#Q60 Kewanee 201 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

The #Q60 project was studied as a total injection of 201 MW (40MW of Capacity) into the Kewanee 138 kV TSS 74 bus. Queue #Q60 was evaluated for compliance with PJM Reliability Criteria for summer peak conditions in 2011. Potential network impacts were as follows:

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

No problems were identified

Multiple Facility Contingency *(Double Circuit Towerline contingencies only. Stuck breaker and bus fault contingencies will be performed for the Impact Study)*

1. Contribution of 30 MW to the overload of the Queue P39 (Option #2) - Edwards 138 kV line 7423 from 90% to 108% of its LDR (Load Dump Rating) of 164 MVA for the tower outage of lines 7713 and 6101. The LDR of 164 MVA is based on a current transformer and / or relay setting limit at Ameren's Edwards substation.

   Note: ComEd's Planning Reliability Criteria allows for 115% of a facilities' Load Dump Rating for Double Circuit Tower Line contingencies, hence this does not result in an upgrade requirement for Queue Q60 if it were a ComEd facility. However, this is an Ameren (MISO) facility that may be subject to Ameren's (MISO's) Reliability Criteria. This will be evaluated further during the Queue Q60 Impact Study.

Short Circuit Analysis
No problems identified.

Stability Analysis
To be performed during the Q60 Impact Study

Contribution to Previously Identified Overloads

(Queue Q60 contributes to the following contingency overloads, i.e. Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

1. Contribution of 15 MW further overloads the Dresden – Queue O23 345 kV line 1202 (formerly 0302) from 120% to 121% of its LDR (Load Dump Rating) of 1320 MVA for the tower outage of lines 16101 & 97503.

   Queue O73 was the first project identified to cause this overload.

2. Contribution of 25 MW further overloads the Crescent Ridge - Oglesby Tap 138 kV (line 7713) from 161% to 183% of its LDR (116 MVA) for the tower outage of lines 12511 and 7408.

   Queue O29 was the first project identified to cause this overload.

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e."Network Impacts", initially caused by the addition of Queue Q60 generation)

1. Cost and time required to mitigate a current transformer limit (i.e. replace or upgrade the current transformer) at Ameren's Edwards substation is expected to be relatively minor. If this reinforcement is found to be required during the Q60 Impact Study, PJM will work with MISO to develop cost and time estimates for the upgrade requirement in MISO's (AMEREN's) system.

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by Queue Q60. Queue Q60 may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

1. The overload of the Dresden to #O22 345 kV line 1202 (existing line 0302) can be relieved by upgrading station equipment at Dresden Station 12 to relieve a relay thermal limit. The cost for this work is estimated to be **$1,000,000** and take **18 to 24 months** to complete.

2. The overload of the ComEd-owned Crescent Ridge to Oglesby Tap 138 kV (line 7713) may be relieved by updating the relays with a load encroachment setting at Crescent Ridge TSS 981. This will be confirmed for the Q60 Impact Study.

Potential Issues

MISO Impacts

All impacts on the MISO member transmission systems may not be included in this analysis, but they will be included in the Impact Study, which may reveal upgrades needed in the MISO system not identified in this Feasibility Study.

Potential Congestion - Delivery of Energy Portion of interconnection Request

PJM and ComEd also studied the delivery of the energy portion of this interconnection request. Any problems identified below may result in operational restrictions to Queue Q60. Because these potential contingency overloads are not Reliability Criteria violations (an operating solution of reducing Q60 or other generation can be employed pre-contingency) the Interconnection Customer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

1. Q60 contribution of 49 MW increases the loading on the Kewanee station equipment in series with the circuit breaker that ties the ComEd-owned portion of the Kewanee to the Ameren/Illinois Power portion from 141% to 167% of its normal rating (189 MVA).
2. Q60 contribution of 39 MW increases the loading on the Kewanee-Normandy 138 kV line 7408 from 84% to 103% of its emergency rating (210 MVA) for the outage of line 7411.
3. Q60 contribution of 49 MW increases the loading on the Nelson-O29 138 kV line 15508 from 208% to 227% of its emergency rating (265 MVA) for the outage of 138 kV line 13311. The congestion on the monitored element was first caused by project O29.
4. Q60 contribution of 51 MW increases the loading on the Nelson-Rock Falls 138 kV line 15509 from 282% to 309% of its emergency rating (184 MVA) for the outage of 138 kV line 15508. The congestion on the monitored element was first caused by project O29.
5. Q60 contribution of 30 MW increases the loading on the Normandy-O09 138 kV line 7411 from 115% to 129% of its normal rating (209 MVA). The congestion on the monitored element was first caused by project P37.
6. Q60 contribution of 51 MW increases the loading on the Rock Falls-O09 138 kV line 13311 from 301% to 329% of its emergency rating (184 MVA) for the loss of 138 kV line 15508. The congestion on the monitored element was first caused by project O29.