



***Facility Study  
For  
Generation Interconnection  
Request  
GEN-2009-040***

***SPP Tariff Studies***

***(GEN-2009-040)***

**February 2011**

## **SPP Summary**

Westar Energy (WR) performed a detailed Facility Study at the request of Southwest Power Pool (SPP) for Generation Interconnection request GEN-2009-040. The interconnection of the 73.8 MW wind energy facility located near Summerfield in Marshall County, Kansas is in the control area of the Westar Energy, Inc (WRI) transmission network. The request for interconnection was placed with SPP in accordance with SPP's Open Access Transmission Tariff, which covers new generation interconnections on SPP's transmission system.

## **Interconnection Customer Interconnection Facilities**

The Interconnection Customer will be responsible for the 115 kV transmission line from the Wind turbine Collector Substation to the Point of Interconnection (POI), a new 115 kV ring-bus substation on the Knob Hill- S. Seneca 115 kV line near Summerfield, KS. In addition, the customer will be responsible for reactive power compensation equipment to maintain a power factor of 95% lagging (providing vars) and a power factor of 95% leading (absorbing vars) at the point of interconnection.

## **Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades**

Per the following Facility Study, the Interconnection Customer is responsible for **\$5,240,000** of Transmission Owner Interconnection Facilities and non-shared network upgrades.

## **Shared Network Upgrades**

The interconnection customer was studied within the DISIS-2010-001 Impact Study. At this time, the Interconnection Customer is allocated **\$0** for shared network upgrades:

If higher queued interconnection customers withdraw from the queue, suspend or terminate their GIA, restudies will have to be conducted to determine the Interconnection Customers' allocation of shared network upgrades. All studies have been conducted on the basis of higher queued interconnection requests and the upgrades associated with those higher queued interconnection requests being placed in service.



**Generation Interconnection Facilities  
Study**

**For**

**Generation Interconnection Request  
GEN-2009-040**

**December 20, 2010**

## **Introduction**

This report summarizes the results of a Generation Interconnection Facilities Study performed for the Southwest Power Pool (SPP) by Westar Energy (WR) to evaluate a generation interconnection request by the interconnection customer for 73.8 MW of wind-powered generation near Summerfield in Marshall County, Kansas, to the transmission system of Westar Energy, Inc (WRI). The proposed interconnection is on the WR transmission system on the Knob Hill- S. Seneca 115 kV line. Prior to this were completed both a Feasibility Study and a System Impact Study. The requested in-service date of the generating facility is December 31, 2012.

## **Project Location and Existing Facilities**

The project is located in Marshall County in north east Kansas. The interconnection will be effected at a new 115 kV ring-bus substation on the Knob Hill- S. Seneca 115 kV line near Summerfield, Kansas. The substation will connect to Customer facilities at 115 kV. Figure 1 shows the Regional Transmission Facilities and Figure 2 shows the transmission facilities in the local area as well as the service areas of other utilities at the point of interconnection. The proposed project is not within the Westar Energy service area.

## **Interconnection Facilities**

Interconnection to the WR transmission system will be by way of a new 115 kV three position ring-bus switching station on the existing Knob Hill- S. Seneca 115 kV transmission line. The new substation terminal will look towards Customer's facilities. Construction of this new substation terminal requires of additional land adjacent to the existing transmission line right-of-way.

## **115 kV Interconnection Revenue Metering**

The estimated cost is for three (3) 115 kV VTs, three (3) 115 kV CTs, and revenue interconnection metering plus all associated site, yard and conduit work.

**\$220,000**

## **115 kV Ring Bus Substation (no metering or customer equipment included)**

The estimated cost is for three (3) 115 kV breakers, seven (7) 115 kV switches, two (2) 115 kV motor operated switches, six (6) 115 kV CCVTs, two (2) 115 kV wave traps, new primary and backup relaying, relaying setting changes and trap tuning at S. Seneca and Knob Hill, two (2) 115 kV full tension deadend structures, and all associated site, yard and conduit work. This estimate includes all equipment inside the substation fence up to the Point of Change of Ownership, excluding metering.

**\$4,000,000**

**115 kV Substation (Equipment on customer side of meter)**

The estimated cost is for three (3) 115 kV arresters, one (1) 2000A motor operated switch, three (3) 115 kV arrester stands, one (1) 115 kV full tension dead-end structure, and one (1) 3-phase bus support, plus foundations, grounding and rock associated with this part of the substation.

**\$270,000**

**115 kV Transmission Line Work**

The estimated cost is for two three-pole steel dead end structures to connect the existing Knob Hill- S. Seneca 115 kV transmission line into the interconnection substation plus associated foundations and labor.

**\$750,000**

The total cost estimate for Transmission Owner Interconnection Facilities (Interconnection Metering) and Stand Alone Network Upgrades (115 kV Ring-bus Substation and Transmission Line Work) is:

<b>\$4,000,000</b>	<b>115 kV Ring-bus Substation Stand Alone Network Upgrades</b>
<b>\$ 270,000</b>	<b>115 kV Transmission Owner Interconnection Facility</b>
<b>\$ 220,000</b>	<b>115 kV Interconnection Revenue Metering</b>
<b><u>\$ 750,000</u></b>	<b>115 kV Transmission Line Work</b>
<b>\$5,240,000</b>	

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual construction cannot be assured.

The following approximate time lines for the project are based on WR’s engineering time, average procurement time, and good weather during construction. The amount of time per task may change if consultants are hired to perform this work.

20 weeks	Engineering Time
28 weeks	Procurement Time
38 weeks	Construction Time
<b>86 weeks</b>	<b>Total</b>

The design and material ordering will only commence following execution of the Southwest Power Pool Standardized Large Generation Interconnection Agreement.

Westar Energy also maintains its own Facility Connection Requirements, which may be found at ([www.wr.com](http://www.wr.com)).

Figure 1 – Westar Energy Regional Transmission

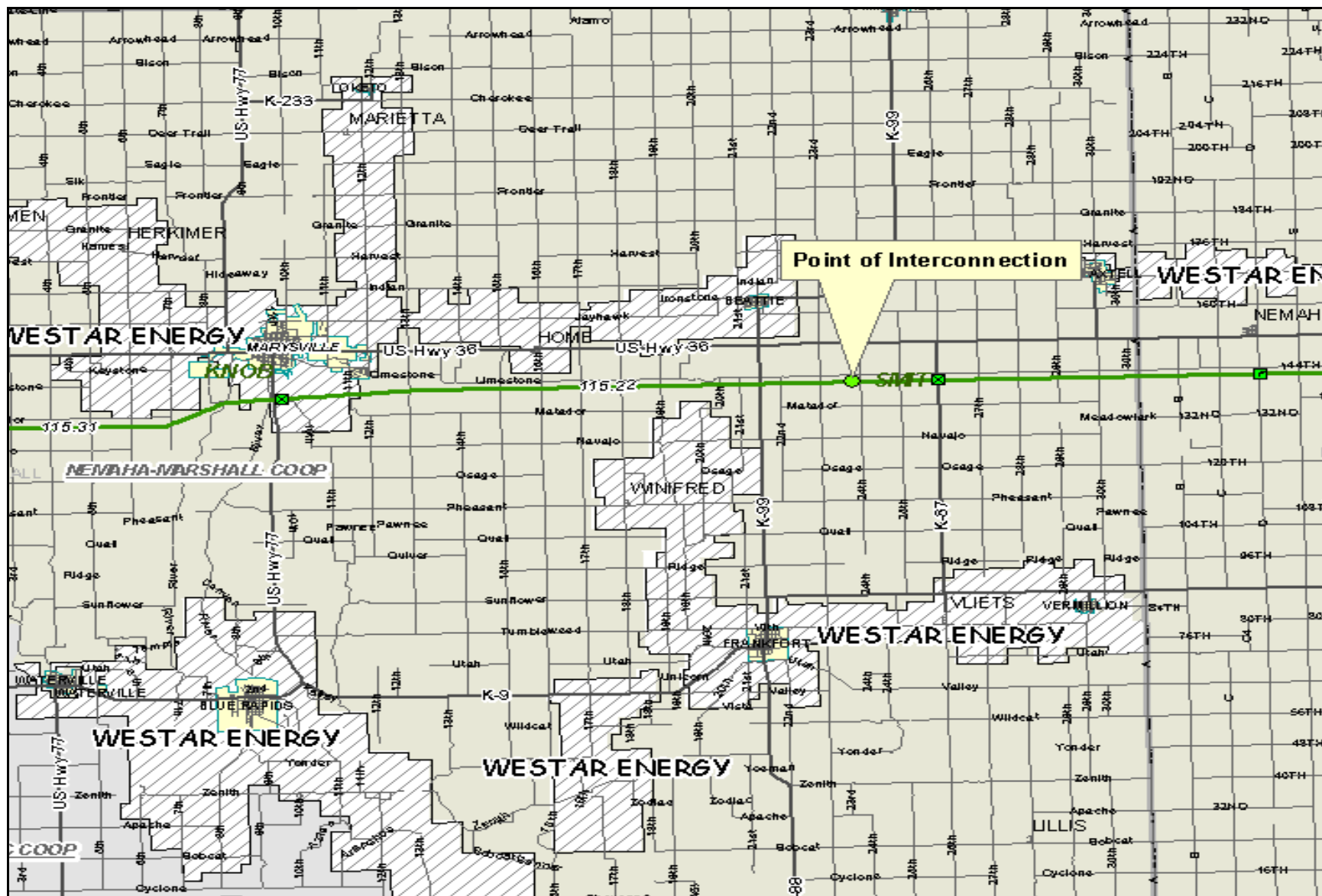
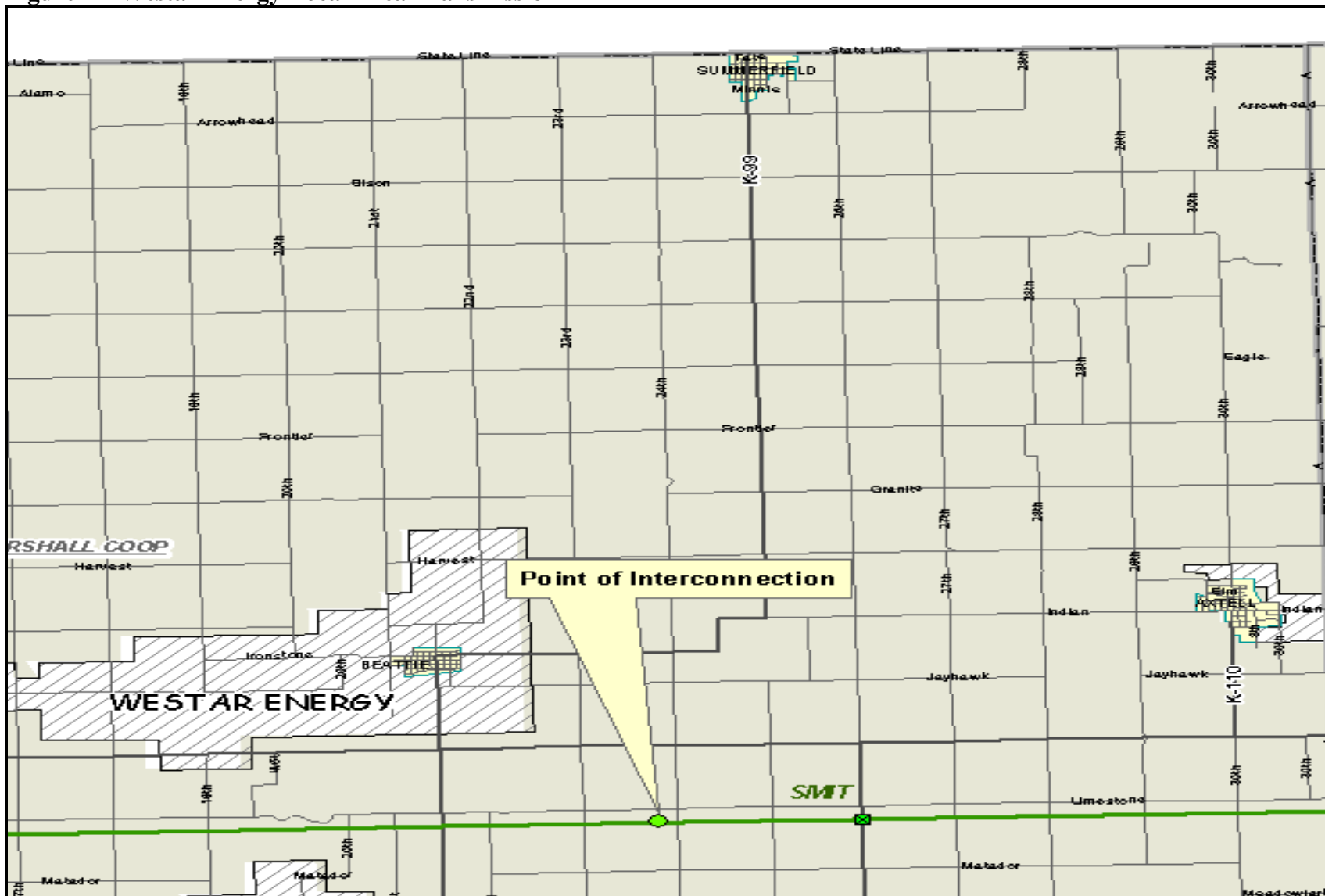
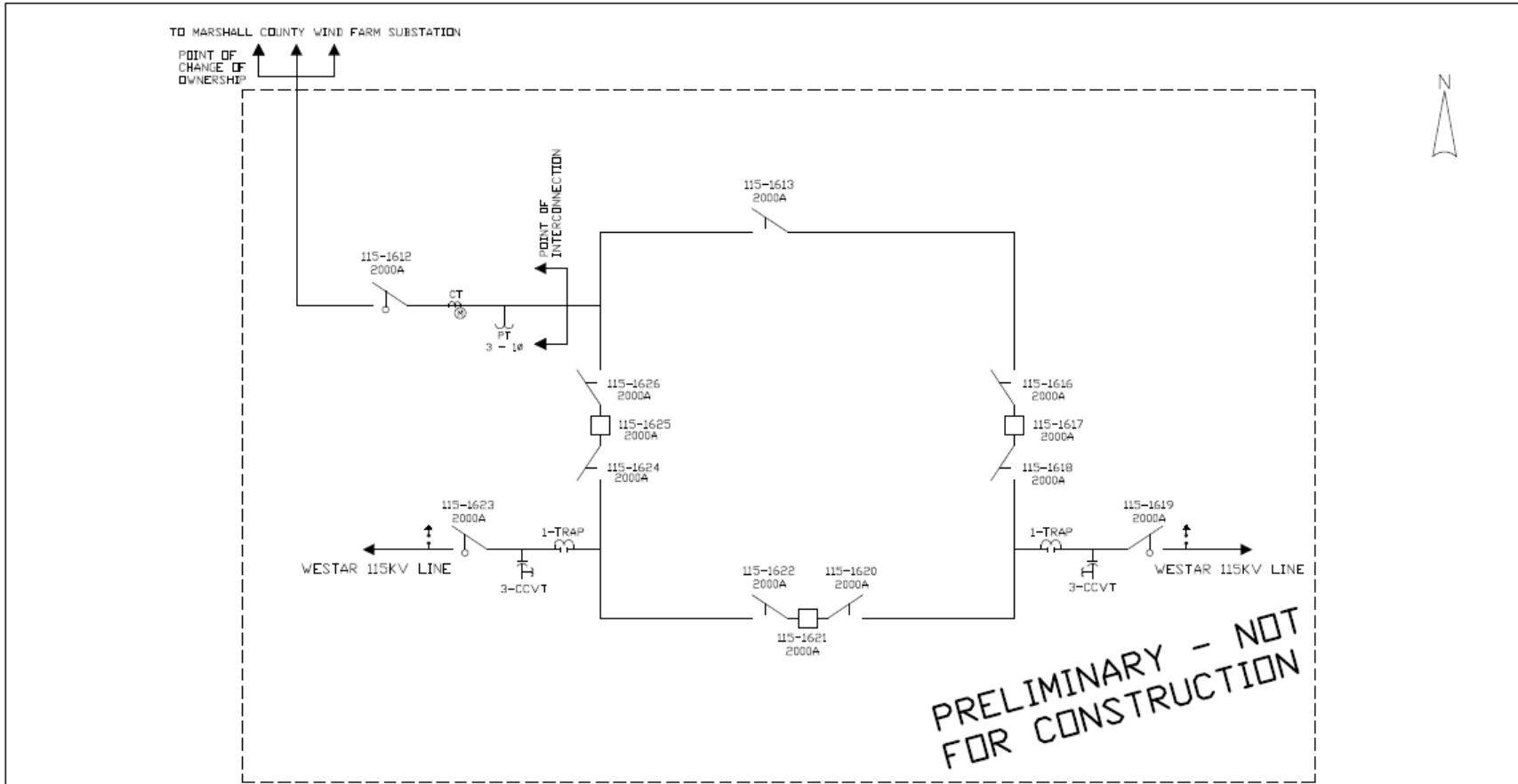


Figure 2 – Westar Energy Local Area Transmission



The proposed project is not within the Westar Energy service area.

**Figure 3 – Interconnection Substation One-Line**



**PRELIMINARY – NOT FOR CONSTRUCTION**

4				DRAWN BY: MGI	DATE: 11/10		TITLE: MARSHALL COUNTY WIND FARM SWITCHING STATION	DIV. NO. S0XXXX_1L01	
3			CHECKED BY: VK	DATE: 11/10	SHEET NO. 1 OF 1				REV. 0
2			APPROVED BY:	DATE:					
1				SCALE: NONE	WORK ORDER NO.				
REV.	DESCRIPTION	DATE	BY/CK						



**Figure 4 – Substation Layout**

