AEP Generation Interconnection

Facilities Study Report

for

DISIS-2022-001

GEN-2022-234

Alluwe Tap to Chelsea transmission line

Rogers County, Oklahoma

November 2025

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 DISIS-2022-001; GEN-2022-234. Per the SPP Generator Interconnection Procedures (GIP), SPP requested that AEP perform an Interconnection Facilities Studies (IFS) for Network Upgrade(s) in accordance with Section 8.11 for the following Interconnection and/or Network Upgrade(s):

1.1 Project Description

GEN-2022-234 proposes to install a 250 MW solar generating facility in Rogers County, Oklahoma(Figure 2). The point of interconnection for the generating facility will be AEP's 138 kV Alluwe Tap to Chelsea transmission line (Figure 1).

1.2 AEP's Scope of Work to Facilitate Interconnection

- To accommodate the interconnection to AEP's existing 138 kV Alluwe Tap to Chelsea transmission line, a new 138 kV, 3-breaker ring bus station will be installed. Also, AEP will complete any needed remote work at the Northeast Power Station and Vinita Junction stations associated with this project. The design and construction of the new station will meet all AEP specifications. Bus work and disconnect switches will be designed to accommodate the loading requirements, and circuit breakers will be rated to ensure adequate load and fault interrupting capability. AEP will own, operate, and maintain the new 138 kV ring bus station.
- Installation of associated protection and control equipment, SCADA, and revenue metering will be required at the new 138 kV ring bus station. AEP reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.
- AEP will extend one span of 138 kV transmission line from the generator's terminal at the new 138 kV ring bus station to the GEN-2022-234 POI. AEP will build and own the first transmission line structure outside of new 138 kV ring bus station, to which AEP's transmission line conductor will attach. Right of Way (ROW) will be required for this span.
- It is understood that the Interconnection Customer is responsible for all of the connection costs associated with interconnecting GEN-2022-234 to the AEP transmission system. The cost of the customer's generating facility and the costs for the line connecting the generating facility to AEP's transmission system (Beyond the first

span exiting the POI) are not included in this report; these are assumed to be the Customer's responsibility.

- The customer will be responsible for the cost of constructing a fiber-optic connection from their telecom equipment to AEP's new 138 kV ring bus station.

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 the generation and related facilities. Therefore, there are no additional short circuit upgrade costs associated with the DISIS-2022-001; GEN-2022-234 interconnection.

1.4 Stability Evaluation

- Based on the results of the DISIS-2022-001 DISIS short circuit and stability report, AEP is not aware of any instances where the system does not meet TPL-001 stability performance requirements for the planning events and generation dispatch conditions that were considered in this DISIS study.

1.5 Interconnection Cost of Facilities Included in the Facilities Study:

Network Upgrades (Build new 138 kV 3-breaker ring bus station)	$15,715,601
Transmission Owner Interconnection Facilities (TOIF)	$3,325,056
Remote End Work	$686,616
Total Cost	$19,727,273

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

1.6 Project Lead time

Project in-service date is projected to be 36 months after the issuance of Authorization to Proceed from the Interconnection Customer.

Figure 1: Point of Interconnection (POI INFORMATION) One-Line Diagram

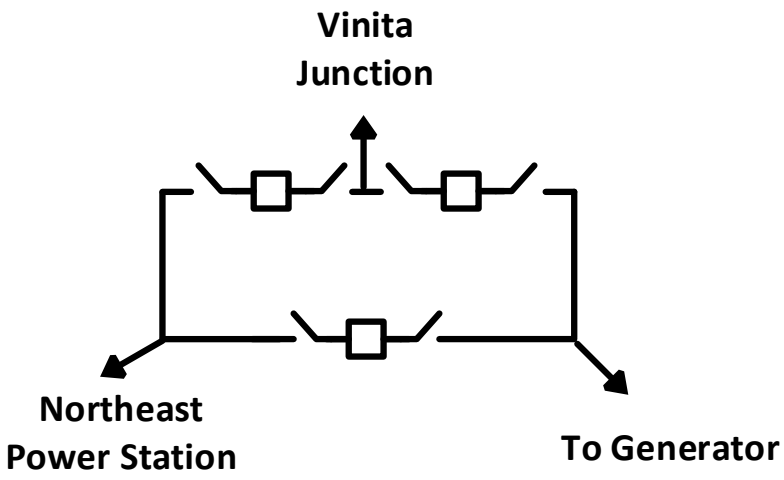
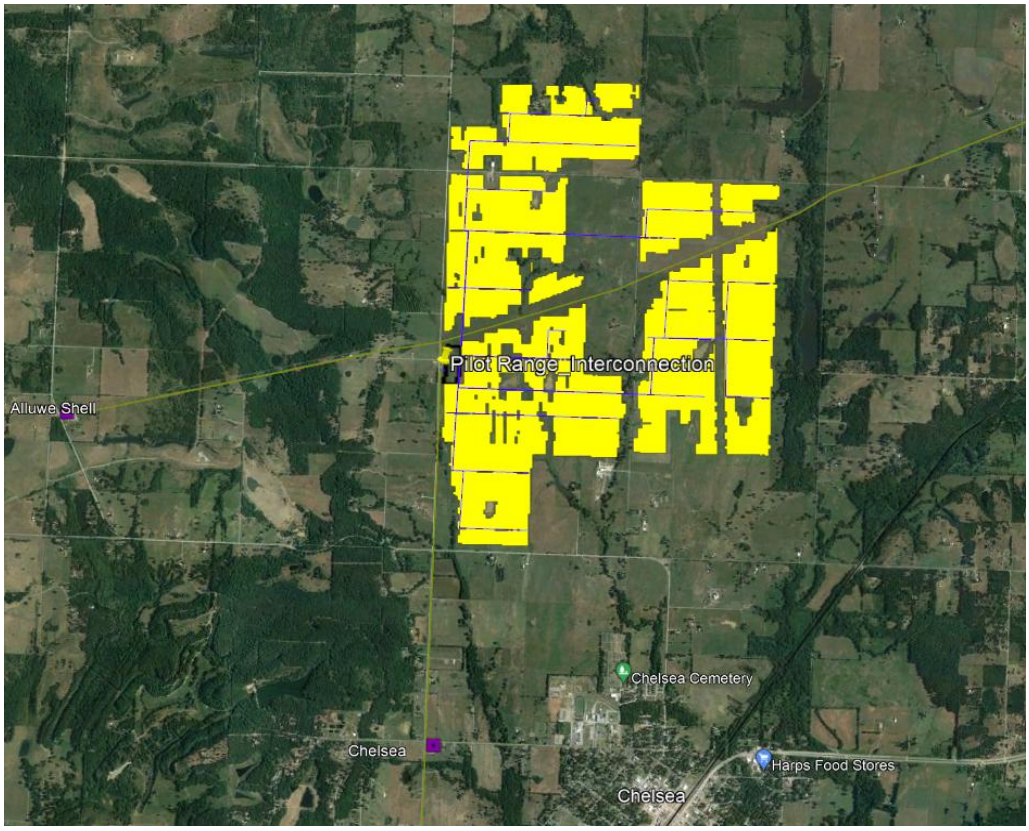


Figure 2: Point of Interconnection Map



Generation Interconnection Facilities Study

for

DISIS-2022-001 Network Upgrades
UID 170707

"BAX492 2 to HOC404 2
69kV Line Rebuild (EMDE)"

Created 10/31/2025

Introduction

At the request of Southwest Power Pool (SPP), The Empire District Electric Company (d/b/a Liberty) has compiled the following Facility Study for SPP to comply with the DISIS-2022-001 Network Upgrade study results.

Project Description

DISIS-2022-001 UID 170707 proposes to rebuild the 69kV line from Baxter Springs West Sub 492 to Hockerville Sub 404, including replacing any necessary terminal equipment, to meet the required minimum 95 MVA capacity in all seasons.

Liberty's Scope of Work

Liberty will rebuild and reconductor 1.43 miles of the transmission line from 336ACSR conductor to 556ACSR conductor shown in Figure 1, as well as replace two (2) 600A disconnect switches and underrated 69kV breaker jumpers at Hockerville Sub 404 shown in Figure 2. Another 2.25 miles of this same transmission line already meet or exceed the required MVA rating above and will remain as-is.

Liberty reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.

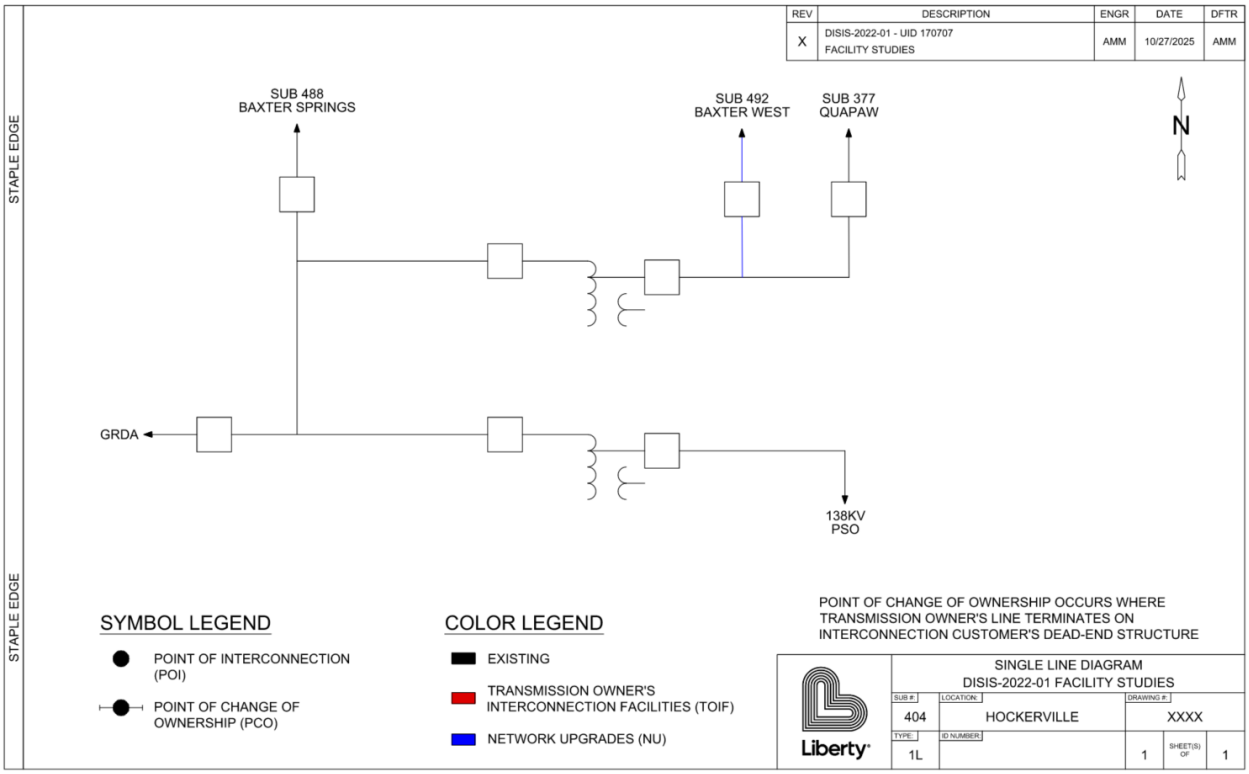
Interconnection Estimated Costs and Lead-Times

Total Cost & Lead-time	
Network Upgrades (NU) - Rebuild 1.43 miles of 69kV line with 556ACSR; (2) 69kV, 2000A switches; 69kV breaker jumpers	
Total	**$1,603,839**
Lead time	36 Months

Table 1 – Cost Estimate

Figure 1 – Impacted Transmission Line and Substations

Figure 2 – Preliminary One-Line of Hockerville Sub 404



Generation Interconnection Facilities Study

for

DISIS-2022-001 Network Upgrades
UID 170709

"HOC404 161/138 kV
Transformer Replacement"

Created 10/31/2025

Introduction

At the request of Southwest Power Pool (SPP), The Empire District Electric Company (d/b/a Liberty) has compiled the following Facility Study for SPP to comply with the DISIS-2022-001 Network Upgrade study results.

Project Description

DISIS-2022-001 UID 170709 proposes to replace the 161/138kV autotransformer at Hockerville Sub 404, including all necessary terminal equipment, to meet a required minimum 148 MVA capacity.

Liberty's Scope of Work

Liberty's will replace the existing 161/138kV, 60/80/100/112 MVA autotransformer with a 120/160/200 MVA unit as shown in Figure 1. Liberty will also plan to replace the high-side interrupting device and all terminal equipment, shown in Figure 2, to interconnect this new transformer, as well as update the protection relaying to meet present day standards.

Liberty reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.

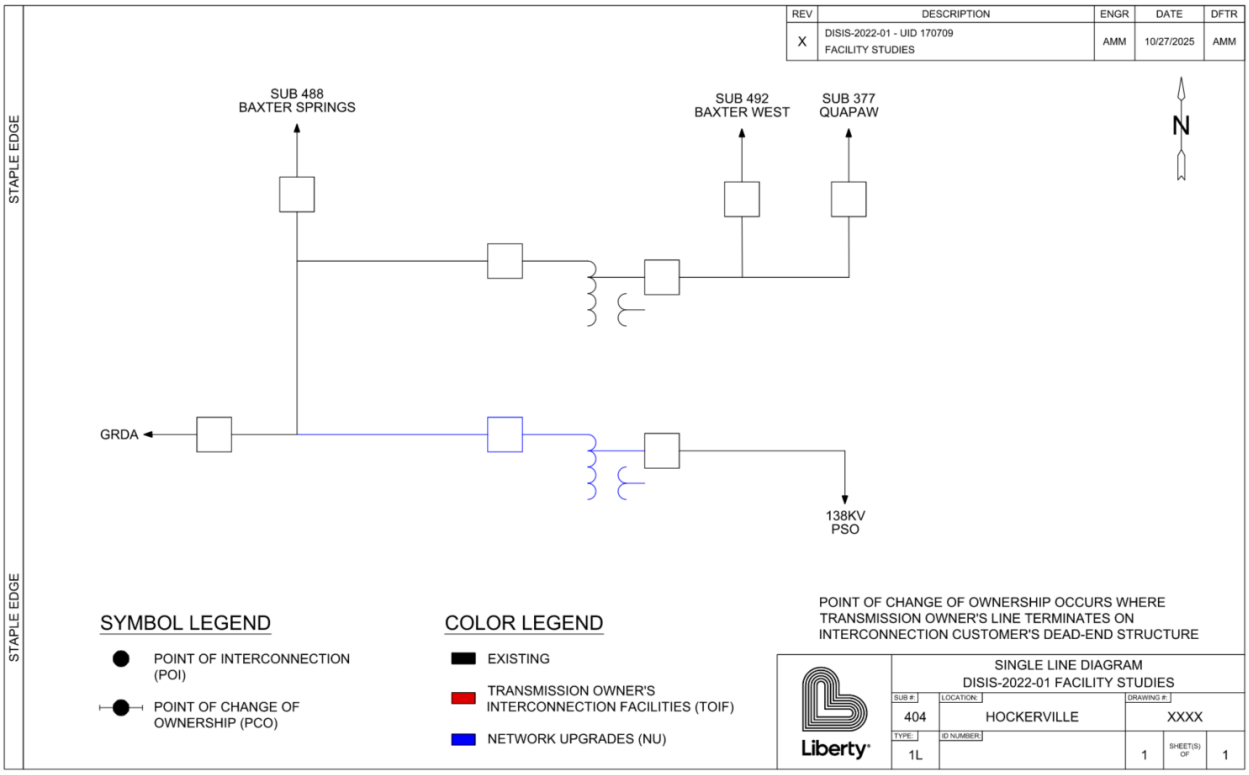
Interconnection Estimated Costs and Lead-Times

Total Cost & Lead-time	
Network Upgrades (NU) - (1) 120/160/200 MVA autotransformer; (1) 161kV, 2000A circuit breaker; autotransformer relay panel	
Total	**$7,570,000**
Lead time	54 Months

Table 1 – Cost Estimate

Figure 1 – Impacted Substation and Autotransformer

Figure 2 – Preliminary One-Line of Hockerville Sub 404



AEP Generation Interconnection

Facilities Study Report

for

DISIS-2022-001

NES to Hawthorne 138 kV Line Rebuild

Rogers County, Oklahoma

November 2025

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 DISIS-2022-001. 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).

NES to Hawthorne 138 kV

- Rebuild the approx. 2.4-mile line to achieve the desired 190 MVA summer emergency rating.

1.1 Project Description

Per the DISIS-2022-001 study request, AEP proposes to rebuild the NES to Hawthorne 138 kV line (Figure 1) in Rogers County, Oklahoma.

1.2 AEP's Scope of Work to Facilitate Interconnection

- To accommodate the desired summer emergency rating of 190 MVA requested for the NES to Hawthorne 138 kV line, an existing approx. 2.4-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 NES to Hawthorne 138 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 DISIS-2022-001, UID 170704 interconnection.

1.4 Interconnection Cost of Facilities Included in the Facilities Study:

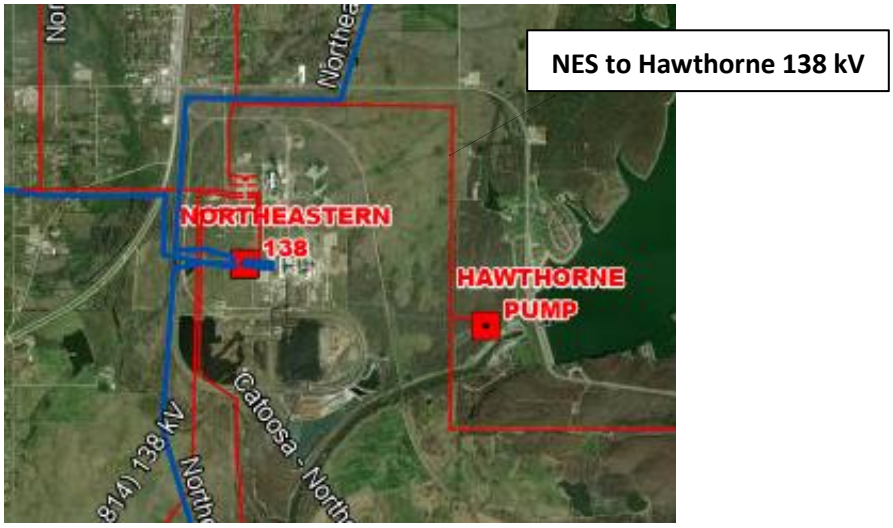
Rebuild the approx. 2.4-mile NES to Hawthorne 138 kV line	$10,013,014
Total Cost	$10,013,014

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 36 months after the issuance of Authorization to Proceed from the Interconnection Customer.

Figure 1



AEP Generation Interconnection

Facilities Study Report

for

DISIS-2022-001

Replace Vinita Junction 138/69 kV Transformer

Craig County, Oklahoma

November 2025

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 DISIS-2022-001. 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).

Vinita Junction 138/69 kV Transformer

- Upgrade the Vinita Junction 138/69 kV auto to achieve a desired 98 MVA summer emergency rating

1.1 Project Description

Per the DISIS-2022-001 study request, AEP proposes to upgrade the Vinita Junction 138/69 kV auto (Figure 1) in Craig County, Oklahoma.

1.2 AEP's Scope of Work to Facilitate Interconnection

- To accommodate the desired summer emergency rating of 98 MVA requested for the Vinita Junction 138/69 kV auto, the existing 138/69 kV auto and associated equipment 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 Vinita Junction 138/69 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 DISIS-2022-001, UID 170710 interconnection.

1.4 Interconnection Cost of Facilities Included in the Facilities Study:

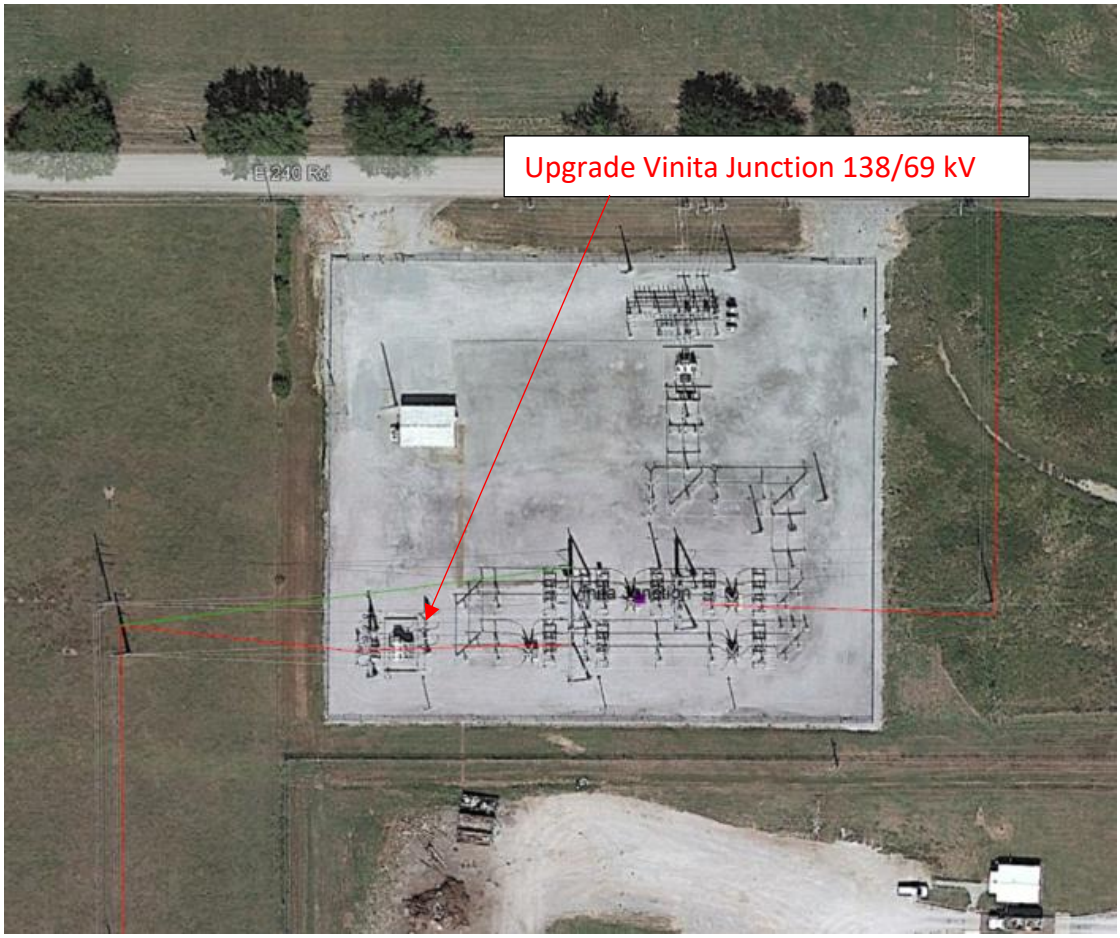
Upgrade the Vinita Junction 138/69 kV Auto	$8,336,025
Total Cost	

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 36 months after the issuance of Authorization to Proceed from the Interconnection Customer.

Figure 1



AEP Generation Interconnection

Facilities Study Report

for

DISIS-2022-001

Vinita to Vinita Junction 69 kV Line Rebuild

Craig County, Oklahoma

November 2025

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 DISIS-2022-001. 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).

Vinita to Vinita Junction 69 kV

- Rebuild the approx. 2.85-mile line to achieve the desired 95 MVA summer emergency rating.

1.1 Project Description

Per the DISIS-2022-001 study request, AEP proposes to rebuild the Vinita to Vinita Junction 69 kV line (Figure 1) in Craig County, Oklahoma.

1.2 AEP's Scope of Work to Facilitate Interconnection

- To accommodate the desired summer emergency rating of 95 MVA requested for the Vinita to Vinita Junction 69 kV line, an existing approx. 2.85-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 Vinita to Vinita Junction 69 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 DISIS-2022-001, UID 170705 interconnection.

1.4 Interconnection Cost of Facilities Included in the Facilities Study:

Rebuild the approx. 2.85-mile Vinita to Vinita Junction 69kV line	$16,828,120
Total Cost	$16,828,120

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 40 months after the issuance of Authorization to Proceed from the Interconnection Customer.

Figure 1

AEP Generation Interconnection

Facilities Study Report

for

DISIS-2022-001

Welsh to Wilkes 345 kV Line Rebuild

Morris County, Texas

November 2025

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 DISIS-2022-001. 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).

Welsh to Wilkes 345 kV

- Rebuild the approx. 12.1-mile line section to achieve the desired 1000 MVA summer emergency rating.

1.1 Project Description

Per the DISIS-2022-001 study request, AEP proposes to rebuild a section of the Welsh to Wilkes 345 kV line (Figure 1) in Morris County, Texas.

1.2 AEP's Scope of Work to Facilitate Interconnection

- To accommodate the desired summer emergency rating of 1000 MVA requested for the Welsh to Wilkes 345 kV line, an existing approx. 12.1-mile line section 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 Welsh to Wilkes 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 DISIS-2022-001, UID 170696 interconnection.

1.4 Interconnection Cost of Facilities Included in the Facilities Study:

Rebuild an approx. 12.1-mile section of the Welsh to Wilkes 345 kV line	$68,578,606
Total Cost	$68,578,606

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