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

Network Impacts - 600 MW Injection at Linden

Potential network impacts for the injection of 520 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 4% on the Aldene-Springfield Rd. 138 kV circuit.

· Results in a normal overload of 6% on the Brunswick-Edison 230 kV circuit.

· Results in a normal overload of 9% on the Sewaren-Woodbridge O 138 kV circuit.

· Results in a normal overload of 28% on the Linden-Sewaren 230 kV circuits.

· Results in a normal overload of 14% on the Brunswick 230/138 kV transformer.

B) Single Contingency

· Contingency overload 10.7% on the Linden-Warinanco 230 kV circuit for the outage of the one Tosco-Deans 230 kV circuit. This is over the wave trap rating of 752 MVA. The conductor rating is 873 MVA.

· Contingency overload 3.4% on the Linden-Warinanco 230 kV circuit for the outage of the Deans-Sewaren 230 kV circuit. This is over the wave trap rating of 752 MVA. The conductor rating is 873 MVA.

· Contingency overload 9.4% on the Linden-Warinanco 230 kV circuit for the

outage of the Brunswick-Edison 230 kV circuit. This is over the wave trap rating of 752 MVA. The conductor rating is 873 MVA.

· Contingency overload 5.7% on the Brunswick-Deans 230 kV circuit for the outage of the Brunswick-Edison 230 kV circuit. This is over the wave trap rating of 752 MVA. The conductor rating is 873 MVA.

· Contingency overload 16.5% on both the Sewaren-Woodbridge M and V 138 kV circuits for the outage of the Sewaren-Metuchen 230 kV circuit. This is over the wave trap rating of 222 MVA. The conductor rating is 308 MVA.

C) Tower Line Contingency

· Contingency overload of 15% on each of the two Linden-Sewaren 230 kV circuits for outage of the Deans-Subject Project/Sewaren-Subject Project 230 kV tower line.

The following list of reinforcements will alleviate the overloads described.

· Construct a third Linden-Sewaren 230 kV circuit.

· Convert the Roseland-Fanwood-New Dover-Sewaren 138 kV line to 230 kV operation and terminate at the 230 kV busses at both Roseland and Sewaren.

· Convert the Fanwood, New Dover, and Woodbridge O 138 kV transformers to 230 kV operation.

· String wire to connect Sunnymeade C station to Bennetts Lane E station, thereby, creating a second circuit between Brunswick and Branchburg 230 kV substations.

· Add a series reactor to the Brunswick-Edison 230 kV circuit.

· Add a series reactor to the Sewaren-Pierson Ave.-Deans 230 kV circuit.

· Add a series reactor to the Aldene-Springfield Rd. 138 kV circuit.

· Upgrade wave traps at Linden, Sewaren, and Brunswick.

It is estimated that the transmission line upgrades described above will cost approximately $9.5 million and the associated substation enhancements will cost approximately $27 million. The construction of all the above facilities would require two-year 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.