DPNS-2023-JUNE-1790

Delivery Point Network Study

Published on 12/28/2023

By SPP Engineering, Transmission Services

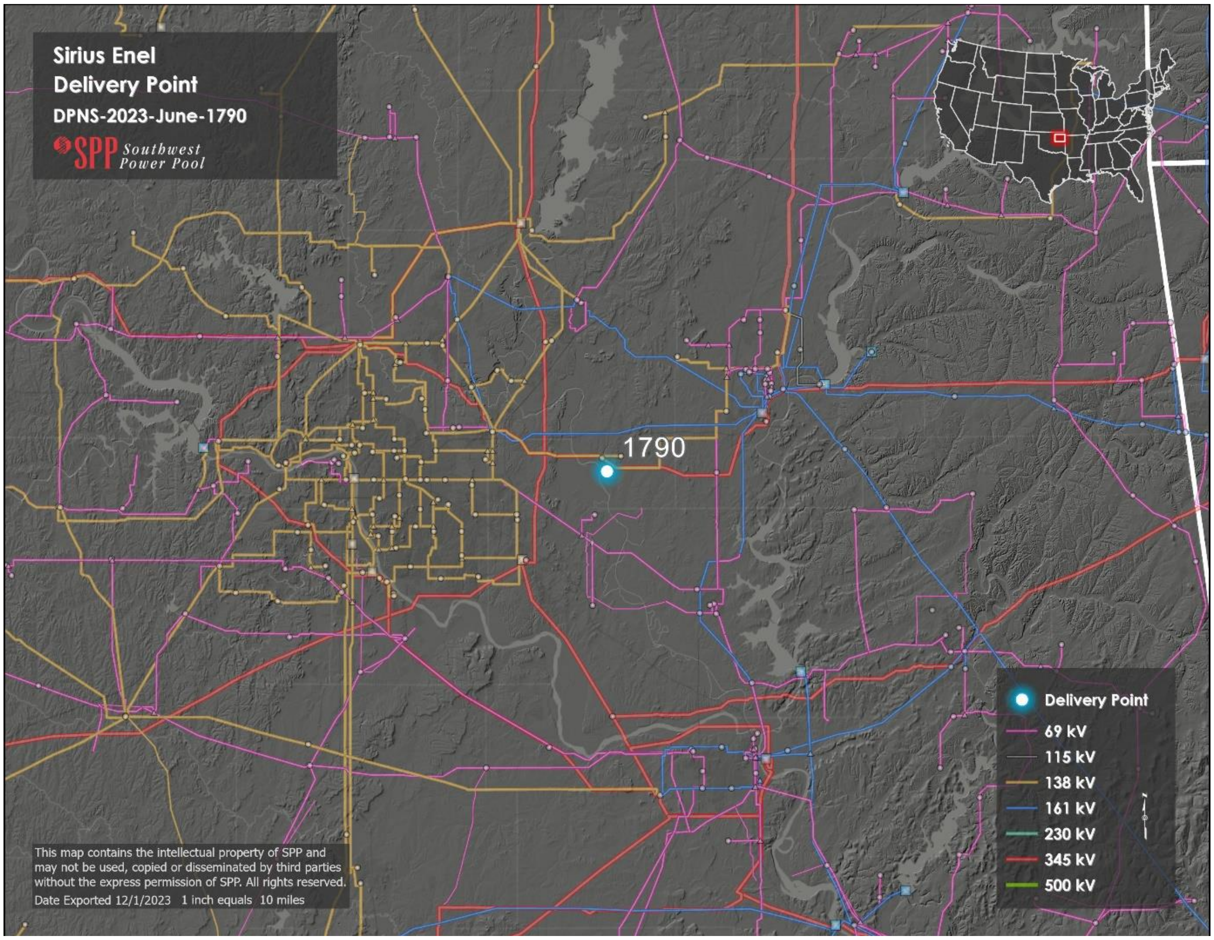
REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION	COMMENTS
12/28/2023	SPP	Original	

CONTENTS

SECTION 1: INTRODUCTION

This report outlines the results of an evaluation of regional transmission impacts from delivery point request DPA-2023-June-1790. The requesting entity plans to add a new delivery point called Sirius. The Sirius delivery point is in the American Electric Power (AEP) 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 AEP. 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 2024, 2027, and 2032
        - Summer Peak (2024S, 2027S and 2032S), Winter Peak (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-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-24L_1790.sav	2024	Light Load	Base Reliability	Sirius = 5.0/3.1
2023ITPPF-24S_1790.sav	2024	Summer Peak	Base Reliability	Sirius = 5.0/3.1
2023ITPPF-24W_1790.sav	2024	Winter Peak	Base Reliability	Sirius = 15.0/7.3
2023ITPPF-27L_1790.sav	2027	Light Load	Base Reliability	Sirius = 100.0/48.4
2023ITPPF-27S_1790.sav	2027	Summer Peak	Base Reliability	Sirius = 100.0/48.4
2023ITPPF-27W_1790.sav	2027	Winter Peak	Base Reliability	Sirius = 100.0/48.4
2023ITPPF-32L_1790.sav	2032	Light Load	Base Reliability	Sirius = 100.0/48.4
2023ITPPF-32S_1790.sav	2032	Summer Peak	Base Reliability	Sirius = 100.0/48.4
2023ITPPF-32W_1790.sav	2032	Winter Peak	Base Reliability	Sirius = 100.0/48.4

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 Sirius delivery point change to determine thermal overloads and voltage violations resulting from the load addition to the transmission system.
- Dynamics Analysis
  - Assumptions
    - MDWG Dynamics Model Set
      - 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 new Sirius delivery point. Table 3-1 details the potential thermal violations and Table 3-2 details the potential voltage violations resulting from the load addition.

Year	Season	Facility Name	Contingencies	RATE A, RATE B (MVA)	Max Flow (MVA)	Change Case Max Loading (%)
2027	Light	KERR GR5 - MAID 5 - 2	INOLATP4 - CATOOSA4 - 1	198/198	207.504	104.8
2027	Light	KERR GR5 - MAID 5 - 2	GUAVA138 - INOLATP4 - 1	198/198	206.712	104.4
2027	Summer	PRY-JCT3 - PRY-JCT1 - 1	INOLATP4 - CATOOSA4 - 1	167/167	178.523	106.9
2027	Summer	L GROVE3 - KERR GR3 - 1	GUAVA138 - INOLATP4 - 1	140/140	190.82	136.3
2027	Summer	LSTAR--3 - L GROVE3 - 1	GUAVA138 - INOLATP4 - 1	130/140	182.98	130.7
2027	Summer	MCARBDE4 - PRY-JCT4 - 1	INOLATP4 - CATOOSA4 - 1	191/216	223.344	103.4
2027	Summer	L GROVE3 - KERR GR3 - 1	INOLATP4 - CATOOSA4 - 1	140/140	212.1	151.5
2027	Summer	LSTAR--3 - PRY-JCT3 - 1	INOLATP4 - CATOOSA4 - 1	130/140	186.76	133.4
2027	Summer	LSTAR--3 - L GROVE3 - 1	INOLATP4 - CATOOSA4 - 1	130/140	204.4	146
2027	Summer	LSTAR--3 - PRY-JCT3 - 1	GUAVA138 - INOLATP4 - 1	130/140	168	120
2027	Winter	LSTAR--3 - L GROVE3 - 1	INOLATP4 - CATOOSA4 - 1	157/169	174.07	103
2027	Winter	L GROVE3 - KERR GR3 - 1	INOLATP4 - CATOOSA4 - 1	174/174	179.22	103
2032	Light	KERR GR5 - MAID 5 - 2	INOLATP4 - CATOOSA4 - 1	198/198	210.276	106.2
2032	Light	KERR GR5 - MAID 5 - 1	GUAVA138 - INOLATP4 - 1	198/198	209.484	105.8
2032	Summer	PRY-JCT3 - PRY-JCT1 - 1	INOLATP4 - CATOOSA4 - 1	167/167	180.026	107.8
2032	Summer	LSTAR--3 - L GROVE3 - 1	GUAVA138 - INOLATP4 - 1	130/140	184.8	132
2032	Summer	LSTAR--3 - PRY-JCT3 - 1	INOLATP4 - CATOOSA4 - 1	130/140	188.44	134.6
2032	Summer	LSTAR--3 - PRY-JCT3 - 1	GUAVA138 - INOLATP4 - 1	130/140	169.68	121.2
2032	Summer	MCARBDE4 - PRY-JCT4 - 1	INOLATP4 - CATOOSA4 - 1	191/216	223.344	103.4
2032	Summer	L GROVE3 - KERR GR3 - 1	INOLATP4 - CATOOSA4 - 1	140/140	214.06	152.9
2032	Summer	PRY-JCT4 - PRY-JCT1 - 1	INOLATP4 - CATOOSA4 - 1	167/167	167.167	100.1
2032	Summer	LSTAR--3 - L GROVE3 - 1	INOLATP4 - CATOOSA4 - 1	130/140	206.36	147.4
2032	Summer	L GROVE3 - KERR GR3 - 1	GUAVA138 - INOLATP4 - 1	140/140	192.64	137.6
2032	Winter	LSTAR--3 - L GROVE3 - 1	INOLATP4 - CATOOSA4 - 1	157/169	170.183	100.7
2032	Winter	L GROVE3 - KERR GR3 - 1	INOLATP4 - CATOOSA4 - 1	174/174	175.218	100.7

Table 3-1: Potential Thermal Violations

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2027	Light	MCARBDE4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.84754
2027	Light	INOLATP4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.71942
2027	Light	ROCKPT-4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.71866
2027	Light	EXPCLAR4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.80821
2027	Light	EXCLART4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.80883
2027	Light	INOLA 4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.71933
2027	Light	ROCKPT-4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.72555
2027	Light	MCARBDE4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.84372
2027	Light	EXPCLAR4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.81303
2027	Light	CHOUTEA4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.79496
2027	Light	PRY-JCT4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.87356
2027	Light	PRY-JCT4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.87054
2027	Light	CHOUTEA4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.78962
2027	Light	PRY_CRK4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.82067
2027	Light	EXCLART4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.81365
2027	Light	PRY_CRK4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.82515
2027	Summer	CHOUTEA4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.77756
2027	Summer	MCARBDE4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.84001
2027	Summer	INOLATP4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.7054
2027	Summer	BIRDHOL4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.89126
2027	Summer	EXPCLAR4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.80079
2027	Summer	MCARBDE4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.83327
2027	Summer	INOLA 4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.70503
2027	Summer	PRY_CRK4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.80928
2027	Summer	EXCLART4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.80142
2027	Summer	ROCKPT-4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.70565
2027	Summer	ROCKPT-4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.70483
2027	Summer	PRY-JCT4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.86124
2027	Summer	BIRDHOL4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.89768
2027	Summer	PRY_CRK4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.81435
2027	Summer	PRY-JCT3	115	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.87748
2027	Summer	CHOUTEA4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.78049
2027	Summer	EXCLART4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.79718
2027	Summer	EXPCLAR4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.79655
2027	Summer	PRY-JCT4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.87
2027	Winter	BIRDHOL4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.89556
2027	Winter	EXCLART4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.79322
2027	Winter	PRY_CRK4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.81556
2027	Winter	INOLATP4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.69801
2027	Winter	EXCLART4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.80373
2027	Winter	PRY_CRK4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.80597
2027	Winter	EXPCLAR4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.8031
2027	Winter	CHOUTEA4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.78452
2027	Winter	CHOUTEA4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.77255
2027	Winter	BIRDHOL4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.89197
2027	Winter	ROCKPT-4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.71371
2027	Winter	PRY-JCT4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.86589

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2027	Winter	PRY-JCT3	115	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.89882
2027	Winter	INOLA 4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.69778
2027	Winter	MCARBDE4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.83107
2027	Winter	PRY-JCT4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.86036
2027	Winter	EXPCLAR4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.79258
2027	Winter	MCARBDE4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.83882
2027	Winter	ROCKPT-4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.69734
2032	Light	MCARBDE4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.84299
2032	Light	EXPCLAR4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.80135
2032	Light	INOLATP4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.7112
2032	Light	PRY_CRK4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.81401
2032	Light	INOLA 4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.71112
2032	Light	MCARBDE4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.83746
2032	Light	ROCKPT-4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.71969
2032	Light	ROCKPT-4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.71044
2032	Light	EXCLART4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.8087
2032	Light	CHOUTEA4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.78244
2032	Light	PRY-JCT4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.86476
2032	Light	PRY-JCT4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.86933
2032	Light	PRY_CRK4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.82033
2032	Light	BIRDHOL4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.89981
2032	Light	EXPCLAR4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.80808
2032	Light	CHOUTEA4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.78979
2032	Light	EXCLART4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.80197
2032	Summer	INOLA 4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.7056
2032	Summer	PRY-JCT3	115	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.87448
2032	Summer	EXPCLAR4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.80128
2032	Summer	INOLATP4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.70596
2032	Summer	BIRDHOL4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.89166
2032	Summer	PRY_CRK4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.81483
2032	Summer	PRY-JCT4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.86242
2032	Summer	EXCLART4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.80191
2032	Summer	ROCKPT-4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.70736
2032	Summer	ROCKPT-4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.70539
2032	Summer	EXCLART4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.7986
2032	Summer	PRY_CRK4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.81066
2032	Summer	MCARBDE4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.84046
2032	Summer	MCARBDE4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.83456
2032	Summer	CHOUTEA4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.78099
2032	Summer	PRY-JCT3	115	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.89996
2032	Summer	PRY-JCT4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.87043
2032	Summer	BIRDHOL4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.89754
2032	Summer	EXPCLAR4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.79797
2032	Summer	CHOUTEA4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.77904
2032	Winter	EXCLART4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.79128
2032	Winter	PRY_CRK4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.81781
2032	Winter	ROCKPT-4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.71646

Year	Season	Facility Name	Facility Voltage (kV)	Contingency Name	Voltage Maximum (pu)	Voltage Minimum (pu)	Bus Voltage (pu)
2032	Winter	PRY-JCT4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.85868
2032	Winter	BIRDHOL4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.89087
2032	Winter	EXPCLAR4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.79064
2032	Winter	CHOUTEA4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.77054
2032	Winter	MCARBDE4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.82927
2032	Winter	EXCLART4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.80604
2032	Winter	PRY_CRK4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.80408
2032	Winter	BIRDHOL4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.8977
2032	Winter	INOLATP4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.69578
2032	Winter	PRY-JCT4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.86785
2032	Winter	INOLA 4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.69555
2032	Winter	CHOUTEA4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.78694
2032	Winter	ROCKPT-4	138	INOLATP4 - CATOOSA4 - 1	1.05	0.9	0.6951
2032	Winter	MCARBDE4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.84093
2032	Winter	EXPCLAR4	138	GUAVA138 - INOLATP4 - 1	1.05	0.9	0.80542

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	GUAVA138 13	12,472
27S	Max Fault	Three Phase	5ELMCRK 16	13,592
27S	Max Fault	Three Phase	CIP 4 13	21,939
27S	Max Fault	Three Phase	LLANE-W4 13	19,818
27S	Max Fault	Three Phase	BA.NO-S4 13	12,183
27S	Max Fault	Three Phase	SPNKY CK4 13	30,759
27S	Max Fault	Three Phase	TER-NIT4 13	18,496
27S	Max Fault	Three Phase	PCATOSA4 13	17,829
27S	Max Fault	Three Phase	LLANE-E4 13	19,880
27S	Max Fault	Three Phase	INOLA 4 13	10,037
27S	Max Fault	Three Phase	INOLATP4 13	12,365
27S	Max Fault	Three Phase	LLAN WT4 13	24,537
27S	Max Fault	Three Phase	LLAN ET4 13	24,468
27S	Max Fault	Three Phase	MAYO--N4 13	23,389
27S	Max Fault	Three Phase	BA.N-ST4 13	23,896
27S	Max Fault	Three Phase	DAWSN-N4 13	18,790
27S	Max Fault	Three Phase	CATOOSA4 13	36,490
27S	Max Fault	Three Phase	DAWSON-2 69	10,107
27S	Max Fault	Three Phase	BCIRCLE2 69	9,276
27S	Max Fault	Three Phase	CATOOSA2 69	10,550
27S	Max Fault	Three Phase	DAWSONT4 13	12,139
27S	Max Fault	Three Phase	LLANETP4 13	27,445
27S	Max Fault	Three Phase	ONETA--4 13	50,422

Season	Model	Fault	Bus	Current(Amps)
27S	Max Fault	Three Phase	T.NO.--4 13	34,705
27S	Max Fault	Three Phase	TERNITP4 13	20,179
27S	Max Fault	Three Phase	CDC-ET 4 13	22,819
27S	Max Fault	Three Phase	PCATSAT4 13	21,103
27S	Max Fault	Three Phase	OWASO2_4 13	14,944
27S	Max Fault	Three Phase	VERDIGS4 13	15,148
27S	Max Fault	Three Phase	CLARTOK4 13	15,126
27S	Max Fault	Three Phase	CATOO1-1 13	17,787
27S	Max Fault	Three Phase	E41ST_W4 13	21,541
27S	Max Fault	Three Phase	OWAS88_4 13	18,616
27S	Max Fault	Three Phase	141PINE4 13	21,055
27S	Max Fault	Three Phase	BIRDCREE-4 13	20,708
27S	Max Fault	Three Phase	MCARBDE4 13	7,587
27S	Max Fault	Three Phase	CHOUTEA4 13	7,376
27S	Max Fault	Three Phase	N.E.S.-4 13	35,803
27S	Max Fault	Three Phase	EXCLART4 13	7,253
27S	Max Fault	Three Phase	EXPCLAR4 13	5,098
27S	Max Fault	Three Phase	PRY_CRK4 13	7,290
27S	Max Fault	Three Phase	ROCKPT-4 13	12,027
27S	Max Fault	Three Phase	CATSAGR4 13	36,490
27S	Max Fault	Three Phase	CATSAGR5 16	25,851
27S	Max Fault	Three Phase	MAID 5 16	43,611
27S	Max Fault	Three Phase	CATTER1 1 13	5,986
27S	Max Fault	Three Phase	CATTER2 1 13	6,067
27S	Max Fault	Three Phase	CATTER3 1 13	10,073
27S	Max Fault	Three Phase	ENEL 13	12,135

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 Sirius delivery point changes. The FFS was performed for 2031 Summer Peak. 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 addition of the load at the new Sirius delivery point caused potential thermal overloads and low voltages on the 115kV, 138kV, and 161kV systems around Sirius. SPP's solutions consisted of addressing the common contingency of the potential violations or adding a 345kV source. The solutions are listed below.

Solution #1: Build New Guava-Catoosa4 138kV Line (Total cost $30M)

Solution #2: Build New Tulsa North – GRDA 345/138 kV Transformer (Total cost $38M)

Solution #3: Build 2 New Tulsa North – GRDA 345/138 kV Transformers (Total cost $46M)

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**	Estimated Cost***
Build new Guava-Catoosa4 138kV Line	15	212	5/1/2026	$30,000,000
TOTAL NEW UPGRADE COST				**$30,000,000**

Table 3-4: Recommended Upgrade Option 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 Sirius load addition. The study shows that the following upgrades are required to reliably serve the load addition:

- Build new Guava-Catoosa4 138kV Line

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