#O39_Sunbury – Dauphin 69kV 56 MW

Generation Interconnection

This analysis was completed to assess the reliability impact for a new generator interconnecting to the PJM system as an Energy (56MW) and Capacity resource (11.2MW).

Network Impacts

The O39 project was studied as an injection of 56 MW energy (11.2 MW capacity) into the Dauphin-Sunbury 69 kV line. Project O39 was evaluated for compliance with reliability criteria for summer peak conditions in 2009. Potential network impacts were as follows:

Local System Impacts (Normal system conditions with all facilities in service)
Overload on Dauphin – Sunbury 69kV line from tap point to PPL Sunbury 69kV bus.

With minimum load on Sunbury-Dauphin 69kV line and the Lykens tap load transferred to Eldred – Pine Grove 69kV line, upon the injection of O39 project max allowable output of 56 MW, the following thermal overloads were observed:

1. 132 % overload on the section between the O39 tap point to Dalmatia tap
2. 108 % overload on the section between the Dalmatia tap and the Sunbury substation.

The Sunbury-Dauphin 69kV line would require replacement of transmission line conductors for approximately 18 miles from the point of interconnection to Sunbury substation. In order to prevent the base case overload, the conductors on the Sunbury - Dauphin 69 kV line must be changed to 556.5 Kcmil ACSR as per PPL EU standards, meaning the entire section of line from the interconnection point to PPL EU Sunbury substation must be upgraded to 556.5 Kcmil ACSR conductors. Total estimated cost to upgrade is $4.5 million. See below for details.

Single Contingency (MAAC Criteria IIA)
No identified problems.

Second Contingency (MAAC Criteria IIB)
No identified problems.

Multiple Facility Contingency (MAAC Criteria IIC)
No identified problems.

Generator Deliverability (single contingency)
No identified problems.

Stability (MAAC Criteria IV)
Will be performed for the Queue O39 Impact Study.

Short Circuit Analysis
No identified problems.

Contribution to Previously Identified System Reinforcements
None

New System (Local Upgrades) Reinforcements

Upgrade Sunbury-Dauphin 69kV line (refer to Figure 2 on page 10):

Total cost estimate to upgrade the Sunbury-Dauphin 69kV line is **$4.5 million.** Estimated construction time **27 months**.

The Sunbury – Dauphin 69kV line would require approximately 18 miles of conductor replacement with larger size conductors (556.5 Kcmil ACSR, rated as Summer Normal = 97 MVA and Summer Emergency = 124 MVA)) from the Queue O39 tap point to PPL EU Sunbury Substation. PPL estimates that approximately 18 miles of this line would require re-conductoring at an estimated cost of $4.5 million. Estimate assumes that adequate ROW exists for re-conductoring.

Acquisition of additional ROW, if needed, may add to cost and additional time for engineering and PA PUC approval. It is assumed that an NPDS permit will be required. Also, due to the size of the re-conductoring project, erosion and sedimentation control would also be required under the transmission line. Estimated time to complete the construction would be approximately 27 months.

It should be noted that the existing Sunbury-Dauphin 69kV line is constructed for 132kV insulation with 2/0 CWC conductors (rated as Summer Normal = 39 MVA and Summer Emergency = 58 MVA) and per PA PUC regulations whenever any line 100kV or above is rebuilt, PA PUC certification is required. Since this line construction predates the PUC certification process, it is assumed that the line construction to 132kV was grandfathered under the existing PUC regulations and no certification would be required. If PUC certification required that may add additional time to the elapsed time required. Additionally, PPL EU must verify that the transmission structures are still insulated for 132kV and this may have an impact on the cost.