Generation Interconnections

This analysis was completed to assess the reliability impact for a new generator interconnecting to the PJM system as a capacity resource.

Network Impacts - 750MW Injection at Kearny

Potential network impacts for the injection of 750 MW at the Kearny 230 kV substation were evaluated for summer peak conditions in 2004. PJM was economically dispatched to determine the resulting generation pattern due to the additional 750 MW of generation.

Based upon this analysis, the 750 MW injection results in the following system upgrades that are required to maintain the reliability of the PJM system.

The unit was initially modeled on the existing Kearny 230 kV bus. The analysis showed for base case conditions, that the addition of the 750 MW unit caused transmission limitations on the Kearny-Turnpike 138 kV circuits and the Hudson 1-6 - Marion 230/138 kV transformer by as much as 35.4% and 8.8% over their respective normal ratings. The installation also caused the Bergen-Leonia-New Milford-Athenia 230 kV circuit to be 46.8% (New Milford-Maywood) over its normal summer rating.

The short circuit screening analysis identified that four to six 230 kV breakers would need to be replaced at Hudson substation.

The overloads described above can be alleviated by creating a new 230 kV substation at Kearny. The new substation will be integrated into the transmission system by constructing a new double circuit tower line between Kearny 230 kV substation and Essex 230 kV substation on the existing right-of-way. Each circuit will have a summer normal rating of 735MVA.

In addition the 138 kV double circuit tower line between Kearny and Turnpike substations will be converted to a double circuit 230 kV tower line, each circuit having a summer normal rating of 735MVA. A second set of conductors, having a 735MVA summer normal rating, will be added to the existing 230 kV circuit between Essex and Hudson substations on the railroad overbuild. Also, string a second set of conductors, 735MVA summer normal rating, in the vacant position of the existing Athenia to Hudson circuit on the towers that are in the existing Athenia corridor.

This work creates a Kearny to Hudson 230 kV circuit and a Kearney to Athenia, via Turnpike, Kingsland, and Cook Rd., 230 kV circuit.

As a result of these conversions the D-1304 and G-1307 conductors between West Caldwell substation and the Athenia corridor will become idle.

In order to accommodate these new circuits the following substation enhancements will be required.

Installation of a fifth bay at Hudson substation to include two 230 kV circuit breakers, 63kA interrupting capability, and one line termination, 735MVA summer normal rating, for the circuit strung on the existing railroad overbuild.

At Essex substation install three 230 kV circuit breakers, 63kA interrupting capability, and two line positions, 735MVA summer normal rating, for the two lines from Kearny.

Prepare the existing terminal, 735MVA summer normal rating, for the 220-1 transformer at Athenia to accept termination of the new 230 kV line from Kearny.

Replace the T-2 and T-4 transformers at Cook Road with 230/13 kV transformers.

Replace the T-1 and T-2 Transformers at Turnpike with 230/13 kV transformers

Change the taps of the T-2 transformer at Kingsland to 230 kV.

Potentially replace four to six 230 kV circuit breakers, 63kA interrupting capability, at Hudson substation.

Attached is a diagram showing the final system arrangement after completion of this project.

It is estimated that the substation work, other than the Kearny 230 kV and the direct connection from Kearny to Essex substations, will cost approximately $9.5 million and the line work will cost approximately $5 million. The construction of the above listed facilities will require approximately two years