



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 -750 MW Injection at West Hempfield

Potential network impacts for the injection of 750 MW at West Hempfield 230 kV substation were evaluated for summer peak conditions in 2004.

Based on this analysis, the 750 MW injection contributes to or causes the following overloads:

A) Normal Conditions

- Normal overload on Manor - West Hempfield 230 kV circuit. The generation at West Hempfield 230 kV substation increases the flow on this circuit by 375 MVA. This increased loading on the Manor - West Hempfield 230 kV circuit exceeds the emergency rating of the circuit.

B) Single Contingency

- Contingency overload on the Brunner - South Mannheim 230 kV circuit for the outage of the Manor-West Hempfield 230 kV circuit and for the outage of the Manor - South Akron 230 kV circuit. The increased generation at West Hempfield 230 kV substation increases the flow for these two contingencies by approximately 84 and 33 MVA respectively.
- Contingency overload on the Manor-West Hempfield 69 kV circuit for the outage of the Manor-West Hempfield 230 kV circuit. The increased generation at West Hempfield 230 kV substation increases the flow by 56 MVA.
- Contingency overload on the Manor - West Hempfield 230 kV circuit occurred for every contingency studied.

C) Tower Line Outages

- No system problems were identified.

D) Short Circuit Analysis

- A short circuit analysis was completed for the injection of 750 MW at West Hempfield 230 kV. Two 230 kV breakers at West Hempfield, three 230 kV breakers at Conastone and three breakers at Middletown Junction were found to be over their interrupting capability.

Injection of 750 MW on the Brunner Island-West Hempfield 230 kV Line

Potential network impacts for the injection of 750 MW on the Brunner Island-West Hempfield 230 kV line were evaluated for summer peak conditions in 2004.

Based on this analysis, the 750 MW injection contributes to or causes the following overloads.

A) Normal Conditions

- Normal overload on Manor - West Hempfield 230 kV circuit. The generation at West Hempfield 230 kV substation increases the flow on this circuit by 213 MVA.
- Normal overload on Brunner - South Manheim 230 kV circuit. The generation at West Hempfield 230 kV substation increases the flow on this circuit by 38 MVA.

B) Single Contingency

- Contingency overload on the Brunner - South Manheim 230 kV circuit for the outage of the Manor-West Hempfield 230 kV circuit and for the outage of the Manor - South Akron 230 kV circuit. The increased generation at West Hempfield 230 kV substation increases the flow for these two contingencies by approximately 91 and 42 MVA respectively. In addition the Brunner-South Manheim 230 kV circuit is overloaded by 34 MW for outage of the 230 kV line from the new generator to West Hempfield.
- Contingency overload on the Manor - West Hempfield 230 kV circuit for the outage of Peach Bottom - TMI 500 kV circuit, for the outage of one Conastone 500/230 kV transformer, for the outage of Brunner - South Manheim 230 kV circuit, and for the outage of South Manheim - South Akron 230 kV circuit. The increased generation increases flow for these four contingencies by approximately, 224 MVA, 204 MVA, 222 MVA, and 230 MVA, respectively.

C) Tower Line Outages

- Contingency overload on the Brunner - South Manheim 230 kV circuit for the double circuit tower outage of the Manor - South Akron 230 kV circuit and Face Rock - Engleside #1 69 kV circuit. The increased generation at West Hempfield

230 kV substation increases the flow by approximately 41 MVA.

- Contingency overload of the Manor - West Hempfield 230 kV circuit for the double circuit tower outage of North Temple - Hosensack 230 kV circuit and North Temple - Lyons 230 kV circuit, for the double circuit tower outage of North Temple - Hosensack 230 kV circuit and Alburdis - Lyons 230 kV circuit, for the double circuit tower outage of Brunner - Middletown Junction 230 kV circuits #1 and #2, and for the double circuit tower outage of West Hempfield - Prince 138 kV circuits #1 and #2. The increased generation at West Hempfield 230 kV substation increases the flow by approximately 225 MVA, 225 MVA, 284 MVA, and 219 MVA, respectively.

D) Short Circuit Analysis

- A short circuit analysis was completed for the injection of 750 MW at West Hempfield 230 kV. Two 230 kV breakers at West Hempfield, three 230 kV breakers at Conastone and three breakers at Middletown Junction were found to be over their interrupting capability.

The following comments about network enhancements are appropriate for either method of interconnection of the proposed project to the system.

The flows on the Brunner - West Hempfield 230 kV circuit and the Brunner - South Manheim circuit are negatively impacted by several new generation projects. Due to the existing number of generation interconnection requests that impact these circuits, it is not reasonable at this time to completely develop what, if any, reinforcements will be required.

One possible solution that will be evaluated is the addition of a new 230 kV transmission line from Brunner to South Akron, which alleviates some existing network problems and will provide capability to relieve some of the overloads listed above. The line will cost approximately \$52 million and take approximately six years to build. In addition, a new 23 mile Brunner Island-Manor 230 kV circuit will be needed to eliminate the overloads. This new line is estimated at \$38 million, including line termination costs, and the anticipated construction time is six years, because of expectation of a need for property condemnations.

However, the Brunner area will be studied extensively during the next level of analysis. The impact of this resource will be evaluated, along with all others in the area, and any system reinforcements and associated costs will be specified at that time, if required.