DPA-2022-OCTOBER-1665

Delivery Point Network Study

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By SPP Engineering, Transmission Services

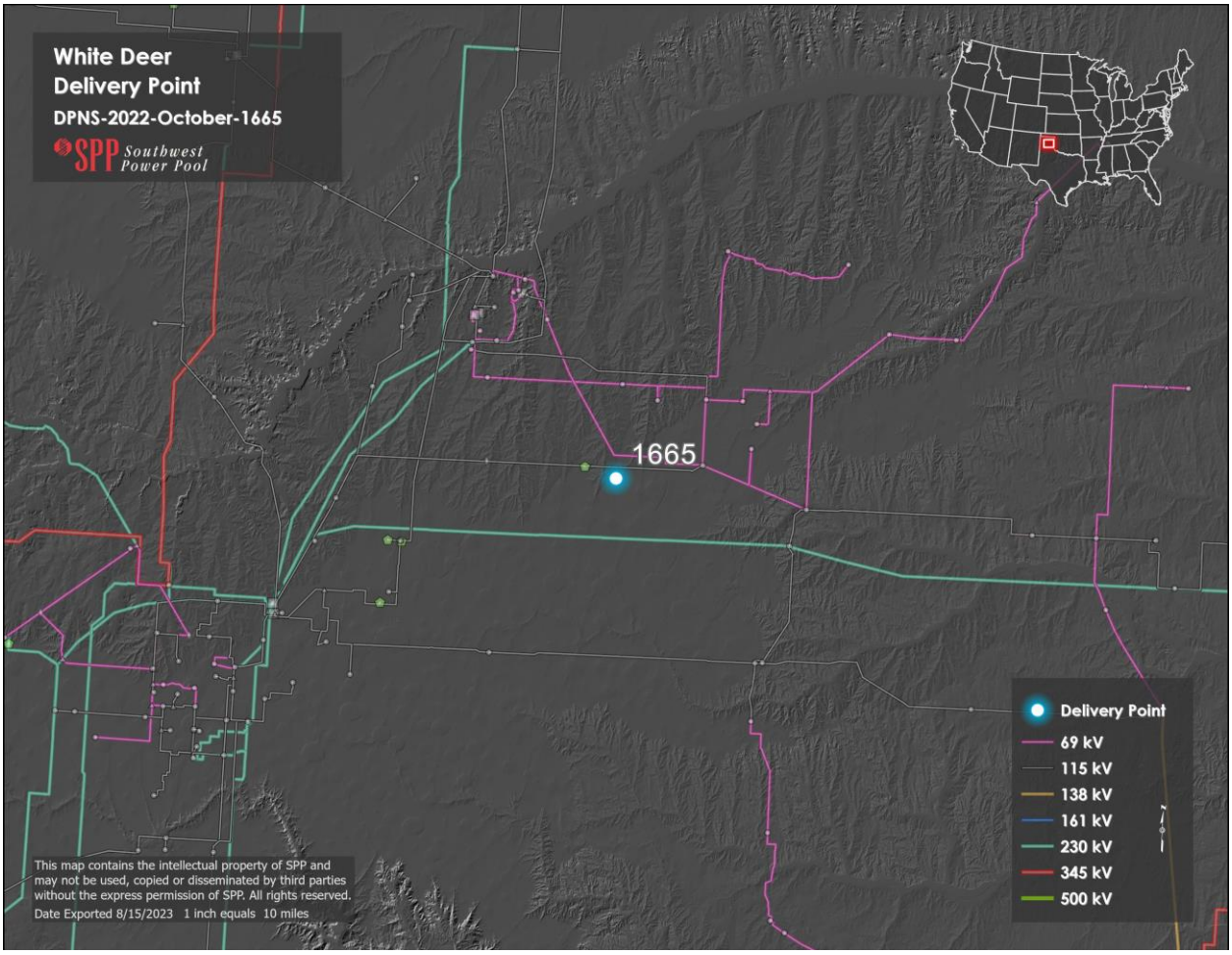
REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION	COMMENTS
8/24/2023	SPP	Original	

CONTENTS

SECTION 1: INTRODUCTION

This report outlines the results of an evaluation of regional transmission impacts from delivery point request DPA-2022-October-1655. The requesting entity plans to add load to the White Deer delivery point. This delivery point is in the Southwestern Public Service Company (SPS) transmission system.



The load flow models used for the evaluation were 2023 ITP models. SPP performed an 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 SPS. SPP performed a Delivery Point Network Study ("DPNS") with the configurations shown in Table 2-1 below.

STUDY PROCESS

- Model Assumptions
  - 2023 ITP models
    - Model years 2023, 2024, 2027, and 2032
    - Summer Peak (2023S, 2024S, 2027S, and 2032S), Winter Peak (2023W, 2024W, 2027W, and 2032W), and Light Load (2024L, 2027L, and 2032L)
  - 2023 ITP Short Circuit model set
    - 2027 Summer Max Fault
  - MDWG Dynamic model set
    - 2031 MDWG Summer Peak Base and Change Case

Case Name	Study Year	Season	Scenario	Load (MW/MVAR)
2023ITPPF-23S.sav	2023	Summer Peak	Base Reliability	Base Case
2023ITPPF-23W.sav	2023	Winter Peak	Base Reliability	Base Case
2023ITPPF-24L.sav	2024	Light Load	Base Reliability	Base Case
2023ITPPF-24S.sav	2024	Summer Peak	Base Reliability	Base Case
2023ITPPF-24W.sav	2024	Winter Peak	Base Reliability	Base Case
2023ITPPF-27L.sav	2027	Light Load	Base Reliability	Base Case
2023ITPPF-27S.sav	2027	Summer Peak	Base Reliability	Base Case
2023ITPPF-27W.sav	2027	Winter Peak	Base Reliability	Base Case
2023ITPPF-32L.sav	2032	Light Load	Base Reliability	Base Case
2023ITPPF-32S.sav	2032	Summer Peak	Base Reliability	Base Case
2023ITPPF-32W.sav	2032	Winter Peak	Base Reliability	Base Case
2023ITPPF-23S_1655.sav	2023	Summer Peak	Base Reliability	White Deer = 50/16.5
2023ITPPF-23W_1655.sav	2023	Winter Peak	Base Reliability	White Deer = 50/16.5
2023ITPPF-24L_1655.sav	2024	Light Load	Base Reliability	White Deer = 50/16.5
2023ITPPF-24S_1655.sav	2024	Summer Peak	Base Reliability	White Deer = 50/16.5
2023ITPPF-24W_1655.sav	2024	Winter Peak	Base Reliability	White Deer = 50/16.5
2023ITPPF-27L_1655.sav	2027	Light Load	Base Reliability	White Deer = 50/16.5
2023ITPPF-27S_1655.sav	2027	Summer Peak	Base Reliability	White Deer = 50/16.5
2023ITPPF-27W_1655.sav	2027	Winter Peak	Base Reliability	White Deer = 50/16.5
2023ITPPF-32L_1655.sav	2032	Light Load	Base Reliability	White Deer = 50/16.5

Case Name	Study Year	Season	Scenario	Load (MW/MVAR)
2023ITPPF-32S_1655.sav	2032	Summer Peak	Base Reliability	White Deer = 50/16.5
2023ITPPF-32W_1655.sav	2032	Winter Peak	Base Reliability	White Deer = 50/16.5

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 White Deer delivery point changes to determine thermal overloads and voltage violations resulting from the load addition to the transmission system.
- Dynamics Analysis
  - Assumptions
    - MDWG Dynamics Model Set
      - 2023 and 2031 MDWG Summer Peak Base and Change Case
  - Analyses
    - Fast Fault Screening using POM Studio
- Short Circuit Analysis
  - Assumptions
    - Used 2023 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 overloads and voltage violations resulting from the load added to the White Deer delivery point. Table 3-1 details the potential thermal overloads resulting from the load addition.

Year	Season	Facility Name	Contingencies	RATE A, RATE B (MVA)	Max Flow (MVA)	Change Case Max Loading (%)
2023	Summer	MIDSTRM_TP 3 - NICHOLS 3 - 1	GRAY_CNTY 2 - GRAY_CNTY 3 - 1	120/128	128.64	100.5
2023	Summer	MIDSTRM_TP 3 - NICHOLS 3 - 1	HUTCH_S 3 - GRAY_CNTY 3 - 1	120/128	128.768	100.6
2023	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	98.16	122.7
2023	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	102.48	128.1
2023	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	102.56	128.2
2023	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	120/120	180	150
2023	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	TYNG - LLANO_WND_3 - 1	120/120	180	150
2023	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	120/120	185.4	154.5
2023	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	134.72	168.4
2023	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	134.72	168.4
2023	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	135.68	169.6
2023	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	101.2	126.5
2023	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	101.36	126.7
2023	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	102.24	127.8
2023	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	103.76	129.7
2023	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	104.16	130.2
2023	Winter	HUTCH_S 3 - GRAY_CNTY 3 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	120/120	163.2	136
2023	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	127.2	159
2024	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	98.4	123
2024	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	102.8	128.5
2024	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	102.88	128.6
2024	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	120/120	179.16	149.3
2024	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	TYNG - LLANO_WND_3 - 1	120/120	179.16	149.3
2024	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	120/120	184.92	154.1
2024	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	134.48	168.1
2024	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	134.56	168.2
2024	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	135.6	169.5
2024	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	100.16	125.2
2024	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	100.4	125.5

Year	Season	Facility Name	Contingencies	RATE A, RATE B (MVA)	Max Flow (MVA)	Change Case Max Loading (%)
2024	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	101.04	126.3
2024	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	101.12	126.4
2024	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	102.24	127.8
2024	Winter	HUTCH_S 3 - GRAY_CNTY 3 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	120/120	162.6	135.5
2024	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	127.04	158.8
2027	Light Load	GRAY_CNTY 3 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	91.44	114.3
2027	Light Load	GRAY_CNTY 2 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	92.88	116.1
2027	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	96.32	120.4
2027	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	100.56	125.7
2027	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	100.56	125.7
2027	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	120/120	176.88	147.4
2027	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	TYNG - LLANO_WND_3 - 1	120/120	176.88	147.4
2027	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	120/120	182.16	151.8
2027	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	132.48	165.6
2027	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	132.48	165.6
2027	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	133.44	166.8
2027	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	98.72	123.4
2027	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	101.76	127.2
2027	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	101.92	127.4
2027	Winter	HUTCH_S 3 - GRAY_CNTY 3 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	120/120	156.48	130.4
2027	Winter	HUTCH_S 3 - GRAY_CNTY 3 - 1	TYNG - LLANO_WND_3 - 1	120/120	156.6	130.5
2027	Winter	HUTCH_S 3 - GRAY_CNTY 3 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	120/120	167.28	139.4
2027	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	124	155
2027	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	124.08	155.1
2027	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	128	160
2032	Light Load	GRAY_CNTY 3 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	87.68	109.6
2032	Light Load	GRAY_CNTY 2 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	90.64	113.3
2032	Summer	MIDSTRM_TP 3 - NICHOLS 3 - 1	GRAY_CNTY 2 - GRAY_CNTY 3 - 1	120/128	131.456	102.7
2032	Summer	MIDSTRM_TP 3 - NICHOLS 3 - 1	HUTCH_S 3 - GRAY_CNTY 3 - 1	120/128	131.456	102.7
2032	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	91.76	114.7
2032	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	94.88	118.6
2032	Summer	GRAY_CNTY 2 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	94.88	118.6
2032	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	120/120	175.56	146.3
2032	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	TYNG - LLANO_WND_3 - 1	120/120	175.56	146.3
2032	Summer	HUTCH_S 3 - GRAY_CNTY 3 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	120/120	180	150
2032	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	129.2	161.5
2032	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	129.2	161.5

Year	Season	Facility Name	Contingencies	RATE A, RATE B (MVA)	Max Flow (MVA)	Change Case Max Loading (%)
2032	Summer	GRAY_CNTY 3 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	130.32	162.9
2032	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	100.24	125.3
2032	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	103.2	129
2032	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	103.28	129.1
2032	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	LLANO_WND_3 - MIDSTRM_TP 3 - 1	80/80	103.52	129.4
2032	Winter	GRAY_CNTY 2 - WH RHP17221 - 1	TYNG - LLANO_WND_3 - 1	80/80	104.32	130.4
2032	Winter	HUTCH_S 3 - GRAY_CNTY 3 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	120/120	167.4	139.5
2032	Winter	GRAY_CNTY 3 - WH RHP17221 - 1	MIDSTRM_TP 3 - NICHOLS 3 - 1	80/80	128.4	160.5

Table 3-1: Potential Thermal Overloads

Table 3-2 details the potential voltage violations resulting from the load addition.

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2023	Summer	MIDSTRM_TP 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.36524
2023	Summer	WHITEDEER +3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.36829
2023	Summer	LLANO_WND_3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.36841
2023	Summer	TYNG	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.36943
2023	Summer	KINGSMILL 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.40118
2023	Summer	WHITEDEER +3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.42967
2023	Summer	WHITEDEER +3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.43031
2023	Summer	TYNG	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.43082
2023	Summer	TYNG	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.43085
2023	Summer	TYNG	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.43149
2023	Summer	LLANO_WND_3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.43151
2023	Summer	SPRINGCREEK2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.4466
2023	Summer	KINGSMILL 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.45906
2023	Summer	KINGSMILL 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.45962
2023	Summer	KINGSMILL 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.47958
2023	Summer	SPRINGCREEK2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.50173
2023	Summer	SPRINGCREEK2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.50176
2023	Summer	SPRINGCREEK2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.50221
2023	Summer	KINGSMILL 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.53487
2023	Summer	KINGSMILL 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.5349
2023	Summer	KINGSMILL 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.53535
2023	Summer	CRMWA#23 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.5493
2023	Summer	CRMWA#21 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.55455
2023	Summer	CRMWA#23TP 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.55466
2023	Summer	KITE 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.57272
2023	Summer	DAMRON 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.57474
2023	Summer	GRAY_CNTY 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.57714

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2023	Summer	CRMWA#23 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.59495
2023	Summer	CRMWA#23 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.59498
2023	Summer	CRMWA#23 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.59531
2023	Summer	CRMWA#21 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.60007
2023	Summer	CRMWA#21 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.6001
2023	Summer	CRMWA#23TP 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.60018
2023	Summer	CRMWA#23TP 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.60021
2023	Summer	CRMWA#21 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.60043
2023	Summer	CRMWA#23TP 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.60054
2023	Summer	KITE 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.61769
2023	Summer	KITE 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.61772
2023	Summer	KITE 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.61804
2023	Summer	DAMRON 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.61965
2023	Summer	DAMRON 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.61968
2023	Summer	DAMRON 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.62
2023	Summer	GRAY_CNTY 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.62198
2023	Summer	GRAY_CNTY 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.62201
2023	Summer	GRAY_CNTY 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.62233
2023	Summer	GRAY_CNTY 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.72611
2023	Summer	GRAY_CNTY 3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.74399
2023	Summer	GRAY_CNTY 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.74401
2023	Summer	GRAY_CNTY 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.74408
2023	Winter	MIDSTRM_TP 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.48607
2023	Winter	WHITEDEER +3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.48894
2023	Winter	LLANO_WND_3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.48911
2023	Winter	TYNG	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.49006
2023	Winter	KINGSMILL 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.5194
2023	Winter	SPRINGCREEK2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.57736
2023	Winter	KINGSMILL 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.60094
2023	Winter	CRMWA#23 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.66628
2023	Winter	CRMWA#21 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.6694
2023	Winter	CRMWA#23TP 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.66948
2023	Winter	KITE 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.68184
2023	Winter	DAMRON 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.68283
2023	Winter	GRAY_CNTY 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.68426
2023	Winter	GRAY_CNTY 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.77426
2024	Summer	MIDSTRM_TP 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.36905
2024	Summer	WHITEDEER +3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.37211
2024	Summer	LLANO_WND_3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.37223
2024	Summer	TYNG	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.37325
2024	Summer	KINGSMILL 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.40504
2024	Summer	WHITEDEER +3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.43536
2024	Summer	WHITEDEER +3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.43604
2024	Summer	TYNG	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.43653
2024	Summer	TYNG	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.43655
2024	Summer	TYNG	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.43723
2024	Summer	LLANO_WND_3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.43725

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2024	Summer	SPRINGCREEK2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.4502
2024	Summer	KINGSMILL 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.4647
2024	Summer	KINGSMILL 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.46529
2024	Summer	KINGSMILL 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.48373
2024	Summer	SPRINGCREEK2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.50714
2024	Summer	SPRINGCREEK2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.50716
2024	Summer	SPRINGCREEK2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.50765
2024	Summer	KINGSMILL 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.54078
2024	Summer	KINGSMILL 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.5408
2024	Summer	KINGSMILL 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.54128
2024	Summer	CRMWA#23 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.55374
2024	Summer	CRMWA#21 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.55882
2024	Summer	CRMWA#23TP 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.55893
2024	Summer	KITE 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.57685
2024	Summer	DAMRON 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.57883
2024	Summer	GRAY_CNTY 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.58115
2024	Summer	CRMWA#23 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.60093
2024	Summer	CRMWA#23 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.60095
2024	Summer	CRMWA#23 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.60131
2024	Summer	CRMWA#21 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.60587
2024	Summer	CRMWA#21 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.60589
2024	Summer	CRMWA#23TP 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.60598
2024	Summer	CRMWA#23TP 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.606
2024	Summer	CRMWA#21 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.60625
2024	Summer	CRMWA#23TP 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.60636
2024	Summer	KITE 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.62331
2024	Summer	KITE 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.62333
2024	Summer	KITE 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.62369
2024	Summer	DAMRON 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.62523
2024	Summer	DAMRON 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.62525
2024	Summer	DAMRON 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.6256
2024	Summer	GRAY_CNTY 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.62748
2024	Summer	GRAY_CNTY 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.6275
2024	Summer	GRAY_CNTY 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.62785
2024	Summer	GRAY_CNTY 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.72837
2024	Summer	GRAY_CNTY 3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.7469
2024	Summer	GRAY_CNTY 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.74691
2024	Summer	GRAY_CNTY 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.747
2024	Winter	MIDSTRM_TP 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.49023
2024	Winter	WHITEDEER +3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.4931
2024	Winter	LLANO_WND_3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.49327
2024	Winter	TYNG	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.49422
2024	Winter	KINGSMILL 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.52352
2024	Winter	SPRINGCREEK2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.58134
2024	Winter	KINGSMILL 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.60528
2024	Winter	CRMWA#23 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.67059
2024	Winter	CRMWA#21 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.67359

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2024	Winter	CRMWA#23TP 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.67367
2024	Winter	KITE 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.68592
2024	Winter	DAMRON 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.68689
2024	Winter	GRAY_CNTY 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.68827
2024	Winter	GRAY_CNTY 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.77644
2024	Winter	WHITEDEER +3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.86005
2024	Winter	WHITEDEER +3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.86014
2024	Winter	TYNG	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.86085
2024	Winter	TYNG	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.86093
2024	Winter	WHITEDEER +3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.86611
2024	Winter	TYNG	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.8669
2024	Winter	LLANO_WND_3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.86694
2024	Winter	KINGSMILL 3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.86797
2024	Winter	KINGSMILL 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.86805
2024	Winter	KINGSMILL 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.8736
2027	Summer	MIDSTRM_TP 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.36084
2027	Summer	WHITEDEER +3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.36387
2027	Summer	LLANO_WND_3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.364
2027	Summer	TYNG	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.36501
2027	Summer	KINGSMILL 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.39686
2027	Summer	WHITEDEER +3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.42347
2027	Summer	WHITEDEER +3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.42349
2027	Summer	WHITEDEER +3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.42408
2027	Summer	TYNG	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.42466
2027	Summer	TYNG	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.42468
2027	Summer	TYNG	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.42527
2027	Summer	LLANO_WND_3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.42529
2027	Summer	SPRINGCREEK2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.43921
2027	Summer	KINGSMILL 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.45304
2027	Summer	KINGSMILL 3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.45307
2027	Summer	KINGSMILL 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.45357
2027	Summer	KINGSMILL 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.47517
2027	Summer	SPRINGCREEK2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.49256
2027	Summer	SPRINGCREEK2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.49262
2027	Summer	SPRINGCREEK2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.49299
2027	Summer	KINGSMILL 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.52879
2027	Summer	KINGSMILL 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.52884
2027	Summer	KINGSMILL 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.52921
2027	Summer	CRMWA#23 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.54625
2027	Summer	CRMWA#21 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.55107
2027	Summer	CRMWA#23TP 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.55118
2027	Summer	KITE 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.569
2027	Summer	DAMRON 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.57091
2027	Summer	GRAY_CNTY 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.57317
2027	Summer	CRMWA#23 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.59043
2027	Summer	CRMWA#23 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.59048
2027	Summer	CRMWA#23 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.59074

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2027	Summer	CRMWA#21 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.59513
2027	Summer	CRMWA#21 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.59518
2027	Summer	CRMWA#23TP 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.59525
2027	Summer	CRMWA#23TP 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.5953
2027	Summer	CRMWA#21 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.59544
2027	Summer	CRMWA#23TP 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.59555
2027	Summer	KITE 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.61256
2027	Summer	KITE 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.61261
2027	Summer	KITE 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.61287
2027	Summer	DAMRON 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.61443
2027	Summer	DAMRON 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.61448
2027	Summer	DAMRON 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.61473
2027	Summer	GRAY_CNTY 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.61662
2027	Summer	GRAY_CNTY 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.61667
2027	Summer	GRAY_CNTY 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.61692
2027	Summer	GRAY_CNTY 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.72163
2027	Summer	GRAY_CNTY 3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.739
2027	Summer	GRAY_CNTY 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.73903
2027	Summer	GRAY_CNTY 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.73909
2027	Winter	MIDSTRM_TP 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.44253
2027	Winter	WHITEDEER +3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.44538
2027	Winter	LLANO_WND_3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.44555
2027	Winter	TYNG	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.4465
2027	Winter	KINGSMILL 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.47685
2027	Winter	SPRINGCREEK2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.5305
2027	Winter	WHITEDEER +3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.53442
2027	Winter	WHITEDEER +3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.53457
2027	Winter	TYNG	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.53554
2027	Winter	TYNG	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.53569
2027	Winter	WHITEDEER +3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.5358
2027	Winter	TYNG	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.53693
2027	Winter	LLANO_WND_3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.53695
2027	Winter	KINGSMILL 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.55737
2027	Winter	KINGSMILL 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.56075
2027	Winter	KINGSMILL 3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.56089
2027	Winter	KINGSMILL 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.562
2027	Winter	SPRINGCREEK2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.61265
2027	Winter	SPRINGCREEK2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.61278
2027	Winter	SPRINGCREEK2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.61377
2027	Winter	CRMWA#23 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.62628
2027	Winter	CRMWA#21 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.62933
2027	Winter	CRMWA#23TP 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.62942
2027	Winter	KINGSMILL 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.63843
2027	Winter	KINGSMILL 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.63855
2027	Winter	KINGSMILL 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.63953
2027	Winter	KITE 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.64225
2027	Winter	DAMRON 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.64325

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2027	Winter	GRAY_CNTY 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.64469
2027	Winter	CRMWA#23 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.69375
2027	Winter	CRMWA#23 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.69385
2027	Winter	CRMWA#23 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.69462
2027	Winter	CRMWA#21 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.69655
2027	Winter	CRMWA#23TP 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.69663
2027	Winter	CRMWA#21 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.69665
2027	Winter	CRMWA#23TP 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.69673
2027	Winter	CRMWA#21 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.69742
2027	Winter	CRMWA#23TP 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.69749
2027	Winter	KITE 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.70835
2027	Winter	KITE 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.70844
2027	Winter	KITE 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.7092
2027	Winter	DAMRON 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.70927
2027	Winter	DAMRON 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.70937
2027	Winter	DAMRON 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.71013
2027	Winter	GRAY_CNTY 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.71059
2027	Winter	GRAY_CNTY 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.71069
2027	Winter	GRAY_CNTY 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.71145
2027	Winter	GRAY_CNTY 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.75981
2027	Winter	GRAY_CNTY 3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.78692
2027	Winter	GRAY_CNTY 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.78692
2027	Winter	GRAY_CNTY 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.78728
2032	Summer	MIDSTRM_TP 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.33248
2032	Summer	WHITEDEER +3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.3354
2032	Summer	LLANO_WND_3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.33556
2032	Summer	TYNG	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.33655
2032	Summer	KINGSMILL 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.36844
2032	Summer	WHITEDEER +3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.38091
2032	Summer	WHITEDEER +3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.38123
2032	Summer	TYNG	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.3821
2032	Summer	TYNG	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.38211
2032	Summer	TYNG	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.38242
2032	Summer	LLANO_WND_3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.38244
2032	Summer	SPRINGCREEK2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.40623
2032	Summer	KINGSMILL 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.41104
2032	Summer	KINGSMILL 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.41129
2032	Summer	KINGSMILL 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.44526
2032	Summer	SPRINGCREEK2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.44555
2032	Summer	SPRINGCREEK2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.44555
2032	Summer	SPRINGCREEK2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.44569
2032	Summer	KINGSMILL 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.48516
2032	Summer	KINGSMILL 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.48516
2032	Summer	KINGSMILL 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.48531
2032	Summer	CRMWA#23 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.51797
2032	Summer	CRMWA#21 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.52284
2032	Summer	CRMWA#23TP 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.52295

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2032	Summer	KITE 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.54086
2032	Summer	DAMRON 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.54285
2032	Summer	GRAY_CNTY 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.5452
2032	Summer	CRMWA#23 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.54981
2032	Summer	CRMWA#23 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.54981
2032	Summer	CRMWA#23 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.54988
2032	Summer	CRMWA#21 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.55463
2032	Summer	CRMWA#21 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.55463
2032	Summer	CRMWA#21 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.5547
2032	Summer	CRMWA#23TP 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.55474
2032	Summer	CRMWA#23TP 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.55475
2032	Summer	CRMWA#23TP 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.55481
2032	Summer	KITE 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.57241
2032	Summer	KITE 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.57241
2032	Summer	KITE 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.57248
2032	Summer	DAMRON 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.57437
2032	Summer	DAMRON 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.57437
2032	Summer	DAMRON 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.57444
2032	Summer	GRAY_CNTY 2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.5767
2032	Summer	GRAY_CNTY 2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.5767
2032	Summer	GRAY_CNTY 2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.57677
2032	Summer	GRAY_CNTY 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.70254
2032	Summer	GRAY_CNTY 3	115	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.71352
2032	Summer	GRAY_CNTY 3	115	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.71357
2032	Summer	GRAY_CNTY 3	115	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.71357
2032	Summer	WHITEDEER +3	115	SWITCHED_SHUNT-523721	1.05	0.9	0.86896
2032	Summer	TYNG	115	SWITCHED_SHUNT-523721	1.05	0.9	0.86983
2032	Summer	KINGSMILL 3	115	SWITCHED_SHUNT-523721	1.05	0.9	0.87197
2032	Summer	LLANO_WND_3	115	SWITCHED_SHUNT-523721	1.05	0.9	0.87821
2032	Summer	NP-SHATTUCK2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.89286
2032	Summer	NP-SHATTUCK2	69	'P12:115:SPS:V29_1_NICHLS_KNGSMLL::::'	1.05	0.9	0.89424
2032	Summer	NP-SHATTUCK2	69	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.89424
2032	Summer	NP-SHATTUCK2	69	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.89433
2032	Summer	XIT_INTG 6	230	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.89527
2032	Summer	XIT_INTG 6	230	LLANO_WND_3 - MIDSTRM_TP 3 - 1	1.05	0.9	0.89971
2032	Summer	XIT_INTG 6	230	TYNG - LLANO_WND_3 - 1	1.05	0.9	0.89982
2032	Winter	MIDSTRM_TP 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.44704
2032	Winter	WHITEDEER +3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.44986
2032	Winter	LLANO_WND_3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.45006
2032	Winter	TYNG	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.45102
2032	Winter	KINGSMILL 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.48161
2032	Winter	SPRINGCREEK2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.5322
2032	Winter	KINGSMILL 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.56278
2032	Winter	CRMWA#23 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.63375
2032	Winter	CRMWA#21 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.63691
2032	Winter	CRMWA#23TP 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.637
2032	Winter	KITE 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.6497

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2032	Winter	DAMRON 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.65075
2032	Winter	GRAY_CNTY 2	69	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.65228
2032	Winter	GRAY_CNTY 3	115	MIDSTRM_TP 3 - NICHOLS 3 - 1	1.05	0.9	0.75999

Table 3-2: Potential Voltage Violations

SHORT CIRCUIT

SPP performed short circuit analysis for the 2027 Summer Peak with the new load addition. The analysis identified the currents as listed in Table 3-3.

Season	Model	Fault	Bus	Current(Amps)
27S	Max Fault	Three Phase	YOAKUM 734	8,824
27S	Max Fault	Three Phase	CROSSROADS 734	8,336
27S	Max Fault	Three Phase	EDDY_TR 113	32,183
27S	Max Fault	Three Phase	EDDY_NORTH 623	8,728
27S	Max Fault	Three Phase	EDDY_CNTY 734	6,740
27S	Max Fault	Three Phase	HOBBS_INT 623	17,677
27S	Max Fault	Three Phase	HOBBS_TR3 113	38,321
27S	Max Fault	Three Phase	HOBBS_INT 734	8,681
27S	Max Fault	Three Phase	LIVSTNRIDGE311	7,205
27S	Max Fault	Three Phase	MEDANOS 311	5,328
27S	Max Fault	Three Phase	POTASH_JCT 311	15,607
27S	Max Fault	Three Phase	KIOWA_TR1 113	27,969
27S	Max Fault	Three Phase	KIOWA 734	7,244
27S	Max Fault	Three Phase	KIOWA 311	15,562
27S	Max Fault	Three Phase	WIPP 311	6,846
27S	Max Fault	Three Phase	PHANTOM TR1113	35,799
27S	Max Fault	Three Phase	PHANTOM TR2113	35,799
27S	Max Fault	Three Phase	PHANTOM 311	10,962
27S	Max Fault	Three Phase	PHANTOM 734	4,473
27S	Max Fault	Three Phase	SAND_DUNES 311	6,863
27S	Max Fault	Three Phase	RED_BLUFF 311	8,876
27S	Max Fault	Three Phase	BOPCO_PKRLK311	10,816
27S	Max Fault	Three Phase	RDRUNNR_SVC115	24,783
27S	Max Fault	Three Phase	RDRNNER_TR1113	22,808
27S	Max Fault	Three Phase	RR_SVC_HV 311	10,658
27S	Max Fault	Three Phase	RDRUNNER 311	10,658
27S	Max Fault	Three Phase	RDRUNNER 734	4,878
27S	Max Fault	Three Phase	TARGA HV 11	8,417
27S	Max Fault	Three Phase	BATTLE_AXE 311	3,006
27S	Max Fault	Three Phase	XTO_DI9_TP 311	7,602
27S	Max Fault	Three Phase	NORTH_LOVNG311	10,975

Season	Model	Fault	Bus	Current(Amps)
27S	Max Fault	Three Phase	N_LOVING 734	5,419
27S	Max Fault	Three Phase	N_LOVING TR113	30,748
27S	Max Fault	Three Phase	MALAGABEND 311	6,786
27S	Max Fault	Three Phase	CHINA_DRAW 113	29,366
27S	Max Fault	Three Phase	CHINA_DRAW 311	9,638
27S	Max Fault	Three Phase	CHINA_DRAW 734	4,746
27S	Max Fault	Three Phase	WOOD_DRAW 311	7,365
27S	Max Fault	Three Phase	AGAVE_RHILL311	9,781
27S	Max Fault	Three Phase	AGAVE_RHIL2311	9,315
27S	Max Fault	Three Phase	OCHOA 311	9,351
27S	Max Fault	Three Phase	CUSTERMTN 311	7,069
27S	Max Fault	Three Phase	PONDEROSA 311	3,866
27S	Max Fault	Three Phase	LEA_ROAD 311	5,645
27S	Max Fault	Three Phase	WARD 311	5,567
27S	Max Fault	Three Phase	TEAGUE 311	6,248
27S	Max Fault	Three Phase	WHITTEN 311	7,160
27S	Max Fault	Three Phase	S_JAL 112	11,172
27S	Max Fault	Three Phase	S_JAL 311	6,316
27S	Max Fault	Three Phase	DOLLARHIDE 311	4,897

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 delivery point changes. The FFS was performed for the 2023 and 2031 Summer Peaks. There were no significant differences in the critical clearing times between the base and change case. Therefore, a transient stability analysis is not required.

TRANSMISSION SOLUTIONS

The new load caused potential thermal overloads and voltage violations on the 115kV and 69kV systems around the area of the delivery point. SPP analyzed several possible solutions to address the violations, including new transmission lines to help serve the load.

SPP chose to utilize a normally open 69kV line from Kingsmill – McCullough Tap that was previously operated closed along with a cap bank to provide reactive support to the area. This solution solves all of the potential thermal and voltage issues that were identified in Table 3-1 and Table 3-2.

New Upgrade Description	Mileage	MVAR	Date Needed**	Estimated Cost***
Add new cap bank at Tyng 115KV sub (28.8 MVAR)	-	28.8	6/1/2023	$1,440,281
Terminal upgrades to close in the Kingsmill – McCullough Tap 69kV line	-	-	6/1/2023	$353,488
TOTAL NEW UPGRADE COST				**$1,793,769**

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).

**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).

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.

SECTION 4: CONCLUSION

The AC analysis revealed potential thermal and voltage violations associated with the White Deer load addition. The study shows that the following upgrades are required to reliably serve the load addition:

Add new cap bank at Tyng 115kV sub (28.8 MVAR)
Terminal upgrades to close in the Kingsmill – McCullough Tap 69kV line

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