#U2-076 Falls 10 MW

Generator 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

Queue U2-076 was studied as a 10 MW Capacity injection into the Falls 34.5 kV Feeder 342. Project U2-076 was evaluated for compliance with reliability criteria for summer peak conditions in 2013. Network impacts were as follows:

NETWORK IMPACTS

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.

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. The Emilie - Neshaminy 138 kV line loads from **117.2% to 118.2%** of its emergency rating (791MVA) for the single line contingency outage (PE55). Contingency "PE55" trips the following equipment: Croydon – Eddington Tap 230kV line, Eddington Tap – Eddington 230kV line, Emilie 230/35kV transformer, and the Eddington 230/13.8kV transformer. This project contributes approximately **8.0 MW** to the thermal violation.

2. The Neshaminy - Byberry 138kV line loads from **116.6% to 117.7%** of its emergency rating (719MVA) for the single line contingency outage (PE55). Contingency "PE55" trips the following equipment: Croydon – Eddington Tap 230kV line, Eddington Tap – Eddington 230kV line, Emilie 230/35kV transformer, and the Eddington 230/13.8kV transformer. This project contributes approximately **8.0 MW** to the thermal violation.

Short Circuit
No problems were identified if Queue U2-076 is connected to a new 34.5 kV line from Falls. If U2-076 were connected to existing 34.5 kV line #342 the short circuit rating of

line equipment would be exceeded and need to be replaced as a result of the additional generation.

Stability Analysis
Not required because of generator size and location in the system.

NETWORK UPGRADE REQUIREMENTS

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 Emilie – Neshaminy 138kV line overload requires the rebuild of approximately 4.4 miles of transmission line to 230kV double circuit, high capacity standards. Both sides of the tower line will be operated at 138kV to achieve a rating of 1490N/1690E MVA. At a rate of $2.5M per mile the new transmission line costs are estimated at $11M. Substation modifications will also be required which will cost about $10M. The total cost of the upgrade is estimated to be **$21M** and it would take **4years** to complete the work.

2. The Neshaminy – Byberry 138kV line overload requires the rebuild of approximately 4.4 miles of transmission line to 230kV double circuit, high capacity standards. Both sides of the tower line will be operated at 138kV to achieve a rating of 1490N/1690E MVA. At a rate of $2.5M per mile the new transmission line costs are estimated to be $11M. Substation modifications will also be required which will cost about $10M. The total cost of the upgrade is estimated to be **$21M** and it would take **4years** to complete the work.

General Notes pertaining to cost allocation rules for overloads: (also see the PJM Tariff and Manual 14)

The first project to cause an overload has cost responsibility.

If this Queue is not the first project to cause the overload, a threshold of;

a) 1% increase in overloaded facility loading must be caused by the this Queue generation, ***and***
b) This Queue's MW contribution must be 5.0 MW or greate.
a and b must bothbe satisfied forthis Queue to have cost allocation responsibility.

And

If not the first project to cause the overload but both conditions a and b above are met, then a threshold of Either of the following are also required for cost allocation responsibility;

a) a 5% generator DFAX (5 MW for a generation request size of 100 MW),* ***or***
(b) This Queue's generation must cause an increase of 5% to the overloaded facility loading

* DFAX may not be equal to this Queue's contribution divided by generator MW size in some cases.