



**Generation Interconnection Feasibility
Study**

For

>Omitted Text< LLC

SPP-GEN-2002-003

19 April 2002

Introduction

This report summarizes the results of a Feasibility Study performed for the Southwest Power Pool to evaluate a generation interconnection request >Omitted Text< LLC for >Omitted Text< of wind-powered generation on the Westar Energy transmission system. The projected in-service date of the Eastern Kansas Project generating facility is February 2003.

Project Location and Existing Facilities

The Eastern Kansas Project is located south of >Omitted Text<. An existing 138 kV transmission line crosses the project site. The substation location for the Eastern Kansas Project is adjacent to the existing Altoona – Butler 138 kV line right-of-way. Figure 1 shows the project location.

The existing 70.62-mile Altoona - Butler 138 kV line is a 1924 vintage line built using double circuit lattice steel towers. The conductor is 266.8 kcmil ACSR and is sag limited by a book rating of 110 MVA capacity. The line does not have overhead lightning protection and is routinely out of service during storms. One side of the line from Butler is used as a distribution circuit to serve a nearby prison. Conductors on one side of the towers are grounded for a portion to act as a proxy for shielding.

Connection Options

At the request of the customer, three options for connecting to the existing Altoona – Butler 138 kV line are considered:

Option 1 - Tap the Existing Altoona - Butler 138 kV Line

Option 2 - Tap the Existing Altoona - Butler 138 kV Line plus Rebuild the Altoona - Butler 138 kV Line

Option 3 - Construct a New Butler – Eastern Kansas Project 138 kV Line.

Because of issues with the performance of the existing line, Westar Energy will not allow the line to become a simple three-terminal line. Accordingly, the minimum work to tap the transmission line assumes a double circuit tap. The estimated costs for each option include both PTs and CTs for interconnection metering on two terminals at the Eastern Kansas Project. Westar Energy also maintains its own Facility Connection Requirements, which may be found on our web-site. (<http://www.wr.com>) Due to the age of the line and its poor lightning performance, simple reconductoring of the line is not a viable option.

Option 1 - Tap the Existing Altoona - Butler 138 kV Line

Construct one span of two single-circuit, single-pole lines from the project substation to the existing line using 954 kcmil ACSR conductor. One span of the existing 138 kV transmission line would be removed and dead-end, angle structures installed. Lightning protection is added to the 15.7-mile portion of the line to Butler using optical shield wire. This option requires replacing the relaying and carrier equipment at the Butler 138 kV substation on the line terminal to project. Interconnection metering is added on both line

terminals at the project substation. The capacity of the 138 kV line to Butler would remain at 110 MVA and would have good lightning storm performance. The capacity of the 138 kV line to Altoona would remain at 110 MVA and would have poor lightning storm performance. Under normal conditions, full output of the project could be utilized. With either 138 kV line out of service, the output of the project would be limited to the conductor rating of 110 MVA.

138 kV line tap to project - \$90,000
Install lightning protection to Butler – \$330,000
Butler substation work and metering at project substation - \$210,000
Total for Option 1 - \$630,000

Option 2 - Option 1 plus Rebuild Altoona - Butler 138 kV Line

In addition to Option 1 above, the entire 70.62-mile Altoona - Butler 138 kV line is rebuilt using 954 kcmil ACSR conductor on the existing right-of-way. Rebuilding would add lightning protection on the entire line. The capacity of the rebuilt line would be 232 MVA and have good lightning storm performance.

138 kV line tap to project - \$90,000
Rebuild Altoona - Butler 138 kV - \$15,750,000
Butler substation work and metering at project substation - \$210,000
Total for Option 2 - \$16,050,000

Option 3 - Construct a New Butler - Project 138 kV Line

This option constructs a new 138 kV transmission line on a new right-of-way approximately 16 miles in length using 954 kcmil ACSR conductor from the Butler substation to the project substation. The line cost includes an estimate for new line right-of-way. The capacity of the new line to Butler would be 232 MVA and would have good lightning storm performance. At the Butler 138 kV substation a new line terminal is installed.

Install 16-mile Butler - Project 138 kV line - \$3,820,000
Butler substation work and metering at project substation - \$530,000
Total for Option 3 - \$4,350,000

Conclusion

Without rebuilding the entire Altoona – Butler 138 kV line or constructing a new 138 kV transmission line out of the Eastern Kansas Project, the output of the generating facility will be limited to 100 MVA for a single-contingency outage.

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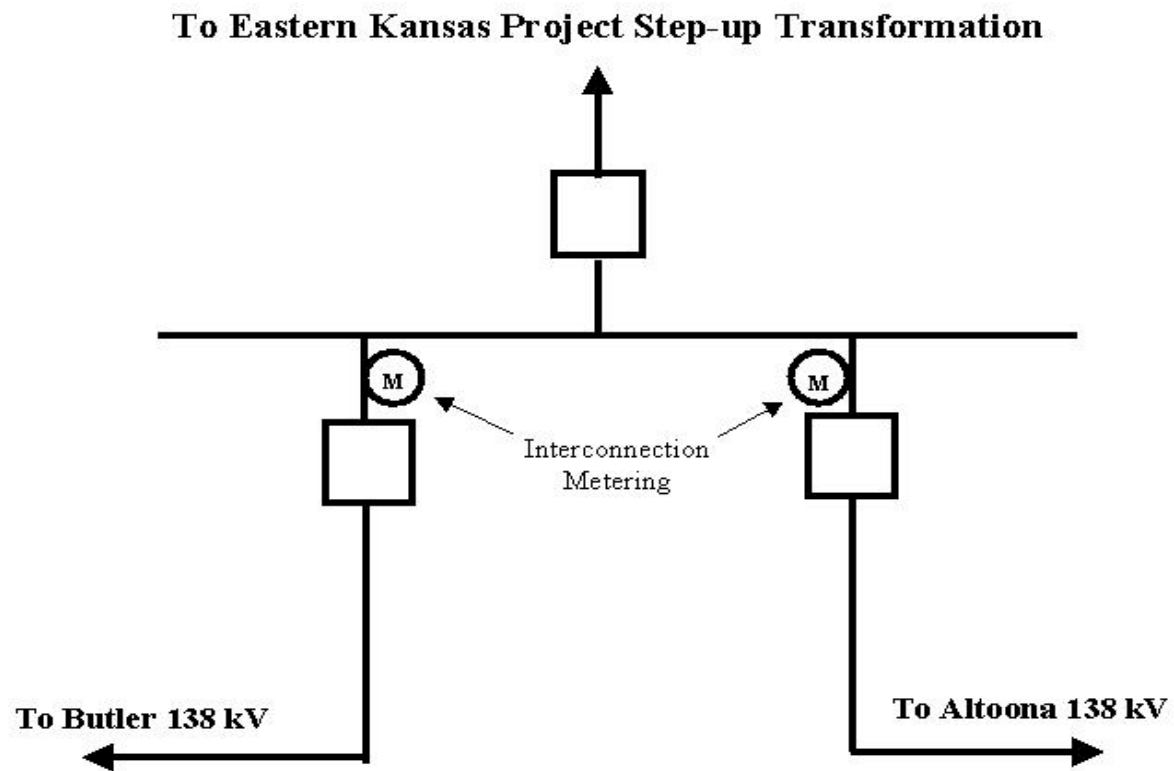


Figure 2 - Conceptual Substation Layout

Figure 3 – Westar Energy Area Transmission

