INTERCONNECTION FACILITIES STUDY REPORT

GEN-2022-147

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By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
02/14/2024	SPP	Initial draft report issued.
02/23/2024	SPP	Interim TOIF added.

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SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2022-147 is for a 196 MW (Summer)/203 MW (Winter) generating facility located in Hale County, Texas. The Interconnection Request was studied in the Group 5 2022 Interim Impact Study for ERIS. The Interconnection Customer's requested in-service date is April 30, 2024.

The interconnecting Transmission Owner, Xcel Energy Services, Inc. (SPS), performed a detailed IFS at the request of SPP. The full report is included in Appendix A. SPP has determined that full Interconnection Service will be available after the assigned Transmission Owner Interconnection Facilities (TOIF), Non-Shared Network Upgrades, Shared Network Upgrades, Contingent Network Upgrades, and Affected System Upgrades that are required for full interconnection service are completed.

The primary objective of the IFS is to identify necessary Transmission Owner Interconnection Facilities, Network Upgrades, other direct assigned upgrades, cost estimates, and associated upgrade lead times needed to grant the requested Interconnection Service.

PHASE(S) OF INTERCONNECTION SERVICE

It is not expected that Interconnection Service will occur in phases. However, full Interconnection Service will not be available until all Interconnection Facilities and Network Upgrade(s) can be placed in service.

COMPENSATION FOR AMOUNTS ADVANCED FOR NETWORK UPGRADE(S)

FERC Order ER20-1687-000 eliminated the use of Attachment Z2 revenue crediting as an option for compensation. The Incremental Long Term Congestion Right (ILTCR) process will be the sole process to compensate upgrade sponsors as of July 1st, 2020.

INTERCONNECTION CUSTOMER INTERCONNECTION FACILITIES

The Generating Facility is proposed to consist of one (1) 203 MW gas turbine for a total generating nameplate capacity of 196 MW (Summer)/203 MW (Winter).

The Interconnection Customer's Interconnection Facilities to be designed, procured, constructed, installed, maintained, and owned by the Interconnection Customer at its sole expense include:

- 18 kV underground cable collection circuits;
- 18 kV to 345 kV transformation substation with associated 18 kV and 345 kV switchgear;
- One (1) 345/18 kV step-up transformer to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation;
- One (1) 345 kV overhead transmission line or bus connection to connect the Interconnection Customer's substation to the Point of Interconnection ("POI") at the 345 kV bus at existing Transmission Owner substation ("Tuco Substation") that is owned and maintained by Transmission Owner;
- All transmission facilities required to connect the Interconnection Customer's substation to the POI;
- Equipment at the Interconnection Customer's substation necessary to maintain a composite power delivery at continuous rated power output at the high-side of the generator substation at a power factor within the range of 95% lagging and 95% leading in accordance with Federal Energy Regulatory Commission (FERC) Order 827. The Interconnection Customer may use inverter manufacturing options for providing reactive power under no/reduced generation conditions. The Interconnection Customer will be required to provide documentation and design specifications demonstrating how the requirements are met; and,
- All necessary relay, protection, control and communication systems required to protect Interconnection Customer's Interconnection Facilities and Generating Facilities and coordinate with Transmission Owner's relay, protection, control and communication systems.

TRANSMISSION OWNER INTERCONNECTION FACILITIES AND NON-SHARED NETWORK UPGRADE(S)

To facilitate interconnection, the interconnecting Transmission Owner will perform work as shown below necessary for the acceptance of the Interconnection Customer's Interconnection Facilities.

Table 1 and **Table 2** lists the Interconnection Customer's estimated cost responsibility for Transmission Owner Interconnection Facilities (TOIF) and Non-Shared Network Upgrade(s) and provides an estimated lead time for completion of construction. The estimated lead time begins when the Generator Interconnection Agreement has been fully executed.

Table 1: Transmission Owner Interconnection Facilities (TOIF)

Transmission Owner Interconnection Facilities (TOIF)	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)	Estimated Lead Time
Tuco 345kV GEN-2022-147 Interconnection (TOIF): Upgrade existing 345 kV gen-tie at TUCO Substation.	$310,493	100%	$310,493	12 Months
Tuco 345kV GEN-2022-147 Interconnection (TOIF) (158412): Expand existing 345 kV bus at TUCO Substation and add a new line terminal for a new GSEC 345 kV gen-tie.	$1,817,027	100%	$1,817,027	54 Months
Total	**$2,127,520**		**$2,127,520**	

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	ILTCR	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)	Estimated Lead Time
Tuco 345kV GEN-2022-147 Interconnection (Non-shared NU) (158413): Expand existing 345 kV bus at TUCO Substation and add a new line terminal for a new GSEC 345 kV gen-tie.	TBD	$5,341,766	100%	$5,341,766	54 Months
Total		**$5,341,766**		**$5,341,766**	

SHARED NETWORK UPGRADE(S)

The Interconnection Customer's share of costs for Shared Network Upgrades is estimated in **Table 3** below.

Table 3: Interconnection Customer Shared Network Upgrade(s)

Shared Network Upgrades Description	ILTCR	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)	Estimated Lead Time
None	Eligible	$0	%	$0	N/A
Total		**$0**		**$0**	

All studies have been conducted assuming that higher-queued Interconnection Request(s) and the associated Network Upgrade(s) will be placed into service. If higher-queued Interconnection Request(s) withdraw from the queue, suspend or terminate service, the Interconnection Customer's share of costs may be revised. Restudies, conducted at the customer's expense, will determine the Interconnection Customer's revised allocation of Shared Network Upgrades.

CONTINGENT NETWORK UPGRADE(S)

Certain Contingent Network Upgrades are **currently not the cost responsibility** of the Interconnection Customer but will be required for full Interconnection Service.

Table 4: Interconnection Customer Contingent Network Upgrade(s)

Contingent Network Upgrade(s) Description	Current Cost Assignment	Estimated In-Service Date
None	$0	N/A

Depending upon the status of higher- or equally-queued customers, the Interconnection Request's in-service date is at risk of being delayed or Interconnection Service is at risk of being reduced until the in-service date of these Contingent Network Upgrades.

AFFECTED SYSTEM UPGRADE(S)

To facilitate interconnection, the Affected System Transmission Owner will be required to perform the facilities study work as shown below necessary for the acceptance of the Interconnection Customer's Interconnection Facilities. **Table 5** displays the current impact study costs provided by either MISO or AECI as part of the Affected System Impact review. The Affected System facilities study could provide revised costs and will provide each Interconnection Customer's allocation responsibilities for the upgrades.

Table 5: Interconnection Customer Affected System Upgrade(s)

Affected System Upgrades Description	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
None	$0	%	$0
Total	$0		$0

CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 196 MW (Summer)/203 MW (Winter) can be granted. Full Interconnection Service will be delayed until the TOIF, Non-Shared NU, Shared NU, Contingent NU, Affected System Upgrades that are required for full interconnection service are completed. The Interconnection Customer's estimated cost responsibility for full interconnection service is summarized in the table below.

Table 6: Cost Summary

Description	Allocated Cost Estimate
Transmission Owner Interconnection Facilities Upgrade(s)	$2,127,520
Non-Shared Network Upgrade(s)	$5,341,766
Shared Network Upgrade(s)	$0
Affected System Upgrade(s)	$0
Total	**$7,469,286**

Use the following link for Quarterly Updates on upgrades from this report: https://spp.org/spp-documents-filings/?id=18641

A draft Generator Interconnection Agreement will be provided to the Interconnection Customer consistent with the final results of this IFS report. The Transmission Owner and Interconnection Customer will have 30 days to negotiate the terms of the GIA consistent with the SPP Open Access Transmission Tariff (OATT).

APPENDICES

A: TRANSMISSION OWNER'S INTERCONNECTION FACILITIES STUDY REPORT AND NETWORK UPGRADES REPORT(S)

See next page for the Transmission Owner's Interconnection Facilities Study Report and Network Upgrades Report(s).

Facility Study for Interim Generation Interconnections as Requested by Southwest Power Pool (SPP)

DISIS 2022-001
Group 5
GEN-2022-147

Xcel Energy Services, Inc.

Southwestern Public Service Co.
Transmission Planning South
Updated 2/21/2024

Executive Summary

The Southwest Power Pool (SPP or Transmission Provider) evaluated the generation facilities requesting to interconnect to the SPS transmission system in the Definitive Interconnection System Impact Study (DISIS-2022-001), which has not been completed. The request for Interim Interconnection was placed with SPP in accordance with the Southwest Power Pool - Open Access Transmission Tariff, Sixth Revised Volume No. 1 - Attachment V Generator Interconnection Procedures (GIP), Section 11A. Interim Generator Interconnection Agreement (Interim GIA).

To accommodate the Interconnection Customer's (IC) request, Southwestern Public Service Company (SPS or Transmission Owner) has determined the modifications/upgrades where needed on the SPS transmission system. List below are the cost estimates associated with both the Interim Generation Interconnection requests and associated modification/upgrade costs for the permanent solution:

Terminal Limit Upgrades for Interim Connection		**TOIF**	
GEN-2022-147		$ 310,493	

TUCO Substation Expansion for Permanent Connection		**TAM**	**TOIF**
GEN-2022-147		$ 5,341,766	$ 1,817,027

NOTE: To meet the permanent interconnection request, the TUCO substation fence will need to be expanded to the south with the understanding that the customer will provide the additional real estate needed for the expansion. The cost for the additional real estate is not included in the cost table.

General Description of SPS Modifications/Upgrades

The objective of this study is to identify the modification/upgrades to the SPS transmission system, and associated costs required to interconnect GEN-2022-147 at both the temporary interconnection location, for interim interconnection purposes, and for the permanent interconnection location. Below is a description of the different project(s) and the scoping level costs associated with each. All costs identified below are without escalation. All projects, routes, and costs are subject to change.

Existing 345 kV Substation "TUCO"

For the interim interconnection location, the existing 345 kV gen-tie termination presently in use by the IC for connecting at SPS TUCO Substation will used to provide interim point-of-interconnection for GEN-2022-147.

For the permanent interconnection the TUCO substation will have to be expanded to provide the permanent point-of-interconnection. The TUCO substation is located at 33.869315 N, -101.843426 W, in Hale County, Texas.

Transmission Line Details

No transmission line work on behalf of Xcel Energy, Inc. is anticipated for the interim agreement. For the permanent interconnection, the network upgrades at the Tuco substation may identify transmission line work that may be required. Any transmission line work impacting Xcel Energy transmission lines will follow the Xcel Energy encroachment process, once the new gen-tie path is identified, and cost estimates will be determined as part of the Xcel Energy encroachment process.

Substation Details

The permanent interconnection entails expanding the existing 345 kV bus at TUCO Substation and adding a new line terminal for a new IC 345 kV gen-tie.

Total Cost

The total cost estimate for this Network Upgrade is show below along with upgrade of the terminal element required for the interim interconnection of GEN-2022-147:

$	5,341,766.00 TAM
$	1,817,027.00 TOIF
$	310,493.00 Terminal Elements Upgrade[1] (TOIF)
$	7,469,286.00 Total Cost

The estimate is accurate to +/- 30%

NOTE: To meet the interconnection request, the TUCO substation fence will need to be expanded to the south with the understanding that the customer will provide the additional real estate needed for the expansion. The cost for the additional real estate is not included in the cost table.

[1] Required for the interim interconnection service of GEN-2022-147.

Time Estimate

Permanent POI Project Duration	54	Months
Terminal Element Upgrade (Interim Interconnection)	12	Months

Engineering, equipment procurement, and construction of the new 345kV line terminal at Tuco Interchange cannot begin until an agreement is signed and an authorization to proceed with the required network upgrades is granted by the customer.

Figure 1 – TUCO Substation Location

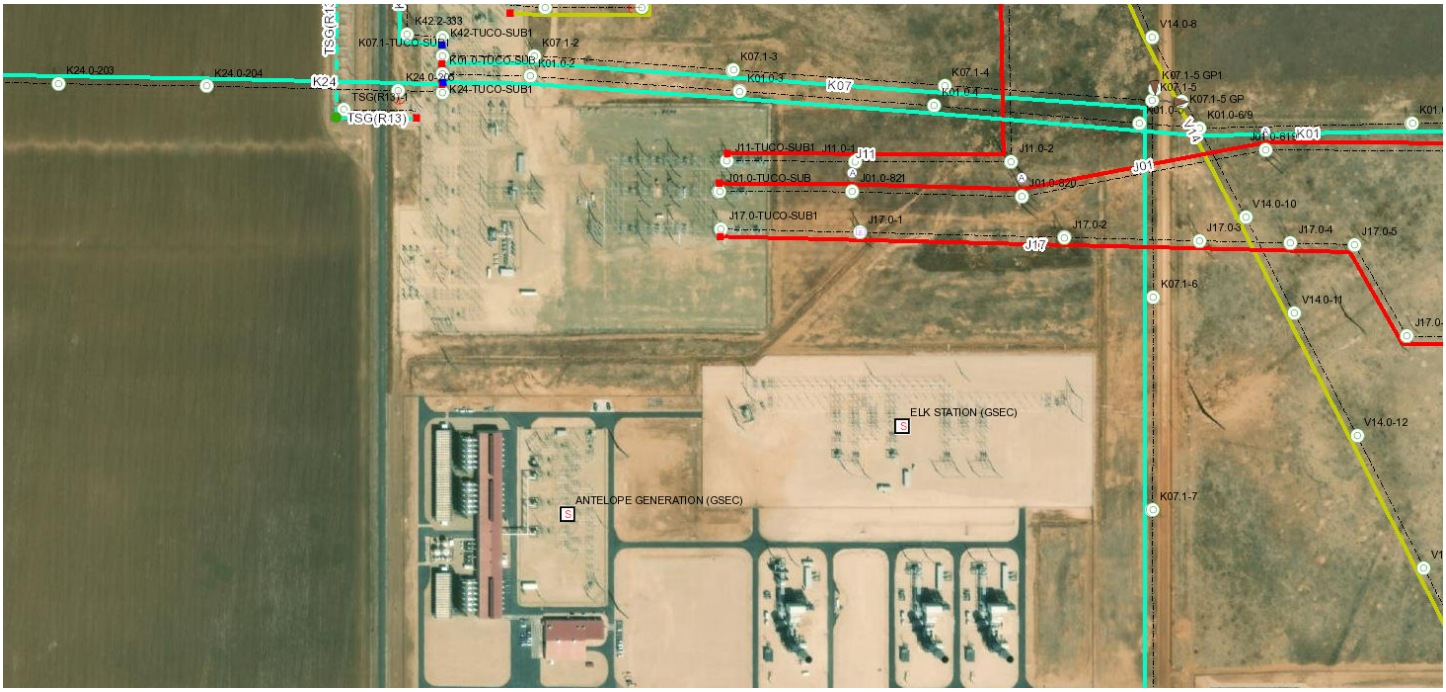

Image showing TUCO Interchange

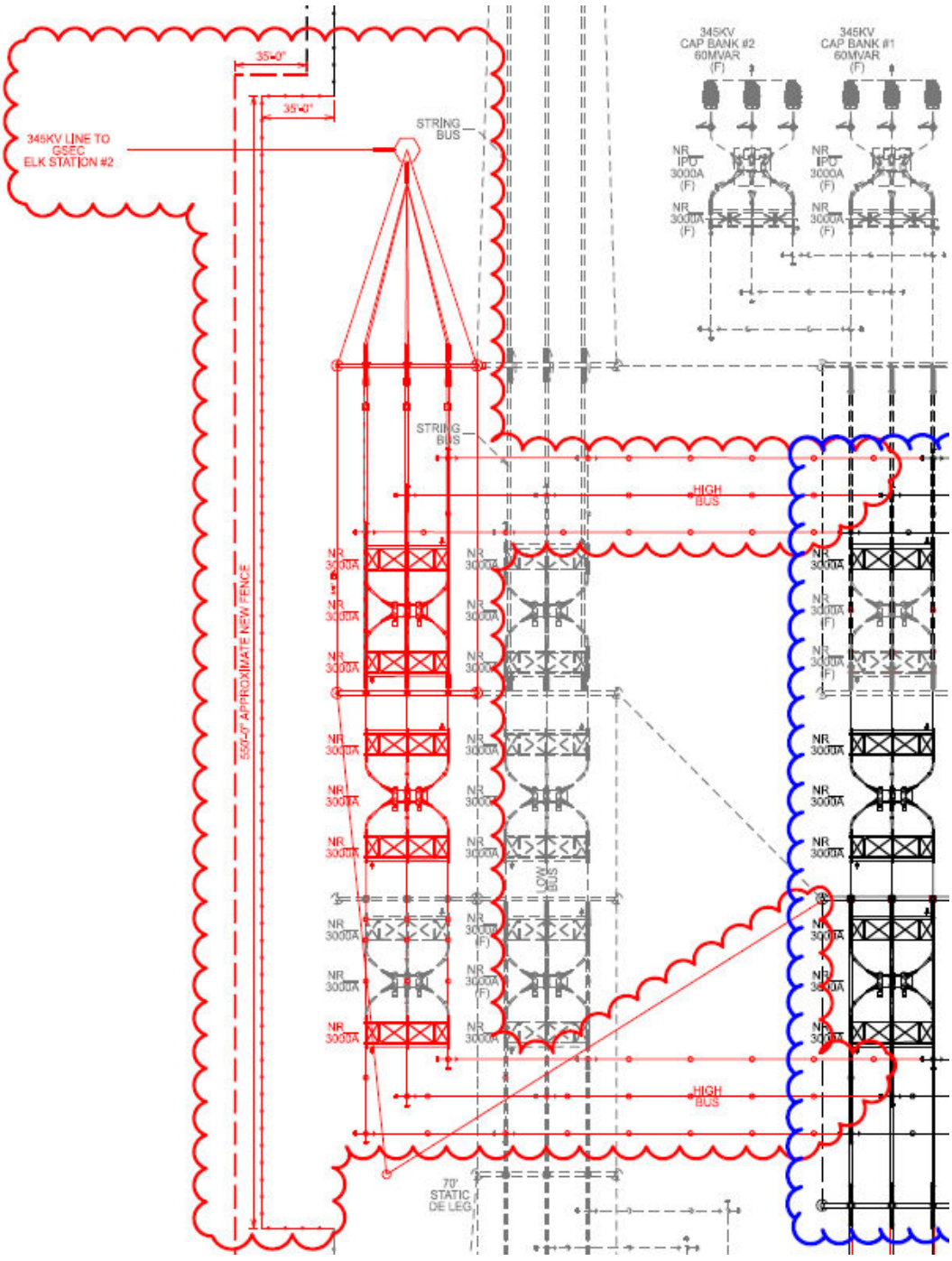

Image showing expansion at TUCO and approximate relocation of south fence for the permanent interconnection.

Other

Please see the Xcel Energy *Interconnection Guidelines For Transmission Interconnected Producer-Owned Generation Greater Than 20 MW* for additional requirements.

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