#T142 East Lima-Marysville 345kV

Generation Interconnection

This analysis was completed to assess the reliability impact for the increase in generation interconnecting to the PJM system as a capacity resource.

Local AEP Impacts

The interconnection for this facility has been requested on the East Lima - Marysville 345 kV circuit or the Southwest Lima – Marysville 345 kV circuit. East Lima – Marysville is the primary connection point, while Southwest Lima – Marysville is the secondary connection point. The interconnection for this unit was studied on both circuits at full capacity. Further study at it's Capacity Credit level (20% of full output) was not deemed necessary based on the results. Further information on the Criteria, Methodology, and Assumptions used for this analysis can be found in Appendix A.

Primary Connection Point (East Lima – Marysville 345 kV)

Normal System (2011 Summer Conditions)

- No concerns

Single Contingency (2011 Summer Conditions)

- No concerns

Multiple Contingency (2011 Summer Conditions)

- No concerns

Short Circuit Analysis

- No concerns

Stability Analysis

- Stability studies were not performed as part of this Feasibility Study and are not normally performed as part of a Feasibility Study effort. The stability assessments are part of the System Impact Study. Based upon the results of this future System Impact Study, the extent of system upgrades could change and the associated costs could be significantly different.

Secondary Connection Point (Southwest Lima – Marysville 345 kV)

Normal System (2011 Summer Conditions)

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- No concerns

Single Contingency (2011 Summer Conditions)

- No concerns

Multiple Contingency (2011 Summer Conditions)

- No concerns

Short Circuit Analysis

- No concerns

Stability Analysis

- Stability studies were not performed as part of this Feasibility Study and are not normally performed as part of a Feasibility Study effort. The stability assessments are part of the System Impact Study. Based upon the results of this future System Impact Study, the extent of system upgrades could change and the associated costs could be significantly different.

Network Impacts (PJM Analysis)

The Queue Project #T142 was studied as a(n) 300MW(Capactiy=60MW) injection at the East Lima – Marysville 345 kV line in the AEP area. Project #T142 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 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.

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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)

None

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

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. **(AEP)** The R60C-Robison Park 345kV line loads from 131.5% to 133.8% (DC power flow) of its normal rating (897MVA) for non-contingency condition. This project contributes approximately 20.4MW to the thermal congestion. Projects S72 and T130 also contribute to this potential congestion.

This potential congestion can be alleviated by expanding the existing Allen 345 kV bus to a 5 position ring with a possible future breaker and a half configuration to allow a loop in and out of the R60-S72/Convoy 345kV circuit.

Estimated Cost:* ***$4,800,000***

- Loop the R60 to S72/Convoy 345 kV circuit into this substation.

Estimated Cost:* ***$500,000***

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Total Local/Network Upgrade Cost*: **$5,300,000**

OPTION 2:

Network Impacts

The Queue Project #T142 was studied as a(n) 300MW(Capactiy=60MW) injection at the SouthWest Lima – Marysville line in the AEP area. Project #T142 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 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

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)

None

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

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(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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

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:

2. 1. **(AEP)** The R60C-Robison Park 345kV line loads from 131.5% to 133.0% (DC power flow) of its normal rating (897MVA) for non-contingency condition. This project contributes approximately 13.9MW to the thermal congestion. Projects S72 and T130 also contribute to this potential congestion.

This potential congestion can be alleviated by expanding the existing Allen 345 kV bus to a 5 position ring with a possible future breaker and a half configuration to allow a loop in and out of the R60-S72/Convoy 345kV circuit.

Estimated Cost:* ***$4,800,000***

- Loop the R60 to S72/Convoy 345 kV circuit into this substation.

Estimated Cost:* ***$500,000***

Total Local/Network Upgrade Cost*: **$5,300,000**

Reactive Requirements

PJM requires a power factor correction to 95% lead/lag at the point of interconnection for wind generating facilities. It is expected that Horizon will adhere to this st

MISO Impacts

Any impacts on the MISO transmission system will be identified in the Impact Study.

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