

#V3-004 (Siegfried – Hauto 83 MW)
Generation Interconnection

This analysis was completed to assess the reliability impact for a new Generation Interconnection to the PJM System.

Network Impacts

The queue V3-004 project was studied as an 83MW capacity injection into the PPL system. There were two optional points of interconnection studied. The first option was to connect to a new substation which taps into the Hauto – Siegfried 69kV circuits #1 and #4. The second option was to connect to a new substation which taps the Harwood – East Palmerton 230kV line. This study also involved a potential transfer of capacity interconnection rights (CIRs) from retired generation at the South Hamburg substation. Project V3-004 was evaluated for compliance with reliability criteria for summer peak conditions in 2014. Potential network impacts were as follows:

Option 1: Hauto – Siegfried 69kV circuit#1 and #4

NETWORK IMPACTS

Generator Deliverability

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

1. The Ashfield - Siegfried 69kV line (from bus 209533 to bus 209303 ckt 1) loads from 30.45% to 117.05% (DC power flow) of its normal rating (43MVA) for non-contingency conditions as a result of V3-004. This project contributes approximately 63.1MW to cause this thermal violation. PJM's CIR transfer study found that generation at South Hamburg had no affect on this overload. This means that a transfer of CIRs from South Hamburg to project V3-004's generation would not alleviate any responsibility to mitigate this violation.

*Note: the power in the basecase (before queue project generation dispatch) was flowing in the opposite direction from Siegfried to Ashfield. This is why V3-004 is able to contribute 63MW, and only load the line to 117% of its normal line rating.

Multiple Facility Contingency

(Double Circuit Tower Line contingencies only for the full energy output. Stuck breaker and bus fault contingencies will be performed for the Impact Study)

2. The Ashfield - Siegfried 69kV line (from bus 209533 to bus 209303 ckt 1) loads from 28.56% to 103.19% (DC power flow) of its emergency rating (63MVA) for the tower contingency ('PL100282_V3-001A') as a result of V3-004. This contingency outage disconnects all lines coming out of the South Slatington2, East Palmerton Old T, and Hauto4 69kV buses. This project contributes approximately 83MW to cause this thermal

violation. PJM's CIR transfer study found that generation at South Hamburg had no affect on this overload. This means that a transfer of CIRs from South Hamburg to project V3-004's generation would not alleviate any responsibility to mitigate this violation.

*Note: the power in the basecase (before queue project generation dispatch) was flowing in the opposite direction from Siegfried to Ashfield. This is why V3-004 is able to contribute 83MW, and only load the line to 103% of its emergency line rating.

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)

No problems identified.

Short Circuit

3. The East and West 69 kV Bus circuit breakers at Siegfried 230/138/69 kV substation were overdutied. The two breakers will need to be replaced with 40 kA interrupting capability equivalent.

NETWORK UPGRADE REQUIREMENTS

New System Reinforcements

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

- 1 & 2. Rebuild the Hauto – Siegfried 69 kV #1 and #4 lines. Total estimated cost is **\$31,970,000** and construction time is **24-36 months**.

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.

Short Circuit

3. The East and West 69 kV Bus circuit breakers at Siegfried 230/138/69 kV substation will need to be replaced with 40 kA interrupting capability equivalent. The estimated cost to complete this work is **\$375,000**.

Stability Analysis

Will be performed for the Impact Study.

Option 2: Harwood – East Palmerton 230kV

Generator Deliverability

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

No problems identified.

Multiple Facility Contingency

(Double Circuit Tower Line contingencies only for the full energy output. Stuck breaker and bus fault contingencies will be performed for the Impact Study)

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)

No problems identified.

Short Circuit

No problems identified.

Stability Analysis

Will be performed for the Impact Study.

NETWORK UPGRADE REQUIREMENTS

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.