

#### NEWFOUNDLAND AND LABRADOR BOARD OF COMMISSIONERS OF PUBLIC UTILITIES 120 Torbay Road, P.O. Box 21040, St. John's, Newfoundland and Labrador, Canada, A1A 5B2

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E-mail: TraceyPennell@nlh.nl.ca

2017-01-27

Ms. Tracey Pennell Senior Counsel Newfoundland and Labrador Hydro P.O. Box 12400 St. John's, NL A1B 4K7

Dear Ms. Pennell:

## Re: Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System - Phase Two - Requests for Information PUB-NLH-640 to PUB-NLH-656 (Gas Turbine Failure Analysis - Final Report, January 11, 2017)

Enclosed are Requests for Information (RFIs) PUB-NLH-640 to PUB-NLH-656 in relation to the Gas Turbine Failure Analysis - Final Report, January 11, 2017.

If you have any questions, please do not hesitate to contact the Board's Legal Counsel, Ms. Jacqui Glynn, by email, jglynn@pub.nl.ca or telephone (709) 726-6781.

Yours truly,

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Board Secretary

cpj Enclosure

ecc <u>Newfoundland and Labrador Hydro</u> Mr. Geoff Young, Email: gyoung@nlh.nl.ca NLH Regulatory, E-mail: NLHRegulatory@nlh.nl.ca <u>Newfoundland Power Inc.</u> Mr. Gerard Hayes, E-mail: ghayes@newfoundlandpower.com Mr. Ian Kelly, Q.C., E-mail: ikelly@curtisdawe.com NP Regulatory, E-mail: regulatory@newfoundlandpower.com <u>Consumer Advocate</u> Mr. Dennis Browne, Q.C., E-mail: dbrowne@bfma-law.com Mr. Stephen Fitzgerald, E-mail: sfitzgerald@bfma-law.com Ms. Sarah Fitzgerald, E-mail: sarahfitzgerald@bfma-law.com Industrial Customer Group

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# 1 IN THE MATTER OF

- 2 the Electrical Power Control Act, 1994,
- 3 SNL 1994, Chapter E-5.1 (the "*EPCA*")
- 4 and the Public Utilities Act, RSNL 1990,
- 5 Chapter P-47 (the "Act"), as amended; and
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- 7 **<u>IN THE MATTER OF</u>** the Board's Investigation
- 8 and Hearing into Supply Issues and Power Outages
- 9 on the Island Interconnected System.

#### PUBLIC UTILITIES BOARD REQUESTS FOR INFORMATION

## PUB-NLH-640 to PUB-NLH-656

Issued: January 27, 2017

- 1PUB-NLH-640Reference: Gas Turbine Failure Analysis Final Report, January 11,22017. Please detail Hydro's oil condition monitoring and management3programs for its gas turbines.
- 5 **PUB-NLH-641** Reference: Gas Turbine Failure Analysis Final Report, January 11, 6 2017. Please confirm if Hydro's oil condition monitoring and 7 management programs were followed for the Stephenville gas turbine for 8 the period between its last overhaul in October 2014 to its failure on 9 March 26, 2016. If the oil condition monitoring and management 10 programs were not followed, please explain why.
- 12PUB-NLH-642Reference: Gas Turbine Failure Analysis Final Report, January 11,132017, Performance Improvements (PI) Limited Report, page 6 of 21.14Please explain why the oil was not replaced in the Stephenville gas15turbine following the lube oil analysis trend report which stated that the16oil's oxidized condition was at "Upper Critical" level and required17replacement (ref sample No 130090 dated March 16, 2015).

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- 19PUB-NLH-643Reference: Gas Turbine Failure Analysis Final Report, January 11,<br/>2017, Performance Improvements (PI) Limited Report, page 5 of 21. PI<br/>indicates the most recently recorded oil sample analysis prior to the<br/>Stephenville bearing failure was more than one year old. What frequency<br/>of sample analysis is required and practiced by Hydro and, if that is one<br/>year or less, please explain the variation in the case of Stephenville.
- 26 PUB-NLH-644 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 27 2017, Performance Improvements (PI) Limited Report, page 5 of 21. PI 28 notes parenthetically that something was amiss in Hydro's subsequent. 29 post bearing failure lube oil analysis and "dismissed the matter from 30 consideration". What is Hydro's explanation for its conclusion that the 31 Stephenville post bearing failure oil quality had a very low oxidation 32 level compared to the pre-failure samples, a conclusion that PI rejected as 33 impossible?
- 35 PUB-NLH-645 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 36 2017, Performance Improvements (PI) Limited Report, page 6 of 21. PI 37 indicates that the Stephenville lube oil pressure filter is made of a larger 38 mesh than industry standards by a factor of 50, and hence susceptible to 39 allowing material through more readily. Please explain why a finer filter 40 was not in place and the length of time that the Stephenville CT has used 41 this size filter. 42
- 43 PUB-NLH-646 Reference: Gas Turbine Failure Analysis Final Report, January 11,
  44 2017. Please describe the circumstances upon which an oil change is required for the Stephenville gas turbine, including circumstances

relating to running time, calendar time, oil quality, or other 1 2 considerations. 3 4 PUB-NLH-647 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 5 2017, Performance Improvements (PI) Limited Report, page 8 of 21, PI 6 indicates that the Stephenville scavenge/return oil filter relief bypass 7 valve lifted due to filter blockage. How long did the system operate with 8 this bypass valve open and what steps, if any, are in place to inform 9 operators that the filter has been bypassed? 10 11 PUB-NLH-648 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 12 2017. Describe the steps being taken to determine why the vibration 13 detection system failed to activate early enough to prevent damage of the 14 Stephenville gas turbine and describe any steps being taken to prevent 15 such failures in the future. 16 17 PUB-NLH-649 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 18 2017, page 5, line 5. Explain why the overhaul facility did not receive the 19 Hardwoods engine until August 3, 2016, approximately 6 months after 20 the failure. 21 22 PUB-NLH-650 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 23 2017, Alba Power Ltd. Report, page 10. Alba Power indicates that a step 24 change in temperature spreads, such as the 20°C experienced at 25 Hardwoods, "is considered significant," but that Hydro ran the engine for 26 another 2-3 days before failure. This seems to contradict Hydro's 27 explanation on page 2, lines 23-26 of its report, which suggests that the 28 unit was removed from service with the burners cleaned and replaced 29 before the unit was made available for service. Please clarify Hydro's 30 description of events prior to the Hardwoods failure. 31 32 PUB-NLH-651 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 33 2017, Alba Power Ltd. Report, page 10. Please provide the current alarm 34 levels and Hydro's opinion on setting those levels consistent with Alba 35 Power's observation that the observed step change in temperature spreads 36 (20°C) "is considered significant". 37 38 PUB-NLH-652 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 39 2017. Please provide a timeline for Hydro's actions, and the operating 40 status of Hardwoods, from the time that temperature spreads were first 41 noticed until the unit failed. Please include the timing of the decision to 42 shut down on February 8, 2016 and the time of the failure. 43 44 PUB-NLH-653 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 45 2017, Alba Power Ltd. Report, page 10-12. Alba Power's root cause 46 analysis for Hardwoods arrived at only one cause that was categorized as

2 on for a period of time when the controls system should have shut down 3 the gas turbine". This suggests that the controls system may have been 4 doubly at fault; first by allowing higher than expected temperatures and 5 second by not tripping the unit soon enough. Notwithstanding Alba 6 Power's "likely" determination, it does not appear that Hydro agrees, as 7 Hydro dismissed this potential factor with the observation on page 7 of 8 the report that settings were consistent with OEM recommendations. 9 Please explain Hydro's position in this regard and Hydro's reasons for 10 not pursuing a more aggressive analysis of the Hardwoods controls. 11 12 PUB-NLH-654 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 13 2017, page 8. Hydro states that "some of the [Hardwoods] 14 recommendations provided will require detailed review of historical data 15 and a full engineering review of the recommended changes to identify 16 how these changes could be implemented into the existing systems." 17 Which of the Alba Power recommendations fall into this category and 18 what is the timetable for addressing them? 19 20 21 PUB-NLH-655 In Order No. P.U. 22(2016) the Board stated: 22 23 WHEREAS the Board notes that the long-term strategy for Hardwoods 24 and Stephenville will be addressed as a part of the ongoing Phase II 25 review process and the Board is satisfied that Hydro should, following 26 the completion of the proposed refurbishment at Hardwoods and 27 Stephenville, file a report addressing the cause of the failures and how 28 the causes and any other relevant findings may impact unit reliability in 29 the short term as well longer term considerations. 30 31 Reference: Gas Turbine Failure Analysis - Final Report, January 11, 32 2017, page 18. Hydro states that "As a result of the implementation of the 33 actions identified thus far, along with improved operational controls, 34 increased maintenance and inspection, staffing of plants during 35 operation to allow for increased attention while operating, and 36 aggressive investigation of issues, Hydro expects the short term and long term reliability of these units to improve." Please explain how the 37 38 implementations provided in this report will improve reliability in both 39 the short and long term as required by the Board in Order P.U. 22(2016). 40 41 PUB-NLH-656 Reference: Gas Turbine Failure Analysis - Final Report, January 11. 42 2017, page 18. Hydro states that "Hydro is currently evaluating the long" 43 term need and role for gas turbines on the Island Interconnected System. 44 both on the Avalon and at other locations across the island. This 45 evaluation will inform if heavy investment into the Hardwoods and 46 Stephenville current gas turbine engines is appropriate or if other

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"likely" - controls. Alba Power further observed that "the gas turbine ran

options such as repowering or replacing is more appropriate." When is this evaluation expected to be completed and will Hydro be filing a report to the Board on its findings?

DATED at St. John's, Newfoundland this 27th day of January 2017.

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# **BOARD OF COMMISSIONERS OF PUBLIC UTILITIES**

Per <u>Argundon</u> Cheryl Blundon \_\_\_\_\_

Board Secretary