



INTERCONNECTION FACILITIES STUDY REPORT

GEN-2015-041
(IFS-2015-002-041)

Published October 2019

By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
07/12/2019	SPP	Initial draft report issued.
08/12/2019	SPP	Final report issued.
8/22/2019	SPP	Final report issued. Revised Table 1: Transmission Owner Interconnection Facilities (TOIF) and Table 6: Cost Summary
10/3/2019	SPP	Revised final report with new Transmission Owner Facilities Study Report.

CONTENTS

Revision History.....	i
Summary.....	1
Introduction	1
Phase(s) of Interconnection Service	1
Credits/Compensation for Amounts Advanced for Network Upgrade(s).....	1
Interconnection Customer Interconnection Facilities	2
Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s).....	2
Shared Network Upgrade(s)	3
Previous Network Upgrade(s).....	3
Affected System Upgrade(s)	4
Conclusion.....	4
Appendices.....	5
A: Transmission Owner’s Interconnection Facilities Study Report and Network Upgrades Report(s)	6

SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2015-041/IFS-2015-002-041 is for a 5.0 MW generating facility located in Hale County, Texas. The Interconnection Request was studied in the DISIS-2015-002, DISIS-2016-001 Impact Studies and DISIS-2016-001-1, DISIS-2016-001-2 Impact Restudies for Energy Resource Interconnection Service (ERIS) and Network Resource Interconnection Service (NRIS) and DISIS-2016-001-3 Impact Restudy for ERIS only. The Interconnection Customer's original requested Commercial Operation Date (COD) was 6/1/2015. The COD was revised in the Facility Study Agreement to 03/2017.

The interconnecting Transmission Owner, Southwestern Public Service Company (SPS), performed a detailed IF 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, Previous 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.

CREDITS/COMPENSATION FOR AMOUNTS ADVANCED FOR NETWORK UPGRADE(S)

Interconnection Customer shall be entitled to compensation in accordance with Attachment Z2 of the SPP OATT for the cost of SPP creditable-type Network Upgrades, including any tax gross-up or any other tax-related payments associated with the Network Upgrades, that are not otherwise refunded to the Interconnection Customer. Compensation shall be in the form of either revenue credits or incremental Long Term Congestion Rights (iLTCR).

INTERCONNECTION CUSTOMER INTERCONNECTION FACILITIES

The Generating Facility is proposed to consist of adding 5 MWs to an existing GEN-2013-016 generation facility for a total generating nameplate capacity of 196 MW.

The Interconnection Customer shall coordinate relay, protection, control, and communication system configurations and schemes with the Transmission Owner.

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** lists 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 (\$)	Estimated Lead Time
None	N/A		N/A	
Total	\$0		\$0	

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	Z2 Type¹	Total Cost Estimate (\$)	Allocated Percent (%)	Allocated Cost Estimate (\$)	Estimated Lead Time
None	N/A	\$0	N/A	\$0	N/A
Total		\$0		\$0	

¹ Indicates the method used for calculating credit impacts under Attachment Z2 of the Tariff.

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 Upgrades

Shared Network Upgrades Description	Z2 Type	Total Cost Estimate (\$)	Allocated Percent (%)	Allocated Cost Estimate (\$)	Estimated Lead Time
None	N/A	\$0	N/A	\$0	N/A
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.

PREVIOUS NETWORK UPGRADE(S)

Certain Previous Network Upgrades are **currently not the cost responsibility** of the Interconnection Customer but will be required for full Interconnection Service.

Table 4: Interconnection Customer Previous Network Upgrade(s)

Previous Network Upgrade(s) Description	Current Cost Assignment	Estimated In-Service Date
None	\$0	N/A

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 Previous 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 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 Share (%)	Allocated Cost Estimate (\$)
None	\$0	N/A	\$0
Total	\$0		\$0

CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 288.00 MW can be granted. Full Interconnection Service will be delayed until the TOIF, Non-Shared Network Upgrades, Shared Network Upgrades, Previous Network Upgrades, Affected System Upgrades that are required are completed. The Interconnection Customer’s estimated cost responsibility for TOIF, Non-Shared Network Upgrades and Affected System Upgrades are summarized in the table below.

Table 6: Cost Summary

Description	Allocated Cost Estimate
Transmission Owner Interconnection Facilities	\$0
Network Upgrades	\$0
Total	\$0

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).



Facilities Study For Southwest Power Pool (SPP)

GEN-2015-041
Total Output: 5 MW
Hale County, Texas

Xcel Energy Services, Inc.
Transmission Planning South
Updated August 27, 2019

Executive Summary

The Southwest Power Pool (SPP or Transmission Provider) evaluated the request GEN-2015-041 to increase the generation output from the GEN-2013-016 generation facility to the SPS transmission system in the Definitive Interconnection System Impact Study (DISIS-2016-001-3).

GEN-2015-041 requested the addition of 5 MW at the existing GEN-2013-016 combustion turbine generator located in Hale County, Texas to the Southwestern Public Service Company (SPS or Transmission Owner) transmission network. To accommodate the Interconnection Customer's (IC) request, SPS will not be required to do any network upgrades and the IC will continue to connect to the SPS 345 kV bus at SPS's TUCO Substation. The IC will be required to maintain a Power Factor between 0.95 lagging and 0.95 leading at the Point of Interconnection (POI).

SPP requires that each generator shall implement automatic Under Frequency Load Shedding (UFLS) according to the SPP UFLS Plan for SPS found in the Xcel Energy interconnection document for "Large Generation Interconnection Guidelines (>20MW)" found at the following link:

<https://www.transmission.xcelenergy.com/Interconnections>

To fulfill this requirement, 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 be in compliance with 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's TUCO Substation.

The shared network upgrades will be determined at a later date by SPP and may impact the total overall costs for interconnection of the IC.

No substation work is required to be completed to add 5 MW to the previous GEN-2013-016 combustion turbine generator interconnection. The IC's cost for the interconnection of this generation facility is shown below in Table 1, with the detailed description of the cost shown in Table 2.

Table 1 – Cost Summary¹

Shared Network Upgrades Total:	\$ See DISIS Report
Network Upgrades:	\$ 0
Transmission Owner Interconnection Facilities:	\$ 0
Total:	\$ 0

¹ The cost estimates are 2019 dollars with an accuracy level of ±20%.

General Description of SPS² Facilities

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

- a. **Location:** IC will use the existing 345 kV line from their substation to SPS's 345 kV TUCO Substation, in Hale County, Texas.
- b. **Bus Design:** The TUCO 345 kV portion and the substation is built in a breaker and a half configuration. No new construction required for the 5 MW increase.
- c. **SPS will not serve as a proxy for communication from the IC to SPP.**

2. Transmission Work – Engineering and Construction

- a. **Coordination:** The SPS Transmission Engineering and Design group requires an engineering review of the customer's design prior to any construction by the IC or its contractor on any customer transmission lines 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 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.
- c. **Schedule:** An engineering and construction schedule for this project is estimated at approximately 0 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

3. Right-Of-Way

- a. **Permitting:** The IC will be responsible for any permitting and right of way of their substation and their transmission line from their substation to the Point of Interconnection (POI).
- b. **Construction Power and Retail Service:** It is the sole responsibility of the IC to make arrangements for both construction and station power. The IC needs to make arrangements for retail service from the local retail provider. Retail provider and Customer will be responsible for making any necessary transmission service arrangements as required under the SPP OATT.

4. Project and Operating Concerns:

² All modifications to SPS facilities will be owned, maintained and operated by SPS

- a. 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. The IC will be required to maintain a power factor between 0.95 lagging and a 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%.

5. Estimated Construction Costs

- a. The projects required for the interconnection of GEN-2015-041 consist of the projects summarized in the table below:

Table 2 - Required Interconnection Projects³

Project	Description	Estimated Cost
	Shared Network Upgrades:	
1	The current estimated shared network upgrades to be determined (TBD)	See DISIS Report
	Network Upgrades (at the IC's expense)	
2	No network upgrades	\$ 0
	Subtotal:	\$0
	Transmission Owner Interconnection Facilities (at the IC's expense)	
3	No network upgrades	\$ 0
	Subtotal:	\$0
	Total Cost	\$0

³ The cost estimates are 2019 dollars with an accuracy level of ±20%.

Appendix A

Figure A-1. General vicinity location map of the SPS facility



Figure A-2. One-line Diagram at TUCO Substation

*DIAGRAMS ARE NOT FOR CONSTRUCTION PURPOSE

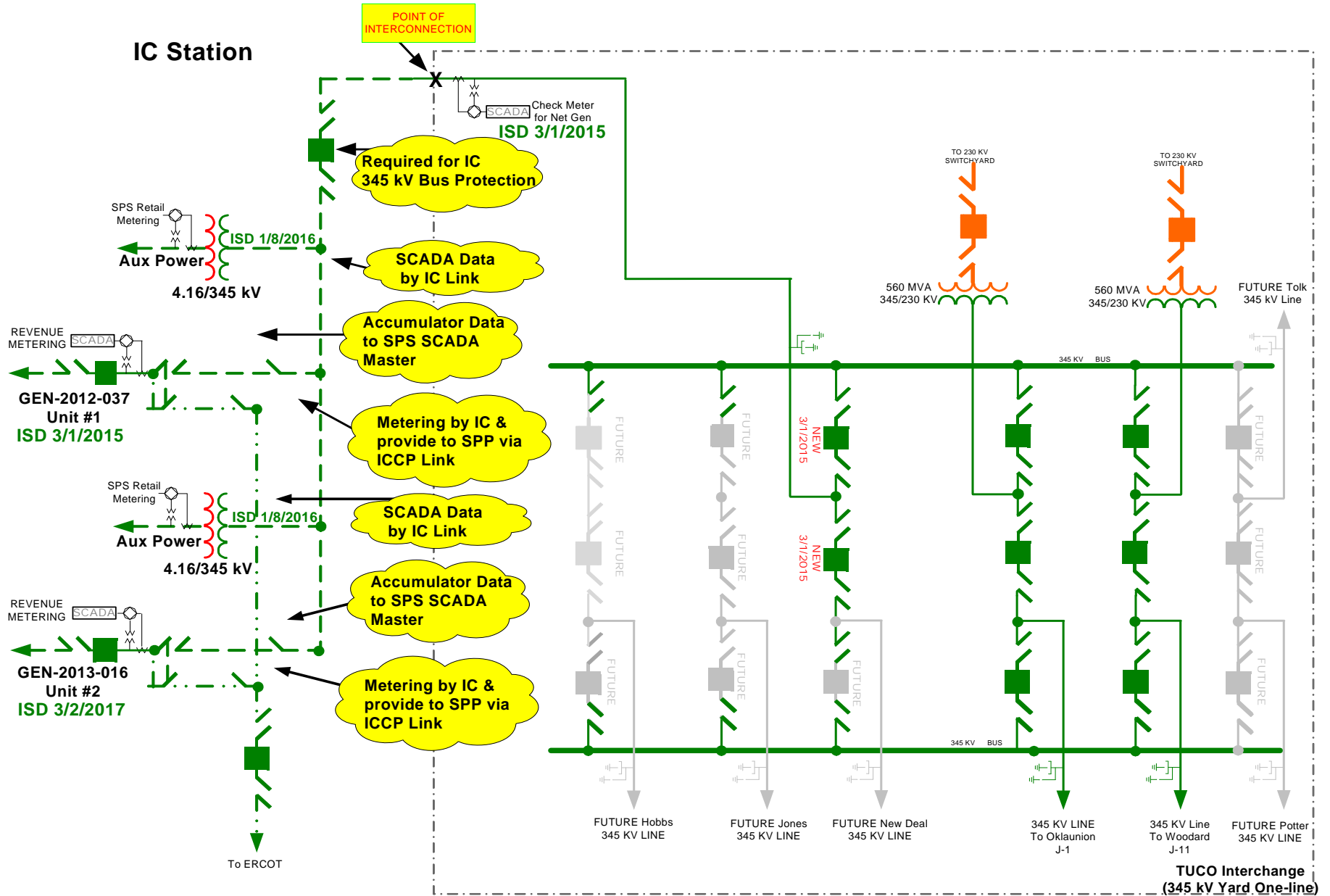
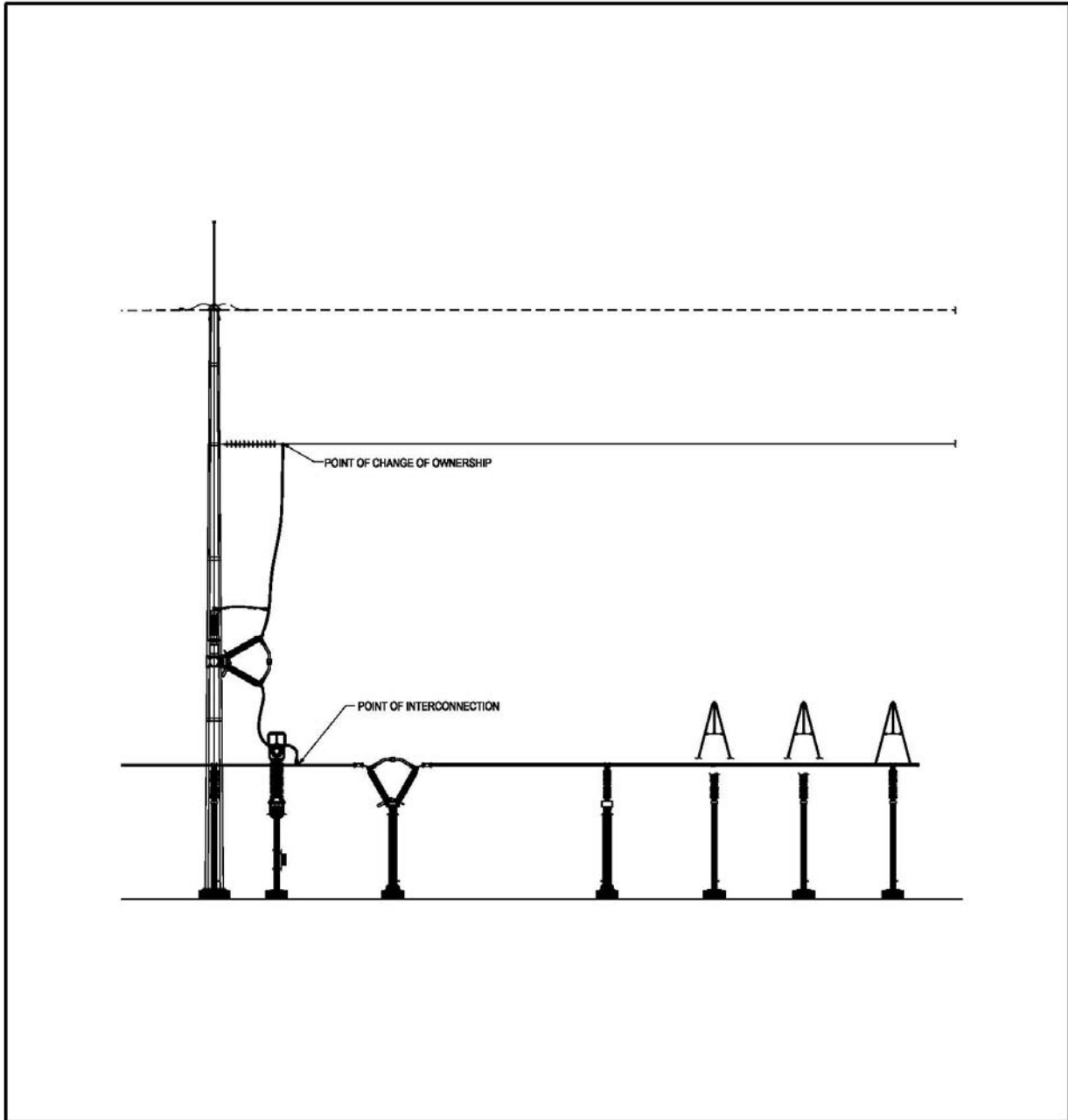


Figure A-3 Point of Interconnection & Change of Ownership Elevation (Typical)

DIAGRAMS ARE NOT FOR CONSTRUCTION PURPOSES



– END OF REPORT –