INTERCONNECTION FACILITIES STUDY REPORT

GEN-2020-083

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By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
May 20, 2025	SPP	Initial draft report issued.
June 4, 2025	SPP	Final report issued.

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SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2020-083 is for a 74.5 MW generating facility located in Fairview, MT. The Interconnection Request was studied in the DISIS-2020-001 Impact Study for NRIS. The Interconnection Customer's requested in-service date is 12/1/2026.

The interconnecting Transmission Owner, Western Area Power Administration-Upper Great Plains Region (WAPA), 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 twenty-four (24) 3.6 MW Sungrow SG3600 UD-MV solar inverters and ten (10) 3.15 MW Sungrow SC3150 UD-MV-US inverters for a total generating nameplate capacity of 74.5 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 115kV transformation substation with associated 34.5 kV and 115kV switchgear;
- One 115kV/34.5 kV 54/72/90 MVA (ONAN/ONAF/ONAF) step-up transformer to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation;
- An Approximately 0.01 mile overhead 115kV line to connect the Interconnection Customer's substation to the Point of Interconnection ("POI") at the 115kV bus at existing Transmission Owner substation ("Fairview 115kV 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** 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 Fairview 115kV Substation GEN-2020-083 Interconnection (TOIF) (UID 156906): Interconnection upgrades and cost estimates needed to interconnect the following Interconnection Customer facility, GEN-2020-083 (74.5/Solar), into the Point of Interconnection (POI) at Fairview 115kV Substation. Estimated Lead Time: 80 Months	$370,000	100.00%	$370,000
Total	**$370,000**		**$370,000**

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	ILTCR	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
Transmission Owner's Fairview 115kV Substation GEN-2020-083 Interconnection (UID 156905): Interconnection upgrades and cost estimates needed to interconnect the following Interconnection Customer facility, GEN-2020-083 (74.5/Solar), into the Point of Interconnection (POI) at Fairview 115kV Substation. Estimated Lead Time: 80 Months	Ineligible	$7,520,000	100.00%	$7,520,000
Total		**$7,520,000**		**$7,520,000**

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
WAPA Fargo 230 kV Terminal Upgrade (UID156282): Upgrade terminal conductor at Fargo 230 kV substation to support the line to Sheyenne.	**$0**	12/31/2025

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 74.5 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)	$370,000
Non-Shared Network Upgrade(s)	$7,520,000
Shared Network Upgrade(s)	$0
Affected System Upgrade(s)	$0
Total	**$7,890,000**

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).

Interconnection Facilities Study Report

Southwest Power Pool, Inc. (SPP) Generator Interconnection Request GEN-2020-083

(DISIS-2020-001)

Western Area Power Administration

Upper Great Plains Region (WAPA-UGP)

May 2025

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1.0 Background:

Western Area Power Administration Upper Great Plains Region (WAPA-UGP[1]) received a request for an Interconnection Facilities Study in accordance with the Southwest Power Pool Inc. (SPP) Open Access Transmission Tariff (Tariff) for interconnection of a Generating Facility near the town of Fairview, Montana to WAPA-UGP's Fairview West Switching Station. SPP generator interconnection request, GEN-2020-083, represents a 74.5 MW nameplate solar/storage generation facility with the Point of Interconnection (POI) at the 115-kV bus of WAPA-UGP's Fairview West Switching Station.

The Generating Facility's collector substation will be located in close proximity to the proposed POI at WAPA-UGP'S Fairview West Switching Station. The collector station will consist of a 115/34.5-kV transformer and multiple 34.5-kV feeders. The Interconnection Customer (IC) will construct, own, and maintain 115-kV tie-line between the collector substation and WAPA-UGP's Fairview West Switching Station. The Point of Change of Ownership between IC and WAPA-UGP will be at the points where IC's 115-kV conductors, jumpers, and insulators connect to WAPA-UGP's 115-kV take-off structure and the rigid bus underhung from the 115-kV take-off structure, as illustrated in Attachment B.

This Facilities Study does not address transmission service or any delivery component of transmission service; only the interconnection requirements and operating impacts of the interconnection service component of the Generating Facility.

2.0 Study Requirements:

This Facilities Study includes an evaluation of the following:

2.1 Prepare/develop a substation layout, perform a preliminary bus design, and determine all electrical equipment requirements to accommodate the request. Develop/compile cost estimates for all WAPA-UGP labor, overheads, equipment additions, modifications, etc. to accommodate the generator interconnection.

2.2 Review and document any other interconnection/control area requirements. Document these additional requirements (such as indication/metering, monitoring, control, relaying) and include these in the cost estimate.

2.3 Determination of need to develop an Operating Guide for WAPA-UGP's Dispatch to document the conditions under which the new Generating Facility must be operated to protect against unacceptable pre- or post-contingent transient voltage and loading conditions.

2.4 Develop an overall time schedule for completion of the necessary addition/modifications.

[1] WAPA-UGP is also referred to as "Western-UGP" in the SPP Tariff.

3.0 Study Results:

The following results document the analysis of the addition of the Generating Facility to WAPA-UGP's transmission system and fulfill the tasks outlined in Section 2.0 above:

3.1 Required Facility Upgrades by WAPA-UGP: WAPA-UGP has determined that following additions are required to maintain a safe and reliable interconnection to WAPA-UGP's transmission system:

- Addition of a new 115-kV bay at Fairview West Switching Station requiring associated yard expansion
- Conversion of the existing 115-kV 4-breaker ring bus at Fairview West Switching Station to a breaker and half configuration to accommodate the 115-kV bay addition

Addition of a new 115-kV bay and the required conversion of the existing 115-kV bus to a breaker and half configuration at the Fairview West Switching Station will require four (4) 115-kV power circuit breakers, nine (9) 115-kV disconnect switches, associated control and protection equipment, high voltage bus, one (1) transmission line take-off-structure, and conductor. The bay addition and bus conversion will require yard expansion. WAPA-UGP's estimated cost for labor, overhead, equipment, construction, and other miscellaneous costs for the additions to WAPA-UGP's Fairview West Switching Station are outlined in Attachment A. The total cost is estimated at $7,890,000.

3.1.1 Transmission Owner's Interconnection Facilities (TOIF): Equipment installed by WAPA-UGP for the sole purpose of this interconnection, such as the Transmission Owner's Interconnection Facilities, which includes equipment between of the Point of Interconnection and Point of Change of Ownership, interrogation, and communication equipment, are considered direct assignment facilities and not subject to inclusion as Network Upgrades. The direct assigned costs for such equipment are estimated at $370,000 and are included in the total cost estimate provided in Attachment A.

3.1.2 Non-Shared Network Upgrades constructed by Transmission Owner (TO): Non-Shared Network Upgrades to be designed, procured, constructed, installed, and owned by WAPA-UGP are the cost responsibility of the IC. This includes the conversion of the existing 115-kV, 4-breaker ring bus to a breaker and half configuration and the addition of a new 115-kV bay; at Fairview West Switching Station. The cost estimate for the Network Upgrades constructed by the Transmission Owner associated with the 115-kV upgrades is $7,520,000. These Non-Shared Network Upgrades are considered Non-Capacity Network Upgrades. These Upgrades would not be subject to the transmission service credits described in Article 11.5 of the SPP Generator Interconnection Agreement (GIA)

3.2 Contractual Agreements:

Pursuant to the SPP Tariff, SPP and WAPA-UGP, as Transmission Owner, will need to execute a GIA (or initially an Interim GIA, if applicable, with a subsequent execution of a GIA) with the IC for the interconnection of the Generating Facility. The GIA will address specific funding requirements and provide an advanced payment schedule for facility additions and upgrades to address WAPA-UGP's requirements. The GIA, which discusses the construction and interconnection aspects of this project, will need to be developed and offered by SPP, pursuant to their obligations and procedures under the SPP Tariff, and forwarded to the IC and WAPA-UGP for review and signature. A payment schedule based on design, procurement, and construction activities will be included in the GIA consistent with the SPP Tariff provisions. Upon completion of the work WAPA-UGP will own, operate, and maintain the modifications and improvements to WAPA-UGP's Fairview West Switching Station.

3.3 Other Interconnection, Metering Requirements:

Basic indication, monitoring, control, and relaying requirements due to a generator interconnection are included in the cost estimate. A list of specific needs will be provided by WAPA-UGP's Operations Office and WAPA-UGP's Montana Maintenance Office once design has progressed.

IC shall install metering at their 115/34.5-kV collector substation in accordance with SPP and WAPA-UGP metering requirements. WAPA-UGP's generation metering requirements, as the Transmission Owner, must also be met, unless specific SPP metering requirements are more restrictive, in accordance with the most current ***Western Area Power Administration Meter Policy*** posted at the "WAPA Meter Policy" link at the following Link URL:
http://www.oasis.oati.com/WAPA/WAPAdocs/Western-Common-Business-Practices.html

Any WAPA-UGP specific implementation of more restrictive SPP metering requirements are also posted on WAPA-UGP's OASIS home page under the "Effective Business Practices" folder at the "UGP Meter Policy Modifications" link at the following Link URL:
http://www.oasis.oati.com/wapa/index.html

WAPA-UGP's ***General Requirements for Interconnection*** must also be met in accordance with the *General Requirements for Interconnection* document posted at the "General Requirements for Interconnection (GRI)" link at the following Link URL:
http://www.oasis.oati.com/WAPA/WAPAdocs/Western-Common-Business-Practices.html

3.4 Operating Guide/Operating Agreement:

Prior to energization, an Operating Guide will need to be developed by WAPA-UGP in coordination with SPP, if necessary, to outline any required operating restrictions under which the generation interconnection must be energized (or de-energized) to protect against

unacceptable system stability limits and/or pre-contingent and post-contingent voltage and loading conditions. The Operating Guide will be developed by WAPA-UGP's Transmission System Planning Division in coordination with SPP Staff. In addition, an Operating Agreement will be developed by WAPA-UGP's Operations Office, jointly with the IC and SPP, if necessary, as will be set forth in the GIA to outline the necessary operations coordination and requirements not otherwise set forth in the GIA.

3.5 Schedule:

Attachment A outlines WAPA-UGP's estimated schedule for planning, design and construction of the facilities required to accommodate the IC's Request. WAPA-UGP anticipates the new 115-kV line bay at Fairview West Switching Station would be completed by May 30, 2032. This schedule is based on the GIA (or Interim GIA) being executed prior to November 15, 2025, and issuance of the NEPA Finding of No Significant Impact (FONSI) or Record of Decision (ROD)by October 1, 2029. The schedule is also dependent on outage availability.

3.6 Environmental Review:

WAPA-UGP is a federal agency under the U.S. Department of Energy and is subject to the National Environmental Policy Act (NEPA), 42 U.S.C §4321, et seq., as amended. The Environmental Review for this project, as described in Attachment V, Sections 3.3.5, and 8.6.1, and any other applicable sections of the SPP Tariff, will be coordinated between WAPA-UGP and the IC. An Environment Review Agreement, Contract No. 23-UGPR-105, was executed between WAPA-UGP and the IC on January 11, 2024. WAPA-UGP anticipates an Environmental Assessment level of NEPA review. The Environmental Review is performed at the IC's expense, and those costs are considered direct assigned costs and are ineligible for credits under the SPP Tariff. Until the appropriate NEPA review is completed (issuance of a FONSI, ROD, or other), no construction activities relating to the Transmission Owner's Network Upgrades may commence

4.0 <u>Facilities Study Cost:</u>

WAPA-UGP will audit the Interconnection Facilities Study costs and provide a summary of costs once the study is completed or the interconnection request is withdrawn.

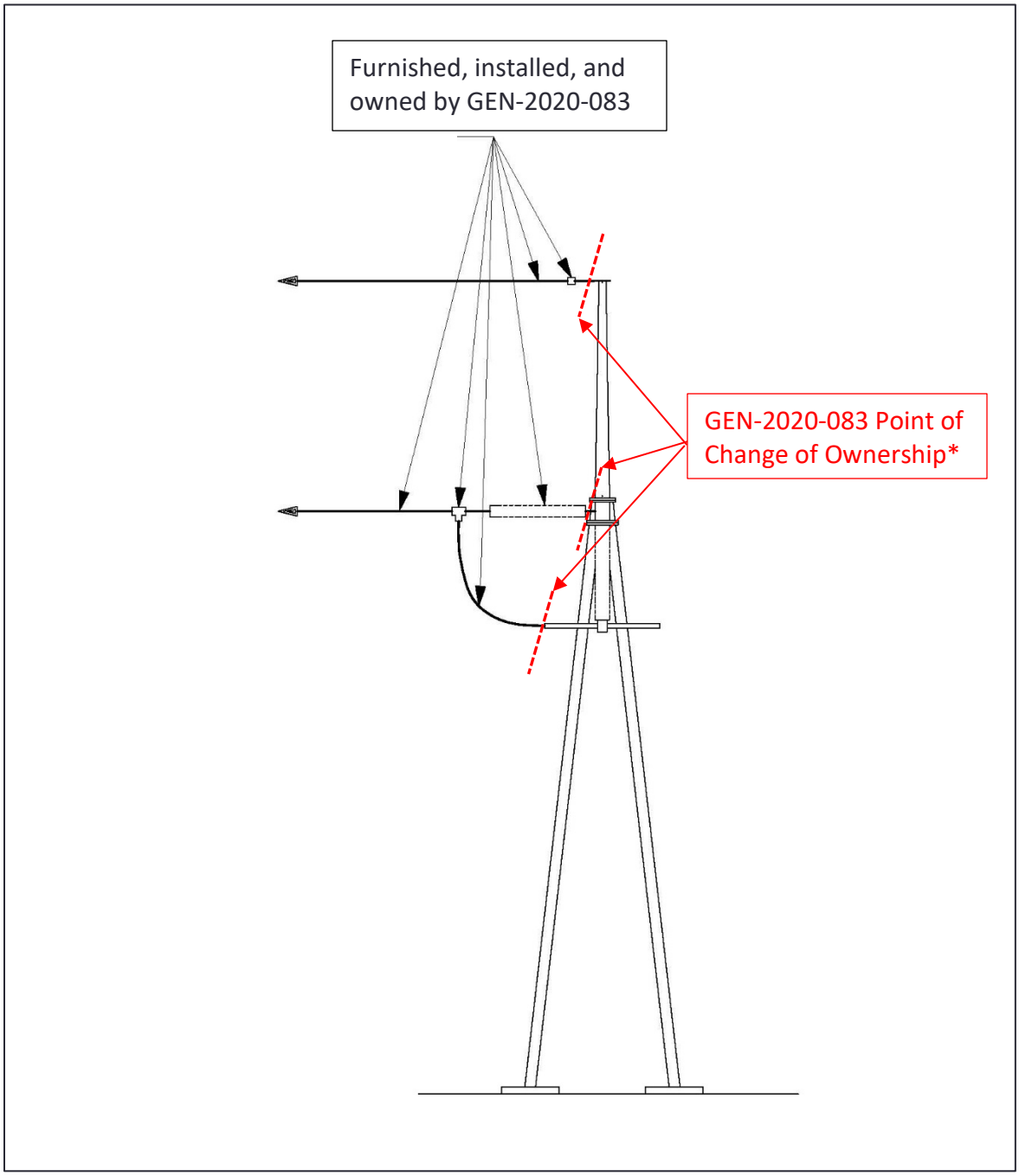
ATTACHMENT A

FAIRVIEW WEST SWITCHING STATION 115-KV
MODIFICATIONS AND ADDITIONS

PROJECT ACTIVITY	ESTIMATED START DATE	ESTIMATED COST, MILESTONE PAYMENT DUE
Preconstruction activities – planning, project management, land acquisition, etc.	30 Calendar Days Following GIA Execution*	$245,000
Provide staff and other resources to engineer, design, and plan construction	30 Calendar Days Following GIA Execution*	$605,000
Procure equipment, parts, and control equipment necessary to construct	30 Calendar Days Following GIA Execution**	$2,490,000
Development, Solicitation, and Award of Construction Contract(s), and WAPA-UGP Construction Administration	November 1, 2027	$3,750,000
Commissioning, Energization, and construction supervision	November 1, 2029	$800,000
In-Service (Estimated Completion Date)	May 30, 2032	
TOTAL ESTIMATED COSTS		$7,890,000***

*Assumes Execution of GIA NLT November 15, 2025.
**Assumes breaker lead time of 185 weeks after purchase award.
***Includes TOIF costs estimated at $370,000 and Non-Shared Network Upgrades constructed by Transmission Owner costs estimated at $7,520,000.

ATTACHMENT B



*This represents the Point of Delivery for GEN 2020-083