Queue S36
Kankakee 138kV
Feasibility Study Report

Option 1

Network Impacts

The #S36 project was studied as a 175 MW (35 MW Capacity) injection at two alternative interconnection points in the ComEd area. Option #1 connects into the Kankakee substation (TSS 157) 138kV Bus #1 with line #8603. Project #S36 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)

No problems were identified.

Multiple Facility Contingency
(Double Circuit Tower Line contingencies only were studied for the full energy output. The contingencies of Line with Failed Breaker and Bus Fault will be performed for the Impact Study)

No problems were identified.

Short Circuit
(Summary of impacted circuit breakers)

To be determined in the System Impact Study.

Contribution to Previously Identified Overloads
(#S36 contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None

Steady-State Voltage Requirements
(Summary of VAR requirements based upon the results of the steady-state voltage studies.)

To be determined in the System Impact Study

Stability and Reactive Power Requirement for Low Voltage Ride Through
(Summary of VAR requirements based upon the results of the dynamic studies.)

To be determined in the System Impact Study

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)

None

Potential Issues

The thermal and short circuit capabilities of the existing Kankakee (TSS 157) station equipment will need to be reviewed due to the installation of this generation project. It is possible that a significant amount of the existing equipment will need to be upgraded, replaced or rebuilt.

During certain maintenance outages, the #S36 Option #1 project will be required to be taken off line. For example, during a maintenance outage of 138kV line #8605, a single contingency of 138kV line #8603 would island the #S36 wind generation into the load at Kankakee. The typical duration of a maintenance outage on the ComEd system is one week.

System Planning Operating Guide (SPOG: 2-16) provides for closing 138kV line #8604 motor operated disconnect (MOD) at Bradley under certain system conditions. With this disconnect closed, 138 kV line #8604 becomes another parallel path for power to flow from Kankakee to Davis Creek. This will result in additional flow on the Kankakee Tap to Bradley portions of 138 kV lines #8603 and #8605.

An arc furnace is served by 138 kV line #8604. When the line #8604 MOD is closed, there is a direct connection between the arc furnace and the #S36 project. The harmonics created by the arc furnace may have an impact on the #S36 installation.

Impacts on the MISO member transmission systems are not 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.

Delivery of Energy Portion of Interconnection Request
PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

As a result of the aggregate energy resources in the area, no violations were identified.

Option 2

Network Impacts

The #S36 project was studied as a 175 MW (35 MW Capacity) injection at two alternative interconnection points in the ComEd area. Option #2 is to build a new three circuit breaker straight bus substation that would cut into the 138 kV line #8605 ½ mile north of Kankakee and terminate the project into the new substation. Project #S36 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)

No problems were identified.

Multiple Facility Contingency
(Double Circuit Tower Line contingencies only were studied for the full energy output. The contingencies of Line with Failed Breaker and Bus Fault will be performed for the Impact Study)

No problems were identified.

Short Circuit
(Summary of impacted circuit breakers)

To be determined in the System Impact Study

Contribution to Previously Identified Overloads
(#S36 contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None

Steady-State Voltage Requirements
(Summary of VAR requirements based upon the results of the steady-state voltage studies.)

To be determined in the System Impact Study

Stability and Reactive Power Requirements for Low Voltage Ride Through
(Summary of VAR requirements based upon the results of the dynamic studies.)

To be determined in the System Impact Study

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)

None

Potential Issues

For the single contingency trip of 138kV line #8605, the #S36 Option #2 project will need to be taken off line to avoid islanding into the load at Kankakee. The addition of circuit breakers at Kankakee (TSS 157) could be installed to mitigate this risk.

System Planning Operating Guide (SPOG: 2-16) provides for closing 138kV line #8604 motor operated disconnect (MOD) at Bradley under certain system conditions. With this disconnect closed, 138 kV line #8604 becomes another parallel path for power to flow from Kankakee to Davis Creek. This will result in additional flow on the Kankakee Tap to Bradley portion of 138 kV line #8605.

An arc furnace is served by 138 kV line #8604. When the line #8604 MOD is closed, there is a direct connection between the arc furnace and the #S36 project. The harmonics created by the arc furnace may have an impact on the #S36 installation.

Impacts on the MISO member transmission systems are not 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.

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

As a result of the aggregate energy resources in the area, the following violations were identified:

1. Contribution of 93 MW overloads the Kankakee Blue Tap to Bradley portion of the Davis Creek to Bradley 138 kV line #8605 from 62% to 106% of its emergency rating (210 MVA) for the outage of the Kankakee to Kensington Ave 138 kV line #19905 (formerly line #8605).