

S51 – East Liberty – Blue Jacket 69 kV
Generation 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

Queue S51 was studied with two interconnection options. The Queue S51OP1 Project was studied as a 150 MW injection at Logan – Darby 69 kV line. Project S51OP1 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. Potential network impacts were as follows:

OPTION#1:

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 for the full energy output. Stuck breaker and bus fault contingencies will be performed for the Impact Study)

1. Bellefontaine-AP Technoglass, which is currently limited to 80N/98E, loads up to 110 MVA.
2. O21 Tap-Logan 69 kV, which is currently limited to 80N/98E, loads to 119 MVA.
3. AP Techno-HBD 69 kV, which is currently limited to 80N/98E, loads to 100 MVA.
4. HBD-BJ Tap 69 kV, which is currently limited to 80N/98E, loads to 99 MVA.
5. Logan-Bellefontaine 69 kV, which is currently limited to 80N/98E, loads to 132 MVA.
6. Darby – Delaware 138 kV line loads to 104% of its emergency rating (242 MVA) for the **tower** outage of S46 – Givens – Urbana – Bath 138 kV lines (Cont ID: DAYTON_TOWER_R52_15B_S46B).

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)

7. Contribution of 8 MW further overloads to the Givens – Urbana 138 kV line from 103.43% to 106.34% of its emergency rating (274 MVA) for the Tower

- contingency outage of Foster – Bath 345 kV line and Foster – Sugar Creek 345 kV line (Cont ID: DAYTON_TOWER_6).
8. Contribution of 11 MW further overloads to the Urbana – Clark 138 kV line from 100% to 104% of its emergency rating (309 MVA) for the Tower contingency outage of Darby – Eagle – Mechanicsburg – R52 138 kV lines (Cont ID: DAYTON_TOWER_R52_15A).
 9. Contribution to the overload of the Kingscreek – Logan 69 kV circuit.
 10. Contribution to the overload of the Woodstock – Marysville 69 kV circuit.

New System Reinforcements

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

1. Reconductor 1.9 mi. of the Bellefontaine – AP Technoglass 69 kV circuit.
2. Reconductor an estimated 12 mi. (depends on final location of O21) of the queue number O21 to Logan 69 kV circuit.
3. Reconductor HBD – AP Technoglass 69 kV circuit.
4. Reconductor HBD – Blue Jacket Tap 69 kV circuit.
5. Reconductor Bellefontaine – Logan 69 kV circuit.
6. Replace 300 Cu Bus, 300 Cu breaker conductor, and relays to increase loadability.
7. Upgrade the Darby – Delaware 138 kV circuit.

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)

To be determined.

Short Circuit

3 of the 4 breakers identified as over-duty as a result of Queue R52 generation will be further overdutied by the S45 project:

1. Urbana 69kV breakers DB-BH1, DB-BH3E, and DB-BH3W.

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.

1. Contribution of 8 MW further overloads the S46 - Givens 138 kV line from 54% to 121% of its normal rating (222 MVA).

2. Contribution of 8 MW further overloads the Givens – Urbana 138 kV line from 115% to 119% of its normal rating (222 MVA).
3. Contribution of 17 MW further overloads the Urbana – Clark 138 kV line from 97% to 103% of its emergency rating (309 MVA) for the outage of the Darby – Mechanicsburg and Mechanicsburg – R52 138 kV lines (Contingency ID: OUTAGE_09AX).
4. Contribution of 17 MW further overloads the Urbana – Clark 138 kV line from 95% to 101% of its normal rating (276 MVA).
5. Contribution of 20 MW further overloads to the Darby – Delaware 138 kV line from 96% to 104% of its emergency rating (242 MVA) for the outage of S46 – Givens – Urbana 138 kV line.
6. Contribution to the overload of the Kingscreek – Logan 69 kV circuit.
7. Contribution to the overload of the Woodstock – Marysville 69 kV circuit.

OPTION#2:

Generator Deliverability

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

1. The Blue Jacket –Blue Jacket tap 69 kV line is overloaded from 85% to 136% of its emergency rating (98 MVA) for the Tower outage of Sidney – Shelby 138 kV line and E. Sidney – Quincy – Logan 138 kV line and the Logan 138/69 kV xfmr DCTL (Contingency ID: DAYTON_TOWER_33). This project contributes approximately 50 MW to cause the thermal violation.

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)

1. BJ Tap-Huntsville 69 kV, which is currently limited to 80N/98E, loads to 101 MVA.
2. Logan-Bellefontaine 69 kV, which is currently limited to 80N/98E, loads to 101 MVA.
3. The Darby – Delaware 138 kV line is overloaded from 96% to 104% of its emergency rating (242 MVA) for the **tower** outage of S46 – Givens – Urbana – Bath 138 kV lines (Contingency ID: DAYTON_TOWER_R52_15B_S46B) This project contributes approximately 20 MW to cause the thermal violation.

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)

4. Contribution to the overload of the Kingscreek – Logan 69 kV circuit.
5. Contribution to the overload of the Woodstock – Marysville 69 kV circuit.
6. Contribution of 6 MW further overloads the Urbana – Clark 138 kV line is loaded from 100% to 102% of its emergency rating (309 MVA) for the **tower** outage of Darby – Eagle – Mechanicsburg – R52 138 kV lines (Contingency ID: DAYTON_TOWER_R52_15A).

New System Reinforcements

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

1. Reconductor Bellefontaine – Logan 69 kV circuit.
2. Reconductor Blue Jacket Tap – Huntsville 69 kV circuit.
3. Upgrade the Darby – Delaware 138 kV circuit.

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)

1. Contribution to the overload of the Kingscreek – Logan 69 kV circuit.
2. Contribution to the overload of the Woodstock – Marysville 69 kV circuit.

Short Circuit

The following 2 breakers are overdutied with this Option 2 interconnection:
Logan 69kV breakers EJ-6645 and EJ-6646

3 of the 4 breakers identified as over-duty as a result of Queue R52 generation will be further overdutied by the S45 project:

1. Urbana 69kV breakers DB-BH1, DB-BH3E, and DB-BH3W.

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.

1. Contribution of 60 MW further overloads the Blue Jacket –Blue Jacket Tap 69 kV line from 63% to 138% of its normal rating (80 MVA).

2. Contribution of 106 MW further overloads the Blue Jacket –Blue Jacket Tap 69 kV line from 52% to 160% of its emergency rating (98 MVA) for the outage of the Blue Jacket 69/138 kV xfmr (Contingency ID: OUTAGE_49A).
3. Contribution of 7.5 MW further overloads the Urbana –Clark 138 kV line from 98% to 101% of its normal rating (276 MVA).
4. Contribution of 19 MW further overloads the Darby – Delaware 138 kV line from 99% to 107% of its emergency rating (242 MVA) for the outage of S46 – Givens –Urbana 138 kV lines (Contingency ID: OUTAGE_09AY_WITH_R52_S46B).