#T131 Ft. Wayne-Lima 138kV

Generation Interconnection

This analysis was completed to assess the reliability impact for the increase in generation interconnecting to the PJM system as a capacity resource.

Network Impacts

The impact of the proposed generating facility on the AEP System was assessed for adherence with applicable reliability criteria. AEP planning criteria require that the transmission system meet single contingency performance criteria in accordance with the AEP FERC Form 715. Therefore, this criterion was used to assess the impact of the proposed facility on the AEP System. The Horizon project was studied as a 150 MW net capability consistent with the interconnection application. The results are summarized below.

It's important to note that there are additional interconnection requests in the area that affect T131's interconnection. PJM Queue R49, a 150 MW wind generation facility will connect to the Haviland – Milan 138 kV circuit. PJM Queue S73, a 200 MW wind generation facility that will connect to both the Lincoln – Sterling 138 kV circuit and the Haviland – Milan 138 kV circuit.

Capacity Impact

*R49, S73, and T131 operating at 20% of capacity

Normal System (2011 Summer Conditions)

- No problems identified.

Single Contingency (2011 Summer Conditions)

- No problems identified.

Short Circuit Analysis

- No problems identified.

Stability Analysis

- Stability studies were not performed as part of this Feasibility Study and are not normally performed as part of a Facility Study effort. The stability assessments are part of the System Impact Study. Based upon the results of this future System Impact Study, the extent of system upgrades could change and the associated costs could be significantly different.

Local Upgrades

- None required.

Option 1 or 2
*with R49 and S73 (see Exhibits 2 or 3)

Normal System (2011 Summer Conditions)

- No problems identified.

Single Contingency (2011 Summer Conditions)

1. The 138 kV CB H and wavetrap at Haviland station are overloaded to 109% of its summer emergency rating of 201 MVA for the outage on the Lincoln – S73 138 kV line and to 101% for the outage on the Tillman – S73 138 kV line.

2. The 138/69/34.5 kV transformer at Haviland station is overloaded to 104% of its summer emergency rating of 53 MVA for the outage on the Lincoln – S73 138 kV line, to 102% for the outage on the North Delphos – S73 (or T131) 138 kV line, and to 100% for the outage on the Tillman – S73 138 kV line.

3. A 138 kV riser at Milan station on the Tillman line is overloaded to 100% of its summer emergency rating of 184 MVA for the outage on the Lincoln – S73 138 kV line.

4. The Haviland - Paulding 69 kV line and wavetrap at Haviland is overloaded to 101% of its summer emergency rating of 50 MVA for the outage on the Lincoln – S73 138 kV line.

Short Circuit Analysis

- No problems identified.

Stability Analysis

- Stability studies were not performed as part of this Feasibility Study and are not normally performed as part of a Facility Study effort. The stability assessments are part of the System Impact Study. Based upon the results of this future System Impact Study, the extent of system upgrades could change and the associated costs could be significantly different.

Contribution to Previously Identified System Reinforcements
(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

5. The 138/34.5 kV transformer at Tillman station is overloaded to 112% of its summer emergency rating of 15 MVA for the outage on the Lincoln – S73 138 kV line and to 101% for the outage on the Haviland – S73 138 kV line. Initially identified for the R49 project.

6. A 138 kV riser at Milan station on the Harper line is overloaded to 117% of its summer emergency rating of 143 MVA for the outage on the Lincoln – S73 138 kV line and to 108% for the outage on the Haviland – S73 138 kV line. Initially identified for the S73 project

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

To maintain appropriate levels of reliability and mitigate the single contingency problems resulting from the additional generation identified in this study, the following system improvements are required:

1. Replace 138 kV CB H and associated equipment including the wavetrap at Haviland Station. Estimated Cost (2008 Dollars): **$500,000**

2. Replace 138/69/34.5 kV transformer at Haviland Station with a 130 MVA unit. Install high-side circuit switcher and associated equipment. Estimated Cost (2008 Dollars): **$2,000,000**

3. Replace 138 kV risers at Milan Station on the Tillman line. Estimated Cost (2008 Dollars): **$50,000**

4. Replace 10.7 miles of 69 kV conductor between Haviland and Paulding Stations. Replace wavetrap at Haviland on the same line. Estimated Cost (2008 Dollars): **$3,000,000**

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

5. The overload on the Tillman transformer can be alleviated by replacing the 138/34.5 kV transformer at Tillman Station with a 30 MVA unit. Install high-side circuit switcher and associated equipment.
   Estimated Cost (2007 Dollars): **$1,000,000**

6. The overload on the Milan-Harper 138kV circuit can be alleviated by replacing risers at Milan Station.

Estimated Cost (2007 Dollars)*: **$100,000**

*The estimates are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements. It will take approximately 18 months after obtaining the authorization to construct the facilities as outlined above.

Reactive Requirements

PJM requires a power factor correction to 95% lead/lag at the point of interconnection for wind generating facilities. It is expected that Horizona will adhere to this standard.
Impact Study.