# DPA-2025-JANUARY-2082

## Delivery Point Network Study

Published on 4/8/2025

By SPP Engineering, Transmission Services

# REVISION HISTORY

| DATE OR VERSION NUMBER | AUTHOR | CHANGE DESCRIPTION | COMMENTS |
|---|---|---|---|
| 4/8/2025 | SPP | Original | |
| | | | |
| | | | |

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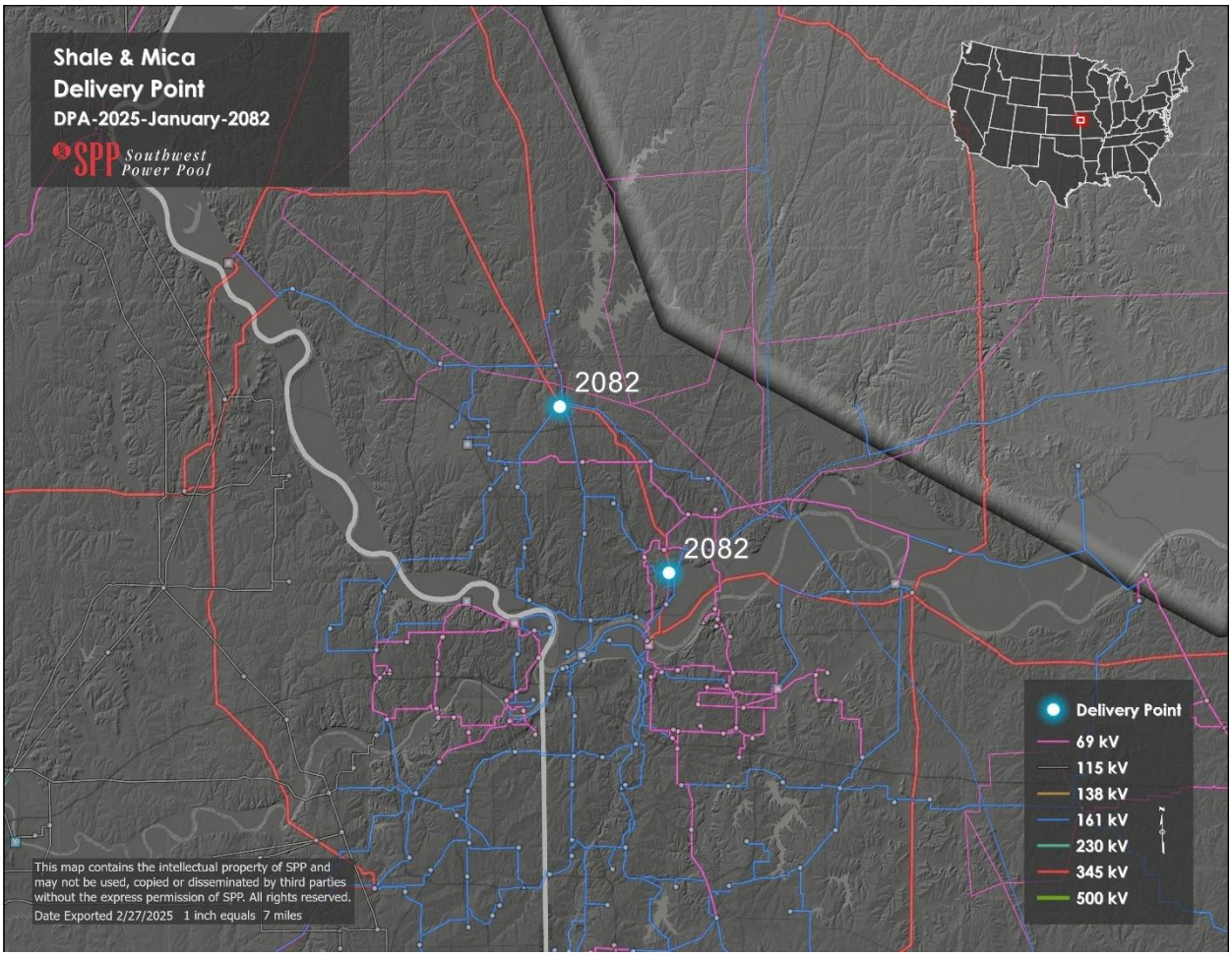
# SECTION 1: INTRODUCTION

This report outlines the results of an evaluation of regional transmission impacts from delivery point request DPA-2025-January-2082. The requesting entity plans to add new load to an existing delivery point called Shale with an in-service date of 6/1/2026 and a new delivery point called Mica with an in-service date of 12/31/2026. The Shale and Mica delivery points are in the 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

| 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_2082.sav | 2026 | Summer Peak | Base Reliability | Shale = 363/119.4 |
| 2025ITPFinal-26W_2082.sav | 2026 | Winter Peak | Base Reliability | Mica = 40/13.2<br>Shale = 363/119.4 |
| 2025ITPFinal-29L_2082.sav | 2029 | Light Load | Base Reliability | Mica = 391/129.03<br>Shale = 500/164.46 |
| 2025ITPFinal-29S_2082.sav | 2029 | Summer Peak | Base Reliability | Mica = 391/129.03<br>Shale = 500/164.46 |
| 2025ITPFinal-29W_2082.sav | 2029 | Winter Peak | Base Reliability | Mica = 391/129.03<br>Shale = 500/164.46 |
| 2025ITPFinal-34L_2082.sav | 2034 | Light Load | Base Reliability | Mica = 425/140.25<br>Shale = 775/254.9 |
| 2025ITPFinal-34S_2082.sav | 2034 | Summer Peak | Base Reliability | Mica = 425/140.25<br>Shale = 775/254.9 |
| 2025ITPFinal-34W_2082.sav | 2034 | Winter Peak | Base Reliability | Mica = 425/140.25<br>Shale = 775/254.9 |

**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 Shale and Mica delivery point changes 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 and voltage violations resulting from the new load at the Shale and Mica delivery points. Table 3-1 details the potential thermal violations and Table 3-2 details the potential voltage violations resulting from the load addition.

| Model | Facility Name | Facility Voltage (kV) | Contingency Name | Rate A, Rate B (MVA) | Max Flow (MVA) | Change Case Max Loading (%) |
|---|---|---|---|---|---|---|
| 29S | IATAN 7 - IATAN11 - 11 | 345/161 | P23:345:KCPL-GMO:IATAN-R7-9:::EHV: | 400/440 | 443.52 | 100.8 |
| 29S | HAWTHS5 - BRMGHAM5 - 1 | 161 | MICA - NASHUA-5 - 1 | 320/360 | 382.68 | 106.3 |
| 29W | MICA - NASHUA-5 - 1 | 161 | SHALE 7 - NASHUA 7 - 1 | 557/557 | 606.573 | 108.9 |
| 34S | HAWTHS5 - BRMGHAM5 - 1 | 161 | MICA - NASHUA-5 - 1 | 320/360 | 390.24 | 108.4 |
| 34S | BRMGHAM5 - CLAYCM15 - 1 | 161 | MICA - NASHUA-5 - 1 | 311/351 | 365.04 | 104 |
| 34S | IATAN 7 - IATAN11 - 11 | 345/161 | P23:345:KCPL-GMO:IATAN-R7-9:::EHV: | 400/440 | 452.76 | 102.9 |
| 34W | MICA - NASHUA-5 - 1 | 161 | SHALE 7 - NASHUA 7 - 1 | 557/557 | 625.511 | 112.3 |

**Table 3-1: Potential Thermal Violations**

| Model | Facility Name | Facility Voltage (kV) | Contingency Name | Voltage Maximum (pu) | Voltage Minimum (pu) | Bus Voltage (pu) |
|---|---|---|---|---|---|---|
| 29L | MICA | 161 | MICA - NASHUA-5 – 1 | 1.05 | 0.9 | 0.8923 |
| 29S | MICA | 161 | MICA - NASHUA-5 – 1 | 1.05 | 0.9 | 0.89219 |
| 34L | MICA | 161 | MICA - NASHUA-5 – 1 | 1.05 | 0.9 | 0.8674 |
| 34S | MICA | 161 | MICA - NASHUA-5 - 1 | 1.05 | 0.9 | 0.87238 |

**Table 3-2: Potential Voltage Violations**

## *SHORT CIRCUIT*

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

| Season | Model | Fault | Bus | Current (Amps) |
|---|---|---|---|---|
| 29S | Max Fault | Three Phase | 7FAIRPT 345.00 | 12,945 |
| 29S | Max Fault | Three Phase | 5MOCITYB2 161.00 | 20,193 |
| 29S | Max Fault | Three Phase | 1FRPT3TR 13.800 | 71,054 |
| 29S | Max Fault | Three Phase | 5PLATCTY 161.00 | 16,521 |
| 29S | Max Fault | Three Phase | 5FAIRPTXF3 161.00 | 19,183 |
| 29S | Max Fault | Three Phase | HOYT 7 345.00 | 16,007 |
| 29S | Max Fault | Three Phase | STRANGR7 345.00 | 26,618 |

| Season | Model | Fault | Bus | Current (Amps) |
|---|---|---|---|---|
| 29S | Max Fault | Three Phase | 87TH 7 345.00 | 20,244 |
| 29S | Max Fault | Three Phase | SLDR_CK_WF7 345.00 | 5,940 |
| 29S | Max Fault | Three Phase | STRAN1 1 14.400 | 33,324 |
| 29S | Max Fault | Three Phase | STRAN3 1 14.400 | 42,229 |
| 29S | Max Fault | Three Phase | STRANGR3 115.00 | 36,011 |
| 29S | Max Fault | Three Phase | NASHUA_CAP5 161.00 | 28,364 |
| 29S | Max Fault | Three Phase | RNRIDGE_CAP5161.00 | 20,541 |
| 29S | Max Fault | Three Phase | ST JOE_CAP5 161.00 | 18,308 |
| 29S | Max Fault | Three Phase | IATAN 11 14.400 | 24,182 |
| 29S | Max Fault | Three Phase | ST JOE 7 345.00 | 20,145 |
| 29S | Max Fault | Three Phase | SIBLEY 7 345.00 | 20,828 |
| 29S | Max Fault | Three Phase | NASHUA 5 161.00 | 34,269 |
| 29S | Max Fault | Three Phase | SMTHVL 5 161.00 | 23,733 |
| 29S | Max Fault | Three Phase | KCI 5 161.00 | 13,286 |
| 29S | Max Fault | Three Phase | TWA 5 161.00 | 15,473 |
| 29S | Max Fault | Three Phase | HLLMRK 5 161.00 | 13,672 |
| 29S | Max Fault | Three Phase | PLTCTY 5 161.00 | 16,591 |
| 29S | Max Fault | Three Phase | RNRIDGE5 161.00 | 23,471 |
| 29S | Max Fault | Three Phase | LBRTYWT5 161.00 | 15,497 |
| 29S | Max Fault | Three Phase | LBRTYST5 161.00 | 20,218 |
| 29S | Max Fault | Three Phase | SIBLEYPL 161.00 | 28,647 |
| 29S | Max Fault | Three Phase | ST JOE 5 161.00 | 20,598 |
| 29S | Max Fault | Three Phase | COOK 5 161.00 | 14,483 |
| 29S | Max Fault | Three Phase | WOODBIN5 161.00 | 17,231 |
| 29S | Max Fault | Three Phase | RNRDGE 2 69.000 | 4,929 |
| 29S | Max Fault | Three Phase | STALEY 2 69.000 | 5,136 |
| 29S | Max Fault | Three Phase | NCONGRS5 161.00 | 18,949 |
| 29S | Max Fault | Three Phase | POPE 161.00 | 13,482 |
| 29S | Max Fault | Three Phase | IATAN5 161.00 | 14,964 |
| 29S | Max Fault | Three Phase | WESTON 5 161.00 | 13,006 |
| 29S | Max Fault | Three Phase | STJOE 1T 13.800 | 86,395 |
| 29S | Max Fault | Three Phase | STJOE 2T 13.800 | 86,394 |
| 29S | Max Fault | Three Phase | AVENUECTY 5 161.00 | 6,393 |
| 29S | Max Fault | Three Phase | EASTOWN7 345.00 | 18,546 |
| 29S | Max Fault | Three Phase | EASTOWN5 161.00 | 17,673 |
| 29S | Max Fault | Three Phase | EASTOWN1 13.800 | 57,196 |
| 29S | Max Fault | Three Phase | BARRY_CAP 5 161.00 | 16,658 |
| 29S | Max Fault | Three Phase | GLADSTN_CAP5161.00 | 18,292 |
| 29S | Max Fault | Three Phase | MICA 161.00 | 33,727 |
| 29S | Max Fault | Three Phase | SHALE 7 345.00 | 20,625 |
| 29S | Max Fault | Three Phase | IAT G1 1 24.000 | 37,330 |
| 29S | Max Fault | Three Phase | IAT G2 1 24.500 | 47,667 |
| 29S | Max Fault | Three Phase | HAW G9 1 13.800 | 98,435 |
| 29S | Max Fault | Three Phase | HAWTH 7 345.00 | 22,241 |
| 29S | Max Fault | Three Phase | HAWTHS5 161.00 | 58,217 |
| 29S | Max Fault | Three Phase | NASHUA 7 345.00 | 22,658 |
| 29S | Max Fault | Three Phase | IATAN 7 345.00 | 30,320 |

| Season | Model | Fault | Bus | Current (Amps) |
|---|---|---|---|---|
| 29S | Max Fault | Three Phase | LEEDS 5 161.00 | 34,909 |
| 29S | Max Fault | Three Phase | HAWTH_B2_1 13.200 | 28,011 |
| 29S | Max Fault | Three Phase | AVONDAL5 161.00 | 30,290 |
| 29S | Max Fault | Three Phase | GLADSTN5 161.00 | 20,580 |
| 29S | Max Fault | Three Phase | WETHRBY5 161.00 | 15,623 |
| 29S | Max Fault | Three Phase | NKANCTY5 161.00 | 34,188 |
| 29S | Max Fault | Three Phase | BARRY 5 161.00 | 18,534 |
| 29S | Max Fault | Three Phase | BRMGHAM5 161.00 | 30,432 |
| 29S | Max Fault | Three Phase | CLAYCM15 161.00 | 21,746 |
| 29S | Max Fault | Three Phase | LINECRK5 161.00 | 17,002 |
| 29S | Max Fault | Three Phase | TIFFANY5 161.00 | 19,788 |
| 29S | Max Fault | Three Phase | RANDLPH5 161.00 | 32,332 |
| 29S | Max Fault | Three Phase | NASHUA-5 161.00 | 34,484 |
| 29S | Max Fault | Three Phase | SHOLCRK5 161.00 | 23,781 |
| 29S | Max Fault | Three Phase | FRSTCRK5 161.00 | 30,770 |
| 29S | Max Fault | Three Phase | LIBRTYS2 69.000 | 9,239 |
| 29S | Max Fault | Three Phase | HAWTHS_G65 161.00 | 57,361 |
| 29S | Max Fault | Three Phase | HAWTHS_XF5 161.00 | 57,300 |
| 29S | Max Fault | Three Phase | NASH T11 13.800 | 12,017 |
| 29S | Max Fault | Three Phase | HAWT T20 13.800 | 12,200 |
| 29S | Max Fault | Three Phase | HAWT T22 13.800 | 12,200 |
| 29S | Max Fault | Three Phase | HAWTHN5 161.00 | 58,795 |
| 29S | Max Fault | Three Phase | NEASTN5 161.00 | 47,580 |
| 29S | Max Fault | Three Phase | SUB M-161 161.00 | 20,494 |
| 29S | Max Fault | Three Phase | ATCHSN 3 345.00 | 18,720 |
| 29S | Max Fault | Three Phase | COOPER1G 22.000 | 56,855 |
| 29S | Max Fault | Three Phase | COOPER 3 345.00 | 28,294 |
| 29S | Max Fault | Three Phase | COOPER 5 161.00 | 17,943 |
| 29S | Max Fault | Three Phase | COOPER T2 913.800 | 44,884 |
| 29S | Max Fault | Three Phase | OLIVECREEK 3345.00 | 24,386 |
| 29S | Max Fault | Three Phase | COOPER T5 913.800 | 25,695 |
| 29S | Max Fault | Three Phase | S3458 3 345.00 | 31,957 |
| 29S | Max Fault | Three Phase | NASHXF 13.800 | 12,017 |
| 29S | Max Fault | Three Phase | CSA-345 345.00 | 18,720 |
| 29S | Max Fault | Three Phase | 7KINGDM 345.00 | 15,745 |
| 29S | Max Fault | Three Phase | 7MCCRED 345.00 | 18,609 |
| 29S | Max Fault | Three Phase | 5FAIRPTB2 161.00 | 19,191 |
| 29S | Max Fault | Three Phase | 7THOMHL3 345.00 | 14,999 |
| 29S | Max Fault | Three Phase | 5HUNTSDLB1 161.00 | 11,600 |
| 29S | Max Fault | Three Phase | 5MCBAIN T 161.00 | 15,571 |
| 29S | Max Fault | Three Phase | 5MOBERLY 161.00 | 17,835 |
| 29S | Max Fault | Three Phase | 7MONTGOMERY 345.00 | 40,795 |
| 29S | Max Fault | Three Phase | 7OVERTON 345.00 | 15,712 |
| 29S | Max Fault | Three Phase | 5OVERTON 1 161.00 | 27,960 |
| 29S | Max Fault | Three Phase | 5OVERTON 2 161.00 | 27,908 |
| 29S | Max Fault | Three Phase | J1376 POI 161.00 | 14,765 |
| 29S | Max Fault | Three Phase | JEC N 7 345.00 | 25,434 |

| Season | Model | Fault | Bus | Current (Amps) |
|---|---|---|---|---|
| 29S | Max Fault | Three Phase | IRSH_CK_WF7 345.00 | 5,475 |
| 29S | Max Fault | Three Phase | HOYT 1 14.400 | 48,824 |
| 29S | Max Fault | Three Phase | 87TH 1X1 14.400 | 77,815 |
| 29S | Max Fault | Three Phase | 87TH 2X1 14.400 | 52,059 |
| 29S | Max Fault | Three Phase | HOYT 3 115.00 | 22,838 |
| 29S | Max Fault | Three Phase | ARNOLD 3 115.00 | 9,182 |
| 29S | Max Fault | Three Phase | JARBALO3 115.00 | 25,870 |
| 29S | Max Fault | Three Phase | NW LEAV3 115.00 | 17,561 |
| 29S | Max Fault | Three Phase | THORNTN3 115.00 | 15,822 |
| 29S | Max Fault | Three Phase | 87TH 3 115.00 | 38,220 |
| 29S | Max Fault | Three Phase | SC_LV1_1 34.500 | 23,310 |
| 29S | Max Fault | Three Phase | SC_LV2_1 34.500 | 23,045 |
| 29S | Max Fault | Three Phase | SC_TERT1_1 13.800 | 14,239 |
| 29S | Max Fault | Three Phase | SC_TERT2_1 13.800 | 14,067 |
| 29S | Max Fault | Three Phase | DOGWDSTG 18.000 | 99,378 |
| 29S | Max Fault | Three Phase | DOGWDCT1 18.000 | 93,904 |
| 29S | Max Fault | Three Phase | DOGWDCT2 18.000 | 93,904 |
| 29S | Max Fault | Three Phase | MULLNCR7 345.00 | 7,607 |
| 29S | Max Fault | Three Phase | PECULR 7 345.00 | 20,657 |
| 29S | Max Fault | Three Phase | PHILL 7 345.00 | 18,624 |
| 29S | Max Fault | Three Phase | SIBLEY 5 161.00 | 26,945 |
| 29S | Max Fault | Three Phase | PHILL 5 161.00 | 34,332 |
| 29S | Max Fault | Three Phase | DUNCAN 5 161.00 | 19,288 |
| 29S | Max Fault | Three Phase | HSNVL 5 161.00 | 14,554 |
| 29S | Max Fault | Three Phase | SEDEAST5 161.00 | 7,685 |
| 29S | Max Fault | Three Phase | LKWINBG5 161.00 | 25,496 |
| 29S | Max Fault | Three Phase | ORRICK 5 161.00 | 13,732 |
| 29S | Max Fault | Three Phase | EAST 5 161.00 | 15,964 |
| 29S | Max Fault | Three Phase | IND PRK5 161.00 | 15,566 |
| 29S | Max Fault | Three Phase | SIBLEY 2 69.000 | 6,401 |
| 29S | Max Fault | Three Phase | PHILL 2 69.000 | 13,055 |
| 29S | Max Fault | Three Phase | HARRIS 161.00 | 26,106 |
| 29S | Max Fault | Three Phase | PECULR 5 161.00 | 25,056 |
| 29S | Max Fault | Three Phase | EDMOND5 161.00 | 13,335 |
| 29S | Max Fault | Three Phase | SIBLEY T 13.800 | 66,263 |
| 29S | Max Fault | Three Phase | PHILL T 13.800 | 66,145 |
| 29S | Max Fault | Three Phase | MIDWAY_5 161.00 | 6,807 |
| 29S | Max Fault | Three Phase | PECULRT 13.800 | 59,166 |
| 29S | Max Fault | Three Phase | MC REAC1 345.00 | 7,277 |
| 29S | Max Fault | Three Phase | MC REAC2 345.00 | 7,277 |
| 29S | Max Fault | Three Phase | MC REAC3 345.00 | 7,277 |
| 29S | Max Fault | Three Phase | SIB REA1 345.00 | 18,528 |
| 29S | Max Fault | Three Phase | KETCHEM7 345.00 | 7,655 |
| 29S | Max Fault | Three Phase | OSBORN7 345.00 | 7,643 |
| 29S | Max Fault | Three Phase | OSBORN_B1_1 34.500 | 24,863 |
| 29S | Max Fault | Three Phase | OSBORN_TER_113.800 | 41,788 |
| 29S | Max Fault | Three Phase | HOLT 7 345.00 | 8,695 |

| Season | Model | Fault | Bus | Current (Amps) |
|---|---|---|---|---|
| 29S | Max Fault | Three Phase | NEASTS_CAP5 161.00 | 36,773 |
| 29S | Max Fault | Three Phase | HAWTH_S_COL113.800 | 53,678 |
| 29S | Max Fault | Three Phase | HAW G5 1 22.000 | 2,522 |
| 29S | Max Fault | Three Phase | NE CT11 13.800 | 37,097 |
| 29S | Max Fault | Three Phase | NE CT12 13.800 | 36,150 |
| 29S | Max Fault | Three Phase | HAWCT6 1 16.000 | 88,768 |
| 29S | Max Fault | Three Phase | HAWCT7 1 13.800 | 59,746 |
| 29S | Max Fault | Three Phase | HAWCT8 1 13.800 | 61,052 |
| 29S | Max Fault | Three Phase | STILWEL7 345.00 | 25,396 |
| 29S | Max Fault | Three Phase | NE CT13 13.800 | 46,010 |
| 29S | Max Fault | Three Phase | NE CT14 13.800 | 45,824 |
| 29S | Max Fault | Three Phase | NE CT15 13.800 | 46,749 |
| 29S | Max Fault | Three Phase | NE CT16 13.800 | 46,990 |
| 29S | Max Fault | Three Phase | LEVEE 5 161.00 | 52,707 |
| 29S | Max Fault | Three Phase | CRAIG 7 345.00 | 20,889 |
| 29S | Max Fault | Three Phase | NE CT17 13.800 | 47,159 |
| 29S | Max Fault | Three Phase | NE CT18 13.800 | 47,114 |
| 29S | Max Fault | Three Phase | NEASTS5 161.00 | 47,353 |
| 29S | Max Fault | Three Phase | GRAND 5 161.00 | 42,817 |
| 29S | Max Fault | Three Phase | GRAND W5 161.00 | 43,321 |
| 29S | Max Fault | Three Phase | MIDTOWN5 161.00 | 35,248 |
| 29S | Max Fault | Three Phase | BLUEVLY5 161.00 | 38,651 |
| 29S | Max Fault | Three Phase | HAWTH_B32_1 13.200 | 27,995 |
| 29S | Max Fault | Three Phase | WINJT N5 161.00 | 23,764 |
| 29S | Max Fault | Three Phase | WINJT S5 161.00 | 22,965 |
| 29S | Max Fault | Three Phase | CHOUTEU5 161.00 | 36,281 |
| 29S | Max Fault | Three Phase | BLUEVLY1 13.200 | 17,798 |
| 29S | Max Fault | Three Phase | RIVRSID5 161.00 | 18,728 |
| 29S | Max Fault | Three Phase | NRTHST_B34_113.800 | 12,039 |
| 29S | Max Fault | Three Phase | NRTHST_B90_113.800 | 12,039 |
| 29S | Max Fault | Three Phase | BLUEVLY12_1 13.200 | 6,929 |
| 29S | Max Fault | Three Phase | CHARLOT5 161.00 | 38,313 |
| 29S | Max Fault | Three Phase | BLUEVLLY3 1 13.200 | 15,478 |
| 29S | Max Fault | Three Phase | HAWT11_2 69.000 | 10,049 |
| 29S | Max Fault | Three Phase | HAWT12_2 69.000 | 10,049 |
| 29S | Max Fault | Three Phase | BLUVLY-161 161.00 | 17,941 |
| 29S | Max Fault | Three Phase | ECKLES-161 161.00 | 25,806 |
| 29S | Max Fault | Three Phase | SUB M 69.000 | 22,211 |
| 29S | Max Fault | Three Phase | SUB N-161 161.00 | 16,472 |
| 29S | Max Fault | Three Phase | SUB N 69.000 | 17,285 |
| 29S | Max Fault | Three Phase | MOORE 3 345.00 | 25,014 |
| 29S | Max Fault | Three Phase | COOPER 869.000 | 6,323 |
| 29S | Max Fault | Three Phase | OLIVECREEK 7115.00 | 45,061 |
| 29S | Max Fault | Three Phase | OLIVECRK.T1913.800 | 32,216 |
| 29S | Max Fault | Three Phase | OLIVECRK.T2913.800 | 32,214 |
| 29S | Max Fault | Three Phase | COOPER T6 913.800 | 6,599 |
| 29S | Max Fault | Three Phase | NEBCTY1G 18.000 | 23,793 |

| Season | Model | Fault | Bus | Current (Amps) |
|---|---|---|---|---|
| 29S | Max Fault | Three Phase | NEBCTY2G 23.000 | 91,692 |
| 29S | Max Fault | Three Phase | S3456 3 345.00 | 34,938 |
| 29S | Max Fault | Three Phase | S3458-HOLT 3345.00 | 31,957 |
| 29S | Max Fault | Three Phase | S3740 3 345.00 | 26,125 |
| 29S | Max Fault | Three Phase | S1280 5 161.00 | 10,240 |
| 29S | Max Fault | Three Phase | 103&ROKEBY3 345.00 | 21,306 |

**Table 3-3: Short Circuit Results**

## *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 Shale and Mica 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 Shale and Mica delivery points caused potential thermal overloads on the 345 kV and 161 kV systems around the delivery points and low voltages on the 161 kV system around Mica. SPP considered the solutions that are listed below.

**Solution #1:** Total cost $11.05M

- Nashua – First Creek 161 kV cut-in at Mica 161 kV substation
- Iatan 345 kV Substation expansion and re-termination

**Solution #2:** Total cost $57.08M

- Birmingham – Hawthorn 161 kV circuit 1 rebuild
- Birmingham – Claycomo 161 kV circuit 1 rebuild
- Mica – Nashua 161 kV circuit 1 rebuild
- Iatan 345 kV Substation expansion and re-termination
- Mica 161 kV 50 MVAR capacitor bank

SPP chose to move forward with Solution #1. This solution solves all issues identified in Table 3-1 and Table 3-2 in the most cost-effective manner.

| New Upgrade Description* | Mileage | MVA (Rate B) | Date Needed** | Host Transmission Owner | Estimated Cost*** |
|---|---|---|---|---|---|
| Nashua – First Creek 161 kV cut-in at Mica 161 kV substation | 1.97 | 836 | 6/1/2028 | Evergy | $1,047,636 |
| Iatan 345 kV Substation expansion and re-termination | - | - | 6/1/2029 | Evergy | $10,000,000 |
| **TOTAL NEW UPGRADE COST** | | | | | **$11,047,636** |

**Table 3-4: Recommended Upgrade Solution 1**

*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 Shale and Mica load additions. The study shows that the following upgrades are required to reliably serve the load additions:

- Nashua – First Creek 161 kV cut-in at Mica 161 kV substation
- Iatan 345 kV Substation expansion and re-termination

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