VELCO/DU Planning Coordination

May 17, 2012

OC meeting

Need for coordination

- Maintain reliability at the lowest cost
  - Sub-transmission performance affects transmission performance and vice versa
- ISO-NE is becoming more aware of interactions between transmission and sub-transmission
  - Sub-transmission is limiting generation capacity
    - ISO-NE has asked for certain sub-transmission elements to be added to the NX9 transmission database for the first time
- The VT sub-transmission system is now completely represented in the regional power flow models
  - Annual update process now includes review of the sub-transmission system
- Approach a seamless communication environment
  - Be aware of how design decisions affect either system
  - Be aware of system behaviors
    - Gain a better understanding of the load and the effects of load reduction efforts and distributed generation

Opportunities for coordination of planning

- Generator interconnection studies
- Transmission and non-transmission planning studies
  - Address sub-transmission and transmission system needs
- Power flow base case data updates
  - Historical loads (MW and MVAr)
    - Station peaks coincident with Vermont peaks
    - Non-coincident station and/or local peak loads
    - Seasonal variations (Summer and Winter peaks, Spring light load, off-peak)
    - Follows load cycle or not
  - System topology changes

Timely submittal of system data

- Topology changes provided at least one month prior to change
  - Needed for EMS modeling, Operations awareness, Engineering and Planning studies
- Coordinate with ISO-NE case update schedule
  - FERC 715 filing in March
    - Need all data by February 15th
      - Spring and Summer loads by October 15th
      - Fall and Winter loads by February 15th
- Coordinate with 20-yr long range plan
    - Hourly load data (MW & MVAr) by bus for five years provided by October 15th (2013 for 2015 plan)
    - Future system changes and load transfers provided by February 15th (2014 for 2015 plan)

Complete system data verification in some areas

- Some areas have not provided data in a long time
- Have not performed a local area study in a long time
- Data needed for
  - Lines
  - Transformers
  - Shunt capacitor banks
  - Generators
  - Others, such as overload protection schemes

Shunt capacitor data requirements

- Status (in or out coincident with the load data provided)
  - Which ones are typically on during the summer peak, winter peak, shoulder, light load
- Size
- Control mode
  - Fixed, i.e. manual switching, remote switching, daily or seasonal switching
  - Time of day switching
  - Voltage
    - Set point and bandwidth, time delay for switching on or off

Line data requirements

- Status (normally in or out)
- Per Unit Impedance
  - Resistance, reactance, charging
- Ratings
  - Summer Normal, Long Term Emergency (LTE 12-hr), Short Term Emergency (STE 15-min), Drastic Action Limit (DAL 5-min)
  - Winter Normal, LTE 4-hr, STE 15-min, DAL 5-min
- Basis for modeling data, perhaps in a database similar to ISO-NE NX-9 database for New England
  - Lengths, conductor types, construction types
  - Worst and 2nd worst limiting equipment

Transformer data requirements

- Status (normally in or out)
- Per Unit Impedance
  - Resistance, reactance, magnetizing branch
- Ratings
  - Summer Normal, LTE, STE, DAL
  - Winter Normal, LTE, STE, DAL
- Nominal voltage of primary and secondary windings, including tap settings
- Whether on-load tap changing or not
  - Voltage set point, bandwidth if on-load tap changing
  - Same data if transformer taps are fixed but the transformer is paired with a regulator on the low side
  - Time delay for taps to move
- Basis for modeling data, perhaps in a database similar to ISO-NE NX-9 database for New England
  - Test report and nameplate
  - Worst and 2nd worst limiting equipment

Generator data requirements

- Status (normally in or out)
- Per Unit subtransient impedance
  - Resistance, reactance
- Capacity
  - Summer 90 deg F, 50 deg F
  - Winter 0 or 20 deg F
  - Whether black start, 10-minute reserve, 30-min reserve
- Voltage control mode
  - Unity power factor or voltage control
  - Controlled bus and bandwidth if voltage control
  - Protection schemes that will trip generator during a disturbance
- Dynamic data (Generator, governor, exciter)
- Basis for modeling data, perhaps in a database similar to ISO-NE NX-12 database for New England
  - V Curve, P and Q curve with limiters