#S101 Ohio Central 138kV

Generation Interconnection

This analysis was completed to assess the reliability impact for the increase in generation interconnecting to the PJM system as a capacity resource.

Network Impacts

The Queue S101 Project was studied as a 580 MW injection at Ohio Central 138 kV substation. Project S101 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. Potential network impacts were as follows:

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

No Problems were identified.

Multiple Facility Contingency

(Double Circuit Tower Line contingencies only for the full energy output. Stuck breaker and bus fault contingencies will be performed for the Impact Study)

No Problems were identified

Short Circuit

No problems identified on the transmission system.

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

1. Contribution of 54 MW further overloads the Conastone –Peach Bottom 500kV line from 178% to 180% of its normal rating (2338 MVA) for the base case.
2. Contribution of 52 MW further overloads to the Conastone –Peach Bottom 500kV line from 237% to 239% of its emergency rating (2598 MVA) for the contingency: Peach Bottom 500/230 kV transformer and 8 machines at Muddy Run (Cont ID: PE500).

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. "Network Impacts", initially caused by the addition of this project generation)

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

1. The overload of the Conastone-Peach Bottom can be mitigated by constructing 2 new 500kV circuits between Conastone and Peach Botton. This will require work to be done by both BG&E and PECO. That work is described below:

BG&E

The major components of this project include:

Conastone Substation 3 - 4 years to complete $39,000,000 add 5% per year inflation beyond 2012

- Rebuild 3 existing bays to 4000A (also add breaker in one of the existing bays)
- Build new 4000A bay and install 3 breakers
- Relocate Hunterstown 500kV line
- Replace 4 inch bus with 5 inch

Transmission Line Component 7 years to build after notice to proceed total estimate for this work is $ 292 Million

- 2 - Double Circuit 500 kV OH lines from Conastone - Graceton - MD line ($136)
- 2 - UG 230 kV circuits from Conastone - Graceton ($122.4)*
- 1 - UG 230 kV circuit from Graceton - MD line ($20.4)
- 1 - UG 115 kV circuit from Graceton - Five Forks ($9.0)
- Acquire additional 50 ft. wide R/W Graceton - MD line ($2.2)
- Remove existing OH lines/structures ($2.0)

* assumes RTEP project b0497 Install a second Conastone - Graceton 230 kV circuit

The total for the BG&E work is **$331 million**

PECO

Relocate Peach Bottom to Graceton 220-08 line to underground (7.4 miles total length @ $4M/mile) to facilitate construction of additional 500kV lines in the Conastone to Peach Bottom right of way. The underground line will require parallel pipe type cables to achieve a rating

of 800MVA, $61M and 36 months to complete. Please note that 220-08 line is an offsite source for Peach Bottom generating station and its integrity must be maintained.

Remove existing 220-08 line towers to clear the north side of the right of way for 500kV construction, $1.5M and 6 months.

Construct new double circuit 500kV line in the north side of the 300 foot wide Peach Bottom to Maryland state line right of way, approximately $17M (6.25 mile PECO portion @ $2.7M/mile) and 30 months to complete after the removal of the existing 230 kV tower line.

Remove existing 5012 line towers to clear the south side of the right of way for new higher capacity 500kV lines, $1.5M (6.25 mile PECO portion) and 6 months.

Construct second new double circuit 500kV line in the south side of the Peach Bottom to Maryland state line right of way, approximately $17M (6.25 mile PECO portion @ $2.7M/mile) and 30 months to complete after the removal of the existing 500 kV tower line.

Upgrade 5012 line substation equipment to achieve the new higher rating, $3M and 18 months to complete.

Expand 500kV substations (north and south) at Peach Bottom to accommodate three additional 500kV lines, approximately $18M ($6M per new line) and 30 months to complete. Please note that the substation work may have to be coordinated with refueling outages at Peach Bottom and that the overall project may overstress several 500 kV circuit breakers.

The total cost for the PECO work is **$69.1 million.**

The total estimated cost of the upgrade is **$400.1 million.**