Generation Interconnection Feasibility Study Report
For
PJM Generation Interconnection Request Queue Position X4-027Linwood

April 2012
Revised May 4, 2012

Network Impacts

The Queue Project #X4-027 was studied as a(n) 35.0MW increase in CIR's (12MW increase in Maximum Facility Output) at Linwood 230kV substation in the PECO area. Project #X4-027 was evaluated for compliance with reliability criteria for summer peak conditions in 2015. Potential network impacts were as follows:

Generator Deliverability
(Single or N-1 contingencies for the Capacity portion only of the interconnection)
1. The LINWOOD – CHICHESTER 230 kV line (from bus 213750 to bus 213490 ckt 2) loads from 98.81% to 100.3% (**DC power flow**) of its normal rating (831 MVA) for non-contingency condition. This project contributes approximately 12.38 MW to the thermal violation.

Multiple Facility Contingency
(Double Circuit Tower Line, Line with Failed Breaker and Bus Fault contingencies for the full energy output)

No violations identified.

Short Circuit

(Summary form of Cost allocation for breakers will be inserted here if any)

Not required for this uprate.

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)
2. The DELCO TAP-MICKLETON 230 kV line (from bus 213559 to bus 228401 ckt 1) loads from 103.79% to 105.52% (**DC power flow**) of its emergency rating (725 MVA) for the single line contingency ('CHIC125'). This project contributes approximately 12.55 MW to the thermal violation.

```
CONTINGENCY 'CHIC125'                              /* $DELCO $CHIC125 $K
  TRIP BRANCH FROM BUS 213489 TO BUS 213490 CKT 1 /* CHICHST1 230.00 CHICHST2 230.00 $DELCO $CHIC125 $K
  END /*            $DELCO    $CHIC125    $K
```

Steady-State Voltage Requirements

(Results of the steady-state voltage studies should be inserted here)

To be determined

Stability and Reactive Power Requirement

(Results of the dynamic studies should be inserted here)

To be determined.

New System Reinforcements

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

1. Install 3rd Chichester-Linwood 230kV line underground with a minimum summer normal and emergency rating of 831/983 MVA. This line is approximately 2.6 miles long. Install new 230kV bus position and breaker at Chichester and Linwood Substations for this new line. Estimated Cost: $25M. This cost does not include any right-of-way costs which may be required.

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)
2. To mitigate the MCKLTON-DELCOTAP 230kV (AE/PECO) overload would require upgrading the 2-954 AL 230kV strand bus at Mickleton to 2-1590 AL. The estimated cost to perform this work is $74,000 and will take 6-12 months to complete. This increases the summer emergency rating to 829MVA.

Delivery of Energy Portion of Interconnection Request
PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The

© PJM Interconnection 2012. All rights reserved.

developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.
Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

None identified.

© PJM Interconnection 2012. All rights reserved.