# #X1-086– Guildford 34.5kV
# Generation Interconnection

## Revenue Metering and SCADA Requirements

**For PJM**: The Interconnection Customer will install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for Interconnection Customer's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 24.1 to 24.2.

**For APS:** The Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "FirstEnergy Requirements for Transmission Connected Facilities" document located at the following links:
www.firstenergycorp.com/feconnect
www.pjm.com/planning/design-engineering/to-tech-standards.aspx

See AP Revenue Metering Requirements for Generation Interconnection Customers and Allegheny Power Engineering Manual Section 19, Subject Index 36.0.

## Network Impacts

The X1-086 project was studied as a 9.7MW (3.69MW Capacity) injection into the Penelec area at the W1-013 TAP 34.5kV substation. Project X1-086 was evaluated for compliance with reliability criteria for summer peak conditions in 2015.

Please note that after the Feasibility Study case was locked and this analysis was been performed, queue projects W1-013 and W1-014 have withdrawn from the queue. The System Impact Study analysis will reflect only active queue projects.

Potential network impacts were as follows:

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

No violations were identified by PJM.

**APS analysis:**

**Table 3. Generator Deliverability - as found by APS**

| Item | Type | Outage Description | Overloaded Element | N/4-Hr Rating | MVA Flow* | % Rating | MW Contribution** |
|---|---|---|---|---|---|---|---|
| 3a | Single | Loss of St. Thomas – W1-086_TAP 34.5kV Line | Grapevine(W1-013 Tap) - CNG Jct. 34.5kV Line | 31.3/36.8 MVA | 45.2 | 122.9 | 8.4 |
| 3b | Single | Loss of V3-062 Tap – Texas Eastern 6 138kV Line | Milnor – Route 16 34.5kV Line | 31.3/36.8 MVA | 47.2 | 128.3 | 1.25 |
| 3c | Single | Loss of Guilford – CNG Jct. 34.5kV Line | LeMasters Jct. –Mercersburg 34.5kV Line | 16.6/19.1 MVA | 21 | 109.8 | 1.9 |

*- Represents the loading with contribution from all projects in the X1 queue.
**- MW contribution of the X1-086 project to the corresponding overload.

**Multiple Facility Contingency**
*(Double Circuit Tower Line contingencies were studied for the full energy output. The contingencies of Line with Failed Breaker and Bus Fault will be performed for the Impact Study.)*

No violations were identified.

**Short Circuit**
*(Summary of impacted circuit breakers)*

Not required.

**Contribution to Previously Identified Overloads**
*(X1-086 contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)*

No violations were identified.

**New System Reinforcements**
*(Upgrades required to mitigate reliability criteria violations, I.e. "Network Impacts", initially caused by the addition of this project's generation.)*

For Item 3a, the overload of the Grapevine (W1-013 Tap) – CNG Jct. 34.5kV line can be relieved by reconductoring approximately 2.13 miles of the Grapevine (W1-013 Tap) – CNG Jct. 34.5kV line and upgrading terminal facilities as necessary. The estimated cost to perform this work is **$632,606**.

For Item 3b, the overload of the Milnor – Route 16 34.5kV line can be relieved by reconductoring approximately 4.09 miles of the Milnor – Route 16 34.5kV line and upgrading terminal facilities as necessary. The estimated cost to perform this work is **$1,198,297**.

For Item 3c, the overload of the LeMasters Jct. – Mercersburg 34.5kV line can be relieved by reconductoring approximately 3.8 miles of the LeMasters Jct. – Mercersburg 34.5kV line and upgrading terminal facilities as necessary. The estimated cost to perform this work is **$1,105,313**.

**Contribution to Previously Identified System Reinforcements**

*(Overloads initially caused by prior Queue positions with additional contributions to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study.)*

Not required.

**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.*

*Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.*

As a result of the aggregate energy resources in the area, no violations were identified.