Queue R64
Lancaster 138kV
Feasibility Study Report

Network Impacts

The #R64 project was studied as a 200 MW (40 MW of capacity) injection into the Lancaster 138 kV substation in the ComEd territory. Project #R64 was evaluated for compliance with 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 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 System Impact Study)

1. The Nelson to Walton Road (#P20) 345 kV line #15502 is loaded from 99.43% to 102% of its applicable load dump rating (1572 MVA) for the Cherry Valley to Silver Lake 345 kV line and Cherry Valley to Glidden 138 kV line tower outage (#15616 & #15627). This project contributes approximately 38 MW to cause the thermal violation.
2. The Lancaster Wind Farm (#K04_CE19) to Pecatonica portion of 138 kV line #17121 is loaded from 72% to 130% of its applicable load dump rating (345 MVA) for the Lancaster to Baileyville Wind Farm (#K02_CE18) and the Sabrooke to Freeport 138 kV tower line outage (#11902 & #19414). This project contributes approximately 200 MW to cause the thermal violation.

Short Circuit

(Summary of impacted circuit breakers)

To be completed in the System Impact Study.

Contribution to Previously Identified Overloads

(#R64 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 38 MW further overloads the Walton Road (#P20) to Electric Junction 345 kV line #18402 from 111% to 113% of its applicable load dump rating (1572 MVA) for the Cherry Valley to Silver Lake 345 kV line and Cherry Valley to Glidden 138 kV line tower outage (#15616 & #15627). This overload was first caused

by the #R33 project with additional contributions from projects #R54, #R55 & #R59. The System Impact Study for this project will define the cost allocation, if any, for this generation project. Rough estimates to eliminate the overload are around $7.2 million.

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)

1. The overload of the ComEd-owned Nelson to Walton Road (#P20) 345 kV line #15502 can be relieved by removing the sag limitation on approximately 2.5 miles of line #15502 between Nelson and Tower #211. The conductor used in this portion of line is 2338 kcmil ACAR. This has been roughly estimated to cost $ 1,300,000.

2. The overload on the portion of 138kV line #17121 from Lancaster Wind Farm (#K04_CE19) to Pecatonica Tap can be relieved by reconductoring approximately 12.3 miles of transmission line to achieve a higher rating. This has been roughly estimated to cost $4,600,000.

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 System Impact Study)

To be determined in the System Impact Study

Potential Issues

Impacts on the MISO member transmission systems are not included in this analysis, but they will be included in the System 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 122 MW further overloads the Lancaster to Freeport 138 kV line #11901 from 227% to 311% of its emergency rating (145 MVA) for the outage of the Wempletown to Lancaster Wind Farm (#K04_CE19) 138 kV line #17121. This overload was caused by projects prior to the R-queue with additional contributions from projects #R16, #R33 & #R55.

2. Contribution of 69 MW further overloads the Lancaster to Freeport 138 kV line #11901 from 145% to 193% of its normal rating (140 MVA). This overload was first caused by the #R16 project with an additional contribution from project #R55.

3. Contribution of 122 MW further overloads the Freeport to Titan Tire Co Tap portion of 138 kV line #19414 from 137% to 203% of its emergency rating (182 MVA) for the outage of the Wempletown to Lancaster Wind Farm (#K04_CE19) 138 kV line #17121. This overload was first caused by project #R16 with an additional contribution from project #R55.

4. Contribution of 69 MW overloads the Freeport to Titan Tire Co. Tap portion of 138 kV line #19414 from 93% to 142% of its normal rating (140 MVA).

5. Contribution of 200 MW further overloads the Lancaster to Lancaster Wind Farm (#K04_CE19) 138 kV line #11921 from 109% to 186% of its emergency rating (261 MVA) for the outage of Lancaster to Freeport 138 kV line #11901, which also opens the 138kV line #11902 circuit breaker at Lancaster. This overload was first caused by the #R16 project.

6. Contribution of 200 MW further overloads the Lancaster Wind Farm (#K04_CE19) to Pecatonica Tap portion of 138 kV line #17121 from 140% to 217% of its emergency rating (261 MVA) for the outage of Lancaster to Freeport 138 kV line #11901, which also opens the 138kV line #11902 circuit breaker at Lancaster. This overload was first caused by the #R16 project.

7. Contribution of 200 MW further overloads the Wempletown to Pecatonica Tap portion of 138 kV line #17121 from 136% to 213% of its emergency rating (261 MVA) for the outage of Lancaster to Freeport 138 kV line #11901, which also

opens the 138kV line #11902 circuit breaker at Lancaster. This overload was first caused by the #R16 project.