#U2-080 South Portsmouth 138kV

Generation Interconnection

This analysis was completed to assess the reliability impact for the new 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 performance criteria in accordance with the AEP FERC Form 715. Therefore, this set of criteria was used to assess the impact of the proposed facility on the AEP System. The project was studied as a 134 MW net energy injection consistent with the interconnection application. This project was studied with PJM projects #N12 and T152 already in service at 100% output in the vicinity of U2-080. The results are summarized below.

Normal System (2012 Summer Conditions)

- No problems identified

Single Contingency (2012 Summer Conditions)

Due to the arrangement of the Millbrook Park-South Portsmouth-Argentum 138 kV system, an outage of the 138 kV line between Millbrook Park and U2-080 forces the full generation output through the Argentum 138/69 kV station and onto the underlying 69 kV system. The single contingency conditions noted below result from this outage scenario.

1. AEP Franklin Furnace – Gray's Branch[1] 69 kV line is overloaded to 183% (86.0 MVA) of its emergency rating for an outage of the AEP Millbrook Park – U2-080 138 kV line. Without the addition of U2-080 Project, the same facilities are loaded to 34% (15.8 MVA) of emergency rating.

2. AEP Franklin Furnace – K.O.T. Coal[1] 69 kV line is overloaded to 142% (56.7 MVA) of its emergency rating for an outage of the AEP Millbrook Park – U2-080 138 kV line. Without the addition of U2-080 Project, the same facilities are loaded to 57% (22.6 MVA) of emergency rating.

3. AEP Wheelersburg – K.O.T. Coal[1] 69 kV line is overloaded to 138% (55.4 MVA) of its emergency rating for an outage of the AEP Millbrook Park – U2-080 138 kV line. Without the addition of U2-080 Project, the same facilities are loaded to 54% (21.5 MVA) of emergency rating.

[1] The affected facility may appear in additional contingencies that are not mentioned.

4. AEP Wheelersburg – Sciotoville[1] 69 kV line is overloaded to 120% (50.4 MVA) of its emergency rating for an outage of the AEP Millbrook Park – U2-080 138 kV line. Without the addition of U2-080 Project, the same facilities are loaded to 40% (16.6 MVA) of emergency rating.

5. AEP Gray's Branch – Argentum[1] 69 kV line is overloaded to 198% (91.1 MVA) of its emergency rating for an outage of the AEP Millbrook Park – U2-080 138 kV line. Without the addition of U2-080 Project, the same facilities are loaded to 27% (12.3 MVA) of emergency rating.

** Please note that Eastern Kentucky Power Company's (EKPC's) Argentum 138/69 kV transformer was overloaded. This issue will be addressed with EKPC in the Impact Study.

Multiple Contingency (2012 Summer Conditions)

- No problems identified

Short Circuit Analysis

6. Millbrook Park[2] 138 kV breaker H interrupting duty percentage increases from 74.8% to 104.4%.

7. Millbrook Park[2] 138 kV breaker O interrupting duty percentage increases from 85.3% to 109.0%.

8. Central Portsmouth[2] 34.5 kV breaker B interrupting duty percentage increases from 74.8% to 104.4%.

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.

Local Upgrades

1. The overload on the Franklin Furnace-Gray's Branch 69kV circuit can be alleviated by reconductoring the 1 mile long circuit. The estimated cost (2008 Dollars) is **$1,000,000.**

[2] The breakers seen to be overdutied are scheduled to be replaced as part of an AEP initiated project by December, 2010. It is anticipated that these issues will not be applicable with the upgraded equipment, and associated costs will not be part of the customer's responsibility.

2. The overload of the Franklin Furnace-K.O.T. Coal 69kV line can be alleviated by reconductoring the 4.0 mile long line. The estimated cost (2008 Dollars) is **$4,000,000.**

3. The overload of the Wheelersburg-K.O.T. Coal 69kV circuit can be alleviated by reconductoring the 1.8 mile long line. The estimated cost (2008 Dollars) is **$1,800,000.**

4. The overload of the Wheelersburg-Sciotoville 69kV circuit can be alleviated by reconductoring the 4.5 mile long line. The estimated cost (2008 Dollars) is **$4,500,000.**

5. The overload of the Gray's Branch-Argentum 69kV circuit can be alleviated by reconductoring the 0.9 mile long line. The estimated cost (2008 Dollars) is **$900,000.**

Network Impacts

The queue project U2-080 was studied as a 134 MW(capacity) injection into the AEP system at the Millbrook - South Portsmouth 138kV lines. U2-080 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)

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

MISO & EKPC Impacts

Any impacts on the MISO and EKPC transmission systems will be identified in the Impact Study.