

April 19, 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) pursuant to Subsection 41(3) of the Act for the approval to complete the repair and advanced overhaul of the Happy Valley Gas Turbine

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

In December 2016, the gas generator at the Happy Valley gas turbine (the HVGT) was observed to be leaking oil after shut down following a test run on-site. Investigation completed by the original equipment manufacturer (OEM) approved field service contractor, with the support of the OEM, determined that there was a leak internal to the engine, likely at the number three bearing seal. Repair of the HVGT requires its removal from site and shipment to the OEM repair facility, as it must be disassembled to access the number three bearing area.

Hydro conducts on-going asset management activities to maintain reliable operation of its gas turbines. One of those activities is to overhaul a gas turbine after the recommended number of operating hours. The HVGT is scheduled for an overhaul in 2019.

This proposed project is requested to address the leak, and to take advantage of the unplanned outage time from the required leak repair to complete an advanced overhaul of the HVGT. Approval of this Supplementary Capital Budget Application to advance the HVGT overhaul will mean that an additional extended outage for the unit originally planned for 2019 to complete the overhaul will be eliminated. In addition, an estimated cost saving of approximately \$600,000 is expected by overhauling the HVGT at this time as opposed to in 2019 as planned, as removal, shipping, reinstallation, and commissioning costs will not have to be incurred in 2019. The total estimated cost of the project is \$3,714,800 and it is scheduled to be completed by September 2017.

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.
ecc: Larry Bartlett – Teck Resources Limited

Dennis Browne, Q.C. – 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 for approval to complete the repair and advanced overhaul of the Happy Valley Gas Turbine 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:

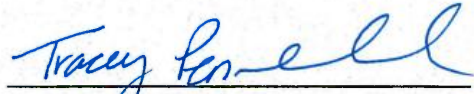
1. Hydro is a corporation continued and existing under the *Hydro Corporation Act, 2007*, is a public utility within the meaning of the *Act*, and is subject to the provisions of the *Electrical Power Control Act, 1994*.
2. Hydro operates four gas turbine facilities including the Stephenville gas turbine, located in Stephenville, the Hardwoods gas turbine located just outside St. John's, the Holyrood gas turbine, located at the Holyrood Thermal Generating Station in Holyrood, and the Happy Valley gas turbine, located in Happy Valley Goose Bay, Labrador (the HVGT).
3. The HVGT is required to provide emergency and peaking power, as well as supply power during the performance of planned maintenance. In addition, the HVGT provides

synchronous condensing capability to provide voltage regulation and permit the transmission of power to the Happy Valley area during the winter months.

4. In December 2016, the HVGT was observed to be leaking oil after shut down following a test run. Investigation completed on-site by an original equipment manufacturer (OEM) approved field service contractor, with the support of the OEM, determined that there is a leak internal to the HVGT, likely at the number three bearing seal. Repair of the HVGT requires its removal from site and shipment to the OEM repair facility, as it must be disassembled to access the number three bearing area.
5. As part of Hydro's on-going asset management activities to maintain reliable operation of its gas turbines, the HVGT was scheduled for an overhaul in 2019. The overhaul requires Hydro to remove the HVGT from service and ship it to an OEM approved repair facility. Hydro is proposing to advance the overhaul of the HVGT to take advantage of the requirement to send the HVGT to a repair facility to repair the oil leak. The repair and overhaul of the HVGT are required to ensure the unit continues to operate safely and reliably in support of the Labrador Interconnected System.
6. Hydro submits that advancing the overhaul of the HVGT scheduled for 2019 to 2017 is justified as:
 - a. The repair of the oil leak from the number three bearing seal requires the complete disassembly of the HVGT;

- b. The OEM has recommended replacement components due to obsolescence, which work would have been completed in the planned overhaul in 2019;
 - c. An estimated cost saving of approximately \$600,000 is expected by overhauling the HVGT at this time as opposed to 2019 as planned, as removal, shipping, reinstallation and commissioning would not have to be incurred in 2019; and
 - d. The need for another extended outage in 2019 to complete the HVGT overhaul as currently planned will be eliminated.
- 7. The estimated capital cost of the project is \$3,714,800 and it is expected to be completed in October 2017. The scope of work for this project is set out in the engineering report attached to the Application.
- 8. Hydro submits that the proposed capital expenditure related to the HVGT 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*.
- 9. Therefore, Hydro makes Application that the Board make an Order pursuant to section 41(3) of the *Act* approving the capital expenditure of approximately \$3,714,800 for the repair and advanced overhaul of the Happy Valley Gas Turbine, 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 19th day of April 2017.



Tracey L. Pennell

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

Happy Valley Gas Turbine - Overhaul Gas Generator

April 19, 2017

A Report to the Board of Commissioners of Public Utilities

1.0 Executive Summary

In December 2016, the gas generator in the Happy Valley gas turbine was observed to be leaking oil after shut down following a test run. Investigation completed on site by an original equipment manufacturer (OEM) approved field service contractor, with the support of the OEM, determined that there was a leak internal to the engine, likely at the number three bearing seal. Repair of the engine requires its removal from site and shipment to the OEM repair facility, as the gas generator must be disassembled to access the number three bearing area.

Newfoundland and Labrador Hydro (Hydro) conducts on going asset management activities to maintain reliable operation of its gas turbines. One of those activities is to overhaul a gas generator based on its condition, or after the recommended number of operating hours. To conduct an overhaul, the gas generator must be removed from service and shipped to an approved repair facility. It is then inspected, refurbished as necessary, and tested, to ensure reliable operation to the next scheduled overhaul. To complete a gas generator overhaul typically requires an extended outage to the gas turbine plant.

This proposed project is requested to address the leak, and to take advantage of the unplanned outage time from the required leak repair to complete an advanced planned gas generator overhaul. Approval of this Supplemental Capital Budget Application to advance the Happy Valley gas turbine overhaul will mean that an additional extended outage for the Happy Valley gas turbine that was planned for 2019 to complete the overhaul covered by this project can be eliminated. The total estimated cost of the project is \$3,714,800 and it is scheduled to be in service by September 2017.

This project was not anticipated and thus was not included in the 2017 Capital Budget as the leak occurred in December 2016 after submittal of the 2017 Capital Budget Application in July 2016. The project cannot wait to be submitted as part of the 2018 Capital Budget Application due to the need for the full generate function of the unit that supports both unplanned outages

- 1 of the transmission line supplying the area, as well as planned outages of the system. Planned
- 2 outages of transmission system elements are required to perform maintenance providing for
- 3 reliable equipment operation.

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2.0 Introduction

In this Supplemental Capital Budget Application, Newfoundland and Labrador Hydro (Hydro) proposes to address the in service failure resulting in an oil leak of the Pratt and Whitney GG8 gas generator at the Happy Valley gas turbine facility (Happy Valley), as well as the completion of an overhaul and upgrades, as required, for continued safe and reliable operation of the unit.

Hydro's Happy Valley gas turbine is located in the community of Happy Valley Goose Bay, Labrador. It provides voltage support to the area for the 138 kV transmission line L1301/L1302 from Churchill Falls and generation support for the Labrador Interconnected System. On December 22, 2016, the unit was test started to prove its capability after issues with loading and surging were experienced during operation to support a planned power outage on December 19, 2016. After the test run, the operator observed oil leaking from the breather hoses. As a result, the gas turbine was only available to start the synchronous condense function and not available for generating service.



Figure 1: Happy Valley Gas Turbine Facility

Typically, the Happy Valley Gas Turbine Plant operates in synchronous condense mode on a continuous basis, from the middle of October until the end of May, to maintain acceptable voltage levels in the Happy Valley Goose Bay area. The gas generator (engine) is only required to start the alternator in synchronous condense mode. Once synchronous condense operation is established, the engine is shut down. A summary of the operation of the Happy Valley gas turbine over the last five years is provided in Table 1.

Table 1: Happy Valley Gas Turbine Operation 2012-2016

	2012	2013	2014	2015	2016	Total
Generation Hours	86	96	84	102	57	425
Synch Condense Hours	5494	3865	1707	3753	3552	18,371
Available Hours	7757	6854	8635	6517	8663	38,426

As can be seen from the operating data, the Happy Valley gas turbine operates primarily in synchronous condense mode, but is also required to operate in generate mode to provide power during both planned and unplanned outages of the 138 kV supply from Churchill Falls.

In the Capital Plan filed with its 2017 Capital Budget Application, Hydro identified expenditures to complete an overhaul of the Happy Valley gas generator in 2019. This planned refurbishment was based on historical operating experience, service time without an overhaul, and the original equipment manufacturer (OEM) recommended reliability upgrades. While the equivalent operating hour threshold for a gas generator overhaul has not yet been reached, it is an opportune time to perform a detailed inspection and early overhaul of the unit as it must be returned to the repair facility to repair the oil leak inside the gas generator. It is expected that completion of the proposed work will allow the gas generator to operate until the next scheduled overhaul interval, estimated at 15 to 20 years.

3.0 Project Description

The Happy Valley gas generator overhaul project consists of completely dismantling the gas generator, performing a detailed inspection, refurbishment or replacement of deteriorated components, and reassembly of the gas generator, followed by performance testing to confirm that the post overhaul unit performance is within specifications. In addition, unit upgrades will be performed, as required, to ensure safe and reliable operation of the gas generator in the future. The work includes:

- Removal of the gas generator from its enclosure;
- Shipping the unit to the original equipment manufacturer overhaul facility;
- Detailed inspection of the unit and determination of the overhaul and upgrade scope;
- Overhaul and upgrade of the gas generator, as required;
- Performance testing of the gas generator to ensure its performance meets overhaul criteria;
- Return shipment of the gas generator to Happy Valley Goose Bay; and
- Gas generator installation and commissioning.

The execution of the project will be performed by a combination of Hydro personnel and contract resources. Critical work such as removal and installation of the gas generator will be overseen by OEM authorized external experts. By completing this scope of work, it is intended that the gas generator will operate until the next scheduled overhaul interval, estimated at 15 to 20 years.

4.0 Justification

The Happy Valley gas turbine gas generator requires repair as a result of an oil leak within the unit, likely at the number three bearing seal. In order to complete the repair, the gas generator must be removed from service and shipped to an overhaul facility.

1 The Happy Valley gas turbine is required to provide emergency and peaking power, as well
2 as supply of power during the performance of planned maintenance to the Happy Valley
3 Goose Bay system. In addition, the unit provides synchronous condensing capability to
4 provide voltage regulation and permit the transmission of power to the Happy Valley area
5 during the winter months.

6
7 This project will provide for the repair of the Happy Valley gas generator as part of the
8 advancement of the planned 2019 gas generator overhaul to be completed while the unit is
9 removed and sent to a repair facility as a result of the in-service failure. Completing the
10 planned overhaul in 2017 is justified as:

- 11 1. The repair of the oil leak from the number three bearing seals requires the complete
12 disassembly of the gas turbine.
- 13 2. The OEM has recommended replacement components due to obsolescence of the
14 components (i.e. combustion cans), and this work would have been completed in
15 the planned overhaul in 2019.
- 16 3. An estimated cost saving of approximately \$600,000 is expected by overhauling the
17 gas turbine at this time as opposed to 2019, as planned, because the removal,
18 shipping, reinstallation, and commissioning costs would not have to be incurred
19 again in 2019.
- 20 4. The need for another extended outage in 2019 to complete the gas generator
21 overhaul as currently planned will be eliminated.

22
23 The repair and overhaul of the Happy Valley gas turbine is required to ensure the unit
24 continues to operate safely and reliably in support of the Labrador Interconnected System.

25 26 **4.1 Existing System**

27 The Happy Valley gas turbine was commissioned and placed in service in 1992. It consists of
28 a Pratt & Whitney GG8 aero-derivative gas generator (Figure 2), a Pratt & Whitney PT8
29 power turbine, a SSS clutch and a Brush generator, all supported by the required auxiliary

1 systems. The unit is capable of operating in generate mode to provide power to the
2 distribution system, as well as synchronous condense mode to provide voltage support for
3 the system as required.

4

5 The gas generator has accumulated 2473 operating hours and 315 starts since its
6 commissioning. During this time, the gas turbine has operated in synchronous condense
7 mode for a total of 109,250 hours and has been available for operation approximately 92%
8 of the time.



Figure 2: Happy Valley GG8 Gas Generator

9 A list of major works or upgrades to the Happy Valley gas turbine since its commissioning in
10 1992 is provided in Table 2.

Table 2: Major Work or Upgrades Happy Valley Gas Turbine

Year	Major Work/Upgrade
2016	Install Transfer Switch for Diesel Automation
2015	Replace Alternator Stub Shaft
2014	Upgrade Gas Turbine Controls
2010	Upgrade Fuel Tank Controls

4.2 Operating Experience

Since its commissioning in 1992, the Happy Valley gas turbine has operated reliably in support of the Labrador Interconnected System. It has operated to provide power in support of local outages, planned maintenance, and system peaking requirements. It also operates in synchronous condense mode to provide voltage support for the Happy Valley Goose Bay distribution system. From 1993 to 2016, the unit has operated just under 2500 hours in generate mode and just under 110,000 hours in synchronous condenser mode (See Table 1). Over its 24 years in-service, the unit has been available just over 92% of the time.

The gas generator has not been previously removed for repair or overhaul and, if approved, this will be its first overhaul. The current configuration of the gas generator is phase 0, or original design, with no modifications or upgrades undertaken to date.

On December 22, 2016, the operator of the gas turbine observed oil leaking from the breather hoses after shut down following a test run. The test run was completed to check the operation of the unit after it had experienced issues with loading and surging while operating to support a planned outage on December 19, 2016. The unit had previously run at near full load (23 – 24 MW) without issues on October 21, 2016, and October 23, 2016, in support of local outages.

In January 2017, Hydro engaged the OEM authorized service provider, Oilfield Solutions Limited (OFS), to provide site investigation services to determine the issue with the gas

generator. Pratt & Whitney Power Systems supported the investigation process. After completion of all testing and investigation which could be completed on site, it was determined that the oil leak is likely located at the number three bearing seal. In order to repair the leak, the gas generator must be removed and sent to the repair and overhaul facility.

The Daily Activity Report submitted by OFS upon completion of the site investigations is attached in Appendix A.

4.2.1 Reliability Performance

There are no past reliability performance issues of the Happy Valley gas turbine related to the justification of this project. The Happy Valley gas turbine has a Utilization Forced Outage Probability (UFOP)¹ of 11.08% over the 2012 to 2016 period. Table 3 provides the five year (2012-2016) capability factor, UFOP, and failure rate for the Happy Valley gas turbine, as compared to the latest Canadian Electrical Association (CEA) average (2011 to 2015).

Table 3: Happy Valley Five Year Average (2012-2016) All Causes

Unit	Capability Factor (%) ²	UFOP (%)	Failure Rate ³
Happy Valley GT (2012-2016)	88.46	11.08	102.88
All Hydro Gas Turbine Units (2012-2016)	70.72	20.51	61.94
CEA (2011 -2015)	82.33	21.17	90.11

¹ UFOP is defined as the probability that a generation unit will not be available when required. It is used to measure performance of standby units with low operating time such as gas turbines.

² Capability Factor is defined as unit available time. It is the ratio of the unit's available time to the total number of unit hours.

³ 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. It can be greatly influenced by operating time of standby units such as gas turbines.

1 **4.2.2 Legislative or Regulatory Requirements**

2 There are no legislative or regulatory requirements related to the justification of this
3 project.

5 **4.2.3 Safety Performance**

6 There are no past safety performance issues related to the justification of this project.

8 **4.2.4 Environmental Performance**

9 There are no past environmental performance issues related to the justification of this
10 project.

12 **4.2.5 Industry Experience**

13 Generally, it is industry practice to follow OEM recommended preventive maintenance
14 protocols for gas turbines.

16 **4.2.6 Vendor Recommendations**

17 The Pratt & Whitney GG8 gas generator is normally recommended to undergo a hot section
18 inspection and refurbishment overhaul after it has accumulated 12,500 equivalent liquid
19 fuel base load hours. The Happy Valley gas generator has accumulated approximately 4946
20 equivalent liquid fuel base load hours to the end of 2016.

21
22 Pratt & Whitney Power Systems have proposed that upgrades be completed on the gas
23 generator while undergoing the repair and overhaul which are listed in Table 4. Other
24 recommendations to upgrade specific components may be made based on the condition of
25 components as determined through the detailed inspection.

Table 4: Recommended Upgrades

Upgrade	Service bulletin	Reason
Exhaust module #6 Bearing carbon seal	SB14B06	Introduce one-piece design to replace the two-piece seal and spring tension washer
Nozzle module J seals	SB00B08, SB02B09	Replaces J seals which can be a high maintenance item with a new configuration
Combustion Cans	SPB S772	Improved spare parts availability, upward spare compatibility
Combustion can hardware	SB97B12, SB92B10	More durable locking feature at the combustion chamber inner case, crossover tube and burner pin bolt locations
HPC module #8/9 stators	SB05B04	Cracking of stators in the outer shroud area
Intermediate Case Module bevel gear assembly	SB14B05	Prevents #3 bearing lock up and subsequent distress

1 **4.2.7 Maintenance or Support Arrangements**

2 Hydro personnel perform preventive maintenance on auxiliary systems related to the major
 3 gas turbine components and use OEM or OEM authorized service company personnel for
 4 inspection, repair, and overhaul of major component equipment.

6 **4.2.8 Maintenance History**

7 Table 5 shows the maintenance expenditures from 2012 to 2016 for the Happy Valley gas
 8 turbine facility.

Table 5: Five-Year Maintenance History

Year	Preventive Maintenance (\$000)	Corrective Maintenance (\$000)	Total Maintenance (\$ 000)
2016	16.9	75.4	92.3
2015	15.7	89.5	105.2
2014	22.6	221.7	244.3
2013	21.0	184.6	205.6
2012	11.7	43.8	55.5

4.2.9 Historical Information

To date, the Happy Valley gas turbine has not required significant maintenance intervention in its service life. Corrective maintenance has been completed, as required.

4.2.10 Anticipated Useful Life

This project is part of the normal asset management activities required to extend the useful life of a gas turbine. It is estimated, based on the current forecast operation of the unit, that this unit will require its next overhaul in approximately 15 to 20 years.

4.3 Forecast Customer Growth

Forecasted customer growth is not applicable to this project.

4.4 Development of Alternatives

4.4.1 Evaluation of Alternatives

There are no viable alternatives to the work outlined for this project.

4.4.2 Energy Efficiency Benefits

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

4.4.3 Economic Analysis

As there are no viable alternatives to the work outlined for this project and no energy efficiency benefits, an economic analysis was not completed.

5.0 Conclusion

On December 22, 2016, the Happy Valley gas turbine suffered an in service failure in the form of an oil leak, likely located at the number three bearing seal. The unit is not currently available for generating service and, in order to repair the gas generator, it must be removed and sent to a repair facility.

As this unit has been in service for 24 years and never been overhauled, Hydro is proposing to overhaul and upgrade the unit while it is at the repair facility for the necessary repair. Hydro had planned to complete an overhaul of the unit in 2019 and this project was included in Hydro's five year plan. Advancing the overhaul will save cost and remove the requirement for an additional extended outage of the unit in 2019 to complete this work.

The repair and overhaul of the Happy Valley gas turbine is required to ensure the unit continues to operate safely and reliably in support of the Labrador Interconnected System.

5.1 Budget Estimate

The budget estimate for this project is \$3,714,800. The breakdown of this estimate is provided in Table 6.

Table 6: Project Budget Estimate

Project Cost:(\$ x1,000)	<u>2017</u>	<u>2018</u>	<u>Beyond</u>	<u>Total</u>
Material Supply	15.0	0.0	0.0	15.0
Labour	269.4	0.0	0.0	269.4
Consultant	0.0	0.0	0.0	0.0
Contract Work	2,640.0	0.0	0.0	2,640.0
Other Direct Costs	112.3	0.0	0.0	112.3
Interest and Escalation	70.8	0.0	0.0	70.8
Contingency	607.3	0.0	0.0	607.3
TOTAL	3,714.8	0.0	0.0	3,714.8

5.2 Project Schedule

The anticipated project schedule is shown in Table 7. These are tentative dates and the actual schedule will depend on the timing of approval by the Board of Commissioners of Public Utilities.

Table 7: Project Schedule

Activity	Start Date	End Date
Contract development and Award	April 2017	May 2017
Engineering and Material Procurement	May 2017	May 2017
Contractor Mobilize	June 2017	June 2017
Seal refurbishment and overhaul	June 2017	August 2017
Unit reassembly, and start-up	August 2017	September 2017
Project Closeout	November 2017	November 2017

1 **5.3 Future Plans**

- 2 It is expected that the gas generator will require overhaul in approximately 15 to 20 years
- 3 under the currently forecast operation.

APPENDIX A

Oilfield Solutions Limited Daily Report

OFS TECHNICAL FIELD SUPPORT MANAGEMENT SYSTEM

Doc. Number: TFS005	Daily Activity Report	
Page 1 of 6	Original Document Date: 24/03/2014, This Revision: 002 (10/07/2015)	

Site Details

Customer Name	Labrador Hydro, Happy Valley	Site Name	Labrador Hydro, happy Valley
Job #	3652		
Task Description	Oil leak in compressor Area-		
Site Location	New Foundland Labrador Hydro NLH- 10 Burnwood Dr, Happy Valley. Goose Bay, NL. A0P1E0		
Field TA	Gino Simion		
Assignment Dates	20/01/17 - 25/01/17		

Unit Run Hours

(NB. Please collect run hours / starts / cycles details for all units on the site)

Unit Name	Click here to enter text.	GG 'A'	GG 'B'
GG Serial Number		P726402	
PT Serial Number		PT8-6/ 80001	
Cycles	Cycle Counter Reading		
Starts	Start Counter Reading	136 hrs since new Program instillation	
Running Hours	Total Hour Counter Reading	2500	
	Liquid Fuel Hour Counter Reading		
	Gas Fuel Hour Counter Reading		

NOTES

Please include the following in the Daily Activity Reports

- All tasks completed and identify the unit and side worked on
- Final Results for Shaft Alignments
- Final Results Collector Box Alignments
- Photos of the unit and component to help highlight the issues/failures encountered, Please ensure the photos have captions inserted to identify the component/unit & side and the problem being reported
- The report must be printed and signed by the customer to provide support for the timesheets being submitted

Doc. Number: TFS005	Daily Activity Report	
Page 2 of 6	Original Document Date: 24/03/2014, This Revision: 002 (10/07/2015)	

Date	Hours	Activity Description
19/01/2017	Travel	
20/01/2017	Travel	
21/01/2017	12	<p>1)Had site induction and discussed scope of work, issue relating to leak from compressor area/blead air piping/#1 bearing</p> <p>2)Found oil Leak in air intake coming from #1 bearing area. -removed nosecone ,found lower bolts holding bearing support loose. Removed bearing support cover and replaced O-Ring PN:ST1050-277 .Re fitted cover. A generator was required to use the vacuum test cart which arrived later the afternoon- A test was performed as per PWPS manual instruction which proved #1 bearing seals are good.</p> <p>3)Drain solenoids- SOV1003 & SOV1004 tested ok</p> <p>4)#4 scupper drain removed and verified no blockage</p> <p>5)verified no oil acumilated in CB</p> <p>NOTE: some forein matter(piece of nylon) was found in R1.1, which probable cause is due to the four large gaps in between the bell mouth seals. Customer was made aware of this.</p> <p>Possible test run in the morning.</p>
22/01/2017	12	<p>1) Completed a test run to find that the unit was still spitting/dripping oil from the bleads.We suspect this due to the visible leak at #1 bearing area dropping into the air path.</p> <ul style="list-style-type: none"> - we re performed the vacuum seal test, which passed again - confirmed scavenge pressure PI614 and CV601 working correctly - confirmed lube oil preasure - borescoped compressor to find oil coating on rotors and stators . <p>Unit was put back in sync .</p>
23/01/2017	12	In communication with PWPS- Planning further testing

OFS TECHNICAL FIELD SUPPORT MANAGEMENT SYSTEM

Doc. Number: TFS005	Daily Activity Report	
Page 3 of 6	Original Document Date: 24/03/2014, This Revision: 002 (10/07/2015)	

24/01/2017	12	<p>Received information from PWPS and verified the following.</p> <ol style="list-style-type: none"> 1) Bearing #1 cover was removed and scavenge pump inspected- ok 2) Replaced accessory drive gear O ring and also Bearing cover o ring (no oil found beyond O ring) 3) Verified PI614- PI612 – Scavenge pressures. Which are ok, no rise in pressure. 4) Verified CV601 5) We know that there is oil backing up in #4.5 or number #1 because the drains are clear. 6) We have no blockage in #1 scavenge line as we blew it out with compressed air. 7) Borescope compressor / diffuser no oil found, no oil was found beyond #1 accessory gear drive either, Only area where oil was visible was the inspection done today through Thermocouple 6, (Pictures attached) 8) Trends for NH/NL were forwarded 9) Vacuum Test #1 bearing compartement.using PWPS cart was used for test and verified using -20 inhg Gauge. 5 psia compartement preasure at a result of 0.87 pph. (Per test if limit exceeds 3 pph-fail) 10) Vacuum Test full GG- 5psia compartement preasure at a result of 47.5 pph. (Per test if limits exceed 41pph –fail) <p>Conference call with PWPS- to stay stanby till further instruction.</p>
25/01/2017	12	<p>Airflow check on the #1 oil supply line requested by PWPS- unable to perform as we no correct equipement at hand.(this test not performed in the field)</p> <p>As Requested From PWPS</p> <ul style="list-style-type: none"> - confirmed oil coating at HP through AP3 & AP4- Pictures forwarded to PWPS - Confirmed no oil in low compressor throu AP2- Pictures forwarded to PWPS - Confirmed no change in Oil level or leaks from the GG after running PT lube oil for an hour. <p>Unit Requested to be returned to Service at 20:00 and returned to customer.</p>
26/01/2017	Standby	Click here to enter text.
27/01/2017	Travel	
28/01/2017	Travel	

OFS TECHNICAL FIELD SUPPORT MANAGEMENT SYSTEM





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Customer Signature	Click here to enter text.	Date	
Customer Representative	Click here to enter text.	Date	

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Photos

	
LP Compressor AP2	LP Compressor AP2
	
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LP Compressor AP2	LP Compressor AP2

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 20:24 25/01/2017 	 20:23 25/01/2017 
HP Compressor AP3 / AP 4	HP Compressor AP3 / 4
 20:19 25/01/2017 	 19:49 25/01/2017 
HP Compressor AP3 / 4	HP Compressor AP3 / 4
 19:46 25/01/2017 	 19:42 25/01/2017 
HP Compressor AP3 / 4	HP Compressor AP3 / 4

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 complete the repair and advanced overhaul of the Happy Valley Gas Turbine pursuant to Subsection 41(3) of the *Act*.

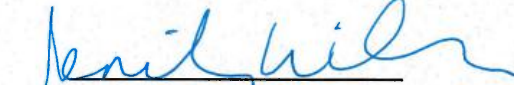
AFFIDAVIT

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

1. I am Vice President, Productions, of Newfoundland and Labrador Hydro, the Applicant named in the attached Application.
2. I have read and understand the foregoing Application.
3. I have personal knowledge of the facts contained therein, except where otherwise indicated, and they are true to the best of my knowledge, information and belief.

SWORN at St. John's in the)
Province of Newfoundland and)
Labrador, this 19th day of)
April 2017, before me:)


Barrister – Newfoundland and Labrador


Jennifer Williams

1 (DRAFT ORDER)
2 NEWFOUNDLAND AND LABRADOR
3 BOARD OF COMMISSIONERS OF PUBLIC UTILITIES
4

5 AN ORDER OF THE BOARD
6

7 NO. P.U. __ (2017)
8

9 **IN THE MATTER OF** the *Electrical Power*
10 *Control Act*, RSNL 1994, Chapter E-5.1 (the
11 *EPCA*) and the *Public Utilities Act*, RSNL 1990,
12 Chapter P-47 (the *Act*), and regulations thereunder;
13

14
15 **AND IN THE MATTER OF** an Application
16 by Newfoundland and Labrador Hydro
17 for approval to undertake Reliability Improvements
18 at the Holyrood Thermal Generating
19 Station pursuant to Subsection 41(3) of the *Act*.
20
21

22 **WHEREAS** Newfoundland and Labrador Hydro (Hydro) is a corporation continued and existing
23 under the *Hydro Corporation Act, 2007*, is a public utility within the meaning of the *Act*, and is
24 subject to the provisions of the *Electrical Power Control Act, 1994*; and
25

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

- 28 a) the cost of construction or purchase is in excess of \$50,000; or
29 b) the cost of the lease is in excess of \$5,000 in a year of the lease,
30 without prior approval of the Board; and
31

32 **WHEREAS** in Order No. P.U. 45(2016) the Board approved Hydro's 2017 Capital Budget in
33 the amount of \$271,265,600; and
34

35 **WHEREAS** in Order No. P.U. 5(2017) the Board approved supplementary 2017 capital
36 expenditures in the amount of \$3,045,000 to construct a distribution feeder at the Bottom Waters
37 Terminal Station; and
38

39 **WHEREAS** in Order No. P.U. 7(2017) the Board approved supplemental 2017 capital
40 expenditures in the amount of \$3,168,944 for: (i) the sublease of two 230 kV transmission lines
41 that run from Churchill Falls to the Twin Falls generating plant site; (ii) the sublease of two 230
42 kV transmission lines that run from the Twin Falls generating plant site to the Wabush Terminal
43 Station; (iii) the lease of electrical equipment situated in the Churchill Falls Switchyard; and (iv)
44 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.
