

#S42 Eldred – Fairview 20 MW  
**Generator 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***

The Queue S42 project was studied as a 20 MW injection (4 MW of capacity) into the Eldred to Fairview 69 kV line. The project 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 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. The Frackville - Siegfried 230 kV line is overloaded from 99.7% to 100.29% of its emergency rating (616 MVA) for the **tower** outage of Susquehanna to East Palmerton 230kV line and Harwood to Siegfried 230kV line (Cont Id. 4PPL). This project contributes approximately **5 MW** to cause the thermal violation.

Mathematically the first project in queue order to cause the Frackville – Seigfried line to exceed its rating was the addition of Queue S42. The overload was small but nevertheless an overload – “the straw that broke the camel’s back”. Current PJM rules establish a threshold whereby the overload contribution must exceed 1% of the facilities’ rating in order to be responsible for the upgrade except if it is the first project to cause the overload, as is the case with Queue S42. The upgrade requirement for Queue S41 will be minimal. See the next page for NETWORK UPGRADE REQUIREMENT.

#### **Short Circuit Analysis**

To be completed during the Queue S42 Impact Study.

#### **Stability Analysis**

Not required because of generator size.

#### **Voltage Regulation and “Zero-Voltage Ride-Thru” Analysis**

To be completed during the Queue S42 Impact Study.

### **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)*

No problems were identified

## **NETWORK UPGRADE REQUIREMENTS**

### **New System Reinforcements**

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

1. Frackville – Siegfried 230 kV line upgrade. In order to provide less than 1% additional capacity on the Siegfried-Frackville 230kV line, PPL EU will first re-calculate the line rating based on the most current Line Rating Guidelines to verify the currently published emergency rating. If the line rating cannot be increased through re-calculation, PPL EU will investigate re-tensioning of those spans of line that limit the line rating because of sag distance above ground.

### **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)*

None identified.

## **POTENTIAL CONGESTION ISSUES**

### **Delivery of Energy Portion of Interconnection Request**

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below may result in operational restrictions to the project under study or to other generating resources. **Queue S42 is not required to upgrade the following facilities.** If desired Queue S42 can proceed with network upgrades to eliminate these potential operational restrictions at their discretion anytime in the future by submitting a Merchant Transmission Interconnection request.

As a result of the aggregate energy resources in the area, the following pre-contingency overloads (congestion) were identified:

1. S42 contribution of **7 MW** further overloads the Frackville - Siegfried 230 kV line from 114% to 115% of its emergency rating (616 MVA) for the outage of Sunbury to Juniata 500 kV line and Sunbury to Susquehanna 500 kV line (Cont Id. PJM69).

2. S42 contribution of **12 MW** overloads the Eldred - Frackville 230 kV line from 99% to 102% of its emergency rating (455 MVA) for the outage of Sunbury to Juniata 500 kV line and Sunbury to Susquehanna 500 kV line (Cont Id. PJM69).
  
3. During system summer peak loading conditions with Queue S42 and all other generation in the area at maximum energy output the Frackville H3 - Frackville 230 kV line loading increases from 99% to 102% of its emergency rating (455 MVA) for the tower line outage of the Sunbury to Juniata 500 kV line and the Sunbury to Susquehanna 500 kV line (Cont Id. PJM69). Queue S42 interconnection contributes **12 MW** to the overload.