#W1-037 East Lima-South Kenton 138kV

Generation Interconnection

Network Impacts

The queue W1-037 project was studied as a 20 MW capacity injection into AEP's system tapping East Lima – South Kenton 138kV line. The project was studied on a combined feasibility-impact basis which utilizes an AC analysis, and incorporates all contingency types. Project W1-037 was evaluated for compliance with reliability criteria for summer peak conditions in 2014. Potential network impacts were as follows:

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, Line with Failed Breaker and Bus Fault contingencies for the full energy output)

No problems identified

Short Circuit

(Summary form of Cost allocation for breakers will be inserted here if any)

No problems identified

Stability

Not required because the project is less than 30 MW.

System Reinforcements

None.

Potential Congestion due to Local Energy Deliverability

(PJM also studied the delivery of the energy portion of the surrounding generation. Any potential 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 Transmission Interconnection Request. Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full deliverability for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which analyzes

all overload conditions associated with the identified overloaded element(s). As a result of the aggregate energy resources in the area, the following violations were identified:

The congestion listed below was based upon U1-060 being at 200 MW and U2-042 being in service at 201 MW. U1-060 subsequently reduced its project to 151.8 MW and U2-042 has been withdrawn.

1. The 05WINDFL-Fulton 138 kV line (from bus 243148 to bus 243011 ckt 1) loads from 141.03% to 148.66% (DC power flow) of its emergency rating (262 MVA) for the single line contingency ('5138_B2_TOR700_U1-60A'). This project contributes approximately 20 MW to cause the thermal violation.

2. The 05N WALD-05WINDFL 138 kV line (from bus 243048 to bus 243148 ckt 1) loads from 193.91% to 204.32% (DC power flow) of its emergency rating (192 MVA) for the single line contingency ('5138_B2_TOR700_U1-60A'). This project contributes approximately 20 MW to cause the thermal violation.

3. The West Newton-East Lima 138 kV line (from bus 243155 to bus 242989 ckt 1) loads from 206.74% to 217.16% (DC power flow) of its emergency rating (192 MVA) for the single line contingency ('5138_B2_TOR700_U1-60B'). This project contributes approximately 20 MW to cause the thermal violation.

4. The West Newton-East Lima 138 kV line (from bus 243155 to bus 242989 ckt 1) loads from 198.45% to 208.74% (DC power flow) of its normal rating (156 MVA) for non-contingency condition. This project contributes approximately 16.06 MW to cause the thermal violation.

5. The 05BLMF Z-05WMTVER 138 kV line (from bus 242963 to bus 243153 ckt 1) loads from 197.07% to 207.93% (DC power flow) of its emergency rating (184 MVA) for the single line contingency ('5138_B2_TOR700_U1-60A'). This project contributes approximately 20 MW to cause the thermal violation.

6. The Lynn-South Kenton 138 kV line (from bus 243031 to bus 243103 ckt 1) loads from 207.67% to 218.09% (DC power flow) of its emergency rating (192 MVA) for the single line contingency ('5138_B2_TOR700_U1-60A'). This project contributes approximately 20 MW to cause the thermal violation.

7. The U1-60 TAP-West Newton 138 kV line (from bus 292823 to bus 243155 ckt 1) loads from 208.81% to 219.22% (DC power flow) of its emergency rating (192 MVA) for the single line contingency ('5138_B2_TOR700_U1-60B'). This project contributes approximately 20 MW to cause the thermal violation.

8. The U1-60 TAP-Lynn 138 kV line (from bus 292823 to bus 243031 ckt 1) loads from 208.81% to 219.22% (DC power flow) of its emergency rating (192 MVA) for the single line

contingency ('5138_B2_TOR700_U1-60A'). This project contributes approximately 20 MW to cause the thermal violation.

9. The U1-60 TAP-West Newton 138 kV line (from bus 292823 to bus 243155 ckt 1) loads from 201% to 211.3% (DC power flow) of its normal rating (156 MVA) for non-contingency condition. This project contributes approximately 16.06 MW to cause the thermal violation.

10. The Fulton-05BLMF Z 138 kV line (from bus 243011 to bus 242963 ckt 1) loads from 198.91% to 209.78% (DC power flow) of its emergency rating (184 MVA) for the single line contingency ('5138_B2_TOR700_U1-60A'). This project contributes approximately 20 MW to cause the thermal violation.

11. The 05WILDC8-05N WALD 138 kV line (from bus 243147 to bus 243048 ckt 1) loads from 204.89% to 215.31% (DC power flow) of its emergency rating (192 MVA) for the single line contingency ('5138_B2_TOR700_U1-60A'). This project contributes approximately 20 MW to cause the thermal violation.

12. The South Kenton-05WILDC8 138 kV line (from bus 243103 to bus 243147 ckt 1) loads from 206.15% to 216.57% (DC power flow) of its emergency rating (192 MVA) for the single line contingency ('5138_B2_TOR700_U1-60A'). This project contributes approximately 20 MW to cause the thermal violation.