of the original wall thickness remaining. In recent years, Hydro has installed welded patch plates to repair leaks at a number of locations. Replacement is now necessary to ensure reliable operation. Condenser cooling water outlet piping is shown in Figure 9.

Figure 9: Condenser Cooling Water Piping

3. Turbine main steam supply flange. The Units 1 and 2 turbines main steam supply consists of 10 inch diameter high pressure piping which has a flanged connection prior to entering the turbines. In 2016, Hydro experienced three forced outages on Unit 2 as a result of high pressure steam leaks at this location caused by flange gasket failures. These forced outages occurred in November and December at the beginning of the peak operating season. Flange mating surfaces have degraded over time leading to re-occurring high pressure steam leaks which required an outage to address. Hydro is proposing to remove the flanges at each location and install welded pipes to improve safety and reliability.

4. Units 1 and 2 DC lubrication oil pump motor starter. The DC lubrication oil pump is a back-up pump that provides lubrication oil to the turbine and generator bearings in the event of a failure of the main AC lubrication oil pumps. The existing motor starter, while functional, is now considered obsolete and requires replacement. Hydro is proposing to replace these starters during the 2017 unit maintenance outages.

5. No.6 fuel oil steam heat tracing replacements. The fuel supply for Holyrood includes a tank farm consisting of four (4) 250,000 barrel No.6 fuel oil storage tanks located to the South of the plant. No.6 fuel oil is gravity fed to the plant from the tank farm via an 18 inch pipe. Steam heat tracing is used to heat the No.6 fuel oil to enable it to flow to the plant and consists of a ¾ inch steam pipe that is attached to the 18 inch pipe line and wrapped in external insulation. Many sections of the steam tracing have degraded over time from erosion and corrosion and now require replacement. Hydro is proposing a condition assessment of the steam heat tracing system and to complete targeted replacements on sections that have reached the end of life. A section of failed heat tracing is shown in Figure 10.

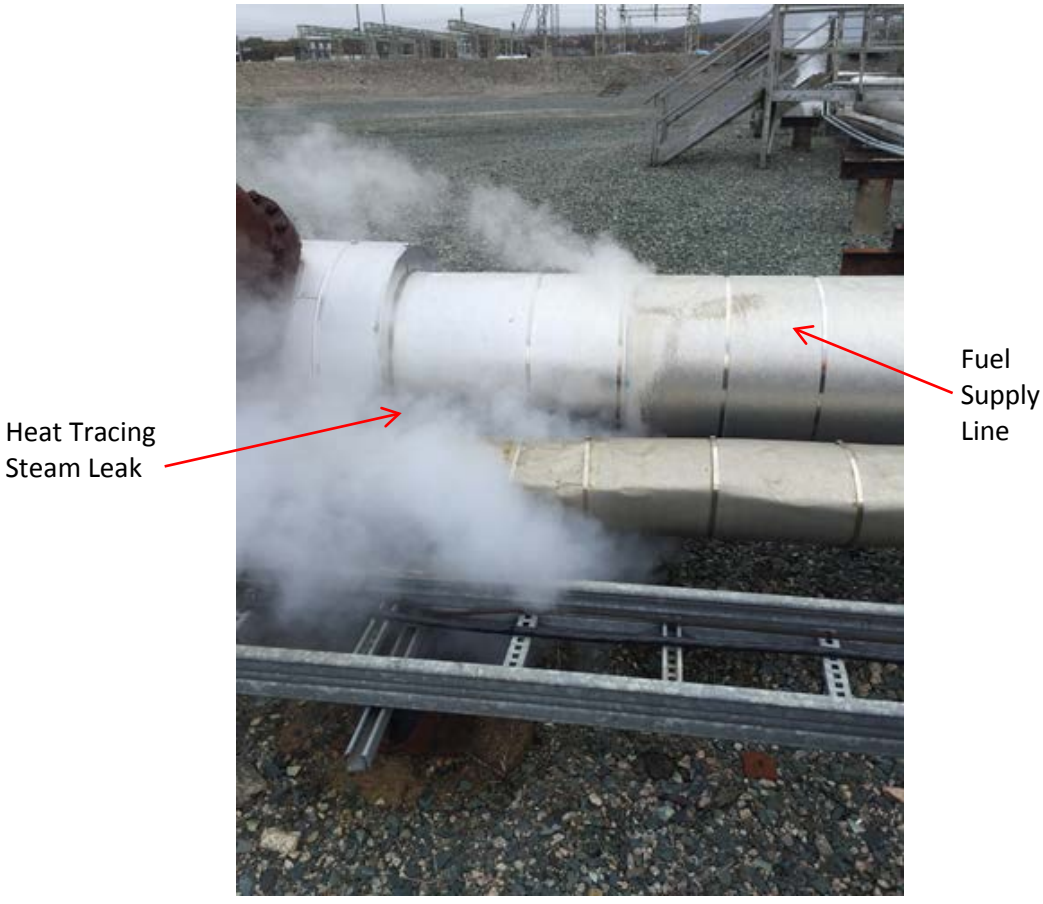

Figure 10: Steam Heat Tracing Failure

6. Turbine speed probes and cables. The turbine control system receives the turbine speed via magnetic speed sensors to represent the turbine speed in RPM. The magnetic sensors are mounted next to a multi-tooth gear attached to the turbine shaft. A total of 6 sensors are used, 3 for control and 3 for trip protection. These sensors and associated interconnection cables are normally partially immersed in lubrication oil during operation as the assembly is in close proximity to the turning gear set. Turbine generator speed probes and cables are shown in Figure 11.

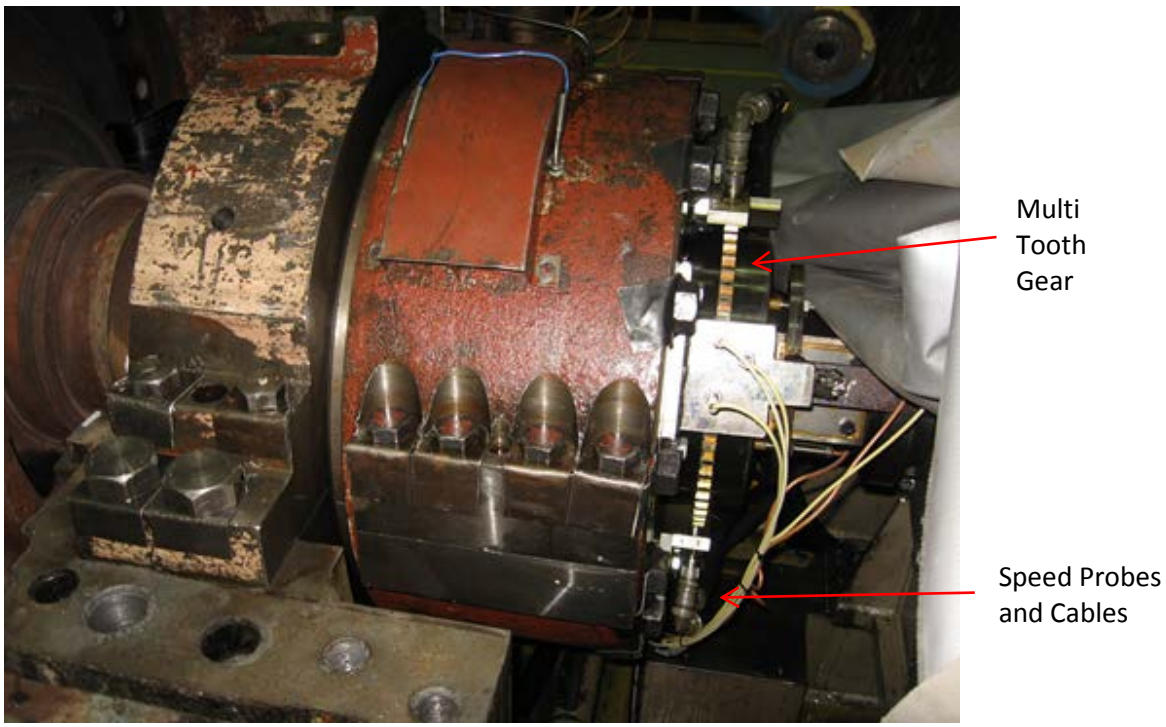

Figure 11: Turbine Speed Control System

In 2016, there have been a number of occurrences where the turbine control system has lost signal from the speed sensors, delaying the start-up of Unit 2 following the annual outage and a smaller maintenance outage. Exposure to oil degrades electrical equipment over time and reduces reliability. Oil attacks the insulating jacket on cables making it ineffective in its primary role as an insulator and reduces the signal strength of the cable and sensor. Accurate and reliable turbine speed signals are necessary for safe and reliable governing of the turbine generator during operation. Hydro is

proposing to replace the six magnetic speed sensor cables on both Units 1 and 2 during the 2017 annual maintenance outage.

While Hydro has currently identified equipment for immediate replacement, it is possible that additional components may require replacement during the annual outages. Hydro proposes that any item, material in dollar value, that meets capitalization criteria, that is required to be replaced to mitigate an unplanned outage in the coming winter season, and that can be replaced within this project's contingency, would be replaced and communicated to the Board via the year end Capital Expenditures Variance report.

3.3 Existing System

3.3.1 Boiler Air Heaters

The four main components of each generating unit are the boiler, steam turbine, generator and transformer. The main components of a boiler are forced draft fans, fuel combustion system, air heaters, ductwork, water wall tubes, boiler drum, superheater, reheater, and economizer. A cross section of the boiler air heater is shown in Figure 12.

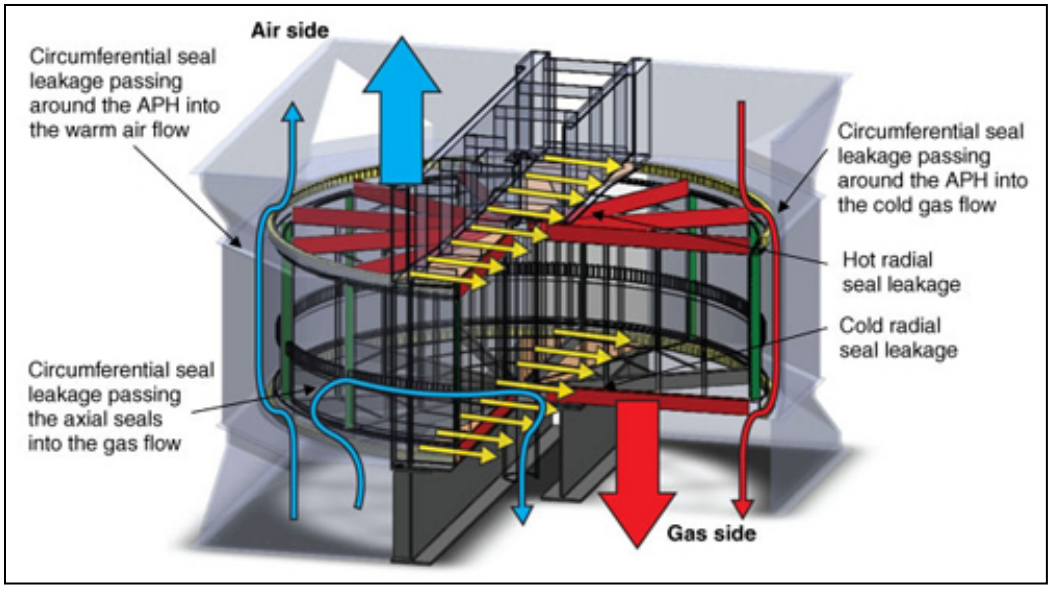

Figure 12: Boiler Air Heater

The primary function of the boiler air heater is to recover heat from the flue gas to heat the incoming boiler combustion air for improved efficiency. There are two (2) air heaters per boiler. Each air heater contains a cylindrical rotor that turns slowly on a vertical axis. The rotor is equipped with two layers of baskets or heating elements. The rotor passes through the flue gas duct and through the incoming combustion air duct and the baskets pick up heat from the flue gas and transfer this heat to the combustion air. Sector plates separate the gas and air ducts. Seals on the rotor minimize the amount of air or gas that bypasses the rotor and also minimizes the amount of air that leaks directly across the air heater, bypassing the boiler completely. Air heater leakage, largely due to long term erosion and corrosion of the sector plates, has been confirmed to be a significant problem and a major contributor to the de-ratings of Units 1 and 2.

3.3.2 Expansion Joints

Expansion joints are a component of the ductwork that conveys combustion air to the boiler. The primary function of expansion joints is to allow the ductwork to expand and contract during operation and prevent cracking. Many of the ductwork expansion joints serving Unit 1 and Unit 2 have developed holes due to erosion and corrosion and require replacement. A complete failure of expansion joints during operation will result in forced unplanned unit outages. Boiler ductwork expansions joint are shown in Figures 13 and 14. Additional photos of deteriorated expansion joints are shown in Figures 2, 3, and 4.

Boiler air heater refurbishments and expansion joint replacements will be completed during the scheduled 2017 unit maintenance outages, pending Board approval.

Figure 13: Boiler Ductwork Expansion Joint (1)

Figure 14: Boiler Ductwork Expansion Joint (2)

3.4 Operating Experience

3.4.1 Boiler Air Heaters and Expansion Joints

Originally rated for 150 MW, Units 1 and 2 were placed in service in 1969 and 1970, respectively, and were upgraded to 170 MW in 1988 and 1989. The Original Equipment

Manufacturer (OEM) for both units is General Electric (GE). Unit 3 is rated for 150 MW and was placed in service in 1979. The OEM for the Unit 3 boiler is B&W and the OEM for the Unit 3 turbine and generator is Hitachi. As of February 2017, Unit 1 has an approximate total operating hours in excess of 202,182, Unit 2 has an approximate total operating hours in excess of 193,690, and Unit 3 has an approximate total operating hours in excess of 155,008. Boiler tuning was completed in the Fall of 2016 when units could reach high loading ranges without overly risking island electrical system stability in the event of a trip. Units 1 and 2 are currently de-rated to 135 MW as a result of boiler air flow issues.

3.4.2 Equipment Replacement

Following many years of operation, it is normal for various equipment components, especially high pressure piping components, to deteriorate. A listing of plant systems and equipment requiring replacement is provided above in Section 3.3.2. Replacement of aged or faulty equipment mitigates risk of operational issues during high demand periods.

3.5 Reliability Performance

In March of 2017, a forced outage occurred on Unit 1 as a result of cooling water leaks on the East and West air heater bearings. During the 2017 operating season, the available capacity of Units 1, 2, and 3 has gradually reduced to 135 MW as a result of boiler air flow issues. There have been no forced outages caused by failure of boiler combustion air ductwork expansion joints.

Other equipment to be addressed in this project can impact safety, efficiency, availability and/or reliability of the plant. Hydro has recently experienced a number of forced outages on Units 1 and 2 as a result of high pressure steam leaks at the main steam piping flanged connection to each turbine as a result of gasket failures. In 2016, Hydro experienced three (3) forced outages on Unit 2 as a result of high pressure steam leaks at this location. These forced outages occurred in November and December at the beginning of the peak operating season. Also in 2016, there have been three (3) occurrences where the turbine control system has lost

signal from the speed sensors, delaying the start-up of Unit 2 following the annual outage and smaller maintenance outages. In addition, a loss of turbine speed signal to the control system during operation will result in forced unit outages.

Table 1 shows the outage statistics for Holyrood as well as the latest average statistics as reported by the Canadian Electrical Association (CEA).

Table 1: Holyrood Thermal Generation Unit Performance

Five Year Average 2011-2015			
Unit	**Incapability Factor[2] (%)**	**DAFOR[3] (%)**	**Failure Rate[4]**
Holyrood Unit 1	43.19	28.78	10.57
Holyrood Unit 2	32.48	10.61	10.64
Holyrood Unit 3	38.91	9.36	5.17
Holyrood Plant	39.19	17.37	8.94
CEA (2011-2015)	26.65	13.75	8.55

3.6 Legislative or Regulatory Requirements

The physical condition of a steam boiler and power piping operating in the province of Newfoundland and Labrador is governed by the *Boiler, Pressure Vessel, and Compressed Gas Regulation* under the provincial *Public Safety Act*. Operating a boiler or external power piping with a leak is not contrary to this legislation; however, a provincial boiler inspector is notified when a leak is identified.

3.7 Safety Performance

Safety non-compliance is not an issue for boiler air heater and combustion air ductwork expansion joint air leakage. Boiler air heater leakage is internal to the air heater where

[2] Incapability Factor is defined as unit unavailable time. It is the ratio of the unit's available time to the total number of unit hours.
[3] DAFOR is defined as De-rated Adjusted Forced Outage Rate and is the ratio of equivalent forced outage time to equivalent forced outage time plus the total equivalent operating time.
[4] Failure Rate is defined as the rate at which the generating unit encounters a forced outage. It is calculated by dividing the number of transitions from an Operating state to a forced outage by the total operating time.

combustion air bypasses the rotor and mixes with the boiler flue gas and is discharged to the exhaust stack. If a failure of a combustion air ductwork expansion was to occur, it would be localized and the boiler system can be shut down in a controlled, safe manner.

Hydro notes that, for the reliability improvement work, there are direct safety related outcomes for some projects:

1. Units 1 and 2 turbine main steam piping flange. Failure of a gasket on the main steam pipe flange connection on the turbine can be very dangerous for employees in the vicinity, which is an Occupational Health and Safety (OHS) risk for employees.
2. Valve replacements. Failure to replace valves that are leaking process fluid can be very dangerous for employees in the vicinity, which is also an Occupational Health and Safety (OHS) risk for employees.

3.8 Environmental Performance

There are no environmental issues related to this project.

3.9 Vendor Recommendations

Internal inspection and service reports were completed by B&W and Howden in 2016. These reports recommend refurbishing the boiler air heaters serving Units 1, 2, and 3 and replacing Units 1 and 2 leaking boiler combustion air ductwork expansion joints that are at the end of life to correct boiler air flow issues. Hydro has accepted and is proposing to follow these recommendations.

3.10 Maintenance or Support Arrangements

From 1997 until 2011, Alstom provided Hydro with maintenance services for the three boilers. As of April 2012, B&W has been providing Hydro with maintenance services for all three boilers. Hydro also maintains a turbine generator service contract with GE and other various service contracts for balance of plant equipment.

3.11 Maintenance History

The maintenance history for the Units 1, 2, and 3 boiler air heaters and expansion joints is shown in Tables 2, 3, and 4:

Table 2: Unit 1 Boiler Air Heaters and Expansion Joints Maintenance History

Year	Preventative Maintenance ($000)	Corrective Maintenance ($000)	Total Maintenance ($000)
2016	45.6	71	116.6
2015	8.5	19.2	27.2
2014	28.8	65	93.8
2013	15.6	25	40.6
2012	12	26	38

Table 3: Unit 2 Boiler Air Heaters and Expansion Joint Maintenance History

Year	Preventative Maintenance ($000)	Corrective Maintenance ($000)	Total Maintenance ($000)
2016	45.6	8.2	53.8
2015	37.8	71.5	109.3
2014	28.8	82.5	111.3
2013	15.6	184	199.6
2012	22.0	35.2	57.2

Table 4: Unit 3 Boiler Air Heaters Maintenance History

Year	Preventative Maintenance ($000)	Corrective Maintenance ($000)	Total Maintenance ($000)
2016	45.0	5.0	50
2015	26.4	8.5	34.9
2014	16.8	11.0	27.8
2013	22.8	5.0	27.8
2012	14	12.4	26.4

The equipment proposed for replacement is a number of small to medium size plant components. Much of the maintenance history at the plant is not captured and reportable by small component size. Hydro does note that all components are maintained as part of various comprehensive plant preventative maintenance work orders where corrective maintenance is also completed as required.

3.12 Anticipated Useful Life

The refurbished boiler air heaters and replacement expansion joints for Units 1, 2, and 3 and the majority of the replaced equipment proposed is expected to last up to end of steam, and until a determination has been made for when Units 1, 2, and 3 are no longer required for generation.

4.0 Development of Alternatives

The alternative to completing this project is to not refurbish or replace any equipment, including the boiler air heaters and expansion joints, and instead replace upon failure. This would increase risk of additional unit deratings and unplanned outages during peak operating season.

Hydro has experienced a de-rating on Units 1 and 2 throughout much of the winter of 2017, and believes it is appropriate to refurbish boiler air heaters and replace expansion joints on Units 1 and 2 in advance of the next winter. It is also appropriate to refurbish the boiler air heaters on Unit 3 to avoid a de-rating due to air flow issues. Further, Hydro has evaluated various system components and identified components for replacement to mitigate a risk of interrupted service of Holyrood in the next high demand operating season. Hydro deems it is necessary to proceed with this work in 2017 in order to increase the generation output on Units 1 and 2 by an estimated 10 MW per unit and avoid a de-rating on Unit 3.

Delaying this work until 2018 and including it as part of the 2018 Capital Budget Application is not considered to be an acceptable alternative considering the existing de-ratings of Units 1 and 2 and the forecast demand for the winter of 2017/2018. Further, the risk would remain of operational and availability issues if the additional equipment identified is not replaced.

5.0 Execution

This project is expected to cost approximately $2,610,000 and will take eight months to complete.

5.1 Budget Estimate

Table 5: Project Budget Estimate

Project Cost:*($ x1,000)*	**2017**	**2018**	**Beyond**	**Total**
Material Supply	39.6	0.0	0.0	39.6
Labour	438.9	0.0	0.0	438.9
Consultant	0.0	0.0	0.0	0.0
Contract Work	1,660.5	0.0	0.0	1,660.5
Other Direct Costs	5.0	0.0	0.0	5.0
Interest and Escalation	37.2	0.0	0.0	37.2
Contingency	428.8	0.0	0.0	428.8
TOTAL	**2,610.0**	**0.0**	**0.0**	**2,610.0**

5.2 Project Schedule

Table 6: Project Milestones

Activity		Start Date	End Date
Planning	- Identify and order materials - Issue PO to contractor	April 2017	April 2017
Procurement	- Materials arrive on site	April 2017	June 2017
Construction	- Refurbish boiler air heaters - Replace expansion joints - Equipment replacements	May 2017	Oct. 2017
Commissioning	- Verify air heater seal clearances - Complete unit load testing - NDE new pipe welds - Set-up turbine speed probes - DC lube oil pump motor starter checks - Valve set-up	June 2017	Oct. 2017
Closeout	- Project close out and hand over documents	Nov. 2017	Dec. 2017

Hydro notes that Units 1, 2, and 3 will undergo annual maintenance outages in 2017, as per normal maintenance cycles. The work described in this proposal would take place concurrently with the maintenance outages already planned.

6.0 Conclusion

Holyrood is an essential part of the Island Interconnected System and Hydro requires that Holyrood continue to operate reliably to provide capacity and energy to Island Interconnected System.

Hydro is proposing to improve the reliability at Holyrood by refurbishing and replacing critical systems and equipment that are necessary for the safe and relation operation of the plant. This includes:

1. Boiler air flow and heat transfer equipment refurbishments and replacements including boiler air heaters and expansion joints;
2. Piping, valves, and heat tracing replacements related to boiler feed water, steam, and cooling water systems; and

3. Turbine and generator lubrication and control system replacements including DC lube oil, pump motor starters, and speed probes and cables.

Completing this work will reduce the risk of unplanned equipment failures, thereby improving plant availability and unit capacity until interconnection. If approved, this work will occur concurrently with the planned annual maintenance outage schedules for the Units in 2017.

The estimated capital cost of this project is $2,610,000.

Appendix A

Howden Inspection Report (Unit 1 Preheaters)

Inspection Report

Unit 1 Air Preheaters

Two size 21.5-VIRX-40” Air Heaters

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Date: 10/05/2016

Location: NALCOR Energy
Newfoundland Labrador Hydro
HOLYROOD STATION
1 Thermal Plant Road
Canada, NL A0A 2R0

Equipment: Unit 1 Airheaters

OEM Contract Number: 0828-1201

Customer PO No.: TPX284373

Invoice No.:

Contact:

Phone:

Purpose of Visit:

The purpose of the visit was to inspect the air heaters on Unit 1 and provide recommended repairs for the FUTURE outage.

Equipment:

NOTE: Representative photographs of the conditions described in the body of this report are for illustrative purposes only. Observations apply to both air heaters unless otherwise specified.

Observations:

Rotor Structure:

The internal inspection began with the hot end sides of both units. Assisting with the inspection was [redacted], Field Service Engineer with B&W. First impressions of the rotor structure showed that the unit is in good condition as far as structural integrity. No stay plate weld cracks were found. Hardware fasteners were in good condition with the exception of the mounting angles for the circumferential seals. These use square headed bolts for holding the backing bar to the seal and approximately 4 were found missing. Previous repairs here were noticed and appeared to be serviceable and holding.

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The structure inspection on the cold ends showed that the structure was in good condition for its age and would not require any major repairs. These rotors have short cold element that is side loaded through the rotor housing via an access door. The element sits on grating that is also loaded through these doors. This grating was noticed to be welded to the sides of the diaphragms.

This is incorrect. The support grating is supported on the sides with blocks that are welded to the diaphragms. The grating is allowed to float freely without concern that it will fall out of the structure. The basketed element is also free to move on this grating during thermal expansion and deformation. Welding the grating to the diaphragms restricts this expansion and can cause stress in the rotor structure.

During any outage that maybe scheduled next year, these welds should be removed and allow the rotor to be free from restriction on expansion and to conform to thermal deformation design and allowing proper sealing.

The grating itself is in good condition and can be reused if new cold end element is installed.

The #1 East rotor was checked for level and found to be [redacted]" out of level across its diameter. It must be noted however, that the level that was used was also found to not be calibrated and was [redacted] out of calibration. Time constraints and other work going on for the West unit prevented a level check from being conducted.

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It is not known if this is a condition due to the guide bearing housing out of center or if it is a worn guide bearing. Consultations with [redacted] included the need for inspecting the guide bearing before making any adjustments to the guide bearing housing.

Rotor Housing:

The housing was found to be in good condition with the exception of the cold end sector plate sealing surfaces that are built integral with the main structures. The sealing surface that is at the gas to air junction of the rotation of the rotor is suffering the most damage from corrosion. This is the hottest part of the rotor during operation and corrosion and/or erosion from this environment is usually where damage is found. The sector plate sealing surfaces at the air to gas junction one hundred and eighty degrees on the other side is in great shape with no damage found.

This damage can be measured for a possible liner that can be applied to the sealing surface to bring dimensions back within specs. However, due to the rotor on 1 east being found out of level, these measurements could not be taken due to time constraints.

As mentioned earlier, the levelness of the rotor must be verified before any liner calculations can be made. Once the rotor is leveled, a pair of fingertabs can be attached to the outboard of the diaphragms and a sweep can be made to determine the thickness and size of any liners that may be needed. Anything with variations larger than [redacted] needs to be relined to be brought back to within tolerance and help with leakage and bypass.

The seal ring that runs the circumference of the housing for the circumferential seals to operate on was found to be serviceable. There is some wear in places around the structure, but it is not known if that is a result from the rotor being eccentric with the housing or that the support angles for the seals needing replaced. A run out of the seal bars/rings was not done. It will be recommended in this report that the circumferential seals and their support angles be replaced in the seal change out.

Rotor Element:

The condition of the hot end element is very good and can be expected to be serviceable for the next three years. The cold end element is showing thinning and some fracturing especially at the inboard center of the rotors. A change out of this element is recommended at the next outage. As mentioned earlier, the support grating needs to be freed from weld restriction when this element is replaced.

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Although the hot end element is in good condition, it is suffering bypass from the basket to diaphragm gaps. This may be a result from smaller than normal baskets or to an oversize expanded compartment. Due to the lack of excessive heat evidence, it is suspected that the baskets are just small. The baskets can be used in this condition without problems if the gaps are just stripped with material to keep the flow from going around the basket.

These gaps exist at several locations including at the diaphragms and any of the stay plates. Any gaps larger than [redacted]" should be considered for closing off. Flow goes through here and is not absorbed by the element and contributes to a loss of return. Material that is stripped here must be tack welded to either the sides of the diaphragms or the baskets, but not from basket to basket or to both diaphragms and baskets. The goal is to force the flow through the element without restricting the thermal movement and expansion of the rotor or the element. Tabbing these gaps can improve the gas outlet and air outlet temperatures by 6°F to 8°F.

Sealing Systems:

The rotor post seals, radial seals, circumferential seals need to be replaced on all sides of both rotors. They are thinned and breaking on the hot ends and thinned and corroded away on the cold ends.

Some spot replacements of rotor post seals were ongoing during the inspection. The trunnion air seals were found to be serviceable and can be reused with new packing and new rotor post seals.

The cold end radial seals on both units are gapped at the rotor post to the point of being ineffective. This is due to corrosion and damage from contact with sootblowing media that may actually be within specs and will work fine with new radial seals. It was found on the #1 west cold that the radial seals are installed on the wrong side of the diaphragms. Some

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other seals and holding strips were also found installed incorrectly. It was also noticed that some of the outer seal tabs were installed incorrectly in relation to the outboard radial seal.

The end plates at the rotor post will also need to be replaced during these repairs and new lifting apparatus for changing out the support bearings is recommended. The ideal time to replace the lifting apparatus is when the cold end element is out of the air heater.

- *Once the old seals are all removed, the rotor structures can be more effectively inspected for any repairs and be marked up with highly visible paint. Removing the cold end baskets and the inboard "A" baskets can also allow for a more efficient inspection where repairs can be done readily.*

Rotor Drive:

An inspection of the wear on the pin rack was done and no issues were found. The wear is minimal and is not into the softness of the pins. No open inspection of the pinion gear was done. Drive reducers were checked for oil levels and any noticeable leaks. All appeared normal without exception.

Rotor Bearings:

No open bearing inspections were done during this short trip. All oil levels were checked and the oil appeared clean and was at the full marks according to their dipsticks.

As mentioned earlier, the guide bearing on the #1 East rotor must be checked for wear and may have to be replaced. The rotor is out of level and the bearing may be letting the rotor lean to the heavy side. Preparations should be made for doing the same on the West unit in the event of finding that the rotor there is also out of level.

Sootblowers:

The cold end sootblowers are used on a daily basis. The lances were found to be covered in ask buildup and is suspected to be from the water wash in the beginning of the outage. The lances must be checked before closing up the cold end ducts to be sure they are clear and serviceable. Nozzles were checked and found to be [redacted] or farther from the element and is of no concern as long as blowing pressures are maintained at the proper levels as outlined in the OEM manuals.

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Summary:

- The rotors of unit# 1 are in good condition for their age. They can be repaired to be within spec design with normal maintenance as outlined in the OEM manuals.

- No major issues were found that would prevent the air preheaters from operating when repairs are made.

Recommendations:

- Check the 1East guide bearing for wear and replace if required.
- All rotating rotor seals are in need of replacement and proper setting.
- The support angles for the circumferential seals need to be replaced and set properly.
- All rotor bearings should be visibly inspected for wear and damage and replaced if necessary.
- Both rotors must be checked for level and repositioned if required. This must be done before any sealing surface repairs or seal installation is conducted.
- The cold end element must be replaced. The element is thinned and fractured
- The hot element is still serviceable, but needs to be stripped with basket seals to prevent bypass.
- The end plates need to be replaced during these repairs.
- The lifting apparatus for changing out the support bearings needs to be replaced.

Repair and replacement of the seals and sealing systems and leveling of the rotors will result reducing the fan pumping power and improved unit efficiency.
Striping the hot end baskets will reduce air and gas bypassing the element. This will result in thermal performance improvement of the unit.

Sincerely,

[redacted]
Field Service Technical Advisor
Howden North America, Inc.

Appendix B

Howden Inspection Report (Unit 2 Preheaters)

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FIELD SERVICE

Babcock & Wilcox Power
NALCOR Energy
Newfoundland Labrador Hydro
Holyrood Generating Plant

Unit #2 APH
LAP# 21.5 VIRX 40
Ljungström:

Unit #2 EAST LAP 21.5 #0828 VIRX 40 #1202-2
Unit #2 WEST LAP 21.5 #0828 VIRX 40 #1202-1

Inspection Dates:
July19, 2016
Technical Advisor:
[redacted]

NOTE: Representative photographs of the conditions described in the body of this report are for illustrative purposes only. Observations apply to both air heaters unless otherwise specified.

Unit #2 EAST LAP 21.5 #0828 VIRX 40 #1202-2
Unit #2 WEST LAP 21.5 #0828 VIRX 40 #1202-1

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Work Summary

July 19, 2006

- Unit #2 East and West air pre heaters were already under full permit and scheduled repairs were in progress with 2 weeks remaining in the outage. The APH's were isolated under permit and the rotors locked (rotor welded to the housing cross braces at multiple points) securely in position to remove the top guide bearing housing for annual cleaning. Soot blower inspections as per annual preventative maintenance was in progress.

#2 East APH

- The East APH drive assembly had looseness in the coupling. The electric motor had a damaged keyway; the motor was removed and sent away to have the shaft and keyway repaired.
- Cold end soot blower lance nozzles were in poor condition. The lance tube repair was in progress.
- The top guide bearing housing replaced with the spare unit. This is a normal routine to change the housings for cleaning out scale and debris from the cooling jacket.

#2 West APH

- Cold end soot blower lance nozzles were in poor condition. The lance tube repair was in progress.
- A quick visual inspection of top guide bearing revealed the trunnion shaft lock plate bolts sheared off. The damage to the inner center pipe from an unsecure rotating trunnion shaft rubbing against it. The damage parts have left metal debris in the bearing housing.
- A local Machine shop will repair the housing and the bearing assembly. The trunnion shaft taper to the bearing assembly requires a proper fit.
- Rotating the West APH during my visit will not happen due to the conditions of the guide bearing.
    - Rotor level check and bearing housing level check are required when all the repaired parts returned to site and installed. Instructions and methods discussed with the site contacts.
    - Radial seal clearances with the rotor stationary locked in position on the hot and cold prior to the bearing housing repairs.

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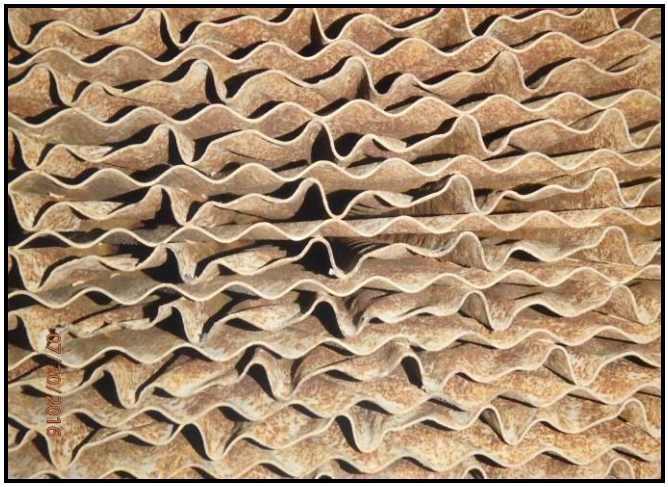
Rotor

Baskets

- The East and West APH's have 2 rows of baskets. The HE overall basket depth is [redacted] and CE basket overall depth is [redacted]. They have been recently replaced within the past 4 years. The CE grating and support bars are in good serviceable condition.
- There are gaps between the HE baskets to stay plates and baskets to diaphragms.
  Recommend: Gaps larger than a [redacted] should be covered with a sealing strip to maintain flow thru the basket elements.

Element

- The HE and CE element appear to be good serviceable condition. No signs of severe pluggage. No signs of thinning or fracturing. With the soot blowers lance tubes being replace this outage this will aid in keeping the CE basket element in good condition.



Hot end elements

Enameled Cold end elements

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Hot end sector plates

- The East and West APH's HE sector plates are in good serviceable condition. There are signs of minor wear grooves.

HE Air to Gas


He Gas to Air

Cold end sector plates

- The East and West APH's CE sector plates are equally in poor condition. There is a significant discrepancy in the reduced thickness of the GAS to Air sector plate. The original [redacted] thick sector plate is reduced to approximately [redacted] thick in the middle and outboard portion of the sector plate.

- Radial seals set to the appropriate cold seal settings to the higher AIR to GAS sector plate there is a substantial gap and direct leakage path across the sector plate to the gas side. There was ash build up on top of the sector plates indicating that the CE radial seals are not making contact with the sector plate.
  Recommend: Replace the GAS to AIR sector plate in both the East and West APH's.


East APH CE GAS to AIR

West APH CE GAS to AIR

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Circumferential sealing ring

Air side

- The Circumferential seal ring on the air side HE and CE has no signs of contact wear on the East and West APH's. The East APH HE gap of [redacted] was relatively uniform and concentric to the rotor. The West APH is indicating the same discrepancy.
  Recommend: Align the air side circumferential seal ring on HE and CE end concentric to the rotor to maintain proper gap on both APH's.

Gas side

- The Circumferential sealing ring on the HE and CE has signs of contact wear on the East and West APH's. There are some excessive gaps up to [redacted]

Gas HE Cir seal ring wear up to [redacted]

Gas CE Circ seal ring no wear

CE GAS circ seal gap of [redacted]

CE GAS circ seal ring eroded at sector plates

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Seals

Radial seals

- The radial seals on both the east and west APH are in satisfactory condition. There are signs of bent, misalignment, overlapping and gaps with the HE and CE radial seals on both East and West APH's.

Abutting radial seals have some gaps

Over lapping radial seals

Circumferential seals

- The circumferential seals and holding strips were installed incorrectly. Signs that the Diaphragms have been relieved allowing the holding strip to pass thru. The holding strips should start/stop at the intersecting diaphragm to rotor shell. This is a direct leakage path.

- The cold seal settings on the HE and CE exceed the recommend settings.
  Recommend: Replace circumferential seals and holding strips and hardware.

Holding strip passes thru diaphragm

Missing sealing strips

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Post seals

- The hot end post seal have been previously repaired and showing signs of wear.
  Recommend: Replace the HE and CE post seals in both the East and West APH's

East HE post seal

East CE post seal

West HE post seal

West CE post seal

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Seal setting chart

Radial seals

- Historically it has been a common practice to set the HE seals [redacted] and the CE seals [redacted] which exceeds the recommended clearances and not as per the OEM chart.

- The seal gaps as found during this outage. The radial seal clearances are relatively the same on the East and West APH's. The gaps on the GAS to AIR sector plate are the largest.

Hot end			
IB		[redacted]	Recommended: [redacted]
OB		[redacted]	Recommended:
Cold end			
IB		[redacted]	Recommended: [redacted]
OB		[redacted]	Recommended:

Circumferential Seals

Hot end	Air side [redacted]	Gas side [redacted]	Recommended: [redacted]
Cold end	Air side [redacted]	Gas side [redacted]	Recommended:

- Overall there are no signs of contact wear on the HE and CE air side circumferential sealing ring. There is up to [redacted] deep wear groove in the HE and CE sealing rings on the gas sides on both east and west units.
  Recommend: Replace all seals during the next scheduled outage. Set them using a seal setting bar.

Drive unit

- The East and West drive unit has a Falk gear drive model [redacted]AP with a gear ratio of [redacted]. With one auxiliary air motor per APH. The units have new pinion gear shrouds installed and were not removed during this visit. Therefore no pin rack to pinion gear throat clearances were taken. The oil levels are very low and this was brought to the site contacts attention.

- The West APH was not available to rotate because of the top guide bearing was removed.

- The East APH was rotated by means of an Aluminum bar because the drive motor was removed and sent out to have the shaft keyway repaired.

- The up shaft positive air supply shaft seal appears to be good on the West APH and the EAST APH seal will need attention during the next scheduled outage.

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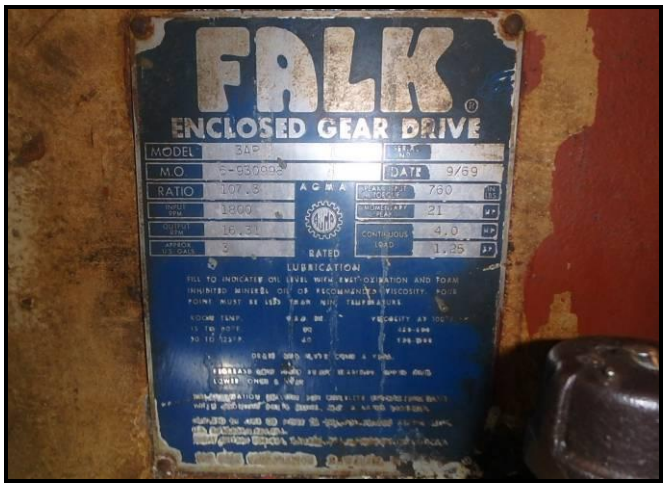
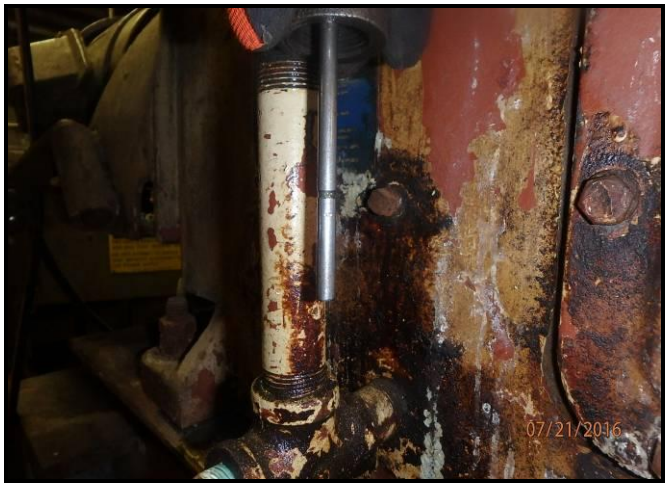


Leaking seal



Low oil level

Support bearings

- The bottom support bearings appear to be in good service condition. The oil levels are indicating at the full line on both the East and West APH's.

Guide bearings

- The top guide bearings annually have the bearing housing removed to clean out scale and debris from the cooling jacket to prevent overheating during normal operating conditions. The East was removed and replace with the spare to perform a rotor level check. The debris and scale gets cleaned out and they perform a pressure test annually to ensure there are no leaks.

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Access port for cleaning

Center pipe burred

- The West APH top cover was removed for a quick inspection. The three [redacted]" bolts that hold the trunnion shaft locking plate were sheared off and the trunnion bearing sleeve adapter was not secured to the end of the trunnion shaft.

Trunnion shaft

Locking Plate

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End of trunnion shaft and guide bearing

Before

After

Recommend: To replace the top guide bearing and trunnion shaft and bearing assembly trunnion sleeve assembly and locking plate. Address the HE trunnion positive air shaft seal.

Pin rack and pinion gear

- The Pin Rack has normal wear on the contact surfaces. The pin rack to pinion gear clearance was not measured at this time.

Auxiliary devices

Water wash manifolds

- The east and west APH's have water wash manifolds in the HE gas inlet and outlet. They are in good condition.

Soot blowers

- The east and west APH's have retractable soot blowers on the CE gas outlets. The lance tubes were found in poor condition during this outage.

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- Both soot blowers were in a complete overhaul state and new lance tubes to be replaced this outage.

Steam coils

- The East and West APH's have steam coils in the CE Air inlet side. They appear dirty and fouled and a good majority of the coils exterior fins are bent over. This may have an impact on the air flow, temperature and pressure entering the APH.
  Recommend: To clean and replace damaged steam coils. Ensure there is decking installed above the steam coils to minimize foot traffic on top of the coils that damage the outer fins.

East APH Steam coils

West APH steam coils

Conclusions / Recommendations / Summary:

- Align the air side circumferential sealing ring on both APH's HE and CE ends.
- Reestablish the CE circumferential sealing ring at the OB sections of the sector plates/housing.
- Replace all of the post, radial and circumferential seals during the next scheduled outage.
- Replace the CE gas to air sector plates on both APH's.
- Replace the West APH guide bearing, trunnion shaft and bearing trunnion assembly and shaft seal.
- Seal off the excessive gaps between the Baskets and baskets and stay plates/diaphragms.
- Clean and replace the steam coils as necessary.
- Replace the West APH top guide bearing and trunnion shaft and bearing assembly sleeve and locking plate and associated hardware.
- Repair or replace the HE trunnion positive air shaft seal on both APH's
- Repair/clean the steam coils.

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Sincerely,

[redacted]

Field Service Technical Advisor
Howden North America, Inc.

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 for approval to undertake Reliability Improvements at the Holyrood Thermal Generating Station pursuant to Subsection 41(3) of the *Act*.

AFFIDAVIT

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

1. I am the VP, Production Operations of Newfoundland and Labrador Hydro, the Applicant named in the attached Application.

2. I have read and understand the foregoing Application.

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

SWORN at St. John's in the Province of Newfoundland and Labrador this 18th day of April, 2017, before me:)

Barrister – Newfoundland and Labrador

Jennifer Williams

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

AN ORDER OF THE BOARD

NO. P.U. __(2017)

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 for approval to undertake Reliability Improvements at the Holyrood Thermal Generating Station pursuant to Subsection 41(3) of the *Act*.

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 *Electrical Power Control Act*, 1994; and

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

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

without prior approval of the Board; and

WHEREAS in Order No. P.U. 45(2016) the Board approved Hydro's 2017 Capital Budget in the amount of $271,265,600; and

WHEREAS in Order No. P.U. 5(2017) the Board approved supplementary 2017 capital expenditures in the amount of $3,045,000 to construct a distribution feeder at the Bottom Waters Terminal Station; and

WHEREAS in Order No. P.U. 7(2017) the Board approved supplemental 2017 capital expenditures in the amount of $3,168,944 for: (i) the sublease of two 230 kV transmission lines that run from Churchill Falls to the Twin Falls generating plant site; (ii) the sublease of two 230 kV transmission lines that run from the Twin Falls generating plant site to the Wabush Terminal Station; (iii) the lease of electrical equipment situated in the Churchill Falls Switchyard; and (iv) the purchase of spare parts and inventory associated with the Wabush Terminal Station, the

Churchill Falls Switchyard and the transmission lines to acquire two 230 kV transmission lines serving Labrador West; and

WHEREAS in Order No. P.U. 11(2017) the Board approved supplementary capital expenditures in the amount of $2,585,200 for 2017 and $327,300 for 2018 to replace equipment and complete a level 2 condition assessment at the Wabush Terminal Station; and

WHEREAS on April 13, 2017, Hydro applied to the Board for approval to proceed with reliability improvements at the Holyrood Thermal Generating Station, including the refurbishment or replacement of the boiler heat transfer equipment, air flow equipment, and other system components that are at the end of life; and

WHEREAS the capital cost of the project is estimated to be $2,610,000; and

WHEREAS the Board is satisfied that the reliability improvements at the Holyrood Thermal Generating Station are 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 for reliability improvements at the Holyrood Thermal Generating Station, including the refurbishment or replacement of the boiler heat transfer equipment, air flow equipment, and other system components that are at the end of life, at an estimated capital cost of $2,610,000 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 , 2017.

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