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June 7, 2018

Delivered by Email, RESS & Courier

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
2300 Yonge Street
Suite 2701
Toronto, ON M4P 1E4

Dear Ms. Walli:

Re: Hydro One Networks Inc.
Application for Leave to Construct – EB-2018-0098
Evidence of Atlantic Power Corporation

We are counsel to Atlantic Power Corporation in respect of the above noted matter.

Please find attached the evidence of Atlantic Power Corporation.

Yours very truly,

BORDEN LADNER GERVAIS LLP

Per:

Original signed by John A.D. Vellone

John A.D. Vellone

cc: Applicant and Intervenors of record in EB-2018-0098
Joseph Cleary, Atlantic Power Corporation
Jarvis Coffin, Atlantic Power Corporation

EB-2018-0098

IN THE MATTER OF the *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, Sched. B, as amended;

AND IN THE MATTER OF an Application by Hydro One Networks Inc. under Sections 92 and 97 of the Act for approval to upgrade an existing 115 kilovolt electricity overhead transmission line and station facilities and for approval of the form of land agreements it offers to landowners to use their lands for construction of the proposed upgrade;

EVIDENCE OF
ATLANTIC POWER CORPORATION

June 7, 2018

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A. INTRODUCTION:

1. As requested by the Ontario Energy Board (the "**OEB**"), and in accordance with Procedural Order No. 2, this represents the evidence of Atlantic Power Corporation ("**Atlantic Power**") in respect of an application filed by Hydro One Networks Inc. ("**Hydro One**") on February 6, 2018, and amended March 8, 2018, under sections 92 and 97 of the *Ontario Energy Board Act, 1998* for approval to upgrade an existing 115 kilovolt electricity overhead transmission line and station facilities and for approval of the form of land use agreements it offers to landowners to use their lands for construction of the proposed upgrade (the "**Application**").

2. For ease of reference, Atlantic Power has labelled this evidence as Exhibit J to avoid overlap with the Hydro One evidence (which encompasses Exhibits A to I).

B. THE ATLANTIC POWER FACILITIES:

3. Atlantic Power is the owner and operator of two generation facilities located in the Kapuskasing area:

    a. the Calstock Generation Facility, as further described in Appendix "A" (the "**Calstock GS**"); and
    b. the Kapuskasing Generation Facility, as further described in Appendix "B" (the "**Kapuskasing GS**").

4. Atlantic Power is seeking a fair and objective analysis of whether either or both plants could operate in the future in a manner which would enable H9K to stay within its power flow limits when circuit L21S is out of service and the system load is high, which would have the effect of eliminating the need for the transmission upgrade project proposed by Hydro One.

5. To-date this analysis has not been undertaken. To do this analysis properly Atlantic Power proposes that the OEB deny the requested leave to construct pending the completion of

evidence that Hydro One and the IESO engaged in a transparent, iterative and fair cycle of discussions with Atlantic Power to identify technical system needs, to identify options to utilize existing facilities to meet those needs, and finally to properly cost those options and compare them to the proposed facility upgrades on an apples-to-apples basis.

6. Atlantic Power is willing to entertain a mutually agreeable short-term contract, if one is required, to ensure the provision of continued services from either the Calstock GS, the Kapuskasing GS, or both (as needed) past June 2020 to ensure that system needs continue to be met. Such a short-term arrangement would alleviate the schedule pressure that is currently driving Hydro One to seek an expedited response from the OEB, and would allow for a more fulsome consideration of all of the alternatives / options, which in Atlantic Power's view is in the public interest.

C. ATLANTIC POWER CONCERNS:

7. In response to OEB Staff Interrogatory 3(a) Hydro One states that:

> *"To respond to this interrogatory, the IESO completed additional analysis, and the estimated the cost on a NPV basis for a 5-year contract is more than $36 million. This is because the fixed costs associated with re-configuring the existing facilities to become quick start, including existing asset overhaul and/or replacement, would still have to be recovered, just over a shorter period of time."*

8. The estimated NPV of $36 million substantially overstates the costs of utilizing Atlantic Power's existing facilities to meet the local system needs. Amortizing that assumed scope of work over 5 years instead of 10 years arrives at an obvious and not helpful result and does not answer the question of scope and term trade-offs. Hydro One has not provided the models used to arrive at this estimate, nor have they provided detailed evidence to support all the assumptions made in those models. However, Hydro One has stated that it assumes "existing asset overhaul and/or replacement". As shown in Appendix "A" and "B", Atlantic Power's existing assets have a lengthy remaining useful life. Atlantic Power has not requested deregistration from IESO for its Kapuskasing plant, and there is no basis for Hydro One to assume either Kapuskasing or Calstock would be deregistered at the end of

its OEFC contract term. An existing asset overhaul and/or replacement is not a reasonable assumption in these factual circumstances. Atlantic Power would be willing to enter into negotiations with the IESO and/or Hydro One to better quantify the actual comparable costs (if any) of utilizing Atlantic Power's existing facilities to meet local system needs. This option has not, to-date, been explored by the IESO or Hydro One.

9. In response to OEB Staff Interrogatory 3(a) Hydro One states that:

> "*To meet the local area reliability need, it is also possible to continue to operate the existing generators as they are operated today (i.e. not reconfiguring the existing facilities to become quick start). However, if the units are not reconfigured to have a faster start up time, the units will have to run as baseload generators to ensure they are available when needed, which would result in high energy costs. The IESO estimates that extending the contract with the existing facilities without reconfiguring the facility to become quick start, and assuming baseload generation of 10MW for a 5 year term, would still cost more than $35 million.*"

10. The estimated NPV of "more than $35 million" substantially overstates the costs of utilizing Atlantic Power's existing facilities to meet the local system need. With regards to Atlantic Power's existing facilities, it is not true that they will "have to run as baseload generators to ensure they are available when needed". As described in Appendix "A", the Calstock GS shuts down on most weekends – and does not run baseloaded at all hours. In addition, Atlantic Power has a degree of operational flexibility that could be utilized to meet system needs with one or both of its existing facilities that has not been accounted for in this analysis. In addition, Atlantic Power could implement targeted incremental changes to one or both facilities that would cost considerably less than a complete asset overhaul or replacement, that would further increase operational flexibility. None of these alternatives have been accounted for in the IESO/Hydro One's analysis.

11. In response to OEB Staff Interrogatory 6(b) Hydro One cites the December 14, 2015 and December 16, 2016 directives to the IESO from the Minister of Energy, pursuant to which the IESO is directed to, inter alia:

"*Continue to consider NUGs as options to maintain regional reliability*."

12. The IESO and Hydro One have not, to-date, entered into discussions with Atlantic Power about the options available to utilize the Calstock and/or Kapuskasing generating stations to maintain regional reliability and defer the need of costly transmission system upgrades. This was confirmed in Hydro One's response to Atlantic Power Interrogatory 1(a).

13. Hydro One failed to provide a response to the question asked in Atlantic Power 2(b). To clarify, Atlantic Power was not specifically invited to participate in this process, despite the importance of the Atlantic Power facilities to maintaining regional reliability.

14. In the response to Atlantic Power Interrogatory 5(c), Hydro One clearly demonstrates the shortcomings of the evaluation of options that has been undertaken to date. It states that:

> "*The assumptions in calculating the total costs of Option 3 are provided below:*
>
> *i. the assumed term of any new generation contract: 10 to 15 year contract terms were assumed based on the expected end-of-life range for the 32 km section of H9K in question.*
>
> *ii. the assumed pricing for such new contract: IESO leveraged third party cost estimates for new generation facilities and costs for similar contracted facilities in Ontario.*
>
> *iii. the assumed capacity and operating characteristics of such generation: It was assumed that a 30MW gas turbine was re-contracted and re-configured to match required operating characteristics: a high degree of operability (quick starts, rapid ramping) and a low capacity factor (< 5%).*
>
> *iv. the assumptions about which portion of the contracted price was directly attributable to meeting local reliability needs vs. which portion of the contracted price was intended to meet broader system needs:*
>
> *The entire contracted cost for a facility, as described in i) to iii) above, was*

attributed to meeting the local need.

v. any assumptions about other costs included: The installation of the capacitor at the end of the new contract term was also included in the cost."

15. Hydro One's evidence does not explain how the IESO arrived at single NPV estimate for local generation using a range of contract terms of 10-15 years.

16. Hydro One's evidence does not explain why the IESO utilized third party cost estimates for "new generation facilities", when those estimates would not provide an appropriate benchmark for Atlantic Power's existing facilities that have equipment with a remaining useful life that corresponds to required 10 to 15-year term.

17. Hydro One has not provided evidence that supports any particular level of operability that is required to meet local system needs. In particular, it does not demonstrate what specific requirements of quick starts, rapid ramping and low capacity factor are essential and required operational characteristics. The existing Calstock facility's operability currently meets local needs.

18. Contrary to the suggestions that the Calstock facility is a baseload facility, the Calstock facility shuts down most weekends. This is shown in the operational profile in Appendix "A".

19. Hydro One's evidence does not explain why the entire cost of a contracted facility would be attributed to meeting local reliability needs given the generation facility would also provide:

    a. Capacity (capacity has an intrinsic value separate from meeting local reliability needs - for example capacity is currently valued by the IESO at $200/MW-day in the Northeast Region based on the May 10, 2018 IESO demand response auction results)
    b. Energy (energy has an intrinsic value separate from meeting local reliability needs, as determined by the Hourly Ontario Electricity Price); and
    c. Ancillary services (such as VAR support, which has a value separate from

meeting local reliability needs) - in fact the IESO has established market values for some ancillary services with market development underway for other ancillary services.

For an apples-to-apples comparison to take place, the value attributable to capacity, energy and all existing and expected ancillary services that are supplied by a generation facility over the term of evaluation need to be deducted when comparing against a transmission upgrade project that provides none of these additional valuable services.

20. Further, the IESO has undertaken efforts to demonstrate viable energy storage to help the business case for intermittent renewable energy sources. Calstock is a dispatchable renewable energy generator (not intermittent) with extensive renewable wood energy stored on-site. Calstock's value should be benchmarked to the expected costs IESO will incur over the 10 or 15 years for energy storage costs related to firming intermittent renewable energy sources.

21. Finally, it is not reasonable to include the costs of the capacitor at the end of the 10-15 year period. The supply and demand circumstances of the region, available technologies and alternatives will change substantially in that period of time and the capacitor bank realistically may not be required.

22. In response to Atlantic Power Interrogatory 5(d) Hydro One states that:

> "*When determining the costs of Option 3, the IESO considered two possible modes of operation for the re-contracted existing facility. The first was continuing the present mode of operation and the second was reconfiguring the existing facility and operating it as a quick start facility. The IESO leveraged third party cost estimates for new generation facilities and costs for similar IESO-contracted facilities in Ontario to perform this analysis. The cost of the latter was less expensive than the former but still substantially more expensive than Option 1.*"

23. The IESO and Hydro One have failed to consider reasonable alternatives that represent a sensible middle ground between these two extreme modes of operation. Rather than

continue in the present mode operation, Atlantic Power would propose exploring the operational flexibility available at the two existing facilities that can be achieved without installing an entirely new generation facility, and without incurring a substantial number of costly upgrades.

24. In addition, the IESO and Hydro One have not provided any evidence on their assumed costs for "similar IESO-contracted facilities in Ontario" nor have they indicated what the NPV of such an option is.

25. In response to Atlantic Power Interrogatory 5(e) Hydro One States that:

> "*Current forecasting from the Long Term Energy Plan indicates a need for incremental capacity to emerge in the mid-2020s. This need would inform the first date of the incremental capacity auction, regardless of the timeline of the IESO's Market Renewal Project. Analysis shows that re-contracting or extending existing contracts for the time between the time of contract expiry in 2020 and the commitment time of an incremental capacity auction would be a higher cost option than the recommended Kapuskasing Area Reinforcement Project.*"

26. The IESO is actively procuring incremental capacity resources in the Northeast[1] zone (which includes the Kapuskasing regional area) as part of their Demand Response Auction process.[2] Additional procurement efforts can be expected to meet the LTEP forecasted need in the mid-2020s. A dispatchable renewable energy generator would be expected to command a premium over traditional capacity resources such as diesel-fired reciprocating engines.

27. The most recent auction results were released on May 10, 2018 and resulted in 66.2 MW of capacity procured in the Northeast at a cost of $200/MW-day for the May 2018 to October 2019 commitment period.[3] For the previous commitment period, the price for capacity in the Northeast was $275/MW-day.[4] For the year prior to that, the price for

[1] http://www.ieso.ca/localContent/zonal.map/index.html
[2] http://www.ieso.ca/sector-participants/market-operations/markets-and-related-programs/demand-response-auction
[3] http://reports.ieso.ca/public/DR-PostAuctionSummary/PUB_DR-PostAuctionSummary_2018.xml
[4] http://reports.ieso.ca/public/DR-PostAuctionSummary/PUB_DR-PostAuctionSummary_2017.xml

capacity in the Northeast was $378.21/MW-day in the summer commitment period and $359.87/MW-day in the winter commitment period (for an average price of $369.04/MW-day).[5]

28. Taken together, Atlantic Power is of the view that the economics of utilizing one or both generation facilities to meet local reliability needs is likely to result in a lower total cost option for ratepayers than the proposed Kapuskasing Reinforcement Project, particularly once the additional value added services offered by the generation facility are properly accounted for to facilitate an apples-to-apples comparison, including without limitation:

    a. The value of capacity over the forecast period with proper consideration of the value of dispatchable renewable capacity;
    b. The value of energy over the forecast period with proper consideration of the additional value of renewable energy; and
    c. The value of ancillary services over the forecast period.

29. In response to Atlantic Power Interrogatory 5(k) Hydro One States that:

"During the Class EA process Hydro One did consider socio-economic effects related to the proposed project; however, no socio-economic effects were identified."

30. Eliminating a potential source of ancillary market revenue for either or both of these projects by upgrading a transmission line, inhibits the ability of these facilities to compete in the wholesale power market. The impacts of permanently closing either or both facility will have far reaching socio-economic effects to the local tax payers, the plant employees, the timber industry, the local economies, and First Nations. Numerous comment letters have been provided to substantiate this fact.

[5] http://reports.ieso.ca/public/DR-PostAuctionSummary/PUB_DR-PostAuctionSummary_2016.xml

APPENDIX "A"
FACILITY DESCRIPTION: CALSTOCK POWER PLANT

A. Name of Facility:

Calstock Power Plant

B. Municipal Location and Address:

Highway 11, Lot 26, 27, 28, Concession 4 Stoddart Unorganized Township, District of Cochrane.

C. Connection Point and Circuit Designation:

From Calstock main transformer 3306T1 through 3306T1-CIC to 3305-CIC (Hearst Switching Station or Hearst TS) through 3305F1E-MSO to Hydro One's 115 kV line F1E.

D. Description of Generation Technology:

The Calstock Power Plant is a renewable generation facility that utilizes combined waste heat recovery and renewable biomass to generate power. Waste heat is captured from the exhaust gases of the TransCanada mainline compressor drives (gas turbines). Biomass is combusted in a power boiler. The steam generated is then directed to the steam turbine generator.

E. Detailed Description of Facility:

1.0 Overview

Calstock is an enhanced biomass fueled power plant. Calstock's steam turbine has a maximum capacity about 40MW and the plant operates under a contract with an output limit of 38 MW.

1.1 Site Description

Calstock is located 30 km west of Hearst, Ontario. The plant is located on a 55 acre (13.9 Hectares) lot, near TCPL's compressor station 88

1.2 Project Design and Major Equipment

The plant is a steam turbine-driven power generating plant using wood waste from the Hearst region and waste heat from TransCanada's nearby Station 88 compressor station.

Wood waste is delivered by truck and unloaded by a twin cylinder hydraulic truck dumper, into an intake hopper. Conveyors either dump the wood onto a storage pile or through a screening process then fed to the boiler. The normal inventory is typically 6 weeks or 33,000 tonnes. The boiler has supplemental natural gas firing for start-up and combustion support, including supporting low quality wood fuel conditions.

The wood waste is burned in a Foster Wheeler water-tube boiler which incorporates a Detroit Stoker vibrating hydrograte. Steam is also produced from the waste heat from the compressor turbine drives (gas turbines) at station 88 in two Innovative Steam Technologies 'Once Through' heat recovery steam generators.

The steam turbine was manufactured by ABB with rated capacity of 46 MW. The electric generator is a Type GAA 1250 LK unit rated at 48 MVa.

1.3 Environmental Features

The plant has all of its environmental permits in place. The flue gases from the boiler are treated in a cyclone separator and an Environmental Elements electrostatic precipitator which removes the majority of the unburned carbon and ash before the gases enter the atmosphere.

1.4 Fuel Supply

The plant is designed to burn up-to 320,000 green metric tonnes (GMT) per year of wood waste. Natural gas is supplied directly from the TransCanada Pipeline Station's (TCPL) nearby mainline.

1.5 Reliability and Operating Profile

The most recent major overhaul of the steam turbine generator was 2012. The boiler and other pressure vessels undergo annual 3rd party inspections.

The availability of the facility over the most recent 3 years of operation was 96.8%.

The facility currently operates pursuant to a contract with OEFC. Current operations are characterized as follows: (i) The facility operates at maximum output during on peak hours and minimum load during off peak hours. Maximum output is about 28 MW with steam from the Foster Wheeler boiler, and up-to an additional 12 MWs when maximum steam from waste heat is available. (ii) The facility shuts down most weekends. (iii) If waste heat is available the facility may continue to operate during the weekends on waste heat only. Figure 1 shows a typical monthly operating profile.

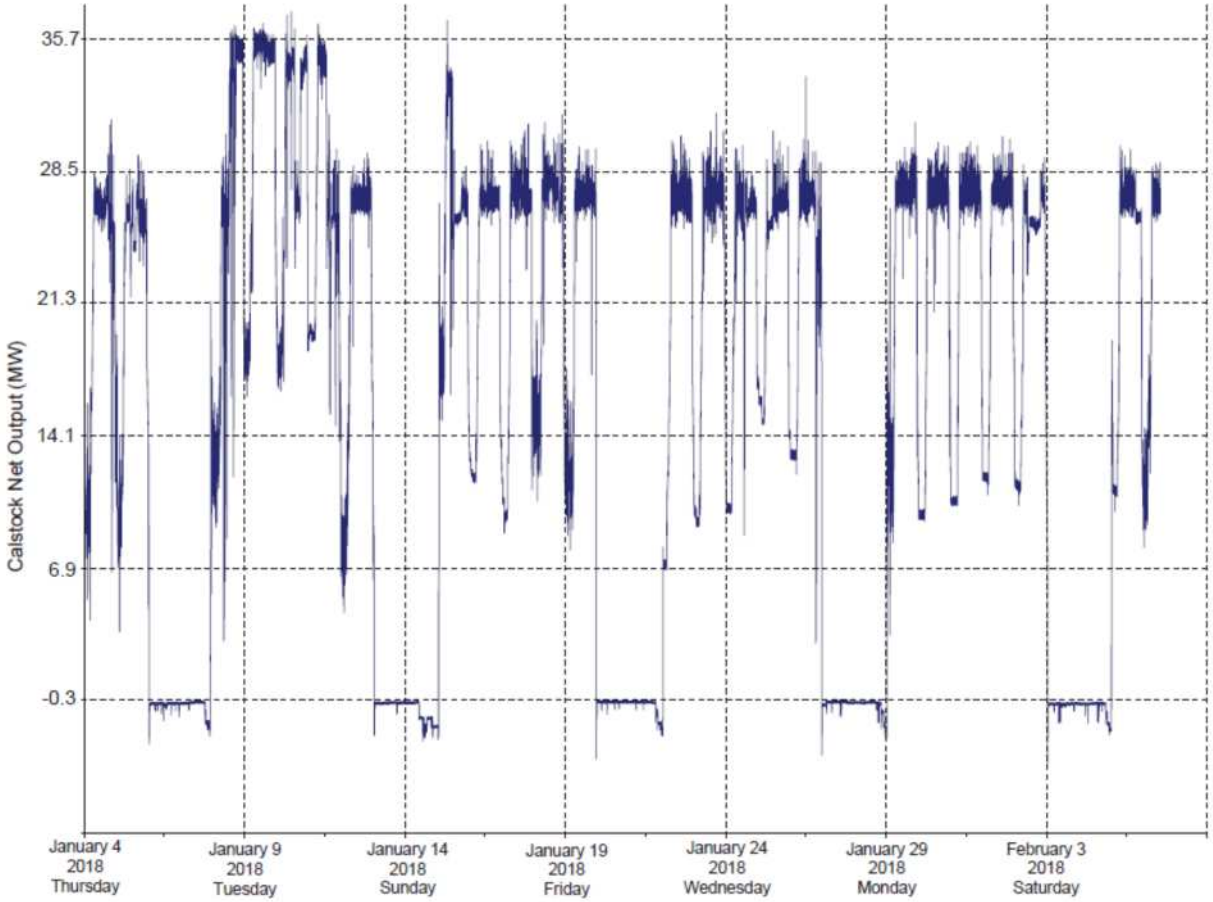

Figure 1: *Calstock Net Output (MW) (for the weeks beginning January 4, 2018 to Feb 3, 2018)*

The facility is periodically asked by IESO to provide reactive power support. Figure 2 shows the minimum, maximum and average VARS (MVA) provided each month for 2013-2018.

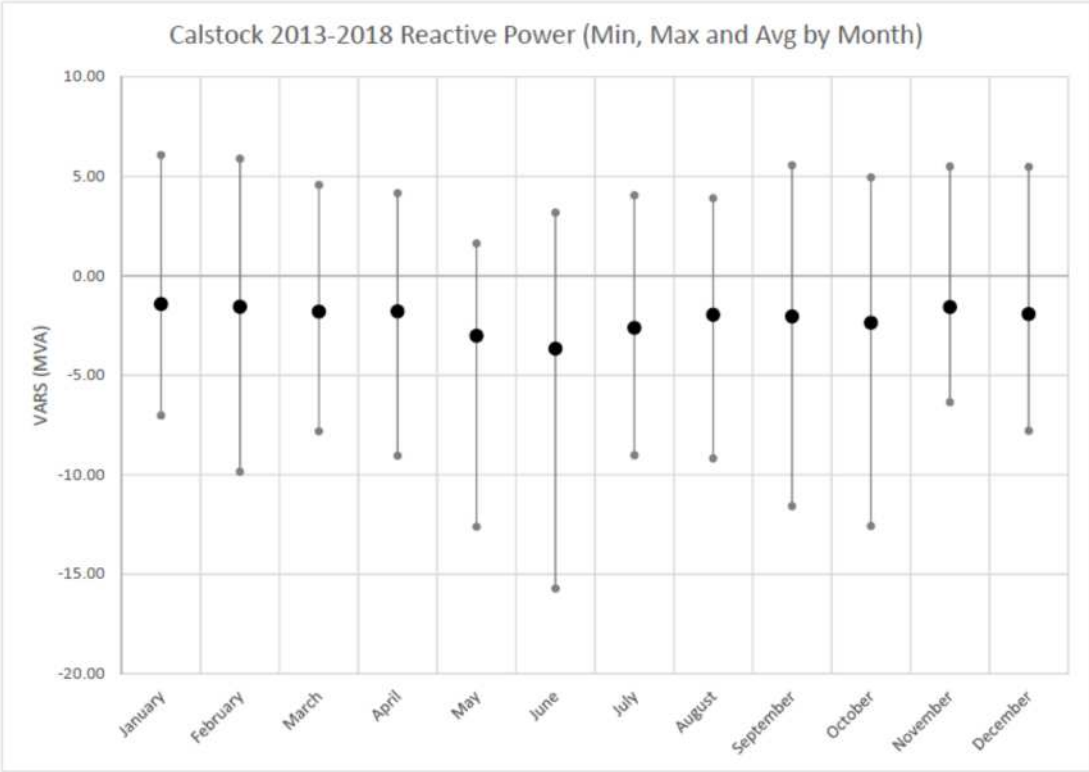

Figure 2: *Calstock 2013-2018 Reactive Power (Min, Max and Avg by Month)*

Upon expiry of the existing OEFC contract, the facility is capable of a more flexible operating mode to accommodate system needs. More specifically, while the facility previously operated by providing maximum output during peak hours for weekdays – its operating profile can be modified and optimized to meet system needs if the historical operating mode is no longer preferable.

Atlantic Power management believes the useful life of the equipment at the Calstock facility will extend at least 10 years beyond the expiry of OEFC contract and could extend a further 10 years with proper maintenance. In management's view the Calstock facility can continue to run reliably until at least 2030 (for an initial life of 30 years) and potentially until 2040 with proper maintenance.

1.6 Electrical Interconnection

The produced power at 13.8kV is stepped up through a 27/36/45 MVA ABB transformer for

transmission on the integrated power system. Power is transmitted through a 38 km line to an interconnection with Hydro One's 115kV Line F1E at Hearst TS.

1.7 Timeline

The facility began operations in 2000. Its existing contract with OEFC expires in June 2020.

APPENDIX "B"
FACILITY DESCRIPTION: KAPUSKASING POWER PLANT

A. Name of Facility: Kapuskasing Power Plant

B. Municipal Location and Address: 47 Gough Road, Kapuskasing, Ontario, P5N 2X7

C. Connection Point and Circuit Designation: K38SBO-3036 on Hydro One's 230 kV circuit K38S

D. Description of Generation Technology: Gas turbine generator, heat recovery steam generator, and steam turbine generator.

E. Detailed Description of Facility:

1.0 Overview

Kapuskasing is a nominal 40 MW, combined cycle power plant located in Kapuskasing, Ontario.

1.1 Site Description

The site is situated adjacent to TransCanada's Compressor Station #95, on the south side of the town of Kapuskasing, Ontario.

1.2 Project Design and Major Equipment

The Kapuskasing facility has one natural gas-fired Pratt & Whitney FT8 gas turbine which drives a GEC Alsthom AC synchronous generator designed to produce nominally 25 MW.

The steam turbine is an ABB ST AL VAX MP24 condensing type unit driving an ABB generator with a nominal rating of 30 MW, typically operating at 15-20 MW.

The steam turbine is driven by steam produced by a heat recovery steam generator at the exhaust of the P&W FT8, and two heat recovery steam generators associated the adjacent TransCanada pipeline compressor facility (waste heat).

Operations at the Kapuskasing facility are currently suspended. However, the Kapuskasing facility could return to service in combined cycle mode with both the gas turbine and steam turbine in operation to maximize capacity and efficiency, and to benefit from waste heat. Or, it could return to service in simple cycle mode with just the gas turbine to maximize flexibility and quick starts.

Kapuskasing could follow the example of Atlantic Power's Tunis facility which operated for 20 years as a combined cycle (gas turbine and steam turbine) and will return to service for 15 years as a simple cycle (gas turbine only) starting later in 2018.

All power at the Kapuskasing facility is generated at 13.8 kV and stepped up to 230 kV via a transformer for export to the grid.

1.3 Environmental Features:

The plant continues to maintain its environmental permits in active or suspended status. The FT8 gas turbine is equipped with low NOx burners.

1.4 Fuel Supply

Natural gas is supplied from the TransCanada Pipeline Station's (TCPL) nearby mainline and distributed via a Union Gas distribution station

1.5 Reliability and Operating Profile

The gas turbine is the same unit used at Atlantic Power's North Bay power plant which has also suspended operations. The two plants share a spare gas turbine (including two components: gas generator and power turbine). The three gas turbines among the two power plants regularly underwent scheduled maintenance.

The availability of the facility over the most recent 3 years of operation was 96.3%.

The facility operated up to the end of 2016 pursuant to a contract with OEFC. The facility operated in a baseload mode, 24x7. The unit is capable of a flexible operating to accommodate system needs, either in simple cycle or combined cycle mode.

Atlantic Power management believes the useful life of the equipment at the Kapuskasing facility will extend for at least another 10 years of operations and could extend further with proper maintenance. In management's view the Kapuskasing facility can continue to run reliably until at least 2030 (for an initial life of 30 years) and potentially longer with proper maintenance.

1.6 Electrical Interconnection

The 230 kV transmission line interconnects with the Hydro One transmission circuit K38S approximately 1.4 km from the site.

1.7 Timeline

The Kapuskasing facility operated from October 1996 - December 2017. It is currently mothballed (i.e. operations have been suspended, but equipment is still in place). Kapuskasing can be reactivated similar to Atlantic Power's Tunis facility which was also mothballed at the end of 2014 and will be returning to service in 2018.