

Vermont-New York Screening Analysis

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Matthew H. Garber
Assistant Engineer, Regional Planning and Coordination

Background

- Vermont 10-Year Needs Assessment in progress
 - Several problem areas identified in the system
 - Several solutions under consideration to address system issues
- Major wind projects being studied in upstate New York
 - May need higher rated or additional export paths than are currently available
 - Subject of ongoing NYISO and TO studies
- Load growth coupled with facilities (transmission and generation) out of service raises reliability issues in both New York and New England

Background, *cont.*

- Voltage limitations restrict flow on Central East to 2,800 MW
 - Previous studies indicated an upgrade of the Plattsburgh – Vermont transfer capability could increase this limit
- Screening analysis of a new Plattsburgh – Vermont tie was completed and reviewed with PAC and IPSAC
 - Preliminary results showed benefits of
 - Improved performance of the Vermont and New York transmission systems under the dispatch assumptions used
 - Higher loss of source limits
 - Greater ability to transfer power into and out of New York's North Country

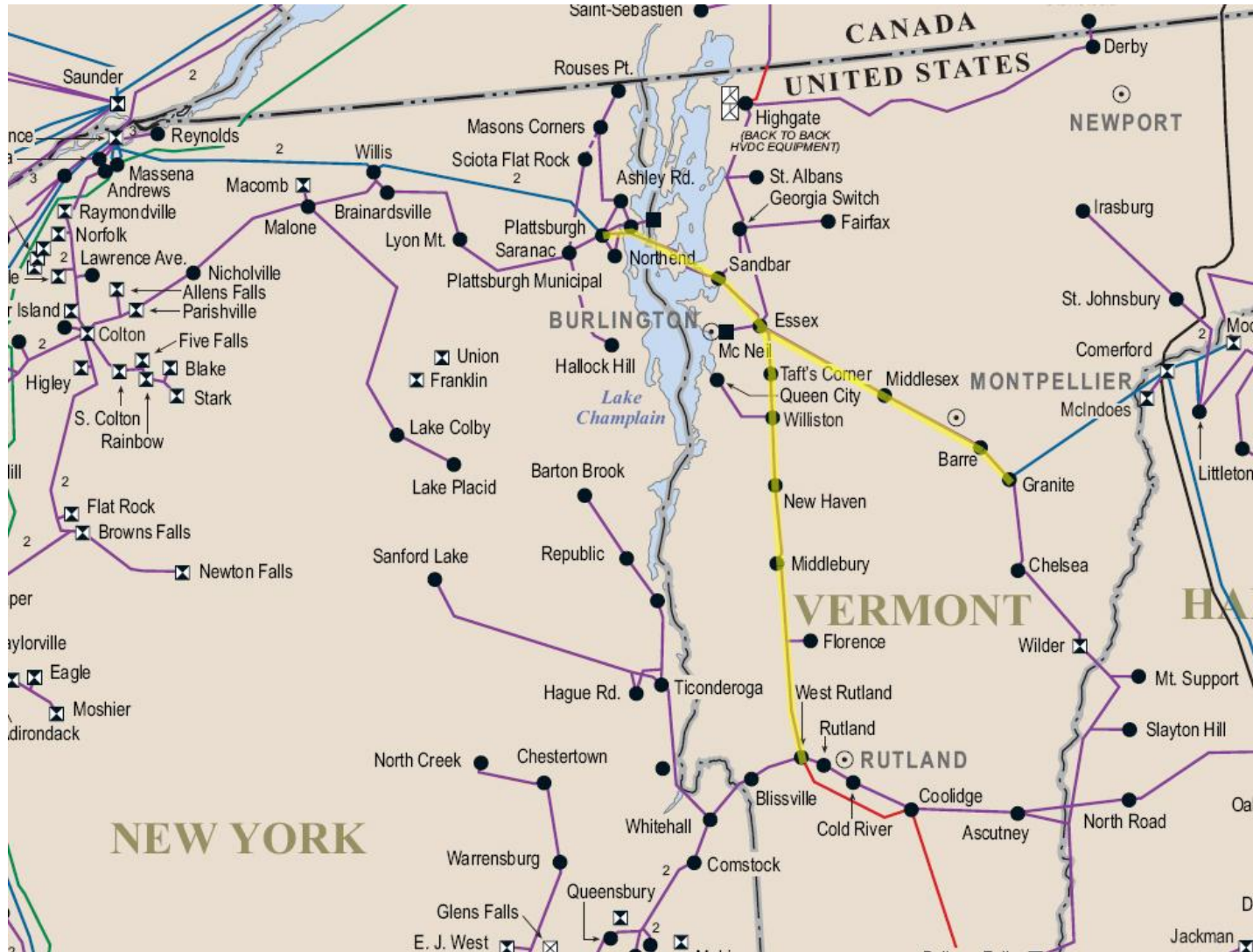
Scope of Work for New VT-NY Tie

- Assess currently planned system performance
- Evaluate two proposed alternative transmission improvements for interregional impacts and their effects on interregional reliability
- Look at effects of a new transmission path for multiple North Country levels of wind dispatch
- Conduct screening for potential impacts on NY Central East & PJM transfers across West, Central, East, and Juniata interfaces for New England loss of source contingencies
- Examine 2013 and 2018 systems

Progress

- Since the November WebEx, the following progress has been made on this study effort
 - 2018 load flow analysis completed
 - Presentation of results made to New England stakeholder Planning Advisory Committee (PAC)
 - Detailed technical appendix with CEII information made available on ISO New England website
 - Offers extended to present technical material at NYISO stakeholder meeting
- Additionally, the Vermont Needs Assessment has been issued for review

Area of Study



Base Cases

- Case compiled under direction of the Joint ISO/RTO Planning Committee (JIPC)
- Based on following load forecasts
 - ISO New England: RSP 08
 - NYISO: 2008 CRP
 - PJM: RTEP 07
- Major Transmission Projects Included
 - New England East-West Solution
 - Vermont Southern Loop
 - PJM Backbone Projects (500 kV and 765 kV upgrades)
 - Maine Power Reliability Program not included; did not have I.3.9 approval at time of study initiation and did not have impacts on area under study

Base Cases, *cont.*

- Base cases are as follows
 - As planned 2013/2018 system
 - As planned 2013/2018 system plus 230 kV tie from Plattsburgh to Granite, VT
 - As planned 2013/2018 system plus 230 kV tie from Plattsburgh to New Haven, VT
- Both new tie cases had two 350 MVA 230/115 kV transformers at Essex, VT
- Phase angle regulator (PAR) on new tie line and new tie ratings assumed to be above 500 MVA
- New 350 MVA 230/115 kV transformer added at Granite for new tie to Granite
- New 350 MVA 230/345 kV transformer added at New Haven for new tie to New Haven

Sensitivities

- Dispatch scenarios were as follows
 - Existing Central East (including PV20) at 2,700 MW of transfer
 - New York new wind farms at 50 MW total output
 - New York new wind farms at 450 MW total output
 - New York new wind farms at 900 MW total output
- PV20 sensitivities
 - PV20 normally scheduled at 105 MW to New England
 - PV20 scheduled at 0 MW (evaluated as sensitivity, and for transfers to New York over new tie)
 - PV20 out of service (evaluated as sensitivity)

Sensitivities, *cont.*

- Sensitivity cases with an element initially out of service
 - Granite – Comerford 230 kV line out of service
 - Highgate DC/DC converter out of service
 - Vermont Yankee out of service
 - Coolidge – West Rutland 345 kV line out of service
 - Coolidge 345 kV/115 kV transformer out of service
 - Alcoa aluminum load out of service
 - Saranac Energy out of service

Methodology

- All study work was fully coordinated
 - ISO-NE
 - NYISO
 - PJM
 - VELCO
 - United Illuminating
 - New York Power Authority
 - National Grid
- Base cases were developed jointly by ISO-NE, NYISO, and PJM with input by affected transmission owners in the area
- All criteria contingencies (loss of single elements, double circuit outages, stuck breaker faults, etc.) were jointly developed and reviewed
- The PAR setting on the new tie was varied to determine its optimal point

Methodology, *cont.*

- Analysis run by ISO New England and NYISO
 - System dispatches as outlined for the 2013 and 2018 base cases were considered
 - PJM and transmission owners kept advised of scope, assumptions, and results
 - Feedback solicited and adjustments were made as needed
- A comparison of system performance (voltage and thermal) between the existing system and each tie option (Granite and New Haven) was conducted

Analysis of New Ties

- The system performance for each tie option was assessed
 - Comparisons were made to identify reliability issues that could be successfully resolved
- The optimal PAR settings and operational ranges for each new tie option for every dispatch were identified
- Thermal overloads and voltage violations were identified for each dispatch

Analysis of New Ties, *cont.*

- Analyzed all dispatches for each proposed tie
- Considered the following additional system modifications
 - Separation of Moses – Willis lines
 - Operation of PV20 outage mitigation system (OMS) normally in service, or inserted automatically
 - Plattsburgh substation reconfiguration
- Adjusted PAR setting to attempt to maintain all transmission elements within their LTE thermal rating for major contingencies
- Voltage performance that improved and degraded with the addition of new transmission facilities is highlighted in the appendix, and is based on the operational limits of the new PAR

Conclusions

- A new tie from Plattsburgh to Vermont improves overall system performance in both Vermont and New York under certain conditions
- A new tie to New Haven generally provides better system performance than a tie to Granite
- The following additional system improvements would increase the benefits of the new tie
 - Separate the Moses – Willis lines from common structures
 - Close the Plattsburgh 230 kV bus for the 230 kV tie options
 - Operation with the OMS normally in service on existing line could be considered

Conclusions, *cont.*

- Upgrades being considered in the Vermont Solutions Assessment may further improve performance and the operational range of new tie
 - Reactive support along the 115 kV corridor between Coolidge and Essex
 - Additional 345/115 kV transformer at Coolidge would increase the operational range of the new PAR many cases
- Going forward, this version of the project should be considered as a potential alternative