

#P20 - Nelson – Electric Junction 345kV  
(210 MW Energy and 42 MW Capacity)

### **Generation Interconnection**

#### **Network Impacts**

The #P20 project was studied as a total of 210 MW (42 MW of Capacity) into a tap of the Nelson-Electric Junction 345 kV line 15502. Project #P20 was evaluated for compliance with PJM reliability criteria for summer peak conditions in 2010. Potential network impacts were as follows:

#### **Generator Deliverability**

No problems were identified

#### **Multiple Facility Contingency**

No problems were identified

#### **Contribution to Previously Identified Overloads**

1. Contribution of approximately 19 MW to further overload the Kammer 765/500 kV transformer from 127% to 129% of its emergency rating (1434 MVA) for the Beverly-Tidd-W. Bellair and Kammer-W. Bellair 345 kV tower outage. This violation was first identified for the #N42 project. APS is currently studying the associated network reinforcements to mitigate this condition. The necessary reinforcements and associated cost estimates will be available at the Impact Study phase for this project. The replacement cost for the Kammer 765/500 kV transformer is estimated in the \$18,000,000 range, and P20 may share an allocation cost for this upgrade. The allocation cost, if any, will be determined during the P20 Impact Study.
2. Contribution of approximately 9 MW further overloads the West Dekalb Tap to Tower Road Wind Farm portion of 138 kV line 11323 from 116% to 119% of its load-dump rating (300 MVA) for the tower outage of lines 18402 & 16703. The thermal violation on line 11323 from West Dekalb Tap to Tower Road Wind Farm was originally identified due to the #P14 project for the tower outage of lines 15616 & 15627. The same monitored element is also overloaded by the #P14 project for the tower outage of lines 18402 & 16703. The solution for this overload is still being developed, and P20 may share an allocation for this upgrade. The allocation cost, if any, will be determined during the P20 Impact Study.
3. There is a potential overload on the Byron to Wempletown 345 kV line 0624, for which project #P20 contributes approximately 17 MW to the loading on the facility. PJM and ComEd are continuing to review the cause of and solution to the overload. The Impact Study for this project will define the cost allocation, if any, for this generation project. Rough estimates to eliminate the overload are around \$20 million. The P20 cost allocation, if any, for this upgrade will be determined in the P20 Impact Study.
4. Contribution of 10 MW further overloads the 138kV station equipment and current transformers in series with the Bus Tie 2-3 Circuit Breaker at Waterman from 124% to 128% of its load-dump rating (247 MVA) for the tower outage of lines 18402 & 16703.

The violation was originally caused by the #P14 project. The solution for this overload is still being developed, and P20 may share an allocation for this upgrade. The allocation cost, if any, will be determined during the P20 Impact Study.

5. Contribution of 9 MW further overloads the Waterman to West Dekalb Tap portion of 138 kV line 11323 from 127% to 131% of its load-dump rating (259 MVA) for the tower outage of lines 18402 & 16703. The violation was originally caused by the #P14 project. The solution for this overload is still being developed, and P20 may share an allocation for this upgrade. The allocation cost, if any, will be determined during the P20 Impact Study.
6. Contribution of 9 MW to further overload the Steward to Tower Road Wind Farm portion of 138 kV line 11323 (future line 18623) from 100% to 103% of its load-dump rating (279 MVA) for the tower outage of lines 18402 & 16703. The thermal violation from the TSS 186 Steward to TSS 984 Tower Road Wind Farm portion of 138kV line 11323 (future 18623) was originally caused by the #P14 project for the tower outage of lines 15616 & 15627. The solution for this overload is still being developed, and P20 may share an allocation for this upgrade. The allocation cost, if any, will be determined during the P20 Impact Study.

### **Contribution to Previously Identified System Reinforcements**

To be determined at the System Impact Study.

### **Short Circuit**

The 138kV bus tie 3-4 circuit breaker at TSS 155 Nelson was overdutied as a result of the interconnection of the #P20 project.

The short-circuit study for #P20 considers the overdutied breakers upgraded for projects ahead of #P20 in the PJM queue. If projects ahead of #P20 drop out, the short-circuit analysis will be repeated, and #P20 may ultimately be responsible for additional breaker upgrades.

See “New System Reinforcements” below for cost estimate to mitigate this overdutied circuit breaker.

### **New System Reinforcements**

#### **Cost estimate:**

Qty	Item Description	Material	Labor	Total
<b>TSS 155 Nelson</b>				
1	Replace 138kV Circuit Breaker, bus work and disconnects	\$ 200,000	\$ 165,000	\$ 365,000

#### **System Reinforcement Schedule:**

Estimated timeframe to complete engineering, procurement, and construction for this reinforcement is approximately 18 – 24 months, and can be done concurrently with the Direct Connection schedule.

## **Potential Issues**

**Impacts on the MISO member transmission systems are not included in this analysis, but they will be included in the Impact Study, which may reveal upgrades needed in the MISO system not identified in this Feasibility Study.**

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

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

As a result of the aggregate energy resources in the area, the following violations were identified:

No problems were identified.