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 - 1000 MW Injection at the Hosensack 230 kV Bus

Potential network impacts for the injection of 1000 MW into the Hosensack 500 kV and 230 kV substations were evaluated for summer peak conditions in 2004. PJM was economically dispatched to determine the resulting generation pattern due to the additional 1000 MW of generation. Several generation scenarios were studied in an attempt to bracket expected system conditions in 2004.

Based on this analysis, a 1000 MW injection at the Hosensack 230 kV bus results in two negative impacts to the PJM system. The first and most critical is that the Hosensack - Buxmont 230 kV flow increases by approximately 200 MW resulting in both normal and contingency overloads under certain generation scenarios. The second identified negative impact is the increased loading on 230 kV circuits in the northern JCP&L area.

A) Normal Conditions
· Results in normal overload on Hosensack - Buxmont 230 kV.
· Contributes to normal loading problems on Portland - Greystone 230 kV. The normal flow on this circuit increases by approximately 50 MW due to the 1000 MW injection.

B) Single Contingency
· Contributes to contingency overloads on Portland - Greystone 230 kV for the outage of Kittatinny - Newton 230 kV, Portland - Kittatinny 230 kV, or Newton - Montville 230 kV.
· Results in contingency overload on the Buxmont - Hosensack 230 kV circuit for the outage of the Elroy - Hosensack 500 kV circuit.

Due to the significant detrimental increase in the flow on the Hosensack - Buxmont 230 kV circuit, it was decided not to perform any additional analysis related to a 1000 MW injection at the Hosensack 230 kV bus. The estimated "lead-time" for construction of a 230 kV circuit to mitigate this problem is 2-5 years.

1000 MW Injection at the Hosensack 500 kV Bus

Based on this analysis, the only identified negative impact to the PJM system for a 1000 MW injection at the Hosensack 500 kV bus is the increased loading on the 230 kV circuits in northern JCP&L.

A) Normal Conditions
· No problems were identified under normal system conditions.

B) Single Contingency
· Contributes to contingency overloads on Portland - Greystone 230 kV for outage of Kittatinny - Newton 230 kV, Portland - Kittatinny 230 kV, or Newton - Montville 230 kV. The impact of the 1000 MW injection results in up to an 8% increase (approximately 60 MVA) in the contingency flows under certain generation scenarios. Several other northern JCP&L 230 kV outages resulted in contingency loading approaching overload.

C) Short Circuit Analysis
· The fault duty was evaluated at all substations that had a greater than 5% increase in fault current due to a 1000 MW generator at the Hosensack 500 kV substation. The fault duty was below all circuit breaker interrupting capabilities and, as such, no circuit breaker replacements would be expected due to a 1000 MW generator at the Hosensack 500 kV substation.

The flows on the northern JCP&L 230 kV path are directly impacted by the connection of new generation on either side of the constraint. Due to the existing number of generation interconnection requests that impact these circuits, it is not reasonable as this time to suggest what, if any, reinforcements will be required. The northern JCP&L 230 kV path will be studied extensively in the Regional Transmission Expansion Plan. The impact of this resource on both contingency operations and local area deliverability, as limited by that path, will be evaluated and additional upgrades and associated costs will be specified at that time, if required.