MARITIME ELECTRIC
A FORTIS COMPANY

February 20, 2019

Ms. Cheryl Mosher
Island Regulatory and Appeals Commission
PO Box 577
Charlottetown PE C1A 7L1

Dear Ms. Mosher:

2018 Storm Post-Mortem
Response to Interrogatories from Roger King

Please find attached the Company's response to the Interrogatories filed by Mr. Roger King with respect to the 2018 Storm Post-Mortem. An electronic copy will follow.

Yours truly,

MARITIME ELECTRIC

Gloria Crockett

Gloria Crockett, CPA, CA
Manager, Regulatory & Financial Planning

GCC11
Enclosure

MARITIME ELECTRIC
A FORTIS COMPANY

Via email: randjking@pei.sympatico.ca

February 20, 2019

Mr. Roger King
519 Simpson Mill Rd
Hunter River PE C0A 1N0

Dear Mr. King:

2018 Storm Post-Mortem
Response to Interrogatories

Please find attached the Company's response to your Interrogatories with respect to the 2018 Storm Post-Mortem.

Yours truly,

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I N T E R R O G A T O R I E S

Responses to Interrogatories
from
Roger King

November 29, 2018
Storm Post-Mortem

Submitted February 20, 2019

IR-1 During the 8:58 to 13:46 period when all Memramcook supply was not available to PEI, what was the Memramcook local service areas supply situation? Was there proportional curtailment?

RESPONSE

All lines connecting to the Memramcook Substation were lost at 08:58h when the last line supplying the station experienced a thermal overload and tripped automatically. The transmission system protected itself, and any load that was on the associated lines was tripped. 'Curtailment' typically refers to selective tripping of load; this was not the case when all loads supplied out of Memramcook were lost during the storm.

Maritime Electric understands that the NB Power Energy Control Centre (ECC) informed Maritime Electric as soon as the Memramcook station was returned to service. At this point Maritime Electric began the process of reinstating the interconnection.

PEI was limited to its regular import transfer limit once the Memramcook Substation had been deemed available to supply load. There were no additional supply restrictions.

IR-2 As the catalyst for the SAIDI of 15+hours was the NB Power supply interruption, what is the PPA contractual obligation of NB Power for power recovery response times?

RESPONSE

The Transmission division of NB Power is responsible for restoring the transmission system to operational condition after it has experienced interruptions. Maritime Electric's Energy Purchase Agreement (EPA) is with NB Energy Marketing which is a subsidiary of NB Power but is functionally separate from the Transmission division.

Maritime Electric purchases different energy products (Firm, Secure, and Assured) that are backstopped by either system or Island-based generation. Firm Energy is the highest priority (and is backstopped by system generation) followed by Secure Energy and Assured Energy (which are both backstopped by Maritime Electric generation).

According to the EPA, NB Power's obligation for power recovery response time is to restore service as soon as practicable in accordance with good utility practice.

IR-3 Is a future assumption that in the event of an NB Power supply loss, the reinstatement of Cables 3 and 4 will take around 2 hours and reinstatement of cables 1 and 2 will take 12 to 20 hours once NB Power supply returns? If not what typical re-connection times should be expected for all 4 cables?

RESPONSE

The reinstatement time for the cables depends on power system conditions in both New Brunswick and PEI. The delay in returning Cables 1 and 2 to service on November 29 was due to protection and coordination issues between Memramcook, Murray Corner and Bedeque that have since been addressed.

This storm was the first major test of the new interconnection system in terms of a) reinstatement from total outage, and b) limited operation based on both NB and Island system conditions. Maritime Electric believes the interconnection performed well given the circumstances, and the experiences gained during this storm will be used to fine-tune and expedite future cable reinstatements.

In addition, the completion of the Y-109 reroute project in December 2018 has given Maritime Electric additional flexibility in interconnection cable reinstatement.

IR-4 The wind farms' voltage support appears to be dependent on the NB Power supply; could CT2 and CT3 be used more effectively in providing this voltage support as a priority application during transmission and distribution failures?

RESPONSE

Wind farms rely on outside facilities for voltage support as they cannot provide their own. This support must come from other facilities located in PEI or on the mainland.

Maritime Electric's combustion turbines are capable of providing voltage and load following support to wind farms when the Island is disconnected from the mainland. However, the amount of wind that can be supported is relatively small and depends on many factors including wind variability, ambient temperature, location of operating wind farms and wind farm control systems.

In the event that Maritime Electric was providing voltage and load following support for wind, it would at the same time have to provide frequency and load regulation services for its connected load. Maritime Electric's combustion turbines are relatively small and could experience some difficulty in providing the services required by both the load and the wind generators. As such, the amount of wind generation allowed to operate would be limited.

IR-5 In addition to the December modifications to CT3's voltage protection are there any other opportunities to ensure that the start-up times and reliability of both CT2 and CT3 are improved?

RESPONSE

One of the failed starts on November 29 was due to issues with the black start diesel generators. These are proposed to be replaced during the upcoming CT3 balance-of-plant building project which is planned for 2020.

Maritime Electric is also undertaking a major overhaul of CT3 in 2019 based on OEM prescribed maintenance guidelines.

IR-6 The report suggests that repair of the transmission lines took up to 30 hours. If so why was this?

RESPONSE

The Company's transmission system was fully operational just after 23:00h on November 30. The main issues that impacted the transmission system are listed below:

- Line T-2 – A tree contact east of the Crossroads Substation tripped this line. Crews were dispatched on the afternoon of November 29 and the line was returned to service by 22:00h on November 29.
- Line Y-101 – This line sustained a broken guy wire. A crew was dispatched and repairs were completed around 21:00h on November 29.
- Line Y-104 – This line sustained a broken pole. Crews were dispatched on the afternoon of November 29 and repairs were completed around 22:00h on November 29.
- Line Y-109 – This line initially tripped off due to a phase-to-phase fault. Crews were dispatched and found no obvious foreign object but indicated that the lines were coated with ice. The line was ready to be put back in service prior to the restoration of supply from New Brunswick.
- Line Y-111 – A tree contact caused the line to trip. Crews cleared the tree obstruction during the afternoon of November 29. The tree had damaged the conductor and a section needed to be replaced. Since line Y-109 had previously been re-energized and the system was stabilized, the decision was made to wait until daylight for the conductor on Y-111 to be replaced. The conductor was replaced during the morning of November 30 and returned to service around 13:00h on November 30.
- Line T-23 – This line serving the PEI Energy Corporation wind facilities at North Cape sustained broken guy wires. The line was out of service until 23:10h on November 30.

The loss of supply from New Brunswick delayed a number of transmission repairs for several reasons:

- Most of the outages on the transmission system occurred after the loss of supply from New Brunswick. As the Island's transmission system was de-energized, the Company was not aware of such issues until they were discovered during the restoration process.
- Priority was given to the restoration of the interconnection to New Brunswick. The crews working on the interconnection restoration were located in the western district, where damage to the distribution system was the most severe. This caused a shortage of available crews in the western district.
- The restoration of the interconnection was not finalized until the evening of November 29, when crews were close to their maximum working hours. These work levels are dictated by Corporate policy and reflect standard utility practices. As a result, significant repairs to the distribution system could not begin until the morning of November 30.

IR-7 While a record social media interaction occurred during this outage there appeared to be little MECL emphasis upon how customers' reduced use or priority use of electricity might assist the activities of the repair crews. Should standard customer procedures be added to the communication protocol?

RESPONSE

During storm situations, the Company is cognizant to the volume of information it is providing to customers. Its goal is to keep customers informed, but not overload them with information when they may be dealing with multiple other issues at the same time. Maritime Electric has in the past requested customers reduce consumption during system events.

Maritime Electric is considering the details surrounding provision of additional information to customers regarding energy usage during a contingency situation in light of the changing nature of the Island's connected electric load. Provision of such information to customers will depend on many factors, including system conditions, climatic conditions, and prospects for reinstatement of supply from New Brunswick.

IR-8 As the NB Power supply interruption was one root cause of the duration of the outages, could an estimate of the likely changes to the "Customer Restoration" table be provided assuming that the NB Power supply had remained uninterrupted?

RESPONSE

The loss of supply from NB Power impacted a higher number of customers on November 29 than if there was no loss of supply. NB Power's supply had returned to levels sufficient to supply all available Island customers by November 30 at 06:00h.

November 29 – 09:00h
All western PEI customers would have remained connected at this time and would not have experienced interruptions until later in the day when distribution outages began to occur. Central and eastern PEI customers would have remained without supply at 09:00h. CT3 was at this time partway through its start sequence and would not have been capable of supplying energy to the system until around 09:05h.

November 29 – 20:00h
Y-109 would have been returned to service in the afternoon and CT3 would have continued to operate, mostly to support voltage in central PEI. Both transmission lines feeding eastern PEI were out of service so all customers east of Crossroads Substation would have remained without power until those lines were repaired (which occurred around 22:00h on November 29). Central and western outages would have been driven primarily by distribution system issues.

Date	Time	Actual Number Customers Out	Assumed Number Customers Out without NB Supply Loss
November 29	09:00h	80,000	57,000
	20:00h	34,000	27,000
November 30	06:00h	35,000	35,000
	16:00h	7,200	7,200
December 1	16:00h	2,200	2,200
December 2	18:00h	1,400	1,400
December 3	07:00h	750	750

As a suggestion rather than another question, I think a summary of your report posted on the MECL web site should be a very worthwhile "education" piece for your customers, perhaps even linked with my point #7 on the ways we customers can all help during outage situations.

RESPONSE

Thank you for this suggestion.