Reference: PUB-NP-013

Q. This response states in lines 30-31 on page 1 that the Memorial Substation is "integral to the Company's 66 kV transmission network serving the St. John's Region" and further at page 2, lines 1-2 that the substation is 'necessary to provide reliable service to customers throughout St. John's Region". Please explain how customers in St. John's Region, other than Memorial University, are served from and derive benefit from the Memorial Substation because it is part of the 66kV transmission network in the Region. In the response explain whether customers in St. John's Region can still be served if transmission lines 12L and 14L which connect the Memorial Substation to Kings Bridge Road Substation and Stamp's Lane Substation, respectively, are out of service.

A. The St. John's looped 66 kV transmission network ("the St. John's 66 kV network") consists of 23 looped 66 kV transmission lines that provide various levels of redundant supply to approximately 103,000 customers served in St. John's and surrounding areas. The St. John's 66 kV network has been designed with sufficient transmission redundancy to prevent cascading outages and large load loss in St. John's in the event of a single transmission line outage.[1] This design criteria is reviewed on an annual basis and the results of these analyses are provided to the Newfoundland and Labrador System Operator for inclusion in their annual assessment.

Transmission lines 12L and 14L are integral components of the St. John's 66 kV network. Transmission line 12L connects the Kings Bridge Road ("KBR") Substation to the Memorial ("MUN") Substation. Transmission line 14L connects MUN Substation to the Stamps Lane ("SLA") Substation. These transmission lines facilitate power flow between the KBR Substation and SLA substations. The KBR and SLA substations serve approximately 16,000 customers directly, and also facilitate power flow to six additional substations serving approximately 37,000 customers.[2]

With either of transmission lines 12L or 14L out of service, a loss of power flow between KBR and SLA substations would occur. In response to such an outage, power would automatically be redistributed throughout the remaining 66 kV transmission lines on the St. John's 66 kV network. In the event that an additional 66 kV transmission line on the St. John's 66 kV transmission network experiences an outage, customer outages are more likely to occur.

For example, with transmission line 12L or 14L out of service, an outage to transmission line 67L between Oxen Pond ("OXP") and Ridge Road ("RRD") substations during peak conditions could result in a cascading event where transmission overloads occur, resulting in trips to transmission line 32L between OXP and RRD, 58L between Virginia

[1] Transmission supply elements in the St. John's area include Newfoundland Power's 66 kV looped transmission lines and Hydro's 230 kV/66 kV transformers at the Oxen Pond and Hardwoods terminal stations.

[2] SLA Substation is directly connected to four additional substations: St. John's Main, Molloy's Lane, Kenmount Road and Oxen Pond. KBR Substation is directly connected to two additional substations: Ridge Road and Virginia Waters.

Waters ("VIR") and OXP substations, as well as 74L between VIR and Pepperrell ("PEP") substations. This would result in a severe undervoltage condition in the east-end of St. John's and potential loss of supply to approximately 27,000 customers supplied by VIR, PEP, KBR, RRD and Pulpit Rock ("PUL") substations.

High voltage 66 kV equipment at the MUN Substation including circuit breakers, instrumentation devices, disconnect switches and grounding equipment ensures the safe, reliable operation of transmission lines 12L and 14L. Reliable operation of transmission lines 12L and 14L is necessary to maintain the integrity of the St. John's 66 kV transmission network and provide reliable service to customers in St. John's and surrounding areas.