



# Generation Interconnections

This analysis was completed to assess the reliability impact for a new generator interconnecting to the PJM system as a capacity resource.

## Network Impacts -5000 MW Injection into the Steelton 230kV substation

### Network Impacts

All load flow studies were performed under the assumption that the Yorkanna-Otter Creek 230 kV line and Otter Creek 230 kV substation are in-service. The B33 project cannot be granted capacity certification without Yorkanna-Otter Creek in service,

### Normal System

- No identified problems.

### Multiple Facility Contingency (MAAC Criteria IIC)

- No identified problems.

### Generator Deliverability

West Hempfield - B31 230 kV, which is a portion of the Brunner-West Hempfield 230 kV circuit, is overloaded at 115% of emergency rating for loss of the Brunner - South Manheim 230 kV circuit.

### Short Circuit Analysis

Addition of the generating project contributes to eleven circuit breakers at Brunner Island 230 kV substation being overdutied. These breakers were initially identified as needing replacement for project B31.

### Arc Furnace Concerns

There is a large arc furnace being supplied from the Steelton 230kV substation. Impact analysis of the existing Steelton arc furnace flicker on the new generation plant facilities is the responsibility of the project developer. Large arc furnace MVAR swings and existing 230 kV voltage flicker is expected to continue. The generator's automatic excitation, speed governor, and auxiliary plant load systems must be designed to withstand these frequent 230 kV voltage swings. If this can not be done within the generation plant, one solution for design consideration is to pay for the installation of an automatic SVC 200-300MVAR capacitor to mitigate the existing 230 kV voltage swings.

This design shall include compliance with MAAC section IIA analysis for the single contingency loss of either W. Shore-Steelton, or Hummelstown-Middletown Jct-Steelton 230 kV lines. The worst case 230 kV voltage swings at Steelton will occur when one line is out-of-service.

### **System Reinforcements**

The generator deliverability violation described above can be resolved by construction of a second Brunner Island-West Hempfield 230kV circuit with a new Marietta substation constructed to accept the new generation. . This new line would not be double circuited with the existing 230kv line. The requirements are detailed below.

- Construction of approximately 6 miles of new 230 kV transmission line from Brunner Island to Marietta.
- Construction of approx. 8 miles of 230 kV transmission line from Marietta to West Hempfield 230 kV substation.
- Associated substation work to terminate the new line at West Hempfield and Brunner Island substations.

Total cost for these network enhancements is estimated at \$33 million and is expected to require 4-6 years for construction, since it is expected to require property condemnations to obtain right-of-way for the new line.

The short circuit criteria violations described above can be alleviated by the replacement of eleven 230 kV breakers. The cost for replacement is estimated at \$3.3 million. Circuit breaker replacement is estimated to take 2-3 years.

Total network reinforcement costs for this project are estimated to be \$36.9 million and overall construction is estimated at 4-6 years.