DPA-2025-SEPTEMBER-2194

Delivery Point Network Study

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By SPP Engineering, Transmission Services

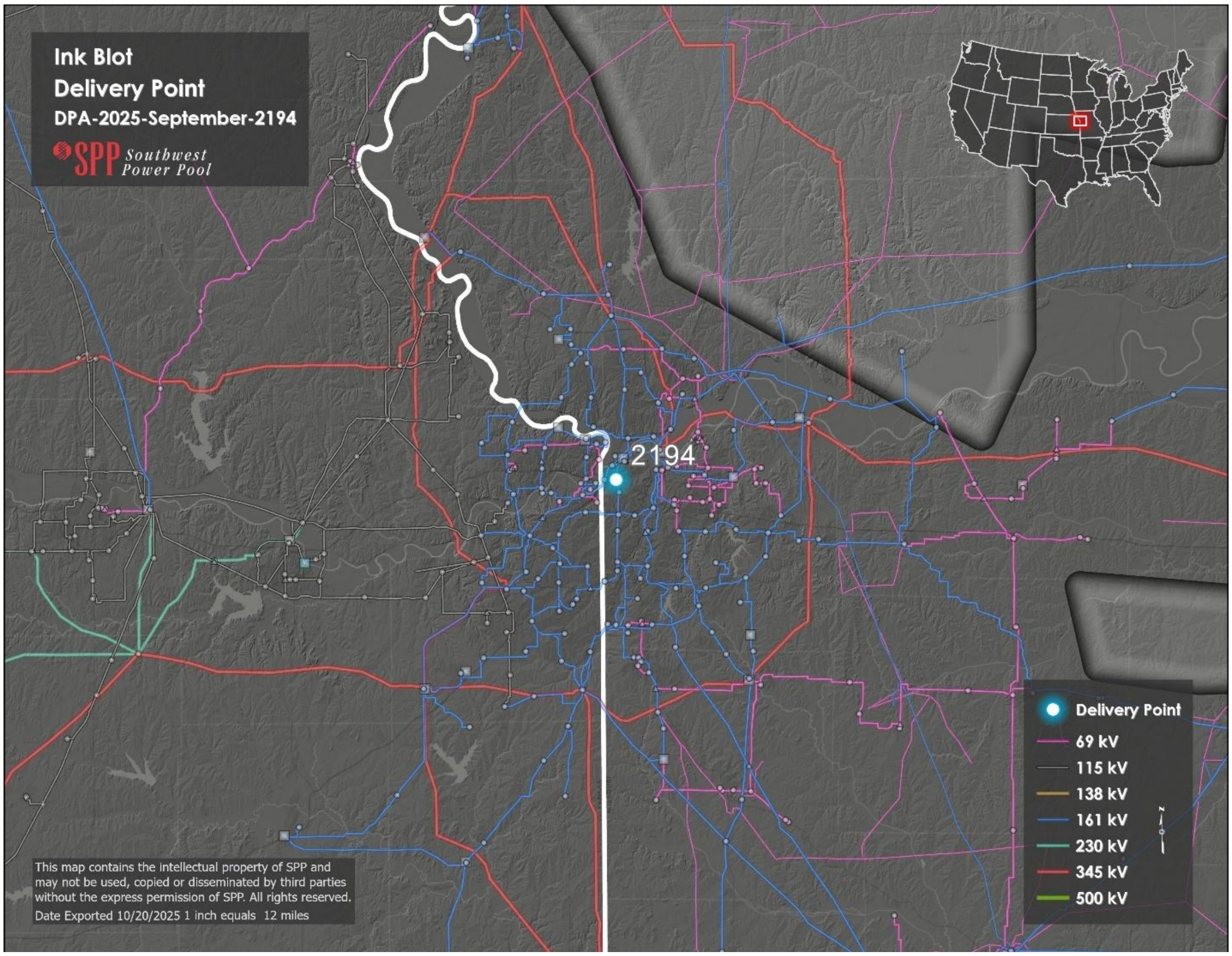
REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION	COMMENTS
11/25/2025	SPP	Original	

CONTENTS

SECTION 1: INTRODUCTION

This report outlines the results of an evaluation of regional transmission impacts from delivery point request DPA-2025-September-2194. The requesting entity plans to add new load and transfer load (Ink Blot) to the delivery point called Crosstown with an in-service date of 9/1/2026. The Crosstown delivery point is in the Evergy Metro (Evergy) Transmission System.



The load flow models used for the evaluation were 2025 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 Evergy. SPP performed a Delivery Point Network Study (DPNS) with the configurations shown in Table 2-1 below.

STUDY PROCESS

- Model Assumptions
  - 2025 ITP Base Reliability Model Series
    - Model years 2026, 2029, and 2034
    - Summer Peak (2026S, 2029S, and 2034S), Winter Peak (2026W, 2029W, and 2034W), and Light Load (2029L and 2034L)
  - 2025 ITP Short Circuit Model Series
    - 2029 Summer Max Fault
  - 2025 Transmission System Planning (TPL) Dynamic Model Series
    - 2026 and 2034 Summer Peak Base and Change Cases

Table 2-1: Study Cases

Case Name	Study Year	Season	Scenario	Load (MW/MVAR)
2025ITPFinal-26S.sav	2026	Summer Peak	Base Reliability	Base Case
2025ITPFinal-26W.sav	2026	Winter Peak	Base Reliability	Base Case
2025ITPFinal-29L.sav	2029	Light Load	Base Reliability	Base Case
2025ITPFinal-29S.sav	2029	Summer Peak	Base Reliability	Base Case
2025ITPFinal-29W.sav	2029	Winter Peak	Base Reliability	Base Case
2025ITPFinal-34L.sav	2034	Light Load	Base Reliability	Base Case
2025ITPFinal-34S.sav	2034	Summer Peak	Base Reliability	Base Case
2025ITPFinal-34W.sav	2034	Winter Peak	Base Reliability	Base Case
2025ITPFinal-26S_2194.sav	2026	Summer Peak	Base Reliability	Ink Blot = 50.0/10.15
2025ITPFinal-26W_2194.sav	2026	Winter Peak	Base Reliability	Ink Blot = 50.0/10.15
2025ITPFinal-29L_2194.sav	2029	Light Load	Base Reliability	Ink Blot = 50.0/10.15
2025ITPFinal-29S_2194.sav	2029	Summer Peak	Base Reliability	Ink Blot = 50.0/10.15
2025ITPFinal-29W_2194.sav	2029	Winter Peak	Base Reliability	Ink Blot = 50.0/10.15
2025ITPFinal-34L_2194.sav	2034	Light Load	Base Reliability	Ink Blot = 50.0/10.15
2025ITPFinal-34S_2194.sav	2034	Summer Peak	Base Reliability	Ink Blot = 50.0/10.15
2025ITPFinal-34W_2194.sav	2034	Winter Peak	Base Reliability	Ink Blot = 50.0/10.15

- 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 Crosstown delivery point change to determine thermal and voltage violations resulting from the load addition to the Transmission System.
- Dynamics Analysis
    - Assumptions
        - 2025 TPL Dynamics Model Series
            - 2026 and 2034 Summer Peak Base and Change Cases
    - Analyses
        - Fast Fault Screening using Physical and Operational Margins Studio
- Short Circuit Analysis
    - Assumptions
        - Used 2025 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 thermal violations resulting from the Ink Blot load at the Crosstown delivery point. Table 3-1 details the potential thermal violations resulting from the load addition. Table 3-1 does not include the violations from years 5 and 10 due to the violations being violations identified in the 2025 ITP study in those years without the load addition.

Table 3-1: Potential Thermal Violations

Model	Facility Name	Facility Voltage (kV)	Contingency Name	Rate A, Rate B (MVA)	Max Flow (MVA)	Change Case Max Loading (%)
26S	GRAND W5 - CROSTWN5 - 1	161	NEASTS5 - CHARLOT5 - 1	259/259	261.33	100.9

SHORT CIRCUIT

SPP performed short circuit analysis for the 2029 Summer Peak with the new load addition. The analysis identified the currents listed in Table 3-2.

Table 3-2: Short Circuit Results

Season	Model	Fault	Bus	Current (Amps)
29S	Max Fault	Three Phase	7OVERTON 345.00	15,712
29S	Max Fault	Three Phase	PHILL 7 345.00	18,624
29S	Max Fault	Three Phase	SIBLEY 7 345.00	20,849
29S	Max Fault	Three Phase	SIBLEY 5 161.00	26,964
29S	Max Fault	Three Phase	MARTCTY5 161.00	28,621
29S	Max Fault	Three Phase	LBRTYST5 161.00	20,272
29S	Max Fault	Three Phase	LNGVW 2 69.000	10,964
29S	Max Fault	Three Phase	BRMALL 2 69.000	15,044
29S	Max Fault	Three Phase	SIBLEY T 13.800	66,273
29S	Max Fault	Three Phase	SIB REA1 345.00	18,545
29S	Max Fault	Three Phase	KETCHEM7 345.00	7,656
29S	Max Fault	Three Phase	MERRIAM_CAP5161.00	26,415
29S	Max Fault	Three Phase	NEASTS_CAP5 161.00	37,591
29S	Max Fault	Three Phase	HAWTH_S_COL113.800	53,695
29S	Max Fault	Three Phase	STHTOWN_CAP5161.00	30,702
29S	Max Fault	Three Phase	HAW G5 1 22.000	3,428
29S	Max Fault	Three Phase	SHALE 7 345.00	20,673
29S	Max Fault	Three Phase	NE CT11 13.800	37,113
29S	Max Fault	Three Phase	NE CT12 13.800	36,166
29S	Max Fault	Three Phase	HAWCT6 1 16.000	88,830

Season	Model	Fault	Bus	Current (Amps)
29S	Max Fault	Three Phase	HAWCT7 1 13.800	59,768
29S	Max Fault	Three Phase	HAWCT8 1 13.800	61,076
29S	Max Fault	Three Phase	HAW G9 1 13.800	98,524
29S	Max Fault	Three Phase	NE CT13 13.800	46,036
29S	Max Fault	Three Phase	NE CT14 13.800	45,850
29S	Max Fault	Three Phase	HAWTH 7 345.00	22,322
29S	Max Fault	Three Phase	HAWTHS5 161.00	59,404
29S	Max Fault	Three Phase	NE CT15 13.800	46,778
29S	Max Fault	Three Phase	NE CT16 13.800	47,020
29S	Max Fault	Three Phase	LEVEE 5 161.00	53,435
29S	Max Fault	Three Phase	NASHUA 7 345.00	22,670
29S	Max Fault	Three Phase	NE CT17 13.800	47,188
29S	Max Fault	Three Phase	NE CT18 13.800	47,142
29S	Max Fault	Three Phase	NEASTS5 161.00	48,718
29S	Max Fault	Three Phase	TROOST 5 161.00	36,071
29S	Max Fault	Three Phase	GRAND 5 161.00	45,352
29S	Max Fault	Three Phase	GRAND W5 161.00	46,060
29S	Max Fault	Three Phase	NAVY 5 161.00	45,844
29S	Max Fault	Three Phase	CROSTWN5 161.00	45,027
29S	Max Fault	Three Phase	TERRACE5 161.00	33,802
29S	Max Fault	Three Phase	STHTOWN5 161.00	37,745
29S	Max Fault	Three Phase	HICKMAN5 161.00	19,624
29S	Max Fault	Three Phase	MIDTOWN5 161.00	35,921
29S	Max Fault	Three Phase	LEEDS 5 161.00	34,949
29S	Max Fault	Three Phase	LVISTA 5 161.00	24,645
29S	Max Fault	Three Phase	BLUEVLY5 161.00	43,397
29S	Max Fault	Three Phase	FOREST 5 161.00	31,867
29S	Max Fault	Three Phase	HAWTH_B2_1 13.200	28,033
29S	Max Fault	Three Phase	HAWTH_B32_1 13.200	28,017
29S	Max Fault	Three Phase	SWOPE N5 161.00	21,736
29S	Max Fault	Three Phase	SWOPE S5 161.00	21,425
29S	Max Fault	Three Phase	BUNKRDG5 161.00	24,430
29S	Max Fault	Three Phase	WINJT N5 161.00	23,767
29S	Max Fault	Three Phase	WINJT S5 161.00	22,965
29S	Max Fault	Three Phase	CHOUTEU5 161.00	36,338
29S	Max Fault	Three Phase	BLUEVLY1 13.200	17,872
29S	Max Fault	Three Phase	AVONDAL5 161.00	30,295
29S	Max Fault	Three Phase	GLADSTN5 161.00	20,581
29S	Max Fault	Three Phase	NKANCTY5 161.00	34,496
29S	Max Fault	Three Phase	BRMGHAM5 161.00	30,597
29S	Max Fault	Three Phase	RIVRSID5 161.00	18,827
29S	Max Fault	Three Phase	CLAYCM15 161.00	21,780
29S	Max Fault	Three Phase	LINECRK5 161.00	17,049
29S	Max Fault	Three Phase	RANDLPH5 161.00	32,416
29S	Max Fault	Three Phase	SHWNMSN5 161.00	35,376
29S	Max Fault	Three Phase	MERRIAM5 161.00	31,468
29S	Max Fault	Three Phase	TOMHAWK5 161.00	27,294

Season	Model	Fault	Bus	Current (Amps)
29S	Max Fault	Three Phase	ROEPARK5 161.00	30,271
29S	Max Fault	Three Phase	SHAWNEE5 161.00	26,692
29S	Max Fault	Three Phase	OVERLPK5 161.00	31,675
29S	Max Fault	Three Phase	NRTHST_B34_113.800	12,046
29S	Max Fault	Three Phase	NRTHST_B90_113.800	12,046
29S	Max Fault	Three Phase	BLUEVLY12_1 13.200	6,940
29S	Max Fault	Three Phase	HAWTHS_G65 161.00	58,512
29S	Max Fault	Three Phase	HAWTHS_XF5 161.00	58,450
29S	Max Fault	Three Phase	CHARLOT5 161.00	41,689
29S	Max Fault	Three Phase	NEAST_DG1 4.1600	9,331
29S	Max Fault	Three Phase	BLUEVLLY3 1 13.200	15,533
29S	Max Fault	Three Phase	HAWT T20 13.800	12,206
29S	Max Fault	Three Phase	HAWT T22 13.800	12,206
29S	Max Fault	Three Phase	HAWT11_2 69.000	10,063
29S	Max Fault	Three Phase	HAWT12_2 69.000	10,063
29S	Max Fault	Three Phase	HAWTHN5 161.00	60,067
29S	Max Fault	Three Phase	NEASTN5 161.00	48,860
29S	Max Fault	Three Phase	ROSEDALE 5 161.00	21,268
29S	Max Fault	Three Phase	BARBER 5 161.00	29,104
29S	Max Fault	Three Phase	GIBBS 5 161.00	21,565
29S	Max Fault	Three Phase	BARBER 2 69.000	8,870
29S	Max Fault	Three Phase	SUB F 69.000	13,060
29S	Max Fault	Three Phase	SUB E 69.000	17,127
29S	Max Fault	Three Phase	BLUVLY-161 161.00	17,995
29S	Max Fault	Three Phase	SUB M-161 161.00	20,590
29S	Max Fault	Three Phase	SUB M 69.000	22,253
29S	Max Fault	Three Phase	SUB N-161 161.00	17,178
29S	Max Fault	Three Phase	SUB N 69.000	17,351
29S	Max Fault	Three Phase	SUB C 69.000	16,442
29S	Max Fault	Three Phase	STRLNGRD 69.000	17,282

STABILITY

SPP performed a Fast Fault Screening (FFS) using the 2026 and 2034 Summer Peak for the base case and change case models. The change case models include the Crosstown 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 load at the Crosstown delivery point caused potential thermal overloads on the 161 kV systems around Crosstown. SPP considered rebuilding the lines that were overloaded as well as new 161 kV line source into the area to serve the new load. The solutions are listed below.

Solution #1: Total cost $55M

- Rebuild Grand – Crosstown 161 kV line (1.95 miles)

Solution #2: Total cost $32M

- Build new BlueValley – Crosstown 161 kV line (5.63 miles)

SPP chose to move forward with Solution #2. This solution solves all issues identified in Table 3-1 in the most cost-effective manner and was identified in the 2025 ITP study to address years 5 and 10 P3 violations (need date: 5/18/2029). The Ink Blot load moved up the need date as shown in Table 3-3 below.

Table 3-3: Recommended Upgrade Solution 1

New Upgrade Description*	Mileage	MVA (Rate B)	Date Needed**	Host Transmission Owner	Estimated Cost***
New BlueValley – Crosstown 161 kV line	5.63	334	9/1/2026	Evergy	$32,000,000
TOTAL NEW UPGRADE COST					**$32,000,000**

*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 Evergy 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 thermal violations associated with the Ink Blot load addition. The study shows that the following upgrades are required to reliably serve the load addition:

- Build new BlueValley – Crosstown 161 kV line (5.63 miles)

The transmission upgrades in Table 3-3 are recommended to mitigate the potential thermal violations.