INTERCONNECTION FACILITIES STUDY REPORT

GEN-2020-003

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By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
June 16, 2025	SPP	Initial draft report issued.
June 20, 2025	SPP	Final report issued.

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SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2020-003 is for a 58 MW generating facility located in Winfield, KS. The Interconnection Request was studied in the DISIS-2020-001 Impact Study for NRIS. The Interconnection Customer's requested in-service date is 6/1/2025.

The interconnecting Transmission Owner, Kansas Power Pool (KPP), 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 three (3) 18.54 MW diesel/gas turbines for a total generating nameplate capacity of 58 MW.

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

- 34.5 kV underground cable collection circuits;
- 34.5 kV to 69 kV transformation substation with associated 34.5 kV and 69 kV switchgear;
- One 69 kV/34.5 kV 45/75 MVA (ONAN/ONAF/ONAF) step-up transformer to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation;
- An Approximately 450 foot overhead 69 kV line to connect the Interconnection Customer's substation to the Point of Interconnection ("POI") at the 69 kV bus at existing Transmission Owner substation ("East Substation 69 kV") 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** list 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 ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
Transmission Owner's East Substation 69 kV GEN-2020-003 Interconnection (TOIF) (UID156902): Interconnection upgrades and cost estimates needed to interconnect the following Interconnection Customer facility, GEN-2020-003 (58/Thermal), into the Point of Interconnection (POI) at East Substation 69 kV. Estimated Lead Time: 30 Months	$180,000	100.00%	$180,000
Total	**$180,000**		**$180,000**

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	ILTCR	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
Transmission Owner's East Substation 69 kV GEN-2020-003 Interconnection (UID156901): Interconnection upgrades and cost estimates needed to interconnect the following Interconnection Customer facility, GEN-2020-003 (58/Thermal), into the Point of Interconnection (POI) at East Substation 69 kV. Estimated Lead Time: 30 Months	Ineligible	$1,750,000	100.00%	$1,750,000
Total		**$1,750,000**		**$1,750,000**

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 ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
NA				
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
Line - Wolf Creek - Blackberry 345 kV (122598): Build a new 345kV line from Wolf Creek to Blackberry with a summer emergency rating of 1792 MVA.	**$0**	7/15/2025

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 ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
NA			
Total	**$0**		**$0**

CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 58 MW 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)	$180,000
Non-Shared Network Upgrade(s)	$1,750,000
Shared Network Upgrade(s)	$0
Affected System Upgrade(s)	$0
Total	**$1,930,000**

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 60 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).

GridLiance High Plains

Facility Study Report

GEN- 2020-003 (Walnut Energy Center)

1. Background:

1.1 Per the Generator Interconnection Procedures (GIP), Attachment V, Section 8.11, SPP requests that GridLiance High Plains (GridLiance) perform a facilities study for the following Interconnection and/or Network Upgrade(s):

Upgrade Type	Upgrade Name
Interconnection	Winfield East 69 kV GEN-2020-003 Interconnection (Non- Shared NU)
Interconnection	Winfield East 69 kV GEN-2020-003 Interconnection (TOIF)

2. Study Requirements:

GridLiance has performed this Facility Study report in accordance with the Generator Interconnection Procedures (GIP), Attachment V, Section 8.11 for the Interconnection and/or Network Upgrade(s) as described in Section 1.

2.1. The Facility Study report includes an evaluation of the following:

2.1.1. Perform/develop a substation layout, perform a preliminary bus design, determine all electrical equipment requirements, and if required, determine a suitable site location to accommodate the Request. Develop/compile cost estimates for all GridLiance labor, overheads, equipment additions, modifications, etc. to accommodate the generator interconnection.

2.1.2 Develop an overall construction schedule for completion of the necessary additions and/or modifications.

2.1.3. Point Of Change of Ownership shall mean the point, as set forth in Appendix A to the Generator Interconnection Agreement, where the Interconnection Customer's Interconnection Facilities connect to the Transmission Owner's Interconnection Facilities. For the purposes of this Facility Study report, the Point of Change of Ownership location is defined as the overhead 69 kV line connecting the Interconnection Customer’s generating facility to the Point of Change of Ownership

("POCO") at the first transmission structure (dead-end structure) outside Transmission Owner's existing Winfield East 69 kV Substation.

2.1.4. The Point of Interconnection is the physical point where the interconnection facilities attach to the existing Winfield East 69 kV substation bus.

2.1.5. Other Interconnection/Metering Requirements. Basic indication, metering, monitoring control, and relaying requirements due to a generator interconnection are included in the cost estimate. GridLiance generation metering requirements, as an SPP Transmission Owner, following SPP metering protocols must be met. A list of specific needs will be provided by GridLiance once design has progressed.

3. Study results for GEN-2020-003:

The following results document the analysis of the required facilities for this Interconnection Request as outlined in Section 1 for interconnecting the generation project to the existing Winfield East 69 kV substation with a single (1) gas circuit breaker in a single bay terminal configuration, as an addition to the existing substation. The 69 kV station construction will include installation of one (1) 69 kV gas circuit breaker, two (2) breaker disconnect switches, three (3) potential transformers, three (3) current transformers, all associated bus work required for connection, substation steel (termination structure, bus supports, equipment supports) and required protection and control additions. Reference Figure A2, Conceptual One-line Diagram, and Figure A3, Overall Electrical Plan – General Arrangement. All protection and control schemes will follow GridLiance design standards. GridLiance has determined that the following additions and improvements are required to maintain a safe and reliable interconnection to GridLiance transmission system.

3.1.3. Physical

The physical scope includes:

- (1) – 69 kV, 2000-amp, 40 kA GIB (Gas Insulated Breakers)
- (2) – 69 kV Gang Operated Disconnect Switches
- (3) – Current Metering Transformer (CT)
- (3) – Potential Metering Transformer (PT)
- (1) – Capacitive Voltage Transformer (CVT)
- (3) – Surge Arrestors
- (1 Lot) – Conduit and Grounding
- (1 Lot) – Aluminum Bus, Stranded Jumpers, and Connectors

3.2. Civil & Structural

The Civil and Structural scope includes:

- (1 Lot) – Site Civil Work
- (1 Lot) – Ground Grid
- (1 Lot) – Security Fence
- (1 Lot) – Lot Final Surfacing
- (1 Lot) – Foundations
- (1 Lot) – Structural Steel

- Termination structure
- Bus supports
- Equipment supports
- Static Mast

3.3. Relay & Control

The study assesses that the control house will have room to install metering and relaying panels, and any other equipment as needed, including future panels for the ultimate layout:

- (1) – Metering Panel
- (1) – Relay panels
- (1 Lot) – Control Cable Installation and Termination

3.4. Environmental Requirements Compliance with all applicable federal, state, and local regulations will be strictly adhered to. Additionally, all applicable and required permits and approvals will be obtained prior to construction.

2. Transmission Line Scope

There is no transmission line scope for this project.

4. Point of Change of Ownership (POCO)

This study will not represent or outline the Customer facilities required for the interconnection other than the physical Point of Change of Ownership (POCO) between the generating facilities and the interconnection facilities. The Generator shall be responsible to extend its 69 kV generation tie line and, at a minimum, 24 count optical ground wire (OPGW) from the POCO to the Generator's facility. Generator shall extend the OPGW to the Generator's provided splice can, which is to be mounted by the Generator on the Generator's interconnecting dead-end structure, where the Generator will terminate the fibers and route back to its control house in the Generator's station. The Generator shall acquire easement, or similar, rights allowing for installation of the Generator's assets to the defined POCO structure.

2. Construction Schedule

The preliminary project schedule provided is for planning level purposes only and will be adjusted with additional project definition.

Activity	Estimated Duration	Estimated Start	Estimated Finish
Development (FIS/IA/Land)	1 months	Month 0	Month 1
Engineering Design	6 months	Month 2	Month 8
Environmental Survey	2 months	Month 2	Month 4
Equipment Procurement	20 months	Month 6	Month 26
Switchyard Construction	6 months	Month 23	Month 29
Testing & Commissioning	1 month	Month 29	Month 30
Total Duration	30 months		

5. Cost Estimate

GEN-2020-003 Estimated Costs Network Upgrades	Current Year $
Station Costs	
Engineering & Overhead	$150,000
Materials	$605,000
EPC (Labor & Materials)	$740,000
Contingency & Escalation	$150,000
Land, Environmental, Legal & Development	$30,000
AFUDC & Taxes	$75,000
Station Sub Total	**$1,750,000**

GEN-2020-090 Estimated Costs TOIF Network Upgrades	Current Year $
Engineering & Overhead)	$10,000
Materials	$90,000
EPC (Labor & Materials)	$30,000
Contingency & Escalation	$30,000
AFUDC & Taxes	$20,000
GEN-2020-090 Total TOIF Cost	**$180,000**

Total Interconnection Cost (NSNU+TOIF)	**$1,930,000**

6. Disclaimer

The facility study assumes the work will be performed by an EPC service provider. This information will allow the Generator to evaluate the necessary work required, project duration, and ability to negotiate a generation interconnection agreement with the Transmission Owner to construct the facilities. In performing the Facility Study, data/information provided by third parties was used, and assumptions/information regarding the state of the SPP's system, considered reasonable and valid at the time this report was prepared, were leveraged.

Appendix A: Project drawings

- **Figure A1: Conceptual One-line Diagram**
- **Figure A2: Overall Electrical Plan (General Arrangement)**

Figure A1: Conceptual One Line Diagram

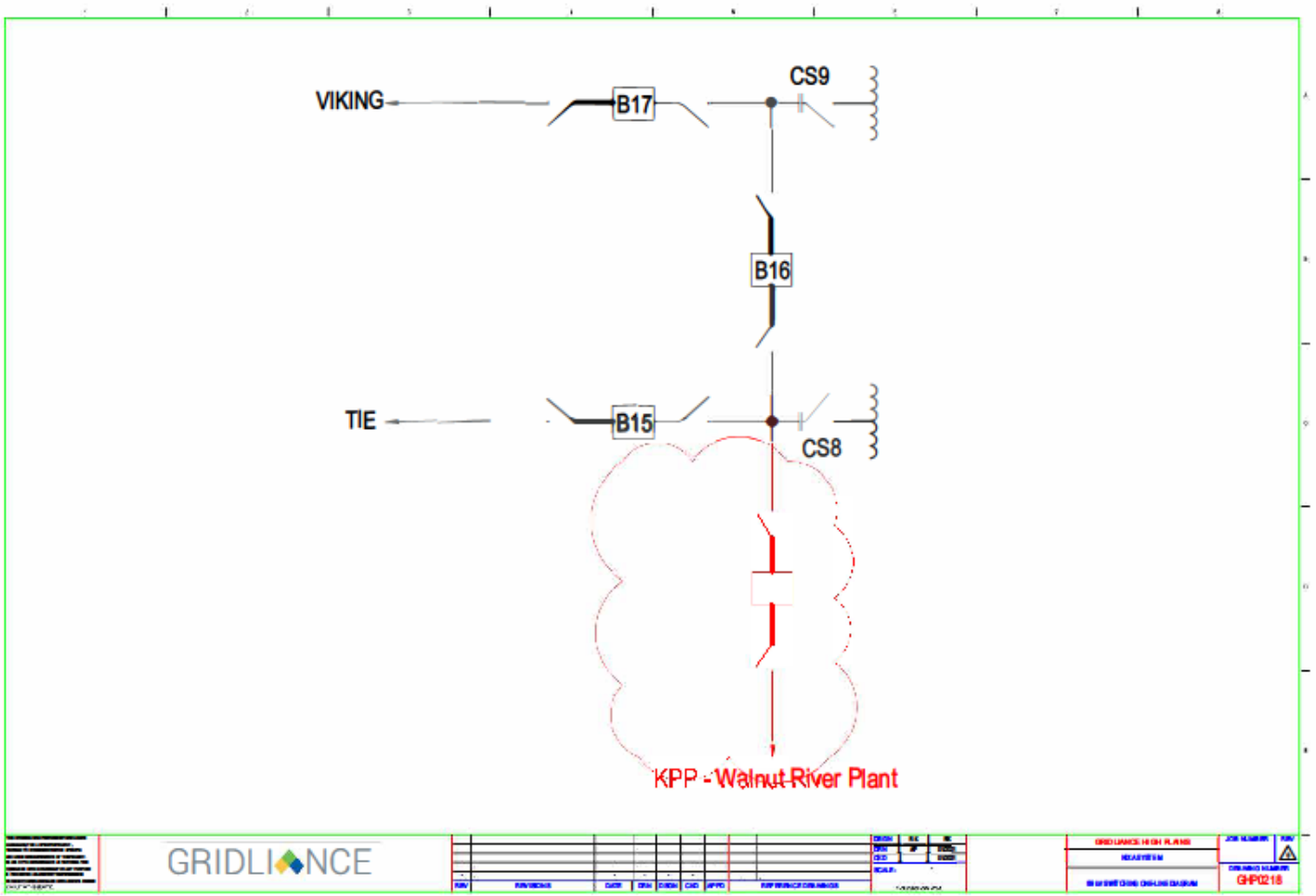

Figure A2: Overall Electrical Plan - General Arrangement