



DPA-2024-NOVEMBER-2060

Delivery Point Network Study

Published on 2/6/2025

By SPP Engineering, Transmission Services

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION	COMMENTS
2/6/2025	SPP	Original	

CONTENTS

Revision History i

Section 1: Introduction 1

Section 2: Study Methodology 2

 Objective 2

 Study Process 2

Section 3: Results of Analysis 4

 Potential Thermal and Voltage Violations 4

 Short Circuit 5

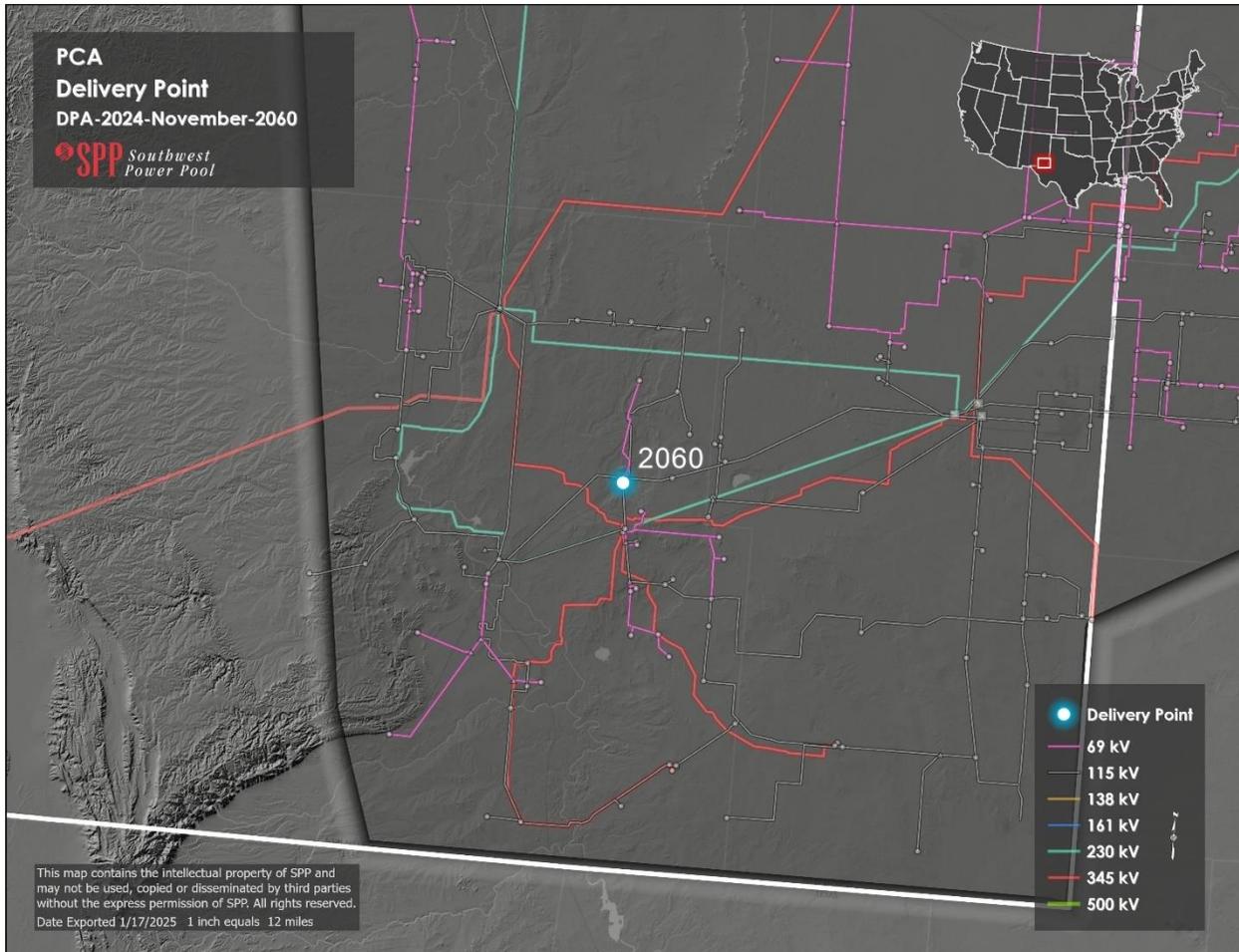
 Stability 5

 Transmission Solutions 6

Section 4: Conclusion 7

SECTION 1: INTRODUCTION

This report outlines the results of an evaluation of regional transmission impacts from delivery point request DPA-2024-November-2060. The requesting entity plans to add new load to the existing delivery point called PCA with an in-service date of 7/1/2025. The PCA delivery point is in the Southwestern Public Service Company (SPS) Transmission System.



The load flow models used for the evaluation were 2024 Integrated Transmission Planning (ITP) base reliability models. Southwest Power Pool (SPP) performed an Alternating Current (AC) contingency analysis on these models using PSS@E.

SECTION 2: STUDY METHODOLOGY

OBJECTIVE

The purpose of this study was to determine the regional Transmission System impacts within the SPP footprint due to the new load served by Western Farmers Electric Cooperative (WFEC). SPP performed a Delivery Point Network Study (DPNS) with the configurations shown in Table 2-1 below.

STUDY PROCESS

- Model Assumptions
 - 2024 ITP Base Reliability Model Series
 - Model years 2025, 2028, and 2033
 - Summer Peak (2025S, 2028S, and 2033S), Winter Peak (2025W, 2028W, and 2033W), and Light Load (2028L and 2033L)
 - 2024 ITP Short Circuit Model Series
 - 2028 Summer Max Fault
 - 2024 Transmission System Planning (TPL) Dynamic Model Series
 - 2025 and 2033 Summer Peak Base and Change Cases

Case Name	Study Year	Season	Scenario	Load (MW/MVAR)
2024ITPPF-25S.sav	2025	Summer Peak	Base Reliability	Lusk 2 = 46.48/15.27
2024ITPPF-25W.sav	2025	Winter Peak	Base Reliability	Lusk 2 = 46.48/15.27
2024ITPPF-28L.sav	2028	Light Load	Base Reliability	Lusk 2 = 46.48/15.27
2024ITPPF-28S.sav	2028	Summer Peak	Base Reliability	Lusk 2 = 46.48/15.27
2024ITPPF-28W.sav	2028	Winter Peak	Base Reliability	Lusk 2 = 46.48/15.27
2024ITPPF-33L.sav	2033	Light Load	Base Reliability	Lusk 2 = 46.48/15.27
2024ITPPF-33S.sav	2033	Summer Peak	Base Reliability	Lusk 2 = 46.48/15.27
2024ITPPF-33W.sav	2033	Winter Peak	Base Reliability	Lusk 2 = 46.48/15.27
2024ITPPF-25S_2060.sav	2025	Summer Peak	Base Reliability	Lusk 2 = 70.404/23.14
2024ITPPF-25W_2060.sav	2025	Winter Peak	Base Reliability	Lusk 2 = 70.404/23.14
2024ITPPF-28L_2060.sav	2028	Light Load	Base Reliability	Lusk 2 = 70.404/23.14
2024ITPPF-28S_2060.sav	2028	Summer Peak	Base Reliability	Lusk 2 = 70.404/23.14
2024ITPPF-28W_2060.sav	2028	Winter Peak	Base Reliability	Lusk 2 = 70.404/23.14
2024ITPPF-33L_2060.sav	2033	Light Load	Base Reliability	Lusk 2 = 70.404/23.14
2024ITPPF-33S_2060.sav	2033	Summer Peak	Base Reliability	Lusk 2 = 70.404/23.14
2024ITPPF-33W_2060.sav	2033	Winter Peak	Base Reliability	Lusk 2 = 70.404/23.14

Table 2-1: Study Cases

- Steady State Analysis
 - Assumptions (consistent with the ITP analysis)
 - AC contingency analysis on all load flow models using PSS@E
 - Monitored Elements
 - SPP facilities 69 kV and above
 - First-tier companies 100 kV and above
 - Contingencies (consistent with the ITP analysis)
 - Provided for the ITP by SPP members and first-tier companies
 - Apply SPP Criteria and National American Electric Reliability Corporation (NERC) reliability standards
 - Compare thermal and voltage violations that occur with and without the PCA delivery point change to determine thermal and voltage violations resulting from the load addition to the Transmission System.
- Dynamics Analysis
 - Assumptions
 - 2024 TPL Dynamics Model Series
 - 2025 and 2033 Summer Peak Base and Change Cases
 - Analyses
 - Fast Fault Screening using Physical and Operational Margins Studio
- Short Circuit Analysis
 - Assumptions
 - Used 2024 Final ITP Short Circuit models (Max Fault)
 - Placed all available facilities in service
 - Generation
 - Transmission lines
 - Transformers
 - Buses
 - Short Circuit Output
 - Physical
 - Short Circuit Coordinates
 - Polar
 - Short Circuit Parameters
 - 3 Phase
 - FLAT - classical fault analysis conditions
 - Analyses
 - Three-phase fault

SECTION 3: RESULTS OF ANALYSIS

POTENTIAL THERMAL AND VOLTAGE VIOLATIONS

The analysis identified potential voltage violations resulting from the new load at the PCA delivery point. Table 3-1 details the potential voltage violations resulting from the load addition.

Model	Facility Name	Voltage Level (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
25W	MAGNUM 3	115	BASE CASE	1.05	0.95	0.94941
25W	PECOS 6	230	BASE CASE	1.05	0.95	0.94771
25W	PCA 3	115	PCA 3 - POTASH_JCT 3 - 1	1.05	0.9	0.8943
25W	XTO_BIGEDDY3	115	PCA 3 - POTASH_JCT 3 - 1	1.05	0.9	0.89736
25W	MALJMAR1&2 3	115	PCA 3 - POTASH_JCT 3 - 1	1.05	0.9	0.8981
25W	MIDS_PRONTO3	115	MADDOX 3 - PEARLE 3 - 1	1.05	0.9	0.89595
25W	MIDSPRON_TP3	115	MADDOX 3 - PEARLE 3 - 1	1.05	0.9	0.8975
25W	ENRON_TP 3	115	MADDOX 3 - PEARLE 3 - 1	1.05	0.9	0.89957
25W	ENRON 3	115	MADDOX 3 - PEARLE 3 - 1	1.05	0.9	0.89734
25W	LYNCH_TP 3	115	MADDOX 3 - PEARLE 3 - 1	1.05	0.9	0.89409
25W	LEA_NATIONL3	115	MADDOX 3 - PEARLE 3 - 1	1.05	0.9	0.89994
25W	MALJMAR1&2 3	115	MADDOX 3 - PEARLE 3 - 1	1.05	0.9	0.89901
28S	MIDS_PRONTO3	115	BASE CASE	1.05	0.95	0.94714
28S	MIDSPRON_TP3	115	BASE CASE	1.05	0.95	0.94872
28S	XTO_BIGEDDY3	115	BASE CASE	1.05	0.95	0.94644
28S	PCA 3	115	PCA 3 - POTASH_JCT 3 - 1	1.05	0.9	0.89749
28S	XTO_BIGEDDY3	115	PCA 3 - POTASH_JCT 3 - 1	1.05	0.9	0.89815
28W	PECOS 6	230	BASE CASE	1.05	0.95	0.9495
28W	QUAHADA 3	115	BASE CASE	1.05	0.95	0.9477
28W	XTO_BIGEDDY3	115	BASE CASE	1.05	0.95	0.94537
28W	PCA 3	115	PCA 3 - POTASH_JCT 3 - 1	1.05	0.9	0.8933
28W	XTO_BIGEDDY3	115	PCA 3 - POTASH_JCT 3 - 1	1.05	0.9	0.89508
33L	KIOWA 3	115	KIOWA 7 - KIOWA 3 - 1	1.05	0.9	0.89353
33L	MIDS_PRONTO3	115	KIOWA 7 - KIOWA 3 - 1	1.05	0.9	0.89702
33L	MIDSPRON_TP3	115	KIOWA 7 - KIOWA 3 - 1	1.05	0.9	0.89999
33S	PCA 3	115	BASE CASE	1.05	0.95	0.94979
33S	MIDS_PRONTO3	115	PCA 3 - POTASH_JCT 3 - 1	1.05	0.9	0.89757
33S	XTO_BIGEDDY3	115	PCA 3 - POTASH_JCT 3 - 1	1.05	0.9	0.89404
33S	MIDSPRON_TP3	115	PCA 3 - XTO_BIGEDDY3 - 1	1.05	0.9	0.89942
33S	MIDSPRON_TP3	115	ENRON_TP 3 - LYNCH_TP 3 - 1	1.05	0.9	0.89469
33S	MIDS_PRONTO3	115	CUNNQUAHTP - QUAHADA 3 - 1	1.05	0.9	0.89936
33S	MAGNUM 3	115	KIOWA 7 - KIOWA 3 - 1	1.05	0.9	0.89288
33W	KIOWA 3	115	KIOWA 7 - KIOWA 3 - 1	1.05	0.9	0.89046
33W	QUAHADA 3	115	KIOWA 7 - KIOWA 3 - 1	1.05	0.9	0.88977

Table 3-1: Potential Voltage Violations

SHORT CIRCUIT

SPP performed short circuit analysis for the 2028 Summer Peak with the new load addition. The analysis identified the currents listed in Table 3-2.

Season	Model	Fault	Bus	Current (Amps)
28S	Max Fault	Three Phase	PCA_TR1 113.200	6,067
28S	Max Fault	Three Phase	PCA 269.000	7,848
28S	Max Fault	Three Phase	PCA 3115.00	11,854
28S	Max Fault	Three Phase	CV-SKELLY 3115.00	3,269
28S	Max Fault	Three Phase	CV-MALJAMAR3115.00	2,890
28S	Max Fault	Three Phase	CV-MLMAN_TP3115.00	6,108
28S	Max Fault	Three Phase	CV-MILLMAN 3115.00	5,043
28S	Max Fault	Three Phase	CV-LUSK 269.000	2,415
28S	Max Fault	Three Phase	CV-LUSK 3115.00	3,516
28S	Max Fault	Three Phase	CV-LUSK_TP 3115.00	4,269
28S	Max Fault	Three Phase	POTASH_TR1 113.200	16,796
28S	Max Fault	Three Phase	POTASH_TR2 113.200	4,229
28S	Max Fault	Three Phase	POTASH_TR3 113.200	4,594
28S	Max Fault	Three Phase	POTASH_JCT 269.000	9,790
28S	Max Fault	Three Phase	POTASH_JCT 3115.00	16,793
28S	Max Fault	Three Phase	POTASH_JCT 6230.00	7,328
28S	Max Fault	Three Phase	KIOWA 3115.00	16,763
28S	Max Fault	Three Phase	MAGNUM 3115.00	8,055
28S	Max Fault	Three Phase	INTREPDW_TP3115.00	13,711
28S	Max Fault	Three Phase	NATPOT_TP 269.000	9,745
28S	Max Fault	Three Phase	CARLSBAD 3115.00	11,201
28S	Max Fault	Three Phase	QUAHADA 3115.00	8,266
28S	Max Fault	Three Phase	XTO_BIGEDDY3115.00	8,842

Table 3-2: Short Circuit Results

STABILITY

SPP performed a Fast Fault Screening (FFS) using the 2025 and 2033 Summer Peak for the base case and change case models. The change case models include the PCA delivery point changes. SPP determined no significant differences in the critical clearing times between the base and change cases. Therefore, a transient stability analysis is not required.

TRANSMISSION SOLUTIONS

The addition of the new load at the existing PCA delivery point caused potential voltage violations on the 230 kV and 115 kV systems around PCA. These issues were mitigated by a new 30 MVAR capacitor bank at the delivery point.

New Upgrade Description*	Mileage	MVA (Rate B)	Date Needed**	Host Transmission Owner	Estimated Cost***
New PCA Capacitor Bank (30 MVAR)	-	-	12/1/2025	SPS	\$1,636,860
TOTAL NEW UPGRADE COST					\$1,636,860

Table 3-3: Recommended Upgrade

*All requests with a Network Upgrade(s) identified in the DPNS will be subject to further evaluation in the soonest available Integrated Transmission Planning Assessment that is able to include the load changes, if it is determined that the Network Upgrade(s) will be able to meet the study timeframe requirements pursuant to the standardized project timelines in SPP Business Practices, based on the SPP determined Network Upgrade(s) need date. If it is determined that a Network Upgrade(s) identified from a DPNS is unable to be further evaluated pursuant to the Integrated Transmission Planning Assessment, the DPNS report will be posted on the SPP website once SPP is notified by the Transmission Customer to update the applicable Network Integration Transmission Service Agreement to reflect the changes in delivery points and the Network Upgrade(s).

Pursuant to Attachment AQ of the Tariff, the Transmission provider is responsible for assessing the impacts on the Transmission System caused by modifying an existing delivery point or establishing the new delivery point through the Delivery Point Network Study (“DPNS”). The DPNS may determine the need for a Network Upgrade(s) necessary for the modification of an existing delivery point or the establishment of a new delivery point. A Network Upgrade(s) that the Transmission Customer or Host Transmission Owner desires that exceeds the needed Network Upgrade(s) identified in the DPNS will need to be studied through the Transmission Provider’s Sponsored Upgrade study process to evaluate the impacts of the desired changes on the Transmission System.

**If the project need date specified in this study cannot be met, the Transmission Owner will be required to submit mitigations pursuant to the SPP Project Tracking process. All upgrades or mitigations must be in place prior to the dates shown in Table 3-3.

***Note that the estimated new upgrade cost provided in this report is an SPP Conceptual Cost Estimate only; this is preliminary, and a more refined Study Cost Estimate will be developed after issuance of this report through a Standardized Cost Estimate Reporting Template (SCERT).

SECTION 4: CONCLUSION

The AC analysis revealed potential voltage violations associated with the PCA load addition. The study shows that the following upgrade is required to reliably serve the load addition:

- New PCA Capacitor Bank (30 MVAR)

The transmission upgrade in Table 3-3 is recommended to mitigate the potential voltage violations.