



**Southwest Power Pool
Generation Interconnection Study
GEN-2001-039**

February 12, 2002

Table of Contents

1.	Executive Summary	2
2.	Introduction	4
3.	Short Circuit Studies	5
4.	Transient Stability Studies	5
5.	Power Flow Studies	5
	5.1 Discussion of Results	
	5.2 Transmission Service Mitigation	
6.	Required Interconnection Facilities	6
	Table 1 – Estimated Interconnection Facility Costs	7

1. Executive Summary

Customer requested an Expedited System Impact Study under the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT) to determine the feasibility of installing 10-2MW generating units to be located in Coffey County, Township 20 North, Range 16 East, Section 30. The site will be located approximately 2.25 miles from the Wolf Creek Nuclear Generating station on property currently owned by Lyon-Coffey Electric Cooperative (LCEC). The proposed units will be connected through an existing 69 kV interconnection to the Westar Energy (Westar) transmission system at Wolf Creek. The proposed facility is expected to be in commercial operation by June 2002.

The principal objectives of this study were:

- Determine the estimated costs to interconnect the proposed Customer units to the existing 69 kV interconnection at Wolf Creek.
- Evaluate the potential for system problems resulting from the interconnection.
- Evaluate the potential modifications required to effect the interconnection.

Short circuit and transient stability studies were conducted to evaluate interconnection impacts of the proposed units. Short circuit and transient stability studies used 2002 summer peak SPP models. Power flow studies were conducted to evaluate possible transmission impacts associated with scheduling power out of the proposed units. Power flow studies used 2002 summer peak and 2006 summer peak models. SPP provided the base case models. Changes were incorporated to evaluate the proposed units.

Results of the short circuit study indicate that no additional Westar facilities are required as a result of the proposed generation addition. Maximum available fault current at the Wolf Creek 69kV bus is 67MVA. **Customer should ensure that LCEC owned breaker 69-4 at Wolf Creek has adequate interrupting capability.**

Results of transient stability studies indicate the addition of the proposed units do not require additional equipment or equipment upgrades based on transient stability considerations.

Power flow studies indicate the addition of the proposed units does not require transmission facility upgrades to the Westar transmission system to effect a transfer of the full output of the proposed units within the Westar Control Area. These results are based upon initial transmission studies using various assumptions on energy transfers. The full extent of the impact cannot be determined until a request for transmission service has been made.

Certain facility upgrades and additions are required to connect the proposed Customer units to the Westar 69kV system at Wolf Creek. These upgrades and additions include the following:

- Install 69kV revenue metering point at Wolf Creek on the LCEC owned line.
- Remove normally open tie switch #F69-137 between Wolf Creek breakers 69-4 and 69-14 for operational and safety reasons.
- Install new protective relaying at LCEC owned breaker 69-4, located at Wolf Creek. Westar has provided Customer with technical specifications and guidance so that protection requirements are met. Customer will be responsible for engineering and installation of the protection system. Westar will perform an engineering review and be involved in the checkout of the equipment. Actual installed costs will be dependent on Customer.

Additional telemeter and RTU costs may be incurred if Westar becomes involved in the dispatch of the proposed units. These costs are not applicable at this time.

Total cost to Customer for the required Westar system upgrades and additions is **\$111,288**. Table 1 summarizes these costs.

2. Introduction

Customer requested a System Impact Study under the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT) to determine the feasibility of installing 10-2MW generating units to be located in Coffey County, Township 20 North, Range 16 East, Section 30. The site will be located approximately 2.25 miles from the Wolf Creek Nuclear Generating station on property currently owned by Lyon-Coffey Electric Cooperative (LCEC). The proposed units will be connected through an existing 69 kV interconnection to the Westar Energy transmission system at Wolf Creek. The proposed facility is expected to be in commercial operation by June 2002.

For purposes of evaluating the interconnection of the proposed units, short circuit and transient stability studies were performed. These studies identify equipment that may require upgrades due solely to the generation interconnection. System conditions were studied using 2002 summer peak, short circuit and transient stability models provided by SPP.

System conditions are also studied using power flow for both normal (no lines out) and single-contingency outage conditions to evaluate possible transmission service limitations. The seasons evaluated were 2002 summer peak and 2006 summer peak using models provided by SPP. Power flow analyses are evaluated using SPP Criteria. Specifically, facility loading greater than 100 percent of normal rating during base case conditions or facility loading greater than 100 percent of emergency rating during single-contingency outage conditions requires mitigation. Transmission facilities subject to monitoring for adverse impact are those operated at 69 kV or greater.

3. Short Circuit Studies

The short circuit study has been run as a part of the SPP Generation Interconnection Request, and identified no additional Westar facilities were required.

Maximum available fault current at the Wolf Creek 69kV bus is 67MVA. A copy of the study results is available upon request. The addition of the proposed units does not result in any overdutied breakers on the Westar system. Customer should ensure the interrupting capability of LCEC owned breaker 69-4.

4. Transient Stability Studies

The transient stability study has been run as a part of the SPP Generation Interconnection Request, and identified no additional Westar facilities were required. A copy of the study is available upon request.

5. Power Flow Studies

SPP supplied base cases for the 2002 summer peak and 2006 summer peak seasons. These cases include generation that is already pending. Data representing the proposed units were added to each base case. A proposed 47MW generation addition at a nearby location was also included in each case. Automatic single-contingency analysis is performed to determine if facility overloads are created due to the addition of the proposed units. Incremental improvements are made to mitigate any overloads. In this way, the minimum improvements necessary are determined.

5.1 Discussion of Results – Power Flow

During *2002 summer peak* base case conditions, with no lines out of service, the full output of the proposed units does not cause overloads or low voltages. During single contingency outages, the full output of the proposed units does not cause additional overloads on Westar facilities.

During *2006 summer peak* base case conditions, with no lines out of service, the full output of the proposed units does not cause overloads or low voltages. During single contingency outages, the full output of the proposed units does not cause additional overloads on Westar facilities.

5.2 Transmission Service Mitigation

Results of power flow studies indicate the addition of the proposed Customer units does not require transmission facility upgrades to the Westar transmission system to effect a transfer of the full output of the proposed units into the Westar Control Area. The system impact on transfers of the proposed units outside of the Westar Control area are not evaluated in this study. The full extent of the impact of this type transfer cannot be determined until a request for transmission service has been made.

6. Required Interconnection Facilities

In order to connect the proposed Customer units to the Westar transmission system, several modifications are required:

- Install 69kV revenue metering point at Wolf Creek on the LCEC owned line.
- Remove normally open tie switch #F69-137 between Wolf Creek breakers 69-4 and 69-14 for operational and safety reasons.
- Install new protective relaying at LCEC owned breaker 69-4, located at Wolf Creek. Westar has provided Customer with technical specifications and guidance so that protection requirements are met. Customer will be responsible for engineering and installation of the protection system. Westar will perform an engineering review and be involved in the checkout of the equipment. Actual installed costs will be dependent on Customer.

Additional telemeter and RTU costs may be incurred if Westar becomes involved in the dispatch of the proposed Customer units. These costs are not applicable at this time.

The total estimated interconnection facility costs are summarized in Table 1.

Table 1 - Estimated Interconnection Facility Costs

Item	Cost
Install 69 kV revenue metering point at Wolf Creek on LCEC owned line.	\$80,000
Remove tie switch F69-137.	\$3,000
Engineering review and field checkout of relaying additions at LCEC breaker 69-4.	\$3,000
Subtotal	\$86,000
Allowance for tax consequences.	\$25,288
Total Interconnected Facility Costs	\$111,288