FACILITIES STUDY REPORT FINAL

3RSC-2023-3

Prepared by: Thomas M. Kreutz, Project Manager

Peer Review by: James Nguyen, Principal Engineer

Approved by: Kevin Pera, OATT Program Manager

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1. Executive Summary

The Transmission Provider, Public Service Company of Colorado (PSCo), is providing this Phase 4 Facilities Study Report for the 3RSC-2023 Resource Solicitation Cluster (RSC) for Generation Interconnection Request (GIR) 3RSC-2023-3. 3RSC-2023-3 is a 200 MW net output wind Generating Facility requesting Network Resource Interconnection Service (NRIS). The requested Point of Interconnection (POI) is at the May Valley 345 kV switching station.

A description of the required transmission system upgrades required to interconnect and support this GIR are included in Section 3. The total estimated cost of the transmission system improvements allocated to 3RSC-2023-3 is $7.342 million, which includes the following:

- Transmission Provider Interconnection Facilities (TPIF) - $3.949 million
- Station Network Upgrades - $3.216 million
- System Network Upgrades - $0.177 million

Interconnection Customer requirements including a reference to the Transmission Provider's interconnection guidelines is provided in Section 4.

The Interconnection Customer has requested "Generator step-up transformer back feed power" on June 30, 2025, and commercial operation date of December 31, 2025. These are not attainable by the Transmission Provider. Based upon the current schedule developed by the Transmission Provider for this GIR with an estimated Large Generator Interconnection Agreement (LGIA) execution date of June 30, 2026, the Transmission Provider proposes a back feed date of July 2, 2027. If the Provisional Large Generator Interconnection Agreement (PLGIA) for PI-2023-5 exits suspension prior to execution of the LGIA, the milestone dates in the PLGIA will be re-evaluated and updated in the PLGIA. Proposed schedule milestones to support the back feed and commercial operation dates for inclusion in the LGIA are provided in Section 5.

The Contingent Facilities identified in Section 6 provides a list of unbuilt Interconnection Facilities and Network Upgrades upon which the costs, timing, and study findings of the 3RSC–2023 are dependent, and if delayed or not built, could cause a need for re-studies of the Interconnection Service or a reassessment of the Interconnection Facilities and/or Network Upgrades and/or costs and timing.

NRIS of 3RSC-2023-3 is 200 MW after required transmission system improvements identified in Table 1, Table 2 and Table 4 for the Transmission Provider Interconnection Facilities, Station Network Upgrades, and System Network Upgrades, respectively.

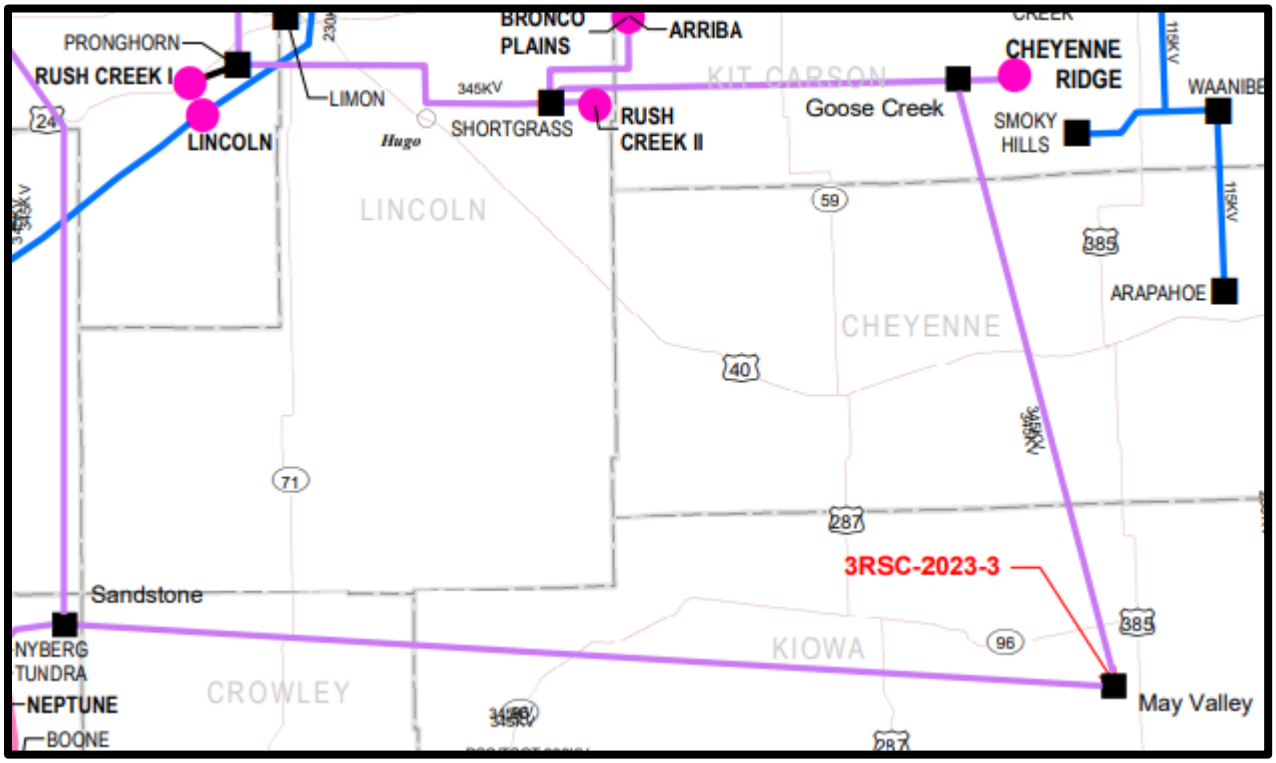
2. Introduction

PSCo has completed the Interconnection Facilities Study for 3RSC-2023-3, part of the 3RSC-2023 cluster study. The results of the Interconnection Facilities Study for 3RSC-2023-3 are provided through this Interconnection Facilities Study Phase 4 Report. This Facilities Study Report provides the information specific to 3RSC-2023-3 to connect the GIR physically and electrically to the transmission system and contains the results of the non-binding cost estimates, the electrical switching configuration of the connection equipment, and an estimate of the time required to complete the construction and installation to implement the conclusions of the 3RSC-2023 Phase 2 Study Report (Rev. 1) dated 7/25/2025.

3RSC-2023-3 is a 200 MW net output (207.4 MW gross) wind Generating Facility located in Kiowa County, Colorado at the approximate location shown on Figure 1. The Generating Facility will consist of the following:

- Sixty-one (61) GE 3.4-140 wind turbine generators (WTGs), each rated at 3.778 MVA at 45 degrees C operating at +/-0.90 power factor.
- Each of the WTGs is connected to a collector transformer, 0.69/34.5 kV, rated at 3.811 MVA.
- Two (2) 345/34.5/13.8 kV main GSU transformers rated at 73.8/98/123 MVA to step the voltage up from the collector transformer voltage to the POI voltage.
- An approximately 8-mile generation tie line connecting the project to the May Valley 345 kV switching station.

Figure 1 - Approximate Location of 3RSC-2023-3 Generation Interconnection Request POI



3. Description of Upgrades and Cost Estimates

This section provides information for the physical and electrical interconnection of the customer's generating facilities to the transmission system and contains the results of the non-binding cost estimates and the electrical switching configuration of the connection equipment.

There are three types of costs identified in the study:

- TPIF which are directly assigned to each GIR.
- Station Network Upgrades, which are allocated each GIR connecting to that station on a per-capita basis per Section 4.2.4(a) of the LGIP.
- System Network Upgrades, which are allocated by the proportional impact per Section 4.2.4(b) of the LGIP.

A. TRANSMISSION PROVIDER INTERCONNECTION FACILITIES

TPIF are all facilities and equipment owned, controlled, or operated by the Transmission Provider from the Point of Change of Ownership (PCO) to the POI, including any modifications, additions or upgrades to such facilities and equipment. TPIF are sole use facilities (e.g., for generator interconnection) and shall not include distribution upgrades, stand-alone network upgrades or System Network Upgrades. Costs of TPIF are directly assigned to the Interconnection Customer(s) using such facilities.

The facilities and estimated costs for the TPIF required for 3RSC-2023-3 to interconnect at the May Valley 345 kV switching station are included in Table 1.

Table 1 - 3RSC-2023-3 Transmission Provider's Interconnection Facilities

Element	Description	Cost Est. (million)
PSCo's May Valley 345 kV switching station	Interconnection of 3RSC-2023-3 at the May Valley 345 kV switching station. The new equipment includes: • (1) 345 kV dead end structure • (1) 345 kV 3-phase arrester • (1) 345 kV 3000 A line disconnect switch • (1) 345 kV 3-phase CT for metering • (1) 345 kV 3-phase 3-winding CCVT • Dual fiber communication equipment • Associated electrical equipment, bus, wiring and grounding • Associated foundations and structures • Associated transmission line communications, fiber, relaying and testing	$3.112
PSCo's May Valley 345 kV switching station	Transmission Provider's steel monopole structure at the Point of Change of Ownership (PCO) outside the switching station fence line and transmission line into new switching station from the PCO. Single span, 3 conductors 2-bundle 795 kcmil "Drake" ACSR, 2 x 48ct. OPGW fiber, insulators, hardware, jumpers and labor.	$0.837
	Total Cost Estimate for Interconnection Customer-Funded, PSCo-Owned Interconnection Facilities	**$3.949**

B. NETWORK UPGRADES

Network Upgrades include the additions, modifications, and upgrades to the Transmission Provider's transmission system required at or beyond the point at which the TPIF connect to the Transmission Provider's transmission system to accommodate the interconnection of the large generating facility to the Transmission Provider's transmission system. The Network Upgrades include both Station Network Upgrades and System Network Upgrades.

i. Station Network Upgrades

The Station Network Upgrade costs are allocated on a per-capita basis (i.e., on a per Interconnection Request basis) in accordance with Section 4.2.4.a of Attachment N Revised LGIP. All Station Network Upgrade Costs associated with the interconnection of 3RSC-2023-3 at the May Valley 345 kV switching station are allocated to 3RSC-2023-3.

The estimated total cost and details of the Station Network Upgrades required at the May Valley 345 kV switching station are shown in Table 2.

Table 2 - Station Network Upgrades – May Valley 345 kV Switching Station

Element	Description	Cost Est. (million)
PSCo's May Valley 345 kV switching station	Interconnection of 3RSC-2023-3 at May Valley 345 kV switching station on an existing breaker-and-a-half bay. The new equipment includes: • (1) 345 kV dead end structure • (1) 345 kV 3000 A SF6 circuit breaker • Associated electrical equipment, bus, wiring and grounding • Associated foundations and structures	$2.805
PSCo's May Valley 345 kV switching station	Install required communication equipment in the EEE at the May Valey 345 kV switching station. The new COMM equipment includes: • (1) Orion LX RTU Panel • (1) Communication Fiber Panel	$0.411
	Total Cost Estimate for PSCo-Funded, PSCo-Owned Interconnection Facilities	**$3.216**

Figure 2 provides a one-line diagram showing the 3RSC-2023-3 interconnection at the existing May Valley 345 kV switching station. Figure 3 provides a preliminary General Arrangement for the May Valley 345 kV switching station with the TPIF and Station Network Upgrades to support the 3RSC-2023-3 GIR.

Figure 2 - Preliminary One-line of the May Valley 345 kV Switching Station showing 3RSC-2023-3

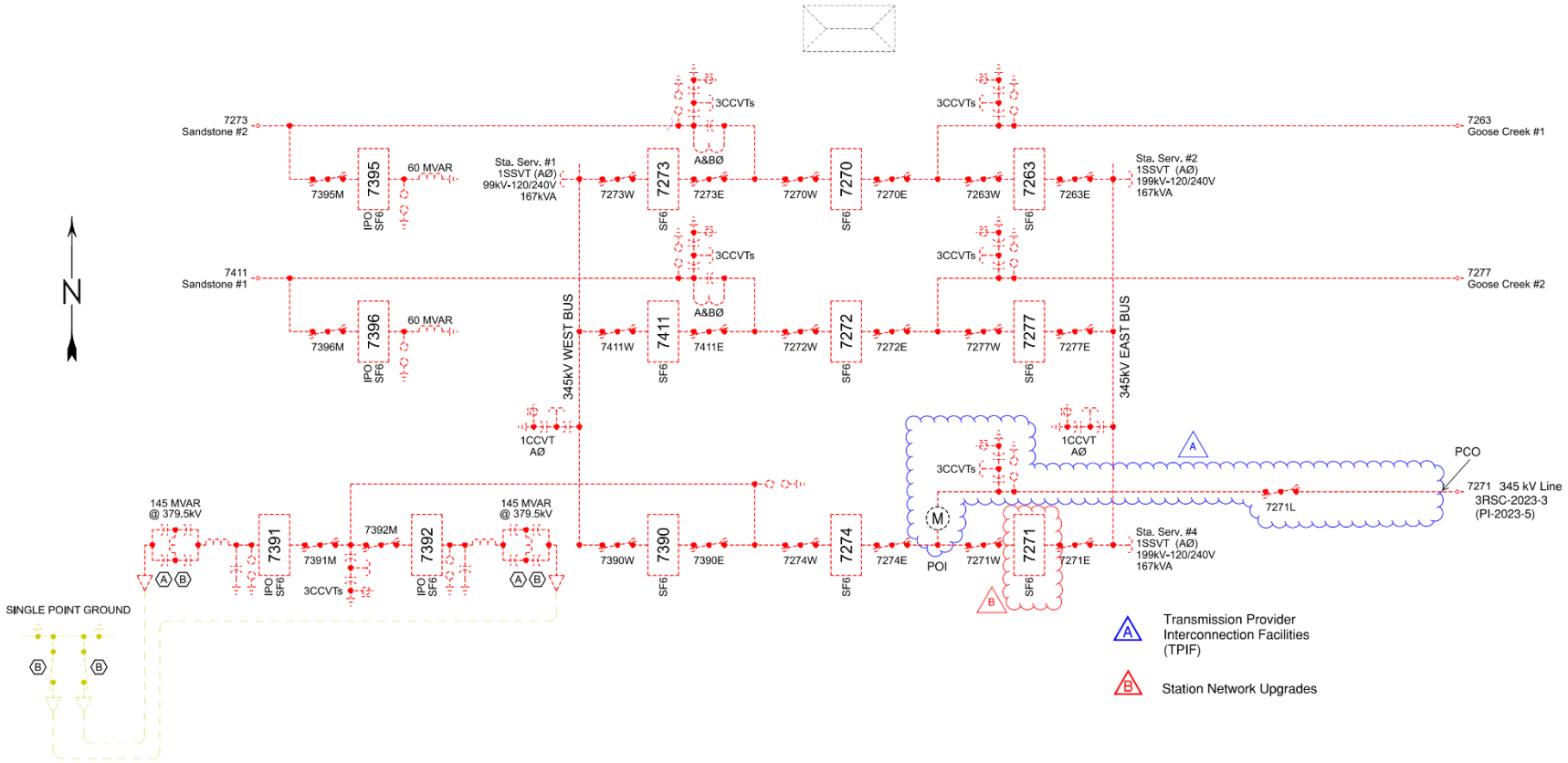
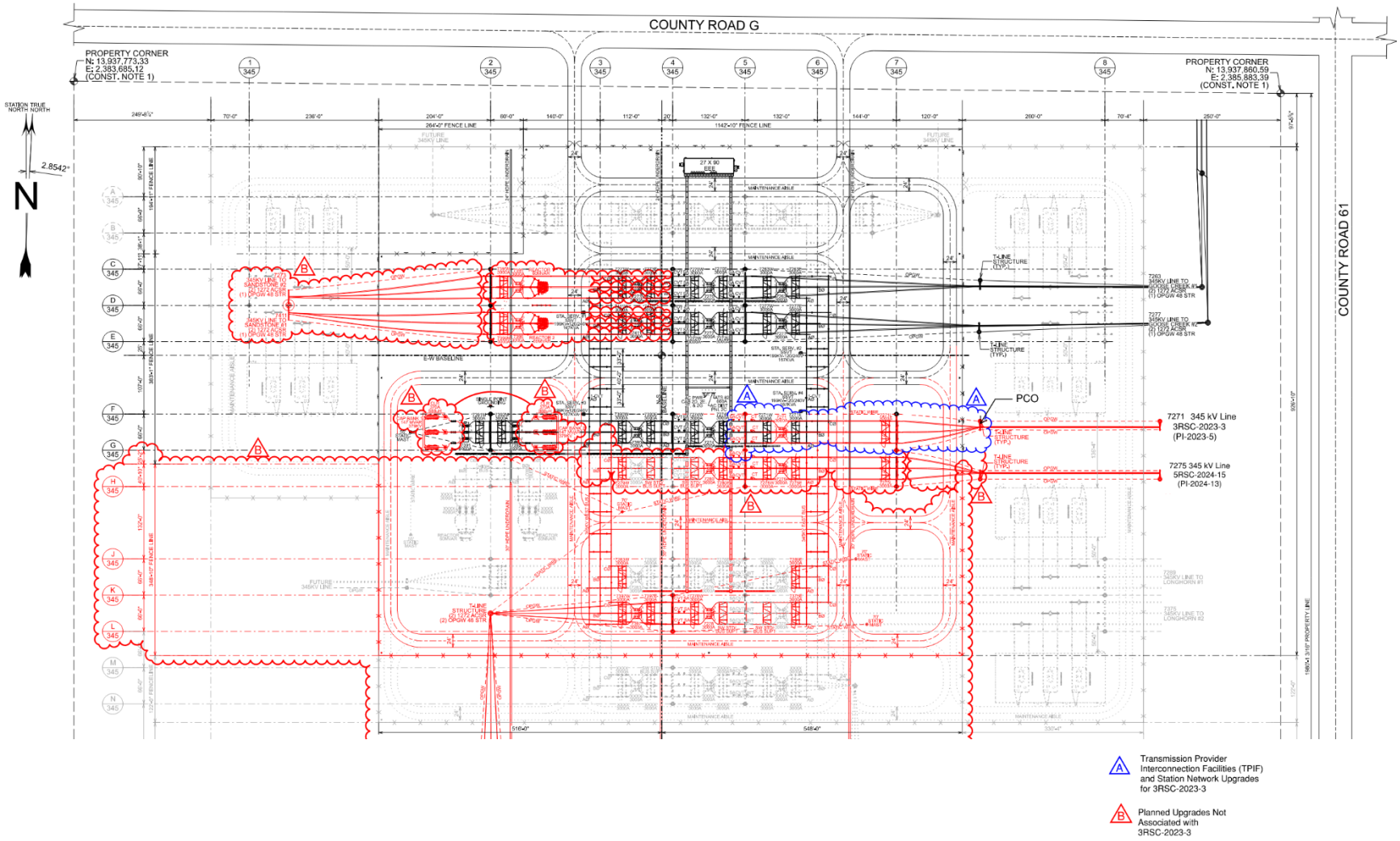


Figure 3 - Preliminary General Arrangement of the May Valley 345 kV Switching Station showing 3RSC-2023-3



ii. System Network Upgrades

All Network Upgrades other than those identified as Station Network Upgrades will be allocated based on the proportional impact of each individual GIR in the Cluster Studies in accordance with Section 4.2.4.b of Attachment N Revised LGIP.

Table 3 shows the System Network Upgrade necessary to resolve a PSCo facility thermal overload.

Table 3 – System Network Upgrade to Mitigate PSCo Facility Thermal Overload

Monitored Facility	Owner	Rate (MVA)	Study Loading (%)	Recommended Mitigation
Midway PS (70286) - Midway BR (73413) 230 kV CKT 1	PSCo	637	112.44	Uprate Line Rating to 717 MVA

The limiting element identified for the Midway PS (70286) - Midway BR (73413) 230 kV CKT 1 is circuit breaker 5120 rated at 1600 A. The associated upgrade includes the replacement of circuit breaker 5120 and associated equipment and relaying to meet the required 717 MVA rating. The System Network Upgrade costs and the allocation associated with the GIRs in the Cluster Study are described in Table 4.

Table 4 – System Network Upgrades Cost Allocation

System Network Upgrade	Total Cost (million)	3RSC-2023-1		3RSC-2023-2		3RSC-2023-3	
		Cost Allocation	Cost (million)	Cost Allocation	Cost (million)	Cost Allocation	Cost (million)
Replacement of Breaker 5120 and Associated Equipment and Relaying	$0.850	0.5275239	$0.449	0.26376195	$0.224	0.20871415	$0.177

The total cost of System Network Upgrades for each GIR is given in **Error! Reference source not found.**5.

Table 5 - Total Cost of System Network Upgrades by GIR

GIR	POI	Total Cost (million)
3RSC-2023-1	Mirasol 230 kV switching station	$0.449
3RSC-2023-2		$0.224
3RSC-2023-3	May Valley 345 kV switching station	$0.177

C. COST ESTIMATE ASSUMPTIONS

The cost estimates provided in this Interconnection Facilities Study Report are based on the following assumptions:

- The cost estimates are in 2025 dollars with an escalation percentage and contingencies applied to the cost estimates.
- The cost estimates do not include an Allowance for Funds Used During Construction (AFUDC).

- The estimated costs include all applicable labor and overheads associated with the siting, engineering, design, and construction of the PSCo facilities to facilitate interconnection.
- The estimated costs do not include the cost for any Customer owned equipment and associated design and engineering.
- Labor is estimated at straight time only, no overtime work is included.
- No costs for retail load metering are included in these estimates.
- PSCo (or its Contractor) will perform all construction, wiring, testing and commissioning for PSCo owned and maintained facilities.

4. Developer Requirements

- Customer will install two (2) redundant fiber optic circuits into the Transmission Provider's substation as part of its interconnection customer interconnection facilities construction scope.
- Power Quality Metering (PQM) will be required on the Interconnection Customer's generation tie-line terminating into the POI.
- The Interconnection Customer will be required to design, procure, install, own, operate and maintain a Remote Terminal Unit (RTU) at their collector substation. PSCo will be provided with indications, readings and data from the RTU.
- The Interconnection Customer will comply with the Interconnection Guidelines for Transmission Interconnected Producer-Owned Generation Greater Than 20 MW, as amended from time to time, and available at: Interconnection | Transmission | Corporate | Xcel Energy.

5. Schedule

This section provides proposed milestones for the interconnection of 3RSC-2023-3 to the Transmission Provider's transmission system. The Interconnection Customer's proposed "Generator step-up transformer back feed power" date of June 30, 2025 and commercial operation date of December 31, 2025, are not attainable by the Transmission Provider. Due to the suspension of PI-2023-5 effective 11/21/2025, the Transmission Provider has stopped work on PI-2023-5 while the current planned work at the May Valley 345 kV switching station continues. Based upon the current schedule developed by the Transmission Provider for this GIR with an estimated LGIA execution date of June 30, 2026, the Transmission Provider proposes a back feed date of July 2, 2027. The Transmission Provider proposes the milestones provided below:

Table 6 - Proposed Milestones for 3RSC-2023-3

Milestone	Responsible Party	Estimated Completion Date
Executed LGIA	Interconnection Customer and Transmission Provider	June 30, 2026
In-Service Date for Transmission Provider Interconnection Facilities and Station Network Upgrades required for interconnection	Transmission Provider	July 2, 2027
In-Service Date & Energization of Interconnection Customer's Interconnection Facilities	Interconnection Customer	July 2, 2027
Initial Synchronization Date	Interconnection Customer	August 2, 2027
Begin trial operation & testing (90% of IC facilities available for testing)	Interconnection Customer and Transmission Provider	August 16, 2027
Commercial Operation Date	Interconnection Customer	October 8, 2027

Some schedule elements are outside of the Transmission Provider's control and could impact the overall schedule. The following schedule assumptions provide the basis for the schedule milestones:

- Permitting for new facilities are anticipated to be completed within 12 months of LGIA execution.
- Equipment and material procured for PI-2023-5 are still available for the project and have not been re-allocated to other projects or if equipment and material have been re-allocated, new orders can be placed for delivery to meet this proposed schedule.
- Construction of the 3RSC-2023-3 interconnection facilities will commence after completion of current projects at the May Valley 345 kV switching station, estimated December 31, 2026.
- The Transmission Provider is currently experiencing continued increases to material lead times which could impact the schedule milestones. The schedule milestones are based upon material lead times known at this time.
- Availability of line outages to interconnect new facilities to the transmission system.

- A Certificate of Public Convenience and Necessity (CPCN) is not anticipated for the construction of the Interconnection Facilities and Station Network Upgrades. However, if a Rule 3206 filing determines that a CPCN is required, the expected time to obtain a CPCN approval is 18 months.

6. Contingent Facilities

The following is the list of the unbuilt Interconnection Facilities and Network Upgrades upon which the costs, timing, and study findings of 3RSC-2023-3 is dependent, and if delayed or not built, could cause a need for re-studies of the Interconnection Service or a reassessment of the Interconnection Facilities and/or Network Upgrades and/or costs and timing. The individual GIR maximum allowable output may be decreased if these Contingent Facilities are not in-service

The Contingent Facilities identified for this GIR are:

- The following unbuilt transmission projects, which are modeled in the Study Case, are considered Contingent Facilities:
  1. Midway – Jackson Fuller L5129 uprate to 637 MVA – ISD 12/31/2029.
  2. New Fort St. Vrain 230/345 kV 560 MVA transformer T9 – ISD 12/31/2029.
  3. Double circuit for Cherokee – Sandown – Chambers – Harvest Mile upgraded substations – ISD 9/13/2029.
  4. Daniels Park – Prairie – Greenwood L5707 uprate to 916 MVA (ISD 2026).
  5. Daniels Park – Prairie – Greenwood L5111 uprate to 916 MVA (ISD 2026).
  6. Arapahoe – Greenwood L5709 uprate to 956 MVA (ISD 2027).
  7. Greenwood – Monaco Series Reactor with X = 0.0145 (ISD 2027).
  8. Buckley – Tollgate L5285 uprate to 796 MVA (ISD March 2030).
  9. Buckley – Smoky Hill L5167 uprate to 796 MVA (ISD Mach 2030).
  10. Fort St. Vrain - Canal Crossing 345 kV double circuit (ISD 2026).
  11. Canal Crossing - Goose Creek 345 kV double circuit (ISD 2025).
  12. Goose Creek - May Valley 345 kV double circuit (ISD 2025).
  13. Sandstone - Harvest Mile 345 kV double circuit (ISD 2027).
  14. Comanche – Midway 230 kV Ckt. 2 interconnection to Mirasol 230 kV “Mirasol loop-in” - The Mirasol loop-in upgrade is assigned to another LGIA (GI-2020-1) at Mirasol, with an LGIA in suspension. Following LGIA execution for at least one of the 3RSC requests, the Interconnection Customer can request to advance construction of this upgrade per Article 11.2.2.

- Additional Contingent Facilities identified for 3RSC-2023-3 include the TPIF, Station Network Upgrades, and System Network Upgrade identified in Tables 1, 2, and 4, respectively