



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 - 1100 MW Injection at Linden

Potential network impacts for the injection of 1100 MW at the Linden 230 kV substation were evaluated for summer peak conditions in 2004. Six cases were developed for the Liberty project. Three pre-project cases at a uniform, high east and high west generation scenarios, and post-project at the same generation outage patterns. These cases had all generation, queued prior to the subject project, and the necessary transmission enhancements required for those projects modeled.

A summary of the load flow analysis for addition of the subject project follows:

A) Normal Conditions

- Results in a normal overload of 11% on the Linden-Warinanco 230 kV circuit.
- Results in a normal overload of 7% on the Aldene-Springfield Rd. 138 kV circuit.
- Results in a normal overload of 6% on the Sewaren-Woodbridge 138 kV circuits

B) Single Contingency

- Contingency overload of 10% on the Linden-Warinanco 230 kV line for an outage of the Deans-Sewaren 230 kV circuit.
- Contingency overload of 19% on the Sewaren-Woodbridge 138 kV circuits for an outage of the Deans-Sewaren 230 kV circuit.

C) Tower Line Contingency

- Contingency overload of 45% on the Linden-Aldene 230 kV circuit for outage of the Deans-Linden/Sewaren-Linden 230 kV tower line.

The following list of reinforcements will alleviate the overloads described.

- Install two new 230 kV underground cables from Linden 23 kV substation to Sewaren

230 kV substation.

- Construct a new 230 kV Metuchen substation
- Install a new Sewaren-Metuchen 230 kV circuit, tapping the Northern Pierson Ave. substation into this circuit. Disconnect the Northern Pierson Ave. from the Linden-Deans 230 kV circuit.
- Convert the Edison-Metuchen, R-1318, 138 kV circuit to 230 kV operation. Connect the Metuchen termination to the new 230 kV bus.
- Convert the Edison and Meadow Rd. 138 kV substations to 230 kV operation.
- Convert the Brunswick-Edison 138 kV circuit to 230 kV operation and move the Brunswick termination to the 230 kV bus.
- Tap the Meadow Rd. Q substation to the Sewaren-Deans 230 kV circuit between the Southern Pierson Ave. and Deans substations.

With the above listed transmission enhancement installed there remains a contingency overload on the Brunswick-Deans 230kV circuit for the outage of the Brunswick-Edison 230 kV circuit. This overload can be relieved by the following:

- Install a series reactor on the Brunswick-Deans 230 kV circuit.

It is estimated that the transmission line upgrades described above will cost approximately \$25.4 million and the associated substation enhancements and new construction will cost approximately \$41.6 million. The construction of all the above facilities would require two years lead time.

A short circuit evaluation was not completed for this installation due to the uncertainty of the number of projects to be installed in this area. The more generation that is added the greater potential for breaker replacements. It is estimated that replacement of a 230 kV breaker will cost approximately \$350,000. A complete short circuit analysis will be performed in the impact study.