Facilities Study For Southwest Power Pool (SPP)

ERAS 2025-001
Group 5
ERAS-2025-036

Xcel Energy Services, Inc.

Southwestern Public Service Co.
Transmission Planning South
Updated 5/8/2026

Executive Summary

The Southwest Power Pool (SPP or Transmission Provider [TP]) evaluated the generation facilities requesting to interconnect to the SPS transmission system in the Expedited Resource Adequacy Study (ERAS-2025-001), which was completed in February, 2026. The requests for interconnection were placed with SPP in accordance with the Scope of Interconnection Facilities Study GIP Section 8.10 and the Interconnection Facilities Study Procedures in accordance with GIP Section 8.11.

ERAS-2025-036 (Interconnection Customer or IC) requested the interconnection of a 140 MW battery storage (BESS) energy generation facility, located in Randall County, Texas, to the Southwestern Public Service Company (SPS or Transmission Owner [TO]) transmission network. SPS will construct a new 230 kV substation named “Emeny”. The new substation will be laid out as a three-breaker ring bus, and expandable for a future breaker and one-half configuration. After substation construction is complete, the IC will connect to the SPS 230 kV bus. The IC is required to build one 230 kV generation tie-line from their collector substation facilities to the SPS Emeny Substation. The IC will be required to maintain a Power Factor between 0.95 lagging and 0.95 leading at the POI.

The customer will refer to other requirements that may be needed at the following link:
Salesforce **(Xcel Energy Interconnection Guidelines For Transmission Interconnected Producer-Owned Generation Greater Than 20 MW).**

Coordination with Xcel Energy is required during the under-frequency relay-setting phase for the generation. The IC is required to report their generation off-nominal frequency tripping relay settings to SPP and SPS. SPS specifies that generators shall not trip at frequencies above 58.5 Hz unless exceptions in the Transmission Provider Criteria are met. The IC agrees that the energy generating units installed at this interconnection will not be tripped for under-frequency conditions above 58.5 Hz in compliance with Transmission Provider criteria. This means that the generation subject to this Interconnection Agreement may not trip for under-frequency conditions on the transmission system until all under-frequency load shedding relays have operated. SPS will also require that the IC follow all applicable criteria, guidelines, standards, requirements, regulations, and procedures issued by the North American Electric Reliability Corporation (NERC), SPP, and the Federal Energy Regulatory Commission (FERC) or their successor organizations.

The IC is responsible for all the cost of the Interconnection Facilities, installation of the direct assigned Transmission Owner Interconnection Facilities (TOIF) which are facilities paid for by the IC but are owned, operated, and maintained by SPS; inclusive of all construction required for the IC to interconnect at SPS’ Substation.

Other network upgrades identified by SPP will have an impact on the total overall costs for interconnection of the IC.

It is anticipated that the entire process of constructing the Substation for the acceptance of the IC facility output and the network upgrades allocated to this project will require approximately 36-42 months to complete after an Interconnection Agreement is signed and authorization to proceed is received. The IC’s cost for the interconnection of this generation facility is shown below in Table 1:

Table 1: Cost Summary[1]

Non-shared Network Upgrades:	**$**	**25,619,705**
Transmission Owner Interconnection Facilities:	**$**	**4,222,767**
Total:	**$**	**29,842,472**

General Description of SPS[2] Facilities

1. **Construction at the SPS Emeny Substation**: See Appendix A, Figure A-1 for general vicinity location map of the SPS facility.

   Location: The IC will build one 230 kV generation tie-line from their generation facility to the 230 kV Emeny Substation, in Randall County, Texas. SPS requires the IC to run dual OPGW conductors from their generation facility to provide redundant communication. The customer will terminate their generation tie-line to transmission terminal structures installed and owned by SPS. The transmission terminal structures will be located outside of the Substation. SPS will install transmission jumpers at the transmission terminal structure and phase conductors along with fiber optics cable to the Point-Of-Interconnection terminal inside the Substation. The transmission terminal structure will provide a clear change-of-ownership point for the IC.

   Bus Design: The 230 kV, three-breaker ring-bus configuration, expandable to a breaker and one-half configuration will be constructed to accommodate the POI for the ERAS-2025-036 battery storage generation facility.

   Revenue Metering: An individual billing meter will be installed at the SPS substation on the line terminal from the IC's substation, which meets the standards: ANSI C12.1 accuracy class 0.2 (3-PT's IEEE C57.13 accuracy class 0.3 and 3-CT's IEEE C57.13 accuracy class 0.15) for full 3-phase 4-wire metering. Pulses out of the billing meter will be sent via SCADA to the Transmission Owner's Control Center in Amarillo, Texas.

   Disturbance Monitoring Device: A Disturbance Fault Recorder (DFR), capable of recording faults, swings, and long-term trending, will be installed to monitor and record conditions in the substation and on the transmission lines. The disturbance equipment will also be equipped with a GPS time synching clock. This equipment will have communication capability with a dedicated communication circuit. The disturbance equipment will have its own dedicated communications circuit.

   Remote Terminal Unit (RTU): An RTU will be utilized for communications with the new IC facilities. A Communication SEL Relay will be utilized for relay communications and other functions as required; these costs will be directly assigned to the IC. The IC will provide and install an RTU for metering and telemetry at the IC's facility as required by the latest Xcel Energy Interconnection Guidelines.

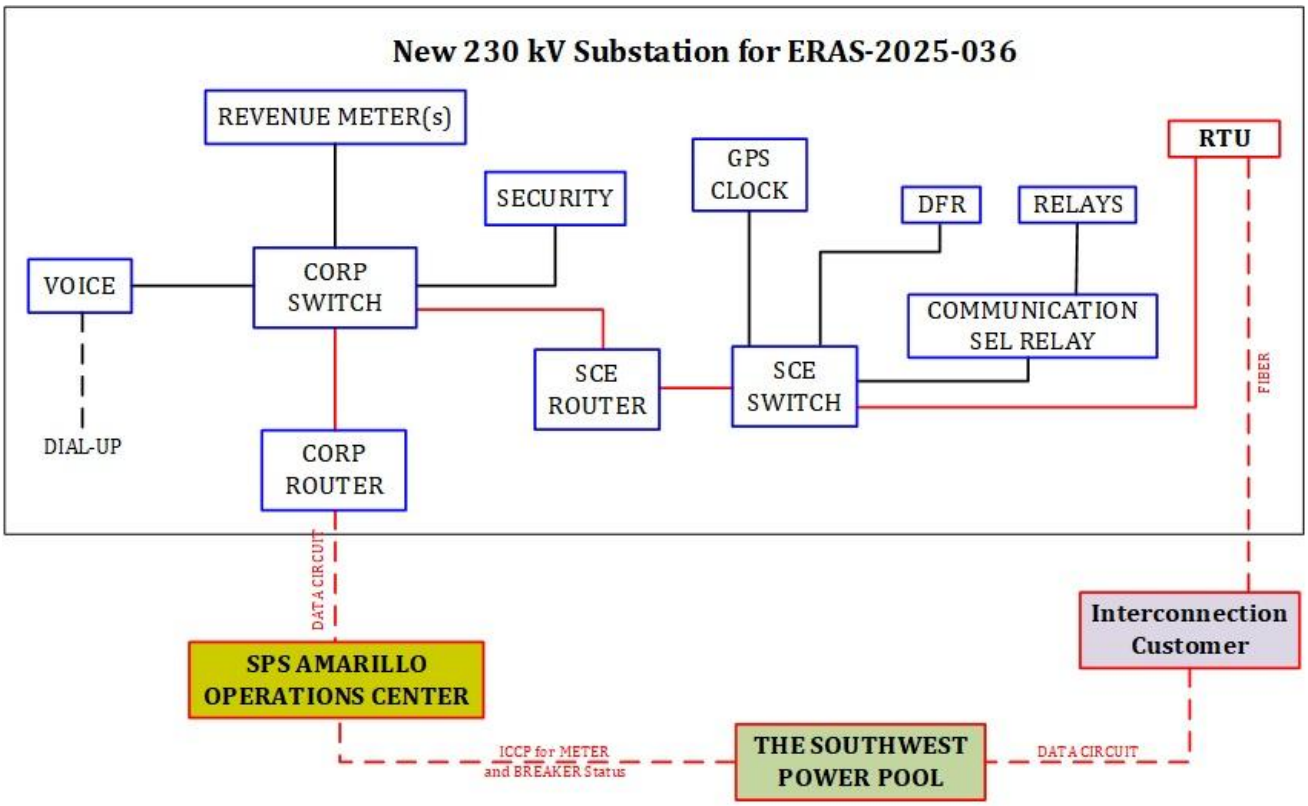
   Communications: To meet its Communications obligations, the IC shall be responsible for planning with the local phone company to provide a communication circuit as required by the Transmission Owner. Transmission Owner equipment may include but is not limited to the following: relay communication equipment, RTU, and disturbance monitoring equipment. Prior to any construction, the IC is required to contact the Transmission Owner substation-engineering

[1] The cost estimates are 2026 dollars with an accuracy level of ±20%.
[2] All modifications to SPS facilities will be owned, maintained, and operated by SPS.

department for all communication details and provide detail of the method to be used in communication.

The following communications schematic diagram, which includes communication equipment information for the IC, Transmission Provider (Southwest Power Pool) and Transmission Owner (Southwestern Public Service), is provided to assist the Parties as a template:

A schematic outlining the proposed communications is provided below:



The IC shall be responsible for providing the dual fiber optic communication circuit installed in the overhead transmission line static wire from the customer's substation to the SPS substation for protective relaying and for transmitting metering and status data to SPS. Utilizing this fiber optic connection, SPS will establish a direct connection to the IC's RTU.

SPS will not serve as a proxy for communication from the IC to SPP.

2. **Transmission and Remote Substation Work – Engineering and Construction**

   a. **Coordination**: The Xcel Energy Transmission Engineering and Design groups require an engineering review of the customer's design prior to any construction by the IC or its contractor on any customer transmission lines, the proposed termination to the SPS substation, or doing work in close proximity to any SPS transmission line. It is the IC's responsibility to initiate the design review in a timely manner before construction of any transmission line begins. If the review has not been made or the design at any of the aforementioned locations is deemed inadequate, the crossing(s) and or termination into the interchange will be delayed until the matters are resolved. SPS will not be held responsible for these delays

b. **Fault or Short Circuit Study**: The IC will coordinate with the System Protection Engineering department at SPS on the available fault current at the interconnection location following the acceptance of the Generator Interconnection Agreement (GIA) and prior to final design on the IC's facilities. The table below shows the approximate available fault current at the interconnection location. The fault data does not contain fault current contribution from the IC's facility.

Table 1: Available fault current at interconnection location

Short Circuit Information without contribution from new Generator Facilities (ERAS-2025-036)				
Fault Location	Fault Current (Amps)		Impedance (Ω)	
	Line-to-Ground	3–Phase	Z^+	Z^0
Emeny Substation	2020.37	8757.04	2.01672, j15.0292	8.11035, j34.5177

3. **Right-Of-Way**

a. **Permitting**: The IC will be responsible for any permitting and right of way of their substation and their generation tie-line from their collector substation to the Emeny Substation. The customer will refer to the Xcel Energy *Right-of-Way, Easements, and Encroachments* web page and the attached Xcel Energy Job Aid document for information concerning crossing of SPS transmission lines with customer generation tie-lines: *Right of Way | Transmission | Corporate | Xcel Energy*

4. **Construction Power and Retail Service**

a. **Responsibility**: It is the sole responsibility of the IC to arrange for both construction and station power. The IC needs to plan for retail service from the local retail provider. The retail provider and the Customer will be responsible for making any necessary transmission service arrangements as required under the SPP OATT.

5. **Project and Operating Concerns:**

a. **Collaboration**: Close work between the Transmission group, the IC's personnel and local operating groups will be imperative in order to meet any in-service date that has been established.

b. **Reactive Power Requirements**: The IC will be required to maintain a power factor between 0.95 lagging and 0.95 leading at the Point of Interconnection (POI). All capacitors required will be installed on the lower voltage bus at IC's substation. This is required to maintain acceptable dynamic voltage rise as per latest revision of the Xcel Energy Interconnection Guidelines for Transmission Interconnection Producer-Owned Generation Greater than 20 MW. If switched reactive devices are used on the IC's system, they need to be switched in stages where the voltage rise is less than 3%.

6. **Estimated Construction Costs and Schedule**

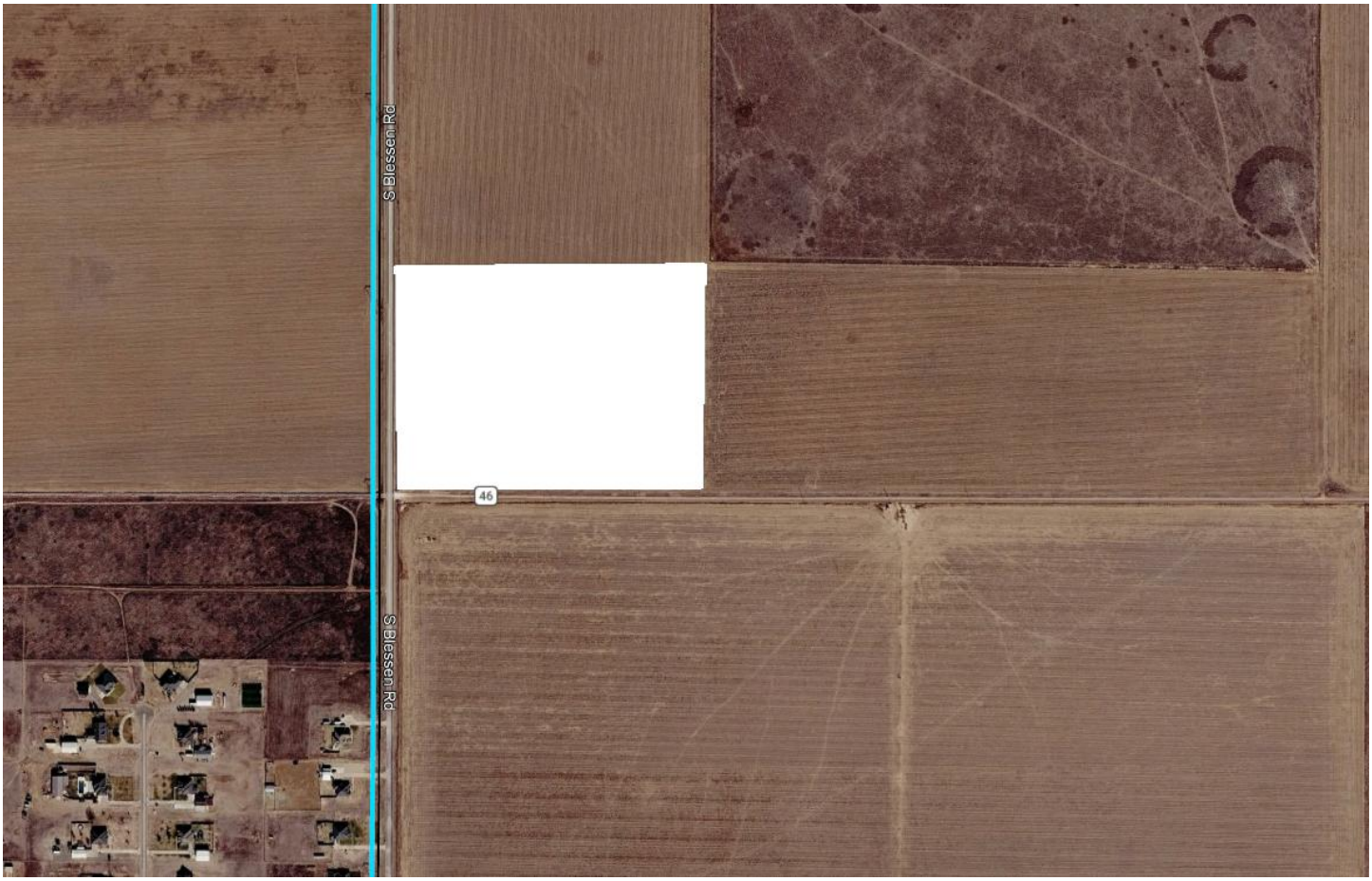
a. **Schedule**: An engineering and construction schedule for this project is estimated at approximately 36 - 42 months. Other factors associated with clearances, equipment delays, and work schedules could cause additional delays. This is applicable after all required agreements

are signed and internal approvals are granted.

b. All additional costs for work not identified in this study are the sole responsibility of the IC unless other arrangements are made.

Appendix A

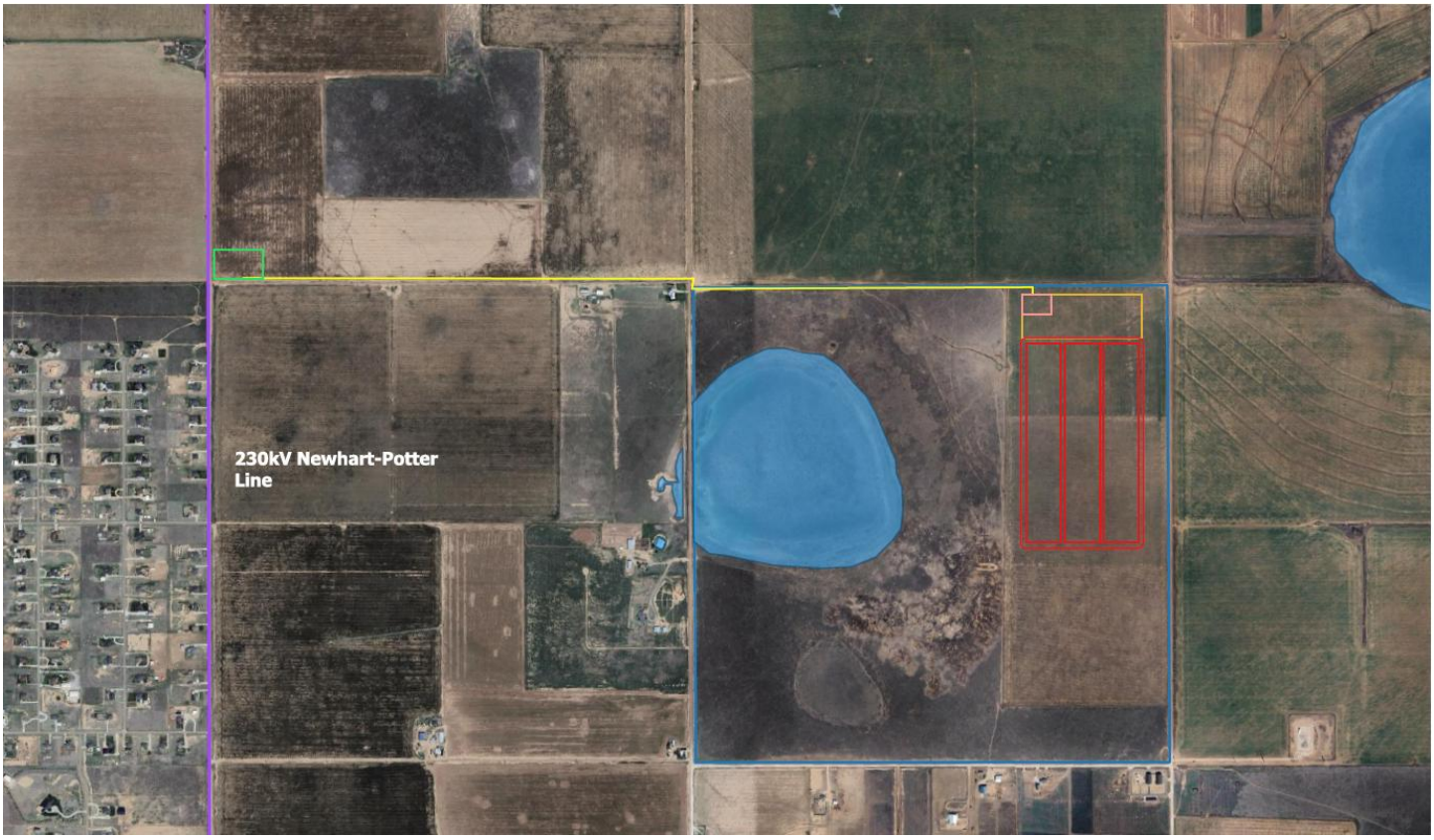
Figure A-1: General vicinity location map of the POI Substation



Emeny POI Substation Will Be Located in White Polygon

35.1628 N, -102.0465 W

Figure A-2: General vicinity location map of the Customer's Generation Facility



From Customer's Documents

Figure A-3: Transmission Terminal Structure & Change of Ownership

DIAGRAMS ARE NOT FOR CONSTRUCTION PURPOSES

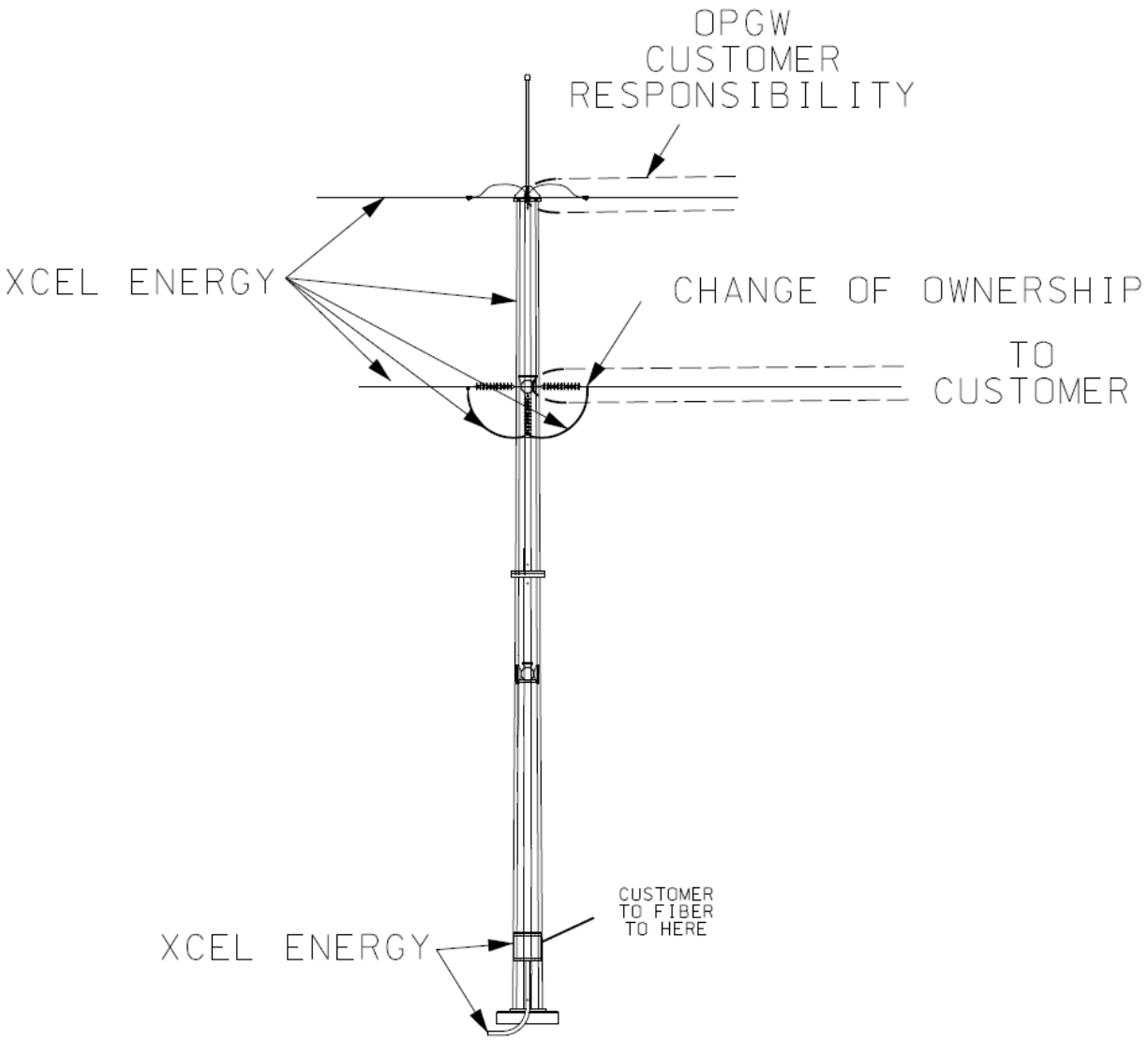
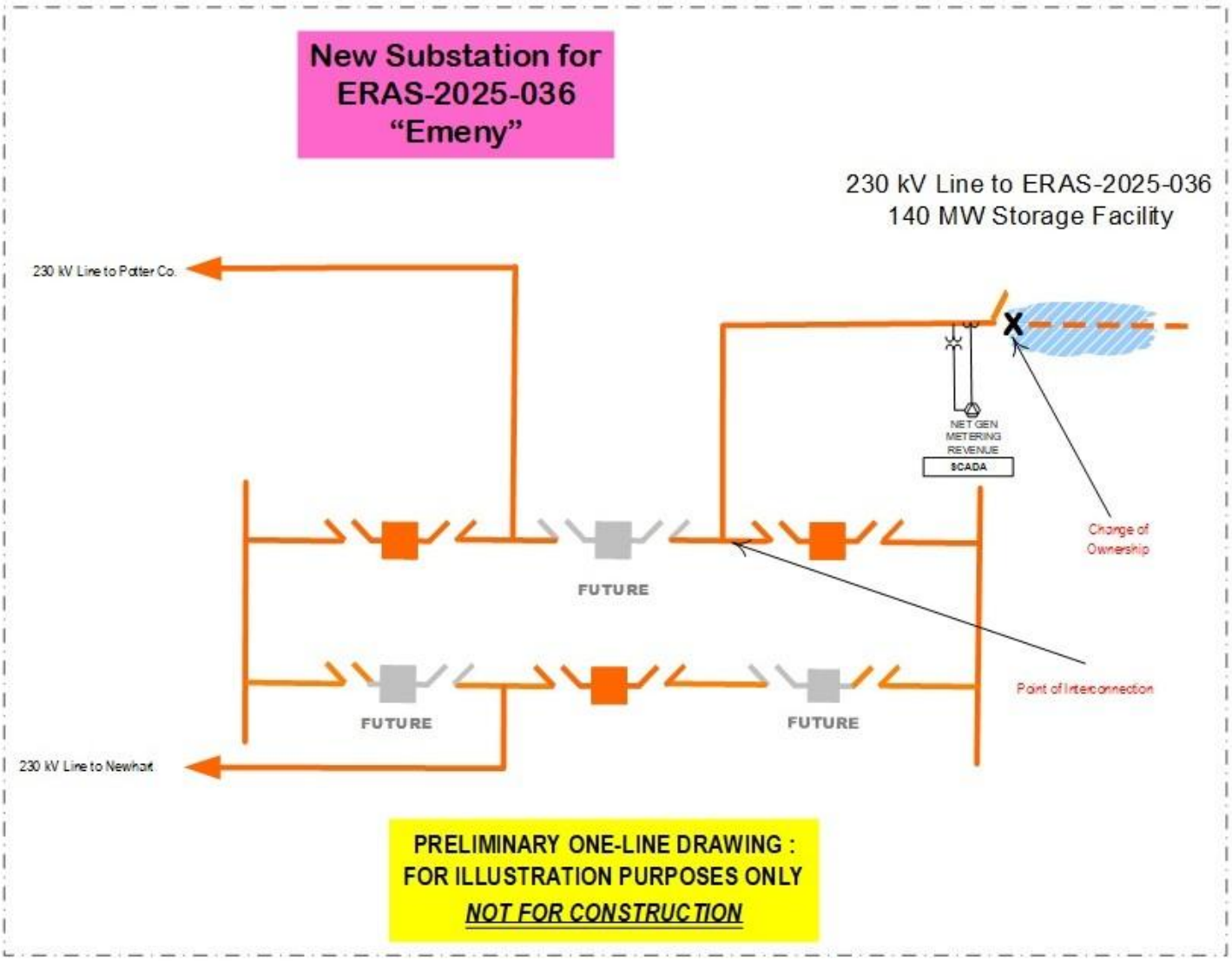


Figure A-4: Preliminary One-Line Diagram

DIAGRAMS ARE NOT FOR CONSTRUCTION PURPOSES



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AEP Generation Interconnection

Facilities Study Report

for

ERAS-2025-001

Lawton Eastside to Oklaunion 345 kV Line Rebuild

Southwest, Oklahoma

April 2026

1 Facilities Study Summary

American Electric Power (AEP) Southwest Transmission Planning performed the following study at the request of the Southwest Power Pool (SPP) for SPP Generation Interconnection request ERAS-2025-001. Per the SPP Generator Interconnection Procedures (GIP), SPP requested that AEP perform an Interconnection Facilities Study (IFS) for Network Upgrade(s) in accordance with Attachment V, Section 8.11 of the Generator Interconnection Procedures (GIP).

Lawton Eastside to Oklaunion 345 kV

- Rebuild the approx. 66.8-mile line to achieve the desired 1080/1390 MVA summer normal/emergency rating.

1.1 Project Description

Per the ERAS-2025-001 study request, AEP proposes to rebuild the Lawton Eastside to Oklaunion 345 kV line (Figure 1) in southwest, Oklahoma.

1.2 AEP's Scope of Work to Facilitate Interconnection

- To accommodate the desired summer normal/emergency rating of 1080/1390 MVA requested for the Lawton Eastside to Oklaunion 345 kV line, the approx. 66.8-mile line will be rebuilt.
- The design and construction of the new equipment will meet all AEP specifications for transmission lines. AEP will own, operate, and maintain the Lawton Eastside to Oklaunion 345 kV line.
- It is understood that the Interconnection Customers are responsible for the cost of all of this work.

1.3 Short Circuit Evaluation

- It is standard practice for AEP to recommend replacing a circuit breaker when the current through the breaker for a fault exceeds 100% of its interrupting rating with recloser de-rating applied, as determined by the ANSI/IEEE C37.5-1979, C37.010-1979 & C37.04-1979 breaker rating methods.
- In the AEP system, no breakers were found to exceed their interrupting capability after the addition of this equipment. Therefore, there are no additional short circuit upgrade costs associated with the ERAS-2025-001, UIDs 172047 & 172048.

1.4 Interconnection Cost of Facilities Included in the Facilities Study:

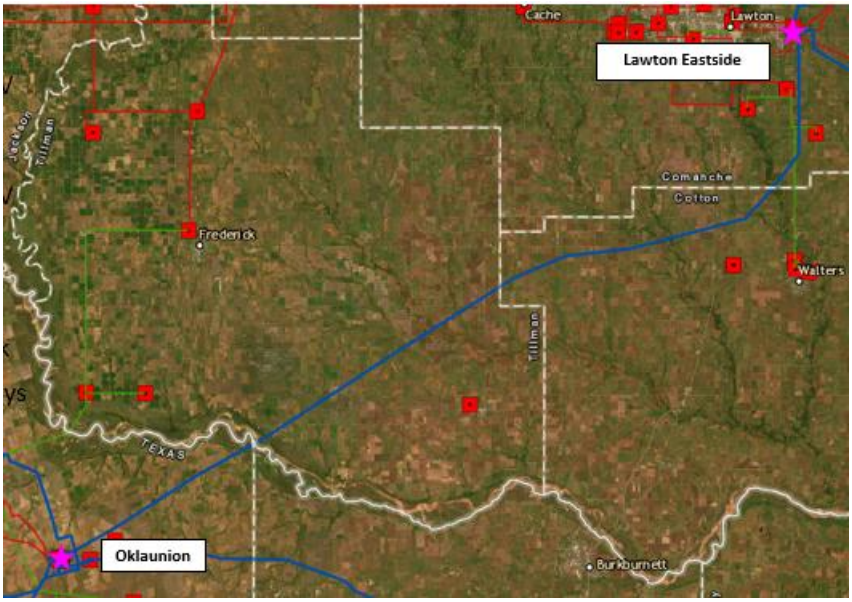
Rebuild the ~4.3-mile line from the Lawton Eastside to Comanche Tap 345 kV	$18,952,333
Rebuild the ~62.5-mile line from the Oklaunion to Comanche Tap 345 kV	$285,578,735
Total Cost	$304,531,068

The estimates do not include the impact that delays in obtaining ROW, permits, or other approvals may have.

1.5 Project Lead time

Project in-service date is projected to be 48 months after the issuance of Authorization to Proceed from the Interconnection Customer.

Figure 1



AEP Generation Interconnection

Facilities Study Report

for

ERAS-2025-001

Elk City 230/138 kV Transformer Upgrades

Beckham County, Oklahoma

April 2026

1 Facilities Study Summary

American Electric Power (AEP) Southwest Transmission Planning performed the following study at the request of the Southwest Power Pool (SPP) for SPP Generation Interconnection request ERAS-2025-001. Per the SPP Generator Interconnection Procedures (GIP), SPP requested that AEP perform an Interconnection Facilities Study (IFS) for Network Upgrade(s) in accordance with Attachment V, Section 8.11 of the Generator Interconnection Procedures (GIP).

Elk City 230/138 kV Transformer

- Upgrade equipment associated with the Elk City 230/138 kV auto to achieve a desired 295/450 MVA summer normal/emergency rating.

1.1 Project Description

Per the ERAS-2025-001 study request, AEP proposes to upgrade equipment associated with the Elk City 230/138 kV auto (Figure 1) in Beckham County, Oklahoma.

1.2 AEP's Scope of Work to Facilitate Interconnection

- To accommodate the desired summer normal/emergency rating of 295/450 MVA requested for the Elk City 230/138 kV auto, equipment associated with the existing 230/138 kV auto will be upgraded.
- The design and construction of the new equipment will meet all AEP specifications for transmission stations. AEP will own, operate, and maintain the Elk City 230/138 kV auto and associated equipment.
- It is understood that the Interconnection Customers are responsible for the cost of all of this work.

1.3 Short Circuit Evaluation

- It is standard practice for AEP to recommend replacing a circuit breaker when the current through the breaker for a fault exceeds 100% of its interrupting rating with recloser de-rating applied, as determined by the ANSI/IEEE C37.5-1979, C37.010-1979 & C37.04-1979 breaker rating methods.
- In the AEP system, no breakers were found to exceed their interrupting capability after the addition of this equipment. Therefore, there are no additional short circuit upgrade costs associated with the ERAS-2025-001, UID 172056.

1.4 Interconnection Cost of Facilities Included in the Facilities Study:

Upgrade Equipment Associated with the Elk City 230/138 kV Auto	$1,033,518
Total Cost	$1,033,518

The estimates do not include the impact that delays in obtaining ROW, permits, or other approvals may have.

1.5 Project Lead time

Project in-service date is projected to be 24 months after the issuance of Authorization to Proceed from the Interconnection Customer.

Figure 1

AEP Generation Interconnection

Facilities Study Report

for

ERAS-2025-001

Elk City to Chisholm 230 kV Line Rebuild

Beckham County, Oklahoma

April 2026

1 Facilities Study Summary

American Electric Power (AEP) Southwest Transmission Planning performed the following study at the request of the Southwest Power Pool (SPP) for SPP Generation Interconnection request ERAS-2025-001. Per the SPP Generator Interconnection Procedures (GIP), SPP requested that AEP perform an Interconnection Facilities Study (IFS) for Network Upgrade(s) in accordance with Attachment V, Section 8.11 of the Generator Interconnection Procedures (GIP).

Elk City to Chisholm 230 kV

- Rebuild the approx. 18.4-mile line to achieve the desired 480 MVA summer emergency rating.

1.1 Project Description

Per the ERAS-2025-001 study request, AEP proposes to rebuild the Elk City to Chisholm 230 kV line (Figure 1) in Beckham County, Oklahoma.

1.2 AEP's Scope of Work to Facilitate Interconnection

- To accommodate the desired summer emergency rating of 480 MVA requested for the Elk City to Chisholm 230 kV line, an existing approx. 18.4-mile line will be rebuilt.
- The design and construction of the new equipment will meet all AEP specifications for transmission lines. AEP will own, operate, and maintain the Elk City to Chisholm 230 kV line.
- It is understood that the Interconnection Customers are responsible for the cost of all of this work.

1.3 Short Circuit Evaluation

- It is standard practice for AEP to recommend replacing a circuit breaker when the current through the breaker for a fault exceeds 100% of its interrupting rating with recloser de-rating applied, as determined by the ANSI/IEEE C37.5-1979, C37.010-1979 & C37.04-1979 breaker rating methods.
- In the AEP system, no breakers were found to exceed their interrupting capability after the addition of this equipment. Therefore, there are no additional short circuit upgrade costs associated with the ERAS-2025-001, UID 172057.

1.4 Interconnection Cost of Facilities Included in the Facilities Study:

Rebuild the approx. 18.4-mile Elk City to Chisholm 230 kV line	$43,551,586
Total Cost	$43,551,586

The estimates do not include the impact that delays in obtaining ROW, permits, or other approvals may have.

1.5 Project Lead time

Project in-service date is projected to be 48 months after the issuance of Authorization to Proceed from the Interconnection Customer.

Figure 1