

VEC

46 kV Transmission System Reliability Study

Evaluation of Non-Transmission Alternatives

Report to VSPC

September 14, 2010

VEC 46 kV Transmission System Reliability Study

- Involves VEC 46 kV System between Highgate, Newport and Irasburg (+/- 60 miles)
- Transmission system analyses performed for VEC's 2008 Integrated Resource Plan (IRP) identified the need for both immediate and longer term 46 kV system improvements.
- VEC retained VELCO/RLC Engineers for assistance in determining additional 46 kV system improvements.
- Basis for study was a Winter 2012 peak load forecast, approximately 92 MW.

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Load Forecast Basis:

- VEC 2008 Integrated Resource Plan forecast, adjusted with actual loads served through Winter 2009-2010. Actual loads adjusted for normal economy.
- General area load growth = 0.9% (basis for power supply negotiations)
- Jay Peak Resort load based on discussions w/ Jay Peak Resort executives.
- Portland Pipeline Load modeled at historic peak load versus present operation. Changes in present operation to be made in October 2010.
- Derby Substation #45 load based on proposed I-91 Port of Entry at Derby Line and the planned retirement of the Derby Line Substation #25.
- New industrial customer at the former Ethan Allen Interiors plant in Island Pond.
- April 2010 forecast data obtained from VPPSA for Barton, Enosburg, Orleans and Swanton.

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RLC Study Results

Key Findings for a Base Case of 2012 Load Levels & “All Lines” In Condition:

- Voltage violations ($\ll 0.95$ pu) on the 46kV system serving the geographic area bounded by the Towns of Richford, Newport, Island Pond and Barton (“Block Load” area)
- Voltage violations on the VELCO 115 kV system occur with the Block Load served via Hydro Quebec or via VELCO. Worst case is winter peak load served via VELCO.
- Thermal overload of the Newport 115/46 kV (T2) transformer with the Block on HQ (107% of the 56 MVA winter LTE rating).
- Thermal overload of the Irasburg 115/46 kV transformer with the Block on VT (113% of the 54 MVA winter LTE rating).
- No one solution, by itself, mitigates all of the thermal and voltage criteria violations. Multiple projects will be needed, most with 2012 need dates.
- A Non-Transmission Alternative (NTA) would have to be capable of providing not less than a 40% load reduction on a continuous basis with “all lines in” at winter peak conditions, and increase over time with future load growth. Using the worst case, winter peak with the Block Load on VELCO scenario, a viable NTA must be capable of serving at least 37 MW of load in 2012.

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Preferred Transmission System Option

- New 115/46 kV VELCO substation adjacent to VEC Jay Peak Switching Station. This project is common to all of the options that merit serious consideration.
- Increase transformer capacity at the VELCO Irasburg Substation.
- Automate 115 kV switches at Moshers Tap.
- Close the present Open Point at Switch 410.
- Install 46 kV capacitor banks in the H16 46 kV line (proposed location is VEC Burton Hill Substation). Size TBD

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Non-Transmission Alternatives

- Must be capable of serving at least 37 MW in by the Winter of 2012 on a continuous basis.
- For generation, installed capacity must be 15% - 20% greater to meet load, due to resource unavailability.
- Fuel price and availability, delivery infrastructure and suitable sites are major concerns for generation.
- Energy efficiency and demand side management measures are not capable of producing an alternative equivalent to a transmission system investment.
- Generation developers looking in the study area are primarily interested in wind or small hydro resources.
- Based on the above factors, the Answer to Question #2 on the screening tool is “No”. No further NTA consideration is required.

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Remaining work:

- Assess the impact of reduced operations at the Portland Pipe facility, announced since RLC began work, on the completed Study.
- Finalize the implementation schedule for the projects comprising the recommended solution
- Results will be presented at the December VSPC Meeting.