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 - 550MW Injection

Injection of 550 MW into the Mercer 230kV substation was evaluated for network impacts. The following network impacts were identified:

Generator Deliverability

1) The Mercer-Kuser 230 kV(A) circuit was overloaded at 120% of the normal rating (653 MVA). Project #D26 contributes approximately 350 MW to the facility loading.

2) The Kuser-Lawrence 230 kV (A) circuit was overloaded at 110% of the normal rating (653 MVA). Project #D26 contributes approximately 350 MW to the facility loading.

3) The Edison – Meadow Rd (Q) circuit was overloaded at 110% of the emergency rating (312 MVA) due to an outage involving the Mercer – Lawrence 230 kV circuit. Project #D26 contributes approximately 100 MW to the facility loading.

4) The Emilie-Neshaminy 138kV circuit was overloaded due to an outage involving the Emilie - Eddington 230 kV circuit. This facility was overloaded by an earlier queued project and project #D26 contributes to the overload.

5) The Neshaminy-Byberry 138kV circuit was overloaded due to an outage involving the Emilie - Eddington 230 kV circuit. This facility was overloaded by an earlier queued project and project #D26 contributes to the overload.

6) The Byberry-Bluegrass 138kV circuit was overloaded due to an outage involving the Eddington – Holmsberg 230 kV circuit. This facility was overloaded by an earlier queued project and project #D26 contributes to the overload.

7) The Burlington – Levittown (J) 138kV circuit was overloaded due to an outage of the parallel path involving the Burlington – Camden (I) 138kV circuit. This facility was overloaded by an earlier queued project and project #D26 contributes to the overload.

8) The Levittown – Cinnaminson (J) 138kV circuit was overloaded due to an outage of the parallel path involving the Burlington – Camden (I) 138kV circuit. This facility was overloaded by an earlier queued project and project #D26 contributes to the overload.

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

9) The Mercer-Trenton 230 kV was overloaded at 209% of the emergency rating (441 MVA) due to the DCTL outage Mercer – Kuser 230 kV circuits. Project D26 contributes approximately 550 MW to the facility loading.

Short Circuit Analysis

All eleven circuit breakers at Trenton 138 kV, 138kV 10-10A circuit breaker at Burlington, and Mercer 230kV circuit breakers 1-6, 3-4, and 2-3 were overdutied.

System Reinforcements

Overloads 1 and 2 can be relieved at an estimated cost of $13.5 million by:

- Constructing a new 230kV ring bus at Trenton with (4) line positions and (3) transformer positions, (7) 230kV breakers, (1) new 230/138 transformer (220-3) connected to 138kV bus section 6.; and relocating the Mercer 230kV circuit to Wheelabrator from position 5 to position 2. (estimated cost: $11.2 million)
- Reconductoring the 230 kV circuit from the new Trenton 230kV substation to Lawrence, and Upgrading the terminal equipment on the three 230 kV lines at Mercer. (estimated cost: $2.3 million)

Overload 3 can be relieved by rebuilding the Edison – Meadow Rd. (Q) circuit. (estimated cost: $3.0 million)

Overload 4, 5 and 6 can be relieved by reconductoring the Emilie – Neshaminy, Neshaminy – Byberry, and Byberry – Bluegrass 138kV circuits. See the Impact Study for queue #B30. (estimated cost: $14.1 million)

Overloads 7 and 8 can be relieved by reconductoring a portion of the Burlington – Levittown (J) 138kV circuit and replacing terminal equipment on the Levittown – Cinnaminson (J) 138kV circuit. See the Impact Study for queue #B9b.
(estimated cost: $1.5 million)

Overload 9 can be relieved at a minimal cost by upgrading terminal equipment on the overloaded circuit and employing an SPS scheme that removes approximately 100 MW or more of #D26 generation when the contingency event that causes this overload occurs. The cost for relieving Overload 9 is incorporated in the estimate for relieving overloads 1 and 2. (Note: The emergency rating of the Mercer – Trenton 230 kV conductor is 873 MVA. The DCTL outage of concern drops Mercer generating unit #2 leaving 922 MW of generation isolated on the Mercer – Trenton 230 kV (H) circuit. More accurate modeling will be necessary to determine the minimum acceptable amount of generation to be removed by the SPS scheme.)

The eleven overdutied breakers at Trenton 138 kV, one 138kV at Burlington, and three at Mercer 230kV must be replaced at an estimated cost of $5.25 million.

The total estimated Network Upgrade Cost is $37.35 million. The total estimated construction time is 24 – 36 months.