DPNS-2025-NOVEMBER-2235

Delivery Point Network Study

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By SPP Engineering, Transmission Services

REVISION HISTORY

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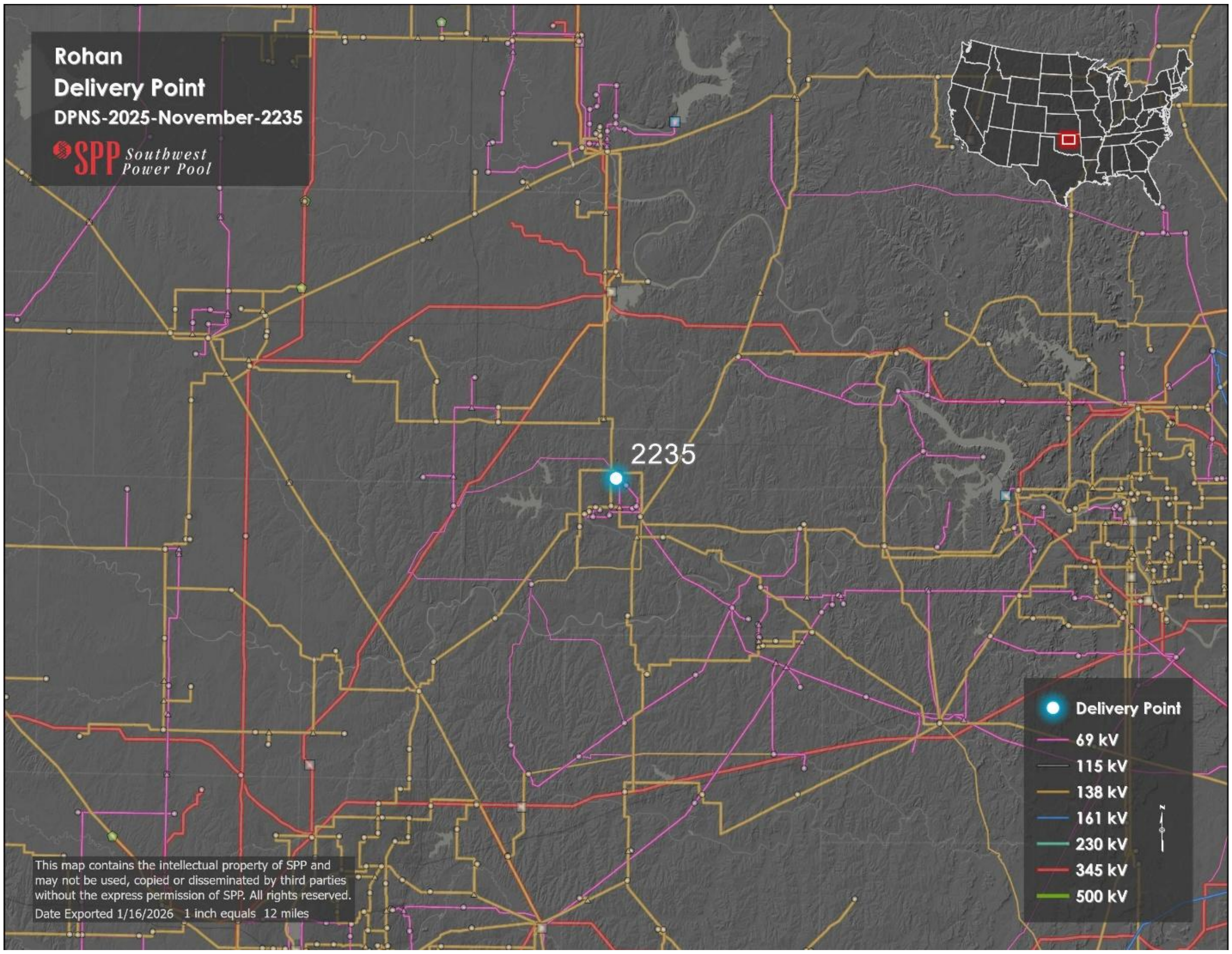
SECTION 1: INTRODUCTION

This report outlines the results of an evaluation of regional transmission impacts from delivery point request DPNS-2025-November-2235. The requesting entity plans to add a new delivery point called Rohan. The Rohan delivery point is in the Oklahoma Gas & Electric (OGE) 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 OGE. SPP performed a Delivery Point Network Study ("DPNS") with the configurations shown in Table 2-1 below.

STUDY PROCESS

- Model Assumptions
    - 2025 ITP models
        - 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 set
        - 2029 Summer Max Fault
    - 2025 TPL Dynamic model set
        - 2026 and 2034 Summer Peak Base and Change Case

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_2235.sav	2026	Summer Peak	Base Reliability	Rohan = 300/53
2025ITPFinal-26W_2235.sav	2026	Winter Peak	Base Reliability	Rohan = 300/53
2025ITPFinal-29L_2235.sav	2029	Light Load	Base Reliability	Rohan = 300/53
2025ITPFinal-29S_2235.sav	2029	Summer Peak	Base Reliability	Rohan = 300/53
2025ITPFinal-29W_2235.sav	2029	Winter Peak	Base Reliability	Rohan = 300/53
2025ITPFinal-34L_2235.sav	2034	Light Load	Base Reliability	Rohan = 300/53
2025ITPFinal-34S_2235.sav	2034	Summer Peak	Base Reliability	Rohan = 300/53
2025ITPFinal-34W_2235.sav	2034	Winter Peak	Base Reliability	Rohan = 300/53

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 NERC reliability standards
    - Compare thermal overloads and voltage violations that occur with and without the Rohan delivery point to determine thermal overloads and voltage violations resulting from the load addition to the Transmission System.
- Dynamics Analysis
    - Assumptions
        - 2025 TPL Dynamics Model Set
            - 2026 and 2034 Summer Peak Base and Change Case
    - Analyses
        - Fast Fault Screening using POM 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 OVERLOADS AND VOLTAGE VIOLATIONS

The analysis identified potential thermal and voltage violations resulting from the load added to the new Rohan delivery point. The potential thermal violations are listed in Table 3-1 and the potential voltage violations are listed in Table 3-2.

Model	Facility Name	Facility Voltage (kV)	Contingency Name	Rate A/ Rate B (MVA)	Max Flow (MVA)	Change Case Max Loading (%)
26S	KINZE 4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	171/198	246.9	124.7
26S	MCELROY4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	171/198	237.1	119.8
26W	KINZE 4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	206/228	266.1	116.7
26W	MCELROY4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	206/228	257.7	113.0
29L	KINZE 4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	171/198	231.858	117.1
29L	MCELROY4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	171/198	229.086	115.7
29S	KINZE 4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	171/198	225.918	114.1
29S	MCELROY4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	171/198	216.81	109.5
29W	KINZE 4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	206/228	235.296	103.2
34L	KINZE 4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	171/198	236.214	119.3
34L	MCELROY4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	171/198	233.244	117.8
34S	KINZE 4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	171/198	231.462	116.9
34S	MCELROY4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	171/198	222.156	112.2
34W	KINZE 4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	206/228	246.696	108.2
34W	MCELROY4 - UNVRSTY4 - 1	138	MORISNT4 - ROHAN4 - 1	206/228	238.488	104.6

Table 3-1: Potential Thermal Violations

Model	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
26S	ROHAN4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.8544
26S	KINZE 4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.8934
26S	MCELROY4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.8834
26S	STILWTR4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.8777
26W	ROHAN4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.8652
26W	MCELROY4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.8939
26W	STILWTR4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.8881
29S	ROHAN4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.88285
29W	STILWTR4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.89725
29W	ROHAN4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.87459
34S	MCELROY4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.89821
34S	STILWTR4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.89162
34S	ROHAN4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.86878
34W	ROHAN4	138	MORISNT4 - ROHAN4 - 1	1.05	0.9	0.8813

Table 3-2: Potential Voltage Violations

SHORT CIRCUIT

SPP performed short circuit analysis for the 2029 summer peak model with the new load addition. The analysis identified the currents listed in Table 3-3.

Season	Model	Fault	Bus	Current (Amps)
29S	Max Fault	Three Phase	4REDRCK 138.00	16,105
29S	Max Fault	Three Phase	WEKIWA-7 345.00	21,470
29S	Max Fault	Three Phase	WEKIWA-4 138.00	32,371
29S	Max Fault	Three Phase	T.NO.--7 345.00	23,626
29S	Max Fault	Three Phase	SAPLPRD7 345.00	22,559
29S	Max Fault	Three Phase	WEKIW1-1 34.500	15,745
29S	Max Fault	Three Phase	WEBBTAP4 138.00	8,651
29S	Max Fault	Three Phase	CLEVLND7 345.00	14,810
29S	Max Fault	Three Phase	KINZEGR4 138.00	14,125
29S	Max Fault	Three Phase	CLEVLND 4 138.00	16,730
29S	Max Fault	Three Phase	CLEVLND1 13.800	13,555
29S	Max Fault	Three Phase	MILLERT4 138.00	20,667
29S	Max Fault	Three Phase	COWCRK 2 69.000	4,506
29S	Max Fault	Three Phase	COWCRK 4 138.00	11,705
29S	Max Fault	Three Phase	PERRY 4 138.00	11,364
29S	Max Fault	Three Phase	OTTER 4 138.00	11,368
29S	Max Fault	Three Phase	WRVALLY4 138.00	9,223

Season	Model	Fault	Bus	Current (Amps)
29S	Max Fault	Three Phase	WOODRNG7 345.00	19,984
29S	Max Fault	Three Phase	OTOE 4 138.00	16,434
29S	Max Fault	Three Phase	OSGE 2 69.000	18,568
29S	Max Fault	Three Phase	OSAGE 4 138.00	17,399
29S	Max Fault	Three Phase	STDBEAR4 138.00	14,422
29S	Max Fault	Three Phase	WHEAGLE4 138.00	16,330
29S	Max Fault	Three Phase	WF KAY 2 69.000	3,191
29S	Max Fault	Three Phase	MARLNDT4 138.00	11,269
29S	Max Fault	Three Phase	SNRPMPT4 138.00	20,732
29S	Max Fault	Three Phase	SNRPMP 4 138.00	11,358
29S	Max Fault	Three Phase	SOONER 4 138.00	32,185
29S	Max Fault	Three Phase	SOONER 7 345.00	27,794
29S	Max Fault	Three Phase	SOONER1G 22.000	76,769
29S	Max Fault	Three Phase	SOONER2G 20.000	9,097
29S	Max Fault	Three Phase	SPRNGCK7 345.00	23,864
29S	Max Fault	Three Phase	MORRISN4 138.00	14,076
29S	Max Fault	Three Phase	KINZE 4 138.00	14,152
29S	Max Fault	Three Phase	MCELROY4 138.00	13,955
29S	Max Fault	Three Phase	STILWTR4 138.00	14,226
29S	Max Fault	Three Phase	CUSHING2 69.000	8,043
29S	Max Fault	Three Phase	CUSHING4 138.00	6,998
29S	Max Fault	Three Phase	PAYNESB4 138.00	9,058
29S	Max Fault	Three Phase	WARWICK4 138.00	9,943
29S	Max Fault	Three Phase	UNVRSTY4 138.00	14,026
29S	Max Fault	Three Phase	DMANCRK4 138.00	8,133
29S	Max Fault	Three Phase	DMNCRKT4 138.00	13,960
29S	Max Fault	Three Phase	GRNWOOD4 138.00	7,758
29S	Max Fault	Three Phase	MORISNT4 138.00	14,103
29S	Max Fault	Three Phase	LNWOODT4 138.00	6,583
29S	Max Fault	Three Phase	KNIPE 4 138.00	8,218
29S	Max Fault	Three Phase	SPGVLLY4 138.00	10,768
29S	Max Fault	Three Phase	RANCHRD7 345.00	14,248
29S	Max Fault	Three Phase	OPENSKY7 345.00	12,574
29S	Max Fault	Three Phase	TRYON 4 138.00	8,493
29S	Max Fault	Three Phase	FRNTWND7 345.00	12,172
29S	Max Fault	Three Phase	COWCRK 1 13.800	8,186
29S	Max Fault	Three Phase	CUSHING1 13.200	10,252
29S	Max Fault	Three Phase	OSAGE 31 13.200	17,879
29S	Max Fault	Three Phase	OSAGE 41 13.200	17,899
29S	Max Fault	Three Phase	SOONER 1 13.800	36,109
29S	Max Fault	Three Phase	THNDRL11 34.500	23,334
29S	Max Fault	Three Phase	THNDRL21 34.500	22,850
29S	Max Fault	Three Phase	THNDRT11 12.500	38,875
29S	Max Fault	Three Phase	THNDRT21 12.500	38,354
29S	Max Fault	Three Phase	THUNDER7 345.00	12,659

Season	Model	Fault	Bus	Current (Amps)
29S	Max Fault	Three Phase	OTOETAP4 138.00	16,481
29S	Max Fault	Three Phase	PINTAIL7 345.00	17,027
29S	Max Fault	Three Phase	KINGWD 7 345.00	16,967
29S	Max Fault	Three Phase	FRNT2WD7 345.00	11,308
29S	Max Fault	Three Phase	WAGNWTIE7 345.00	14,926
29S	Max Fault	Three Phase	GADWALL7 345.00	14,926
29S	Max Fault	Three Phase	COYLE 4 138.00	9,064
29S	Max Fault	Three Phase	ROHAN4 138.00	12,906
29S	Max Fault	Three Phase	WARREN 4 138.00	6,480
29S	Max Fault	Three Phase	OMCDLEC7 345.00	14,221

Table 3-3: Short Circuit Results

STABILITY

SPP performed a Fast Fault Screening (FFS) for the base case and change case models. The change case models include the Rohan delivery point changes. The FFS was performed for the 2026 and 2034 summer peak models. There were 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 new load at Rohan caused potential thermal and voltage violations on the 138 kV Transmission System around the new load for the loss of the Morrison Tap – Rohan 138 kV line. SPP looked at the options listed below to mitigate the thermal and voltage violations.

Solution #1: New line (Total Cost: $ 5,554,914)

- New Morrison Tap – Rohan 138 kV line (5.005 miles)

Solution #2: Rebuild lines (Total Cost: $ 8,004,899)

- Rebuild Kinze – University 138 kV circuit 1 line (0.7 miles)
- Rebuild McElroy – University 138 kV circuit 1 line (1.27 miles)
- New 100 MVAR capacitor bank at Rohan 138 kV substation

Due to new Right of Way costs that could increase the cost of Solution #1, SPP chose Solution #2 to alleviate the potential thermal and voltage violations in Tables 3-1 and 3-2.

New Upgrade Description*	Mileage	MVA (Rate B)	Date Needed**	Host Transmission Owner	Estimated Cost***
Rebuild 138 kV circuit 1 line from Kinze to University	0.7	267	7/1/2026	OGE	$762,147
Rebuild 138 kV circuit 1 line from McElroy to University	1.27	258	7/1/2026	OGE	$1,382,752

Add new 100 MVAR capacitor bank at the Rohan 138 kV substation	-	-	7/1/2026	OGE	$5,860,000
TOTAL NEW UPGRADE COST					**$8,004,899**

Table 3-4: Recommended Upgrades

*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 3-4.

***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 thermal and voltage violations associated with the Rohan load addition. The study shows that the following upgrades are needed to serve the load addition:

- Rebuild 138 kV circuit 1 line from Kinze to University (0.7 miles)
- Rebuild 138 kV circuit 1 line from McElroy to University (1.27 miles)
- Add new 100 MVAR capacitor bank at the Rohan 138 kV substation

The transmission upgrades in Table 3-4 are recommended to mitigate the potential thermal and voltage violations.