#U4-033– University Park 345kV
Generation Interconnection

Revenue Metering and SCADA Requirements

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

For ComEd: IC will be required to install equipment necessary to provide bi-directional Revenue Metering (KWH, KVARH) and real time data (KW, KVAR, circuit breaker status, and 345 kV voltage) for IC's generating Resource. See ComEd Applicable Standards available on the PJM website ("TO Standards") – "Exelon Energy Delivery Interconnection Guidelines (Generators Greater than 20 MW)".

Network Impacts

The queue U4-033 project was studied as a 36MW capacity injection into ComEd's system at the University Park North 345kV substation. Project U4-033 was evaluated for compliance with reliability criteria for summer peak conditions in 2013. Potential network impacts were as follows:

Generator Deliverability

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

Table 1 - Generator Deliverability Impacts

Item	Project	Contribution MW	Overloaded Element	Overload %		Rating		Contingency
				From	To	Type	MVA	
1a	U4-033	27.0	University Park North Energy Center to East Frankfort Red 345kV line 6608	99.97%	102.45%	Emergency	1091	Wilton Center to Dumont 765kV line 11215 ('05DUMONT 765 - WILTO; 765 - 1')

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 problems were identified.

Short Circuit

(Summary of impacted circuit breakers)

To be determined in the System Impact Study.

Contribution to Previously Identified Overloads
(U4-033 contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

No problems were identified.

Steady-State Voltage Requirements
(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

To be determined in the System Impact Study.

Stability and Reactive Power Requirement for Low Voltage Ride Through
(Summary of the 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)

In Item 1a from Contribution to Previously Identified Overloads, the overload of the University Park North Energy Center to East Frankfort Red 345kV line 6608 is caused by an outage of Wilton Center to Dumont 765kV line 11215. The overload can be relieved by reconductoring approximately 5.4 miles of the 345kV line 6608. Existing documentation suggests that sag limitations may exist. Additional review and surveys will need to be conducted to determine the actual upgrade necessary in the Facilities Study stage. The cost of this upgrade is estimated to be **$5,000,000**. Currently this is the first project to cause this overload. If necessary, cost allocations will be assigned during the System Impact Study.

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)

No contribution to previously identified system reinforcements required.

Potential Issues

In the previous queue, multiple projects were studied with more than one option. The U queue was studied with the primary Point of Interconnection (POI) from the prior queue. U queue primary POI selections were studied with only other U queue primary POI selections and the prior queue constraints listed above. U queue secondary POI selections were studied with only other U queue secondary POI selections and the prior queue constraints listed above. Depending on which POI selection the prior queue projects choose, results may significantly change between the Feasibility and Impact Studies.

Impacts on the MISO member transmission systems are not included in this analysis, but they will be included in the 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.

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.

#U4-033– University Park 345kV
Generation Interconnection

Revenue Metering and SCADA Requirements

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For ComEd: IC will be required to install equipment necessary to provide bi-directional Revenue Metering (KWH, KVARH) and real time data (KW, KVAR, circuit breaker status, and 345 kV voltage) for IC's generating Resource. See ComEd Applicable Standards available on the PJM website ("TO Standards") – "Exelon Energy Delivery Interconnection Guidelines (Generators Greater than 20 MW)".

Network Impacts

The queue U4-033 project was studied as a 36MW capacity injection into ComEd's system at the University Park North 345kV substation. Project U4-033 was evaluated for compliance with reliability criteria for summer peak conditions in 2013. 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 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 problems were identified.

Short Circuit
(Summary of impacted circuit breakers)

To be determined in the System Impact Study.

Contribution to Previously Identified Overloads

(U4-033 contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

Table 1 - Contribution to Previously Identified Overloads								
Item	Project	Contribution MW	Overloaded Element	Overload %		Rating		Contingency
				From	To	Type	MVA	
1a	U4-033	27.0	University Park North Energy Center to East Frankfort Red 345kV line 6608	108.7%	111.1%	Emergency	1091	Wilton Center to Dumont 765kV line 11215 ('05DUMONT 765 - WILTO; 765 - 1')

Steady-State Voltage Requirements

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

To be determined in the System Impact Study.

Stability and Reactive Power Requirement for Low Voltage Ride Through

(Summary of the 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)

No new system requirements were identified.

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)

In Item 1a from Contribution to Previously Identified Overloads, the overload of the University Park North Energy Center to East Frankfort Red 345kV line 6608 is caused by an outage of Wilton Center to Dumont 765kV line 11215. The overload can be relieved by reconductoring approximately 5.4 miles of the 345kV line 6608. Existing documentation suggests that sag limitations may exist. Additional review and surveys will need to be conducted to determine the actual upgrade necessary in the Facilities Study stage. The cost of this upgrade is estimated to be **$5,000,000**. Cost allocations will be assigned during the System Impact Study.

Potential Issues

In the previous queue, multiple projects were studied with more than one option. The U queue was studied with the primary Point of Interconnection (POI) from the prior queue. U queue primary POI selections were studied with only other U queue primary POI selections and the prior queue constraints listed above. U queue secondary POI selections were studied with only other U queue secondary POI selections and the prior queue constraints listed above. Depending on which POI selection the prior queue projects choose, results may significantly change between the Feasibility and Impact Studies.

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