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Impact of NEEWS Projects on Lake Road "Location"

Planning Advisory Committee

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Objective

- Provide an overview of the history of the Lake Road electrical “location”
- Update on electrical location of Lake Road generation after NEEWS projects are complete

History

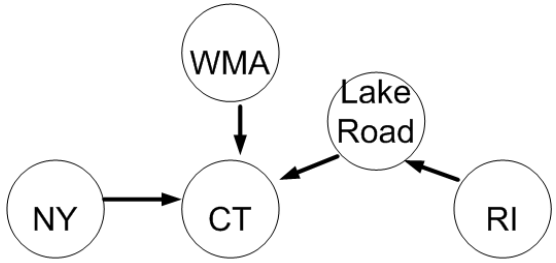

Figure 1

- Lake Road is a generating plant located in Dayville, CT consisting of 3 independent combined cycle units for a total summer output of roughly 750 MW
- Plant achieved commercial operation in 2002
- Original interconnection was a new substation on the 345 kV line between Card (CT) and Sherman Road (RI) (347 line), creating the 330 line (Card – Lake Road) and the 347 line (Lake Road – Sherman Road)
- Due to physical concerns at the plant associated with instantaneous changes in power output (delta P) associated with line reclosing, a Special Protection System (SPS) was installed to trip the plant upon opening of either the 330 or 347 line in anticipation of a potential large delta P associated with automatic line reclosing

History, continued

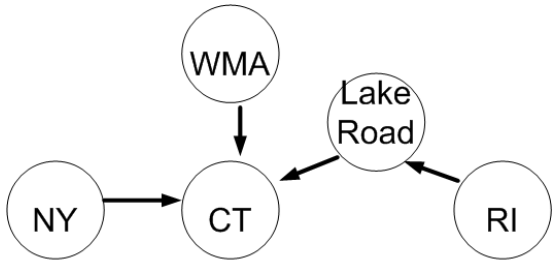

Figure 1

- Since the plant was interconnected along one of the 3 major import lines into CT, there was an immediate question as to whether the plant should be considered in CT from an electrical perspective
- Plant was determined to be electrically located outside of CT
  - Upon loss of one of the lines on the CT Import interface, the units were tripped
  - Net effect to serving CT load is that the units acted similar to units outside of CT
    - With the SPS, after a tie line (either 330 or 347 line) is lost, the plant is also lost providing no benefit to CT load
    - Without the SPS, after the 330 line is lost, access to the generator is limited to import over the remaining ties

System Changes since 2002

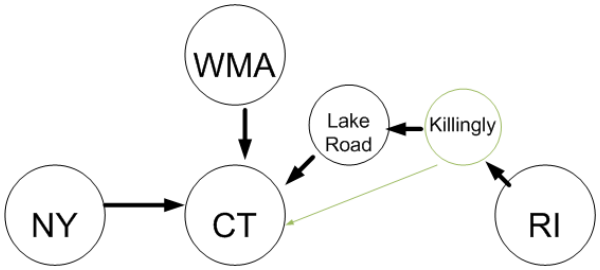

Figure 2

- Installation of the Killingly autotransformer on the 347 line
  - Created two new 345 lines
    - 3348 between Lake Road and Killingly
    - 347 between Killingly and Sherman Road
  - From a CT load serving point of view, very minor benefit from Lake Road
    - Some power flows through the Killingly autotransformer into the eastern CT 115 kV network
    - Majority of power still flows through the tie lines
- Modification to the SPS with the Killingly autotransformer
  - Due to reduced delta P associated with the 330 line, the SPS no longer trips the plant on loss of the 330 line when all other equipment is in service
  - Outage of other equipment such as the Killingly autotransformer still requires activation of the SPS
  - Logic changed to anticipate when successful reclosing is expected to occur; will not trip the plant when there is a permanent fault on the line

Impact of NEEWS Projects

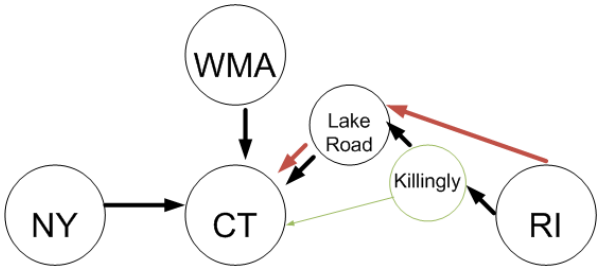

Figure 3

- Greater Springfield Reliability Project (GSRP)
  - Reconfigures Springfield network, but still does not change the fact that when the 330 line is lost, power serving CT load is redirected through the Killingly autotransformer and the remaining CT tie lines
  - A majority of Lake Road is still competing with the resources outside of CT for capacity on those tie-lines
- Interstate Reliability Project (IRP)
  - Constructs new 345 kV lines between Lake Road – Card and Lake Road – West Farnum
  - Provides direct 345 kV connection from the plant to the rest of CT following the first contingency
  - Resolves stability concerns where the plant must be backed down between first and second contingency
  - Delta P are significantly less severe with the first contingency, since a continuous 345 kV path connecting CT to RI remains
    - Need to follow-up with the generator owner as to the potential elimination of this SPS

Conclusion

- After the completion of the Interstate portion of NEEWS and with all of the other system modifications which have occurred since Lake Road was installed, Lake Road will be considered inside the CT Import interface from an electrical perspective

Questions