

# *Special Protection System Powerton/Joliet SPS*



# Powerton/Joliet SPS Goals

- **Congestion** - The objective of the SPS is to mitigate off-peak congestion caused by the significant addition of wind capacity and reduce Edison Mission fleets' operational issues around volatile dispatch and pricing. The Dumont-Wilton Center line is the most frequent contingency for congestion in Northern Illinois
  - Congestion caused by this contingency is in the range of \$40 to \$60 million/year. Congestion is expected to increase as more wind facilities are added to the system
- **Operational Issues** – Frequent, off-peak, congestion have created price volatility and swings in generation dispatch in the western PJM region. As a result, coal generation in that region is forced to dispatch up and down multiple times in a day and often shut down for economics. This jeopardizes the short and long-term reliability of the units. Frequent cycling increases forced outages and adds risk of tripping during periods of peak summer demand

# Temporary Scheme Till Merchant Upgrades are Completed

<b>Upgraded Facilities List from V3-052</b>			
Item	Element	Estimated Mitigation	Transmission Owner
1	Burnham substation	Replace line trap Munster relay upgrade	ComEd NIPSCO
2	Crete-St. John 345kv Tap	Reconductor 345kv L94507	ComEd
3	East Frankfort-Crete 345kv	Reconductor 345kv L6607	ComEd
4	Marengo-Pleasant Valley 138kv	Reconductor 138kv L12204 and replace relays	ComEd
5	Burr Oak 345kv substation	New circuit breaker and associated bus work	NIPSCO
6	Burr Oak 345/138kv transformer	Transformer, 138kv CBs, 345kv MOD replacement, relay replacement for transformer and Cir. 34513	NIPSCO



## *SPS Security Scheme*

- Calculations and operations are performed independently at each generating station using telemetry data from both the ComEd side and AEP side of the line
- FIRST, the system must be armed by the sustained ComEd area load remaining below 15,000 MW and both the ComEd telemetry and the AEP telemetry agreeing that L11215 has flow in excess of 500 MW in the Dumont direction
- SECOND, only if the calculations based on 4 states from the ComEd telemetry agree with the calculations based on 4 states from the AEP telemetry that the line has locked open, can the unit trip be permitted. The 4 states are ComEd area load <15,000 MW, circuit breakers are open at each end, L11215 had flow in excess of 500 MW towards Dumont prior to a line trip, and L11215 now has flow that is approximately 0 MW

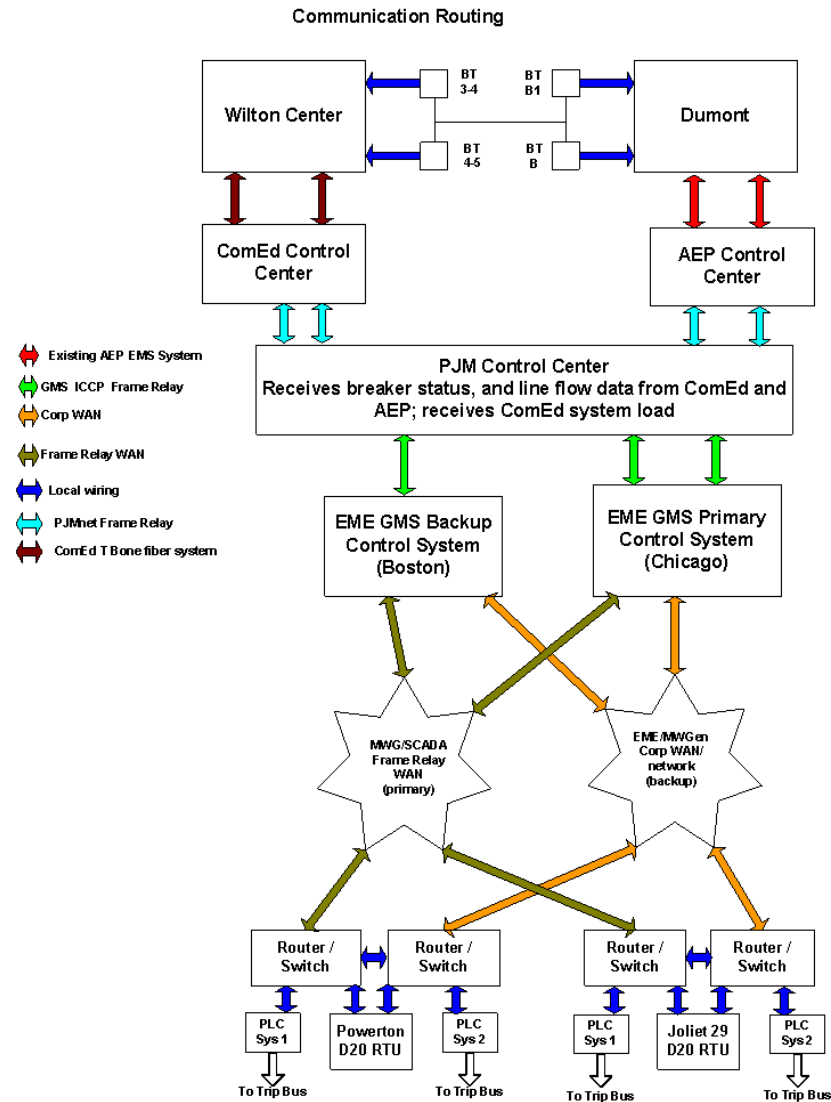
## *SPS Input Data Sources*

- The input data is derived from the current telemetry available from the existing energy management systems (EMS) at ComEd, AEP, PJM and EME
- No additional sensing devices are installed at Wilton Center and Dumont
- The proposed SPS scheme uses the same information collected over the same communication paths that are used to run the real-time contingency evaluations at ComEd, AEP, and PJM

## *SPS Implementation*

- Scheme will be redundant. At each generating station, two PLCs are to be used to provide redundancy both performing identical logic calculations
- Redundant SEL 3530 RTACs using existing power and environmental conditioning
- Input communications will utilize existing dual path IP networks, Primary is dedicated frame relay and backup is corporate network
- Outputs are hardwired to independent trip buses for Unit 7, at Joliet, and Unit 5, at Powerton
- Modbus or DNP3 output could be used in conjunction with DCS if desired

# Simplified Communication Path Map



# **SPS Communication Design Features**

- Uses existing redundant ComEd fiber T-Bone system between Wilton Center and ComEd EMS center
- Uses existing AEP communication system between Dumont and AEP EMS center
- Uses existing redundant communication paths between ComEd and PJM
- Uses existing redundant communication paths between AEP and PJM
- Uses existing redundant communications paths between PJM and EME
- Uses existing redundant EME communication paths between control center and power plants

***Thank You***