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 - 565 MW Capacity Injection

The #J03 project was studied as a **125MW capacity injection into the Red Lion 230kV** substation and **420MW capacity injection into the Christiana 138kV** substation. Project #J03 was evaluated for compliance with reliability criteria for summer peak conditions in 2007. Potential network impacts were as follows:

Generator Deliverability

1. The Christiana – New Castle 138kV circuit is normally overloaded at **146%** of the normal rating (210 MVA). The Christiana – New Castle 138kV is also contingency overloaded at **125%** of the emergency rating (273 MVA) for the outage of the Edgemoor 230/138 kV transformer. The J03 project contributes approximately 186MW to the normal facility loading and 265 MW to the contingency facility loading.
2. The Graysferry – Parrish 230kV circuit is normally overloaded at **103%** of the normal rating (752 MVA). The Graysferry – Parrish 230kV is also contingency overloaded at **108%** of the emergency rating (891 MVA) for the outage of the Concord – Lenape 230kV circuit. The J03 project contributes approximately 62MW to the normal facility loading and 74MW to contingency facility loading.
3. The Edgemoor – Carrcroft 138kV circuit is normally overloaded at **110%** of the normal rating (273 MVA). The Edgemoor – Carrcroft 138kV is also contingency overloaded at **102%** of the emergency rating (347 MVA) for the outage of the Harmony 230/138kV transformer. The J03 project contributes approximately 52MW to the normal facility loading and 33MW to the contingency facility loading.
4. The Eddystone 2 – Llanerch 138kV line is overloaded at **102%** of the emergency rating (311 MVA) for the outage of the Eddystone 1 – Llanerch 138kV circuit The J03 project contributes approximately 8MW to the facility loading.
5. The Eddystone 1 – Llanerch 138kV line is overloaded at **101%** of the emergency rating (313 MVA) for the outage of the Eddystone 2 – Llanerch 138kV circuit. The J03 project contributes approximately 6MW to the facility loading.
6. The Christiana - Edgemoor 138kV circuit is contingency overloaded at **124%** of its emergency rating of (318 MVA) for the outage of the Christiana to New Castle 138kV circuit. The project contributes approximately 440MW to the facility loading.
7. The Basin Road - New Castle 138kV circuit is contingency overloaded at **108%** of its emergency rating of (347 MVA) for the outage of the Carrcroft to Edgemoor 138kV circuit. The project contributes approximately 124MW to the facility loading.

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

Overload #1 can be relieved by reconductoring 4.21 miles of the new Christiana – New Castle 138kV circuit and replacing a disconnect switch at New Castle. The cost is estimated at **$0.904M** and it is expected to take two years to complete.

Overload #2 can be relieved by re-conductoring the Grays Ferry – Parrish 230kV circuit with 1590kcmil ACSS wire. The cost is estimated at **$3.0M** and it is expected to take two years to complete.

Overload #3 can be relieved by reconductoring 3.66 miles of the Edgemoor – Carrcroft 138kV circuit. The cost is estimated at **$0.809M** and it is expected to take two years to complete.

Overload #4 and #5 can be relieved by installing a second 230-138kV transformer at Plymouth substation and installing a 1% reactor in series with both Eddystone-Llanerch lines. The cost is estimated at **$3.0M** and it is expected to take one and half years to complete.

Overload #6 can be relieved by replacing a disconnect switch at Edgemoor 138kV substation. The cost is estimated at **$0.020M** and it is expected to take one year to complete.
Overload #7 can be relieved by reconductoring the Basin Road - New Castle 138kV circuit and replacing terminal equipments. The cost is estimated at **$0.774M** and it is expected to take one year to complete.

Total cost for the new upgrades will be **$8,507,000**.

Contribution to Previously Identified System Reinforcements

The J03 project will contribute to the cost of the following previously identified network reinforcements:

1. Re-conductor the A21 – Chichester 230kV circuits #1 and #2 with 1590kcmil ACSS. The project contributes approximately **183MW**. The cost is estimated at $7 million and it is expected to take three years to complete.
2. Replace terminal equipment at Peach Bottom 500kV substation to increase the rating of the Conastone – Peach Bottom 500kV circuit. The project contributes approximately **91**MW. The total cost is estimated at $0.5 million and it is expected to take one year to complete.
3. Return to service, the second existing Sickler 230/69kV transformer which had been removed from service, and upgrade the Sickler-Transboro 69kV circuit. The project contributes approximately **112MW**. The total cost is estimated at $1.52 million and it is expected to take two years to complete.

Queue J03 will have a cost allocation responsibility for three previously identified system reinforcements with a total estimated cost of **$9,020,000**.