Generation Interconnection

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

Network Impacts -600 MW Injection into the Homer City 500kV substation (G43)

Network Impacts

The Homer City #G43 project was studied as a 600 MW capacity injection into the Homer City 500 kV substation. Project # G43 was evaluated for compliance with reliability criteria for summer peak conditions in 2005. Potential network impacts were as follows:

Generator Deliverability

1. The Altoona – Johnstown 230 kV circuit is overloaded at 100% of the normal rating (499 MVA). The Altoona – Johnstown 230 kV circuit is also contingency overloaded at 101% of the emergency rating (617 MVA) for outage of the Hunterstown – Conastone 500 kV circuit. The G43 project contributes approximately 14 MW to the normal and 19 MW to the contingency loading on this circuit. There is also a voltage collapse associated with these contingencies, centered at the Altoona 230kV substation.

Multiple Facility Contingency – Tower Line Outages (MAAC Criteria IIC)

No identified problems.

Short Circuit

Short circuit analysis was not performed due to the magnitude of reinforcements required to eliminate the identified problem. Any required breaker replacements are not expected to materially alter the total network reinforcement cost.

New System Reinforcements

1) The Altoona – Johnstown 230 kV circuit overloading can be relieved by rebuilding the Johnstown-Altoona 230 kV line (36.22 miles) with 1590 Kcmil 45/7 conductor. The cost estimate for a rebuild of this circuit is $54.3 and the time to construct from an execution of the Interconnection Service Agreement is 2.5 years. Note that this estimate assumes that all structures of this circuit will need to be replaced due to the increase in conductor size from 1033.5 Kcmil 54/7 ACSR. However, it is known that some structures of this circuit were designed to a higher standard as a part of an experimental project and may be of sufficient strength to accommodate the weight of the larger conductor. A determination of which structures can be retained, and a final cost estimate, will be determined during the Facilities Study when field surveys are performed.

2) The voltage collapse problem will be addressed by adding two capacitor banks to the Altoona 230kV substation. The cost estimate for each capacitor bank is $1.1 million ($2.2 million total) and the time to construct from an execution of the Interconnection Service Agreement is 2 years. Two capacitor banks will be installed to minimize voltage rise when the capacitors are switched on.

Contribution to Previously Identified System Reinforcements

The G43 project will contribute to the cost of the following previously identified network reinforcements:

1. Installation of a 350 MVAR SVC at Juniata 500 kV to mitigate previously identified voltage drop violations. The cost is estimated at $24.4 million. This includes the capacitors, appropriately sized transformer, 500 kV circuit breaker, all associated controls, site prep and substation modifications. It does not include gross-up for taxes. The SVC is estimated at $16.5 million and site expansion costs and line relocations at $7.9 million. See Figure #2.

2. Installation of a second Hunterstown - Conastone 500 kV circuit or a new Hunterstown - TMI 500 kV circuit will be required to eliminate voltage problems at Juniata 500 kV. The viability of the alternatives was not evaluated during the Feasibility study. Regardless of the alternative, the cost is expected to exceed $50 million and take in excess of 5 years. A more refined analysis of reinforcement options will be completed in the Impact Study.

Cost allocation percentages are not provided as part of the Feasibility Study analysis, however, cost allocation will be provided at the conclusion of the Queue D, E, & F Impact Study evaluations.

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Figure #2

Proposed Juniata 500kv 350mvar SVC