#T126 Olive-Dequine 345kV

Generation Interconnection

This analysis was completed to assess the reliability impact for the increase in generation interconnecting to the PJM system as a capacity resource.

Local AEP Impacts

The impact of the proposed generating facility on the AEP System was assessed for adherence with applicable reliability criteria. AEP planning criteria require that the transmission system meet single contingency performance criteria in accordance with the AEP FERC Form 715. Therefore, this criterion was used to assess the impact of the proposed facility on the AEP System. The Horizon project was studied as a 202 MW net energy injection (40 MW capacity) consistent with the interconnection application. The results are summarized below.

Normal System (2011 Summer Conditions)

- No problems identified.

Single Contingency (2011 Summer Conditions)

- AEP Olive – S06 345 kV line gets overloaded to 112% (1088 MW) of its normal rating for an outage of AEP Dequine – Reynolds – Olive 345 kV line. Without the addition of T126 Project the same facilities are loaded to 104% (1010 MW) of normal rating under the same contingency.

- AEP Dequine – Reynolds 345 kV line gets overloaded to 122% (1137 MW) of its normal rating for an outage of AEP Olive – S06 345 kV line. Without the addition of T126 Project the same facilities are loaded to 116% (1081 MW) of normal rating under the same contingency.

- AEP Dequine – Reynolds 345 kV line gets overloaded to 100.4% of its normal rating (935 MW) for an outage of AEP Greentown – Jefferson 765 kV line. There are no issues before the addition of T126 Project.

Multiple Contingency (2011 Summer Conditions)

- AEP Dequine – Reynolds 345 kV line gets overloaded to 104.6% (975 MW) of its emergency rating for an outage of AEP Greentown – Jefferson 765 kV and AEP Hanging Rock – Jefferson 765 kV lines. Without the addition of T126 Project the same facilities are loaded to 100.1% (935 MW) of emergency rating under the same contingency.

- AEP Olive – S06 345 kV line gets overloaded to 100.9% (980 MW) of its emergency rating for an outage of AEP Greentown – Jefferson 765 kV and AEP Hanging Rock – Jefferson 765 kV lines. There are no issues before the addition of T126 Project.

Short Circuit Analysis

- No problems identified.

Stability Analysis

- Stability studies were not performed as part of this Feasibility Study and are not normally performed as part of a Facility Study effort. The stability assessments are part of the System Impact Study. Based upon the results of this future System Impact Study, the extent of system upgrades could change and the associated costs could be significantly different.

Reactive Requirements

PJM requires a power factor correction to 95% lead/lag at the point of interconnection for wind generating facilities. It is expected that Horizon will adhere to this standard.

Network Impacts

The Queue Project #T126 was studied as a(n) 200MW(Capactiy=40MW) injection at Olive – Dequine 345 kV line in the AEP area. Project #T126 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. Potential network impacts were as follows:

Generator Deliverability
(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

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

None

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

No problems 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)

None

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

- The 932 MVA SN/SE rating for the Dequine – Reynolds 345 kV circuit is not correct. It is based on a relay limitation that has been eliminated. The present rating should be based on the conductor rating. However, the conductor for this circuit was installed following extensive ice storm damage and is not the original conductor. The original conductor was 1414 MCM ACSR (paper expanded), and this is what the transmission towers were designed for. However, the replacement conductor was 2303 MCM ACAR. Although similar in size, this conductor has different sag characteristics than the original conductor. Therefore, **a sag study is required for the Dequine – Reynolds 345 kV circuit** to determine the maximum conductor operating temperature(s), and the associated rating(s).

- To address the Olive – S06 345 kV circuit overload, structure & sag analyses will be required to determine if the circuit can be reconductored with a higher capacity conductor. If these analyses eliminate this alternative, then Olive – S06 345 kV will need to be rebuilt. The cost of rebuilding this double circuit line will be approximately **$1,700,000 per mile**. The Dequine – Olive 345 kV line is approximately **90 miles long**; however, the length of the Olive – S06 345 kV portion is indeterminate until the interconnection location can be determined with more accuracy. The cost of reconductoring will be less than rebuilding. However, the cost for reconductoring cannot be provided before the structure and sag studies are completed (some structures may still need to be replaced).

  The structure & sag studies required for the Olive – S06 345 kV overload and Dequine – Reynolds 345 kV overload can be performed in the Facility Study and is estimated to cost approximately **$350,000**. It will require approximately 20 weeks from initiation. Most of the conductor lengths for the two circuits involved are located on the same towers. Therefore, a single study should be required to address both overload issues.

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)

None

MISO Impacts

Any impacts on the MISO transmission system will be identified in the Impact Study.