



Facility Study
for GEN-2023-061

100 MW Battery Facility
New Interconnection at Carthage Substation

March 17, 2025

Summary

At the request of Southwest Power Pool (SPP), Southwestern Power Administration (SWPA) performed the following Facility Study. This Facility Study is regarding SPP GEN-2023-061, Carnigan, 161kV, 100MW BESS Addition. From SPP's Generator Interconnection Study Agreement, Appendix 3 submission from Samsung, the generation interconnection request consists of a 100MW BESS facility interconnecting at SWPA's Carthage Substation.

1. Introduction

The SPP requested a Facility Study for the purpose of interconnecting a 100MW Battery Energy Storage System (BESS) facility with a point of interconnection at SWPA's Carthage Substation. The interconnection request will require a new 161kV bay addition at SWPA's Carthage Substation with estimated cost of \$4,200,000 for the facility addition and \$700,000 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 Carthage Substation has multiple transmission lines and two power transformers. Single transmission line contingencies, P1, were performed for five buses away from the Carthage Substation. The nearby SPP area branches were monitored for thermal violations. No thermal violations were found for the subject study.

2.2. Short-Circuit Constraints

The circuit breakers at the Carthage Substation have interrupting capability of 40kA. The highest fault current for the subject substation is approximately 22kA. The increase in fault current capability due to the subject interconnection request is expected to be less than five times the full generation current, which is approximately 2kA for a 100MW BESS facility, 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 would require at a minimum a 161kV bay addition at Carthage 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-2023-061 Carnigan 161kV (Non-Shared NU)	\$4,200,000	48 months
GEN-2023-061 Carnigan 161kV (TOIF)	\$700,000	48 months

Interconnection requests with Southwestern shall be in accordance with SPP's Tariff Attachment AD, Article I, Section 14, (c) and (d), as shown below. In addition, Southwestern's deadline of 36 months does not begin with SPP's approval, but upon the interconnecting party's signed construction agreement with Southwestern. As stated in Southwestern's Interconnection Request Procedures, Southwestern's Interconnection Request Procedures is a two-step process. First, a Facility Study Agreement between the interconnecting party and Southwestern begins the process. Second, a Construction Agreement between the interconnecting party and Southwestern starts the second phase of

the project. The anticipated lead time/deadline will be established in the construction agreement and will not start until all construction funds are received by Southwestern.

“(c) Southwestern agrees to coordinate transmission planning and construction activities with SPP, but reserves the right to plan and construct modifications or additions to Southwestern’s transmission facilities without the approval of SPP, and to approve or disapprove the requests by others to plan and construct such modifications or additions.

(d) No interconnections to Southwestern’s transmission facilities shall be made without written contractual agreements between Southwestern and the interconnecting party which satisfy Southwestern’s NEPA requirements and which establish the terms and conditions of the interconnection. Such agreements shall be made pursuant to Southwestern’s then-current Interconnection Request Procedure as posted on Southwestern’s web site.”