



**INTERCONNECTION
FACILITIES STUDY
REPORT**

GEN-2017-202

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By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
01/20/2023	SPP	Initial draft report issued.
03/02/2023	SPP	Lead time revised. Final report issued.
07/24/2023	SPP	Table 5 revised to reflect updated AEI costs.

CONTENTS

Revision History	i
Summary	1
Introduction	1
Phase(s) of Interconnection Service	1
Compensation for Amounts Advanced for Network Upgrade(s).....	1
Interconnection Customer Interconnection Facilities	2
Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s)	3
Shared Network Upgrade(s)	4
Contingent Network Upgrade(s).....	5
Affected System Upgrade(s)	6
Conclusion.....	7
Appendices	8
A: Transmission Owner’s Interconnection Facilities Study Report and Network Upgrades Report(s).....	9

SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2017-202 is for a 200 MW generating facility located in New Madrid County, MO. The Interconnection Request was studied in the DISIS-2017-002 Impact Study for ERIS. The Interconnection Customer's requested in-service date is December 1, 2026.

The interconnecting Transmission Owner, Southwestern Power Administration (SWPA), 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 two-hundred twenty-four (224) GE PV 0.90 MW / 1.0 MVA for a total generating nameplate capacity of 200 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 161 kV transformation substation with associated 34.5 kV and 161 kV switchgear;
- One 161/34.5 kV 135/180/225 MVA (ONAN/ONAF/ONAF) step-up transformer to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation;
- 15 mile overhead kV line to connect the Interconnection Customer's substation to the Point of Interconnection ("POI") at the 161 kV bus at existing Transmission Owner substation ("New Madrid - Sikeston 161kV") 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
<u>Transmission Owner’s New Madrid - Sikeston 161kV GEN-2017-202 Interconnection (TOIF) (SWPA) (143491):</u> Interconnect the following Interconnection Customer facility, GEN-2017-202 (200 MW/Solar), into the Point of Interconnection (POI) at New Madrid - Sikeston 161kV	\$746,000	100%	\$746,000	36 Months
Total	\$746,000		\$746,000	

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	ILTCR	Total Cost Estimate (\$)	Allocated Percent (%)	Allocated Cost Estimate (\$)	Estimated Lead Time
<u>Transmission Owner’s New Madrid - Sikeston 161kV GEN-2017-202 Interconnection (Non-Shared NU) (SWPA) (143490):</u> Interconnect the following Interconnection Customer facility, GEN-2017-202 (200 MW/Solar), into the Point of Interconnection (POI) at New Madrid - Sikeston 161kV	Ineligible	\$7,069,000	100%	\$7,069,000	36 Months
Total		\$7,260,000		\$7,260,000	

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 (\$)	Estimated Lead Time
<u>N/A</u>	N/A	N/A	N/A	N/A	N/A
Total		N/A		N/A	

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
<u>N/A</u>	N/A	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 (\$)
<u>NA</u>	NA	NA	NA
Total	NA		NA

CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 200 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)	\$746,000
Non-Shared Network Upgrade(s)	\$7,069,000
Shared Network Upgrade(s)	\$0
Affected System Upgrade(s)	\$0
Total	\$7,815,000

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).



Facility Study
for GEN-2017-202

200 MW Solar Facility
New Interconnection Near New Madrid Substation
on Line 3015, New Madrid to Sikeston 161kV

March 7, 2023

Summary

At the request of Southwest Power Pool (SPP), Southwestern Power Administration (SWPA) performed the following Facility Study. This Facility Study is in regard to SPP Generation Interconnection request GEN-2017-202, New Madrid-Sikeston 161kV. From SPP's DISIS_Results_Workbook_DIS1702-1-PowerFlow_Final workbook, the generation interconnection request consists of a 200MW solar generation facility interconnecting on SWPA's line 3015, New Madrid to Sikeston near SWPA's New Madrid Substation located within New Madrid County, Missouri.

1. Introduction

The SPP has requested a Facility Study for the purpose of interconnecting a 200MW solar generating facility near SWPA's New Madrid Substation on SWPA's 161kV line 3015, New Madrid to Sikeston. The interconnection request will require a new 161kV, three-terminal ring bus substation with estimated cost of \$7,069,000 for the facility addition and \$745,000 for the Transmission Owner Interconnection Facilities (TOIF) costs.

2. Existing Interconnection Facilities Review

The existing facility thermal ratings and circuit breaker interrupting capabilities will establish the necessary facility upgrades to accommodate the interconnection request as described in Sections 2.1 and 2.2 below.

2.1. Power Flow Constraints

SWPA's Line 3015, New Madrid to Sikeston has the following seasonal thermal ratings.

Season	Summer Normal	Summer Emergency	Spring/Fall Normal	Spring/Fall Emergency	Winter Normal	Winter Emergency
Line Rating (Amps)	851	851	979	979	1163	1163

The addition of 200MW generation inject near SWPA's New Madrid substation with nearby fossil generation at max does not cause thermal issues within the base case nor with nearby contingencies, therefore SWPA does not foresee need of thermal increase to accommodate the interconnection.

2.2. Short-Circuit Constraints

The circuit breakers protecting SWPA's Line 3015, New Madrid to Sikeston have interrupting capability of 31.5kA. The highest fault current for the subject line is approximately 20kA. The increase in fault current capability due to the subject interconnection request is expected to be less than 1kA for a 200MW solar generating facility interconnection, therefore no need for upgrade of remote end circuit breakers due to interrupting capability.

3. Required Interconnection Facility Upgrades

In accordance with SWPA's Minimum Interconnection Requirements, the interconnection request will require at a minimum a 161kV, three-terminal ring bus substation. The circuit breakers will be 40kA interrupting, 2,000 amp continuous rated. Instrument transformers, disconnect switches, bus, and jumpers will be at least 1,200 amp continuous rated.

GEN-2017-202 New Madrid-Sikeston 161kV (Non-Shared NU)	\$7,069,000	36 months
GEN-2017-202 New Madrid-Sikeston 161kV (TOIF)	\$746,000	36 months

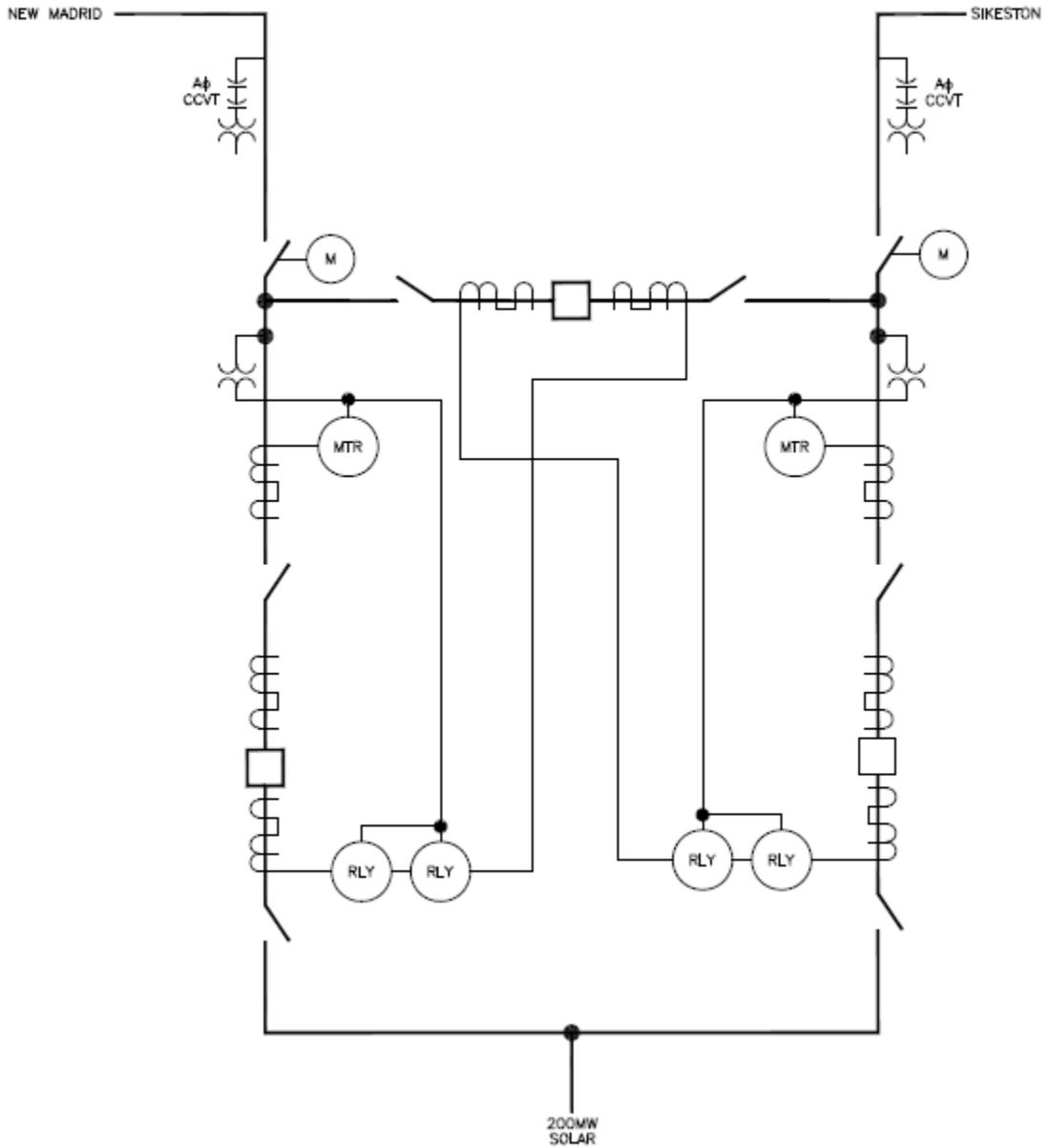


Figure 1 – Three-Position Ring Bus Interconnection
200MW Solar Interconnection Near SWPA New Madrid Substation