



Report on

# GEN-2025-SR9 Surplus Interconnection Service Impact Study

**Revision R1      June 11, 2026**

Submitted to  
**SPP**



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Revision History

| DATE OR VERSION NUMBER | AUTHOR            | CHANGE DESCRIPTION    |
|------------------------|-------------------|-----------------------|
| 6/11/2026              | Aneden Consulting | Initial Report Issued |
|                        |                   |                       |
|                        |                   |                       |

## Executive Summary

Aneden Consulting (Aneden) was retained by the SPP to perform a Surplus Interconnection Service Impact Study (Study) for GEN-2025-SR9 to utilize the Surplus Interconnection Service being made available by the Muskogee Units 4, 5, and 6 at its existing Point of Interconnection (POI), the Muskogee 345 kV Substation in the Oklahoma Gas & Electric control area.

GEN-2025-SR9, the proposed Surplus Generating Facility (SGF), will connect to the existing Muskogee Units 4, 5, and 6 POI via a separate generation interconnection line.

Muskogee Units 4, 5, and 6, the Existing Generating Facility (EGF), has nameplate POI capacity of 1908 MW and is making 400 MW of Surplus Interconnection Service available at its POI. The combined EGF units are modeled in the DISIS-2022-001-1 models with a maximum dispatch of 1580 MW.

Per the SPP Open Access Transmission Tariff (SPP Tariff), the amount of Surplus Interconnection Service available to the SGF is limited by the amount of Interconnection Service granted to the EGF at the same POI. In addition, the Surplus Interconnection Service is only available up to the amount that can be accommodated without requiring Network Upgrades except those specified in the SPP Tariff<sup>1</sup>.

The proposed SGF configuration consists of 20 x INDAR/Ingeteam synchronous gas-fired units operating at 21.0812 MW for a total assumed dispatch of 421.624 MW. The generating capability of the SGF exceeds its requested Surplus Interconnection Service of 400 MW. The injection amount of the SGF must be limited to 400 MW at the POI and the combined generation from both the SGF and the EGF may not exceed 1908 MW at the POI. GEN-2025-SR9 The SGF and EGF information is shown in Table ES-1 below.

The detailed SGF configuration is captured in Table ES-2 below.

Table ES-1: EGF & SGF Configuration

| Request                          | Interconnection Queue Capacity (MW) | Generator Fuel Type | Point of Interconnection |
|----------------------------------|-------------------------------------|---------------------|--------------------------|
| GEN-2025-SR9 (SGF)               | 400                                 | Combustion Turbine  | Muskogee 345 kV (515224) |
| Muskogee Units 4, 5, and 6 (EGF) | 1908                                | Combustion Turbine  | Muskogee 345 kV (515224) |

**Table ES-2: SGF Interconnection Configuration**

| Facility                                            | SGF Configuration                                                                                                                                                                                                 |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Point of Interconnection                            | Muskogee 345 kV (515224)                                                                                                                                                                                          |
| Configuration/Capacity                              | 20 x INDAR/Ingeteam 21.0812 MW (Thermal) = 421.624 MW [dispatch]<br>Units are rated at 25.358 MVA, GEN-2025-SR9 limited to 400 MW at the POI and total POI injection w/ Muskogee 345 kV units limited to 1908 MW  |
| Generation Interconnection Line <sup>1</sup>        | Length = 1.75 miles<br>R = 0.000091 pu<br>X = 0.001154 pu<br>B = 0.008050 pu<br>Rating MVA = 809 MVA                                                                                                              |
| GSU Transformer <sup>2</sup>                        | X12 = 17.993% R12 = 0.514%, X23 = 35.985% R23 = 1.028%, X13 = 17.993% R13 = 0.514%,<br>Winding MVA = 108 MVA,<br>Winding 1 Rating MVA = 180 MVA<br>Winding 2 Rating MVA = 90 MVA<br>Winding 3 Rating MVA = 90 MVA |
| Station Service Load                                | Total of 20.48 MW +9.92 MVAR modeled as eight loads, one at each generator bus as:<br>4 x 2.17 MW + 1.05 MVAR, and<br>4 x 2.95 MW + 1.43 MVAR                                                                     |
| Generator Dynamic Model <sup>3</sup> & Power Factor | 20 x INDAR/Ingeteam 25.358 MVA (GENQECU) <sup>3</sup><br>Leading: 0.83134<br>Lagging: 0.83134                                                                                                                     |

1) All pu are on 100 MVA Base, 2) X and R based on Winding MVA, 3) DYN stability model name

SPP determined that steady-state analysis was required because the combined dispatch of the EGF and SGF exceeded what has been modeled and studied in the previous Definitive Interconnection System Impact Studies (DISIS) study models. The addition of the SGF increased the maximum active power output above what is currently modeled for the EGF in the DISIS-2022-001-1 Low Variable Energy Resource (LVER) steady state models. The LVER models were used based on the fuel type of the SGF (thermal).

The scope of this study included reactive power analysis, short circuit analysis, steady-state analysis, and dynamic stability analysis.

Aneden performed the analyses using the study data provided for the SGF and the DISIS-2022-001-1 study models. The EGF loads were modified within the study models to ensure they were online at the intended MW amount.

All analyses were performed using the Siemens PTI PSS/E<sup>2</sup> version 34 and PowerGEM TARA software and the results are summarized below.

The steady-state analysis was performed using powerflow models derived from the 24SP, 27SP, and 27WP SPP DISIS-2022-001-1 Transfer Case (TC) LVER model set. These models were updated to include the GEN-2025-SR9 surplus project.

<sup>2</sup> Power System Simulator for Engineering

The results of the steady-state analysis showed that there were no non-convergence, thermal, or voltage criteria impacts in the study system due to the addition of GEN-2025-SR9.

The short circuit analysis was performed using the 25SP stability model modified for short circuit analysis. The results from the short circuit analysis compared the 25SP model with the EGF online and SGF not connected to the SGF study model (EGF and SGF online). The maximum contribution to three-phase fault currents in the immediate transmission systems due to the addition of the SGF was not greater than 2.44 kA. The maximum three-phase fault current level within 5 buses of the POI with the EGF and SGF generators online was 63.1 kA for the 25SP model. There were several buses with a maximum three-phase fault current over 40 kA. These buses are highlighted in Appendix B.

The dynamic stability analysis was performed using Siemens PTI PSS/E version 34.8.1 software for the two modified study models: 25SP and 25WP, each with two dispatch scenarios. 136 fault events were simulated, which included three-phase faults and single-line-to-ground stuck breaker faults.

- Scenario 1: SGF at maximum assumed dispatch, 421.624 MW, and EGF disconnected.
- Scenario 2: SGF at maximum assumed dispatch, 421.624 MW, and EGF dispatched at its modeled 1580 MW for a total combination of 2001.624 MW. With the station service loads, the net POI injection is below the limit of 1908 MW.

The results of the dynamic stability analysis showed several existing base case issues that were found in both the original DISIS-2022-001-1 model and in the model with GEN-2025-SR9 included. These issues were not attributed to the GEN-2025-SR9 surplus request and are detailed in Appendix C.

There were no damping or voltage recovery violations attributed to the GEN-2025-SR9 surplus request observed during the simulated faults.

The results of the study showed that the Surplus Interconnection Service Request by GEN-2025-SR9 did not negatively impact the reliability of the Transmission System. There were no additional Interconnection Facilities or Network Upgrades identified by the analyses.

SPP has determined that GEN-2025-SR9 may utilize the requested 400 MW of Surplus Interconnection Service being made available by the EGF. The combined generation from both the SGF and the EGF may not exceed 1908 MW at the POI.

The customer must install monitoring and control equipment as needed to ensure that the SGF does not exceed the granted surplus amount and to ensure that combination of the SGF and EGF power injected at the POI does not exceed the EGF's Interconnection Service amount. The monitoring and control scheme may be reviewed by the TO and documented in Appendix C of the SGF Generation Interconnection Agreement (GIA).

It is likely that the customer may be required to reduce its generation output to 0 MW in real-time, also known as curtailment, under certain system conditions to allow system operators to maintain the reliability of the transmission network.

Nothing in this study should be construed as a guarantee of transmission service or delivery rights. If the customer wishes to obtain deliverability to final customers, a separate request for transmission service must be requested on SPP's OASIS by the customer.

## 1.0 Scope of Study

Aneden Consulting (Aneden) was retained by the SPP's to perform a Surplus Service Impact Study (Study) for GEN-2025-SR9, the Surplus Generating Facility (SGF). A Surplus Service Impact Study is performed to identify the impact of the Surplus Interconnection Service on the transmission system reliability and any additional Interconnection Facilities necessary pursuant to the SPP Generator Interconnection Procedures ("GIP") contained in Attachment V Section 3.3 of the SPP Open Access Transmission Tariff (SPP Tariff). The amount of Surplus Interconnection Service available to the SGF is limited by the amount of Interconnection Service granted to the existing interconnection customer for the Existing Generating Facility (EGF) at the same POI. The Surplus Interconnection Service is only available up to the amount that can be accommodated without requiring additional Network Upgrades except those specified in the SPP Tariff<sup>3</sup>. The required scope of the study is dependent upon the EGF and SGF specifications. The criteria sections below include the basis of the analyses included in the scope of study.

All analyses were performed using the Siemens PTI PSS/E version 34 and PowerGEM TARA software. The results of each analysis are presented in the following sections.

### 1.1 Reactive Power Analysis

SPP requires that a reactive power analysis be performed on the requested configuration if it is a non-synchronous resource. The reactive power analysis determines the added capacitive effect at the POI caused by the project's collection system and transmission line's capacitance. A shunt reactor size was determined for the SGF to offset the capacitive effect and maintain zero (0) MVar injection at the POI while the plant's generators and capacitors were offline, and the EGF project had a shunt compensating for its charging effects.

### 1.2 Short Circuit Analysis

SPP requires that a short circuit analysis be performed to determine the maximum available fault current requiring interruption by protective equipment with both the SGF and EGF online, along with the amount of increase in maximum fault current due to the addition of the SGF. The analysis was performed on two scenarios, with the EGF in service and SGF offline, and the modified model with both EGF and SGF in service.

### 1.3 Stability Analysis

SPP requires that a dynamic stability analysis be performed to determine whether the SGF, EGF, and the transmission system will remain stable and within applicable criteria. Dynamic stability analysis was performed on two dispatch scenarios, the first where the SGF was online at 100% of the assumed dispatch with the EGF offline and disconnected, and the second where the SGF was online at 100% of the assumed dispatch and the EGF was picking up the remaining EGF capacity up to its modeled capacity. The stability analyses will identify any additional Interconnection Facilities and Network Upgrades necessary.

### 1.4 Steady-State Analysis

The steady-state (thermal/voltage) analyses may be performed as necessary to ensure that all required reliability conditions are studied. If the EGF was not studied under off-peak conditions, off-peak steady state analyses shall be performed to the required level necessary to demonstrate reliable operation of the Surplus Interconnection Service. If the original system impact study is not available for the

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<sup>3</sup> Allowed Network Upgrades detailed in SPP Open Access Transmission Tariff Attachment V Section 3.3

Interconnection Service, both off-peak and peak analysis may need to be performed for the EGF associated with the request.

An SGF that includes a fuel type (synchronous/non-synchronous) different from the EGF may require a steady-state analysis to study impacts resultant from changes in dispatch to all equal and lower queued requests. The steady-state analyses will identify any additional Interconnection Facilities and Network Upgrades necessary.

SPP determined that steady-state analysis was required because the combined dispatch of the EGF and SGF exceeded what has been modeled and studied in the previous Definitive Interconnection System Impact Studies (DISIS) study models. The addition of the SGF increased the maximum active power output above what is currently modeled for the EGF in the DISIS-2022-001-1 Low Variable Energy Resource (LVER) steady state models. The LVER models were used based on the fuel type of the SGF (thermal).

### **1.5 Necessary Interconnection Facilities & Network Upgrades**

The SPP Tariff<sup>4</sup> states that the reactive power, short circuit/fault duty, stability, and steady-state analyses (where applicable) for the Surplus Interconnection Service will identify any additional Interconnection Facilities necessary. In addition, the analyses will determine if any Network Upgrades are required for mitigation. The Surplus Interconnection Service is only available up to the amount that can be accommodated without requiring additional Network Upgrades unless (a) those additional Network Upgrades are either (1) located at the Point of Interconnection substation and at the same voltage level as the Generating Facility with an effective GIA, or (2) are System Protection Facilities; and (b) there are no material adverse impacts on the cost or timing of any Interconnection Requests pending at the time the Surplus Interconnection Service request is submitted.

### **1.6 Study Limitations**

The assessments and conclusions provided in this report are based on assumptions and information provided to Aneden by others. While the assumptions and information provided may be appropriate for the purposes of this report, Aneden does not guarantee that those conditions assumed will occur. In addition, Aneden did not independently verify the accuracy or completeness of the information provided. As such, the conclusions and results presented in this report may vary depending on the extent to which actual future conditions differ from the assumptions made or information used herein.

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<sup>4</sup> SPP Open Access Transmission Tariff Section 3.3.4.1

## 2.0 Surplus Interconnection Service Request

The GEN-2025-SR9 Interconnection Customer has requested a Surplus Interconnection Service Impact Study (Study) for GEN-2025-SR9 to utilize the Surplus Interconnection Service being made available by Muskogee Units 4, 5, and 6 at its existing Point of Interconnection (POI), the Muskogee 345 kV Substation in the Oklahoma Gas & Electric (OG&E) control area.

GEN-2025-SR9, the proposed SGF, will connect to the existing POI of the Muskogee Units 4, 5, and 6 via a separate generation interconnection line.

Muskogee Units 4, 5, and 6, the EGF, has a combined nameplate POI capacity of 1908 MW and is making 400 MW of Surplus Interconnection Service available at its POI. The combined EGF units are modeled in the DISIS-2022-001-1 models with a maximum dispatch of 1580 MW.

Per the SPP Tariff the amount of Surplus Interconnection Service available to the SGF is limited by the amount of Interconnection Service granted to the EGF at the same POI. In addition, the Surplus Interconnection Service is only available up to the amount that can be accommodated without requiring additional Network Upgrades except those specified in the SPP Tariff.

At the time of the posting of this report, Muskogee Units 4, 5, and 6 (EGF) are active existing power plants at the same POI (Muskogee 345 kV) that are legacy units and as such do not have Generation Interconnection Agreements (GIAs). Figure 2-1 shows the power flow model single line diagram for the EGF configuration.

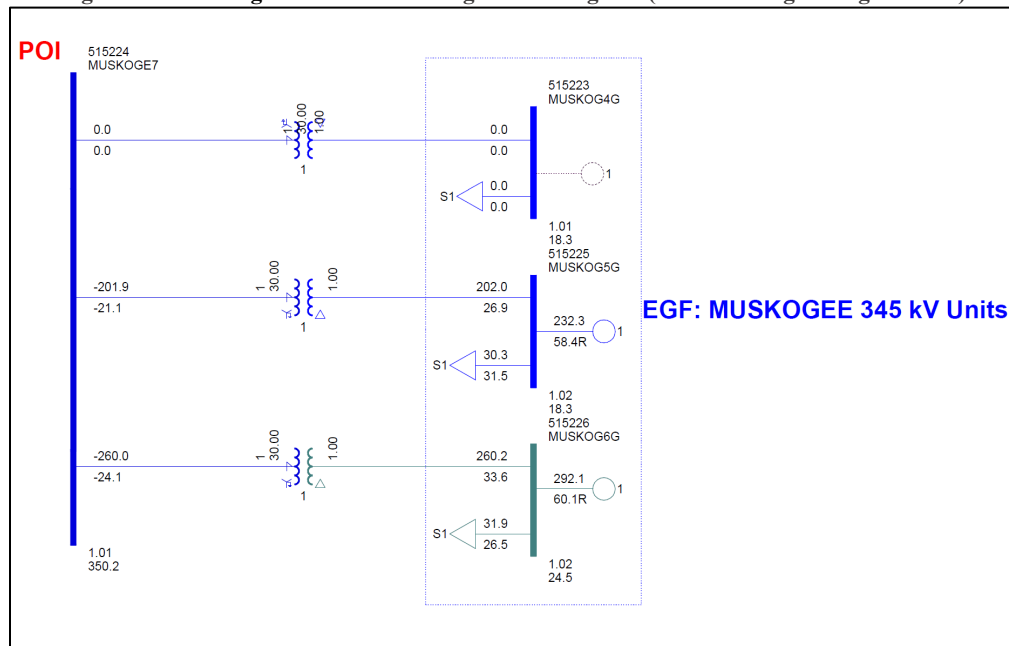
The proposed SGF configuration consists of 20 x INDAR/Ingeteam synchronous gas-fired units operating at 21.0812 MW for a total assumed dispatch of 421.624 MW. The generating capability of the SGF exceeds its requested Surplus Interconnection Service of 400 MW. The injection amount of the SGF must be limited to 400 MW at the POI and the combined generation from both the SGF and the EGF may not exceed 1908 MW at the POI. The SGF and EGF information is shown in Table 2-1 below.

**Table 2-1: EGF & SGF Configuration**

| Request                                 | Interconnection Queue Capacity (MW) | Generator Fuel Type | Point of Interconnection |
|-----------------------------------------|-------------------------------------|---------------------|--------------------------|
| <b>GEN-2025-SR9 (SGF)</b>               | 400                                 | Combustion Turbine  | Muskogee 345 kV (515224) |
| <b>Muskogee Units 4, 5, and 6 (EGF)</b> | 1908                                | Combustion Turbine  | Muskogee 345 kV (515224) |

The proposed detailed SGF configuration is captured in Figure 2-2 and Table 2-2 below.

Figure 2-1: Muskogee 345 kV Units Single Line Diagram (EGF Existing Configuration\*)



\*based on the DISIS-2022-001-1 25SP stability models



Table 2-2: SGF Interconnection Configuration

| Facility                                            | SGF Configuration                                                                                                                                                                                                 |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Point of Interconnection                            | Muskogee 345 kV (515224)                                                                                                                                                                                          |
| Configuration/Capacity                              | 20 x INDAR/Ingeteam 21.0812 MW (Thermal) = 421.624 MW [dispatch]<br>Units are rated at 25.358 MVA, GEN-2025-SR9 limited to 400 MW at the POI and total POI injection w/ Muskogee 345 kV units limited to 1908 MW  |
| Generation Interconnection Line <sup>1</sup>        | Length = 1.75 miles<br>R = 0.000091 pu<br>X = 0.001154 pu<br>B = 0.008050 pu<br>Rating MVA = 809 MVA                                                                                                              |
| GSU Transformer <sup>2</sup>                        | X12 = 17.993% R12 = 0.514%, X23 = 35.985% R23 = 1.028%, X13 = 17.993% R13 = 0.514%,<br>Winding MVA = 108 MVA,<br>Winding 1 Rating MVA = 180 MVA<br>Winding 2 Rating MVA = 90 MVA<br>Winding 3 Rating MVA = 90 MVA |
| Station Service Load                                | Total of 20.48 MW +9.92 MVAR modeled as eight loads, one at each generator bus as:<br>4 x 2.17 MW + 1.05 MVAR, and<br>4 x 2.95 MW + 1.43 MVAR                                                                     |
| Generator Dynamic Model <sup>3</sup> & Power Factor | 20 x INDAR/Ingeteam 25.358 MVA (GENQECU) <sup>3</sup><br>Leading: 0.83134<br>Lagging: 0.83134                                                                                                                     |

1) All pu are on 100 MVA Base, 2) X and R based on Winding MVA, 3) DYN stability model name

## 3.0 Steady-State Analysis

Aneden performed a steady state contingency analysis using PowerGEM TARA to evaluate the non-convergence, thermal, and voltage impacts of interconnecting GEN-2025-SR9 in the existing SPP transmission system. The methodology, criteria, and results of the steady-state contingency analysis are presented in the following sections.

### 3.1 Modeling

The steady-state analysis was performed using powerflow models derived from the SPP DISIS-2022-001-1 Transfer Case (TC) LVER model set. These models were updated to include the GEN-2025-SR9 surplus project.

The following study cases were evaluated:

- Year 2 Summer Peak (24SP)
- Year 5 Summer Peak (27SP)
- Year 5 Winter Peak (27WP)

The EGF loads were modified within the study models to ensure they were online at the intended MW amount.

A set of Pre-Project and Post-Project models were created as shown below:

- Pre-Project Models: DISIS-2022-001-1 TC LVER models with the EGF and any thermal Electrically Equivalent (EE) units dispatched to their modeled maximum
- Post-Project Models: Pre-Project models with the GEN-2025-SR9 unit modeled online at 100% of its assumed dispatch

Dispatch of the additional generation was performed in accordance with SPP DISIS load-ratio share methodologies. Must-run resources were excluded from sink adjustments. Where necessary, the sink definition was expanded consistent with SPP procedures to resolve system imbalances.

Steady-state analysis was performed for system intact and contingency conditions using SPP contingency definitions and methodology consistent with the DISIS-2022-001-1 ERIS steady-state analysis as laid out in the DISIS Manual<sup>5</sup>.

Constraint identification and impact assessment were based on the Post-Project model set, with comparison to the Pre-Project model set to determine incremental impacts associated with the Surplus Interconnection request.

### 3.2 Methodology and Criteria

TARA was used to simulate system intact conditions and contingencies provided by SPP. The system facilities were monitored for non-convergence, thermal and voltage impacts on all 69 kV lines and above.

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<sup>5</sup> GENERATOR INTERCONNECTION MANUAL (DISIS MANUAL) Version 4.4 - October 17, 2025

Network constraints were found using a Transfer Distribution Factor (TDF) analysis.

For ERIS, thermal overloads are defined as being greater than 100% of Rate A for system intact conditions, and greater than 100% of Rate B for contingencies. These impacts were then analyzed to determine if they meet any of the following three criteria:

- At least 3% TDF impact where the constraint is identified under System-Intact conditions,
- At least 20% TDF impact where the constraint is identified under contingency conditions,
- or 3% PTDF on contingent elements that resulted in a non-converged solution.

TARA was also used to determine voltage constraints in accordance with the DISIS Manual and Transmission Owner planning criteria. The identified voltage constraints were analyzed to determine if they met the following criteria:

- At least 3% PTDF on contingent elements that resulted in a voltage constraint or on the line with the largest system intact MW flow into the bus experiencing the system intact voltage constraint
- and 2% change in pu voltage.

### **3.3 Results**

The results of the steady state analysis showed that there were no non-convergence, thermal, or voltage criteria impacts in the study system due to the addition of GEN-2025-SR9.

## 4.0 Short Circuit Analysis

A short circuit study was performed using the 25SP model to determine the maximum available fault current requiring interruption by protective equipment with both the SGF and EGF online for each bus in the relevant subsystem, and the amount of increase in maximum fault current due to the addition of the SGF. The detailed results of the short circuit analysis are provided in Appendix B.

### 4.1 Methodology

The short circuit analysis included applying a 3-phase fault on buses up to 5 levels away from the 345 kV POI bus. The PSS/E “Automatic Sequence Fault Calculation (ASCC)” fault analysis module was used to calculate the fault current levels in the transmission system with and without the SGF online. The first scenario was studied with both the SGF and EGF in service. In the second scenario the SGF was disconnected while the EGF was online to determine the impact of the SGF.

Aneden created a short circuit model using the 25SP DISIS-2022-001-1 stability study model by adjusting the SGF short circuit parameters consistent with the submitted data. The adjusted parameters used in the short circuit analysis are shown in Table 4-1 below. No other changes were made to the model.

**Table 4-1: Short Circuit Model Parameters\***

| Parameter        | Value by Generator Bus# |                  |                  |                  |                  |                  |                  |                  |
|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                  | 925091 (2 units)        | 925092 (3 units) | 925093 (2 units) | 925094 (3 units) | 925094 (2 units) | 925096 (3 units) | 925097 (2 units) | 925098 (3 units) |
| Machine MVA Base | 25.36                   | 25.36            | 25.36            | 25.36            | 25.36            | 25.36            | 25.36            | 25.36            |
| R (pu)           | 0.003                   | 0.003            | 0.003            | 0.003            | 0.003            | 0.003            | 0.003            | 0.003            |
| X'' (pu)         | 0.233                   | 0.233            | 0.233            | 0.233            | 0.233            | 0.233            | 0.233            | 0.233            |

\*pu values based on Machine MVA Base

### 4.2 Results

The results of the short circuit analysis compared the 25SP model with the EGF online and SGF not connected to the stability Scenario 2 dispatch model with both the EGF and SGF in service as described in Section 5.1. The GEN-2025-SR9 POI bus (Muskogee 345 kV) fault current magnitudes for the comparison cases are provided in Table 4-2 showing a fault current of 30.24 kA with the EGF and SGF online. The addition of the SGF configuration increased the POI bus fault current by 2.44 kA. Table 4-3 shows the maximum fault current magnitudes and fault current increases with the SGF project online.

The maximum fault current calculated within 5 buses of the POI was 63.1 kA for the 25SP model. There were several buses with a maximum three-phase fault current over 40 kA. These buses are highlighted in Appendix B. The maximum contribution to three-phase fault currents due to the addition of the SGF was about 8.8% and 2.44 kA.

**Table 4-2: POI Short Circuit Comparison Results**

| Case | EGF Only Current (kA) | SGF & EGF Current (kA) | kA Change | %Change |
|------|-----------------------|------------------------|-----------|---------|
| 25SP | 27.80                 | 30.24                  | 2.44      | 8.8%    |

Table 4-3: 25SP Short Circuit Comparison Results

| Voltage (kV) | Max. Current (EGF & SGF) (kA) | Max kA Change | Max %Change |
|--------------|-------------------------------|---------------|-------------|
| 69           | 16.9                          | 0.04          | 0.3%        |
| 138          | 63.1                          | 0.23          | 0.5%        |
| 161          | 33.6                          | 0.26          | 1.2%        |
| 345          | 36.3                          | 2.44          | 8.8%        |
| 500          | 27.0                          | 0.02          | 0.3%        |
| 765          | 6.2                           | 0.02          | 0.3%        |
| <b>Max</b>   | <b>63.1</b>                   | <b>2.44</b>   | <b>8.8%</b> |

## 5.0 Dynamic Stability Analysis

Aneden performed a dynamic stability analysis to identify the impact of the SGF project. The analysis was performed according to SPP's Disturbance Performance Requirements<sup>6</sup>. The project details are described in Section 2.0 above and the dynamic modeling data is provided in Appendix A. The existing base case issues and simulation plots can be found in Appendix C.

### 5.1 Methodology and Criteria

The dynamic stability analysis was performed using models developed with the requested 20 x INDAR/Ingeteam operating at 21.0812 MW (GENQECU) SGF generating facility configuration included in the models. This stability analysis was performed using Siemens PTI's PSS/E version 34.8.1 software.

Two stability model scenarios were developed using the models from DISIS-2022-001-1. The first scenario (Scenario 1) was comprised of the SGF online at 100% of the assumed dispatch (SGF = 421.624 MW) while the EGF generator was offline and disconnected. The second scenario (Scenario 2) was comprised of the SGF at 100% of the assumed dispatch (SGF = 421.624 MW) while the EGF generator picked up the remaining EGF capacity up to its modeled capability (EGF = 1580 MW). The study scenarios are shown in Table 5-1. The EGF station service loads were updated within the study models to ensure they were online at the intended MW amount. With the station service loads, the Scenario 2 net POI injection is below the limit of 1908 MW.

**Table 5-1: Study Scenarios (Generator Dispatch MW)**

| Scenario | Muskogee Units 4, 5, and 6 EGF (MW) | GEN-2025-SR9 SGF (MW) | EGF + SGF (MW) |
|----------|-------------------------------------|-----------------------|----------------|
| 1        | 0 (Offline)                         | 421.624               | 421.624        |
| 2        | 1580                                | 421.624               | 2001.624       |

The GEN-2025-SR9 project details were used to create modified stability models for this impact study based on the DISIS-2022-001-1 stability study models:

- 2025 Summer Peak (25SP),
- 2025 Winter Peak (25WP)

The dynamic model data for the GEN-2025-SR9 project is provided in Appendix A. The power flow models and associated dynamic database were initialized (no-fault test) to confirm that there were no errors in the initial conditions of the system and the dynamic data.

The following system adjustments were made to address existing base case issues that are not attributed to the surplus request:

- The frequency protective relays at bus 763475 were disabled after observing the generators tripping during initial three phase fault simulations. This frequency tripping issue is a known PSS/E limitation when calculating bus frequency as it relates to non-conventional type devices.
- The voltage protective relays at buses 760392, 760412, & 764511 were disabled to avoid generator tripping due to an instantaneous over voltage spike after fault clearing.

<sup>6</sup> SPP Disturbance Performance Requirements:

[https://www.spp.org/documents/28859/spp%20disturbance%20performance%20requirements%20\(twg%20approved\).pdf](https://www.spp.org/documents/28859/spp%20disturbance%20performance%20requirements%20(twg%20approved).pdf)

- The PSSE dynamic simulation iterations and acceleration factor were adjusted as needed to resolve PSSE dynamic simulation crashes.

During the fault simulations, the active power (PELEC), reactive power (QELEC), and terminal voltage (ETERM) were monitored for the EGF and SGF and other current and prior queued projects in Group 4. In addition, voltages of five (5) buses away from the POI of the SGF were monitored and plotted. The machine rotor angle for synchronous machines and speed for asynchronous machines within the study areas including 327 (EES-EAI), 330 (AECI), 351 (EES), 356 (AMMO), 502 (CLEC), 515 (SWPA), 520 (AEPW), 523 (GRDA), 524 (OKGE), 525 (WFEC), 526 (SPS), 527 (OMPA), 534 (SUNC), 536 (WERE), 544 (EMDE), and 546 (SPRM) were monitored. The voltages of all 100 kV and above buses within the study area were monitored as well.

## 5.2 Fault Definitions

Aneden developed fault events as required to study the SGF. The new set of faults was simulated using the modified study models. The fault events included three-phase faults and single-line-to-ground stuck breaker faults. Single-line-to-ground faults are approximated by applying a fault impedance to bring the faulted bus positive sequence voltage to 0.6 pu. The simulated faults are listed and described in Table 5-2 below. These contingencies were applied to the modified 25SP and 25WP models.

Table 5-2: Fault Definitions

| Fault ID   | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT1000-SB | P4             | Stuck Breaker on MUSKOG7 (515224) 345 kV Bus<br>a. Apply single phase fault at the MUSKOG7 (515224) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the MUSKOG7 (515224) 345 kV to PECANCK7 (515235) 345 kV line CKT 2.<br>b.2.Trip the MUSKOG7 (515224) 345 kV to FIREWHL-TAP (588839) 345 kV line CKT 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| FLT1001-SB | P4             | Stuck Breaker on MUSKOG7 (515224) 345 kV Bus<br>a. Apply single phase fault at the MUSKOG7 (515224) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the MUSKOG7 (515224) 345 kV to PECANCK7 (515235) 345 kV line CKT 1.<br>b.2.Trip the MUSKOG7 (515224) 345 kV to CLARKSV7 (509745) 345 kV line CKT 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| FLT1002-SB | P4             | Stuck Breaker on MUSKOG7 (515224) 345 kV Bus<br>a. Apply single phase fault at the MUSKOG7 (515224) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the MUSKOG7 (515224) 345 kV to FTSMITH7 (515302) 345 kV line CKT 1.<br>b.2.Trip the MUSKOG7 (515224) 345 kV / MUSKOG5G (515225) 18 kV XFMR CKT 1.<br>Trip generator(s) on the Bus MUSKOG5G (515225) 18 kV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| FLT1003-SB | P4             | Stuck Breaker on MUSKOG7 (515224) 345 kV Bus<br>a. Apply single phase fault at the MUSKOG7 (515224) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the MUSKOG7 (515224) 345 kV to OKTAHA 7 (516091) 345 kV line CKT 1.<br>b.2.Trip the MUSKOG7 (515224) 345 kV / MUSKOG4G (515223) 18 kV XFMR CKT 1.<br>Trip generator(s) on the Bus MUSKOG4G (515223) 18 kV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| FLT1004-SB | P4             | Stuck Breaker on MUSKOG7 (515224) 345 kV Bus<br>a. Apply single phase fault at the MUSKOG7 (515224) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the MUSKOG7 (515224) 345 kV / MUSKOG6G (515226) 24 kV XFMR CKT 1.<br>b.2.Trip the MUSKOG7 (515224) 345 kV to G25-SR9GSU1 (925099) 345 kV line CKT 1.<br>Trip generator(s) on the Bus G25-SR9GEN1 (925091) 13.8 kV<br>Trip generator(s) on the Bus G25-SR9GEN2 (925092) 13.8 kV<br>Trip generator(s) on the Bus G25-SR9GEN3 (925093) 13.8 kV<br>Trip generator(s) on the Bus G25-SR9GEN4 (925094) 13.8 kV<br>Trip generator(s) on the Bus G25-SR9GEN5 (925095) 13.8 kV<br>Trip generator(s) on the Bus G25-SR9GEN6 (925096) 13.8 kV<br>Trip generator(s) on the Bus G25-SR9GEN7 (925097) 13.8 kV<br>Trip generator(s) on the Bus G25-SR9GEN8 (925098) 13.8 kV<br>Trip generator(s) on the Bus MUSKOG6G (515226) 24 kV |

Table 5-2 Continued

| Fault ID   | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                          |
|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT1005-SB | P4             | Stuck Breaker on FTSMITH7 (515302) 345 kV Bus<br>a. Apply single phase fault at the FTSMITH7 (515302) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip bus FTSMITH7 (515302) 345 kV.                                                                                                                                                                               |
| FLT1006-SB | P4             | Stuck Breaker on FTSMTHW5 (515301) 161 kV Bus<br>a. Apply single phase fault at the FTSMTHW5 (515301) 161 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip bus FTSMTHW5 (515301) 161 kV.                                                                                                                                                                               |
| FLT1007-SB | P4             | Stuck Breaker on FTSMITH8 (515305) 500 kV Bus<br>a. Apply single phase fault at the FTSMITH8 (515305) 500 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the FTSMITH8 (515305) 500 kV to 8ANO% (337909) 500 kV line CKT 1.<br>b.2.Trip the FTSMITH8 (515305) 500 kV / FTSMITH7 (515302) 345 kV / FTSMTH11 (515726) 13.8 kV XFMR CKT 1.                               |
| FLT1008-SB | P4             | Stuck Breaker on FTSMITH8 (515305) 500 kV Bus<br>a. Apply single phase fault at the FTSMITH8 (515305) 500 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the FTSMITH8 (515305) 500 kV to 8ANO% (337909) 500 kV line CKT 1.<br>b.2.Trip the FTSMITH8 (515305) 500 kV / FTSMTHW5 (515301) 161 kV / FTSMTH41 (515791) 13.8 kV XFMR CKT 4.                               |
| FLT1009-SB | P4             | Stuck Breaker on FTSMITH8 (515305) 500 kV Bus<br>a. Apply single phase fault at the FTSMITH8 (515305) 500 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the FTSMITH8 (515305) 500 kV / FTSMTHW5 (515301) 161 kV / FTSMTH41 (515791) 13.8 kV XFMR CKT 4.<br>b.2.Trip the FTSMITH8 (515305) 500 kV / FTSMITH7 (515302) 345 kV / FTSMTH11 (515726) 13.8 kV XFMR CKT 1. |
| FLT1010-SB | P4             | Stuck Breaker on PECANCK7 (515235) 345 kV Bus<br>a. Apply single phase fault at the PECANCK7 (515235) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the PECANCK7 (515235) 345 kV / PECANCK5 (515234) 161 kV / PECANC11 (515749) 13.8 kV XFMR CKT 1.<br>b.2.Trip the PECANCK7 (515235) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 2.                           |
| FLT1011-SB | P4             | Stuck Breaker on PECANCK7 (515235) 345 kV Bus<br>a. Apply single phase fault at the PECANCK7 (515235) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the PECANCK7 (515235) 345 kV / PECANCK5 (515234) 161 kV / PECANC11 (515749) 13.8 kV XFMR CKT 1.<br>b.2.Trip the PECANCK7 (515235) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 1.                           |
| FLT1012-SB | P4             | Stuck Breaker on PECANCK7 (515235) 345 kV Bus<br>a. Apply single phase fault at the PECANCK7 (515235) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the PECANCK7 (515235) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 1.<br>b.2.Trip the PECANCK5 (515234) 161 kV / PECANCK4 (515233) 138 kV / PECANC31 (515750) 13.2 kV XFMR CKT 1.                           |
| FLT1013-SB | P4             | Stuck Breaker on PECANCK7 (515235) 345 kV Bus<br>a. Apply single phase fault at the PECANCK7 (515235) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the PECANCK7 (515235) 345 kV to R.S.S.-7 (509782) 345 kV line CKT 1.<br>b.2.Trip the PECANCK5 (515234) 161 kV / PECANCK4 (515233) 138 kV / PECANC31 (515750) 13.2 kV XFMR CKT 1.                            |
| FLT1014-SB | P4             | Stuck Breaker on PECANCK7 (515235) 345 kV Bus<br>a. Apply single phase fault at the PECANCK7 (515235) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the PECANCK7 (515235) 345 kV to R.S.S.-7 (509782) 345 kV line CKT 1.<br>b.2.Trip the PECANCK7 (515235) 345 kV / PECANCK5 (515234) 161 kV / PECANC21 (515759) 13.8 kV XFMR CKT 2.                            |
| FLT1015-SB | P4             | Stuck Breaker on PECANCK7 (515235) 345 kV Bus<br>a. Apply single phase fault at the PECANCK7 (515235) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the PECANCK7 (515235) 345 kV / PECANCK5 (515234) 161 kV / PECANC21 (515759) 13.8 kV XFMR CKT 2.<br>b.2.Trip the PECANCK7 (515235) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 2.                           |

Table 5-2 Continued

| Fault ID   | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT1016-SB | P4             | Stuck Breaker on PECANCK4 (515233) 138 kV Bus<br>a. Apply single phase fault at the PECANCK4 (515233) 138 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip bus PECANCK4 (515233) 138 kV.                                                                                                                                                                                                                                                                                                                                                                                            |
| FLT1017-SB | P4             | Stuck Breaker on PECANCK5 (515234) 161 kV Bus<br>a. Apply single phase fault at the PECANCK5 (515234) 161 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the PECANCK5 (515234) 161 kV to AGENCY 5 (515230) 161 kV line CKT 1.<br>b.2.Trip the PECANCK5 (515234) 161 kV / PECANCK7 (515235) 345 kV / PECANCK11 (515749) 13.8 kV XFMR CKT 1.                                                                                                                                                                                                                                        |
| FLT1018-SB | P4             | Stuck Breaker on PECANCK5 (515234) 161 kV Bus<br>a. Apply single phase fault at the PECANCK5 (515234) 161 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the PECANCK5 (515234) 161 kV / PECANCK7 (515235) 345 kV / PECANCK21 (515759) 13.8 kV XFMR CKT 2.<br>b.2.Trip the PECANCK5 (515234) 161 kV to 5TRIBES5 (515228) 161 kV line CKT 1.                                                                                                                                                                                                                                        |
| FLT1019-SB | P4             | Stuck Breaker on CLARKSV7 (509745) 345 kV Bus<br>a. Apply single phase fault at the CLARKSV7 (509745) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the CLARKSV7 (509745) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 1.<br>b.2.Trip the CLARKSV7 (509745) 345 kV to CHAMSPR7 (506945) 345 kV line CKT 1.                                                                                                                                                                                                                                                                   |
| FLT1020-SB | P4             | Stuck Breaker on CLARKSV7 (509745) 345 kV Bus<br>a. Apply single phase fault at the CLARKSV7 (509745) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the CLARKSV7 (509745) 345 kV to CHAMSPR7 (506945) 345 kV line CKT 1.<br>b.2.Trip the CLARKSV7 (509745) 345 kV to GEN-2017-140 (760389) 345 kV line CKT 1.<br>Trip generator(s) on the Bus G17-140-GEN1 (760392) 0.6 kV<br>Trip generator(s) on the Bus G17-141-GEN1 (760412) 0.6 kV                                                                                                                                      |
| FLT1021-SB | P4             | Stuck Breaker on CLARKSV7 (509745) 345 kV Bus<br>a. Apply single phase fault at the CLARKSV7 (509745) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the CLARKSV7 (509745) 345 kV to ONETA--7 (509807) 345 kV line CKT 1.<br>b.2.Trip the CLARKSV7 (509745) 345 kV to GEN-2017-140 (760389) 345 kV line CKT 1.<br>Trip generator(s) on the Bus G17-140-GEN1 (760392) 0.6 kV<br>Trip generator(s) on the Bus G17-141-GEN1 (760412) 0.6 kV                                                                                                                                      |
| FLT1022-SB | P4             | Stuck Breaker on CLARKSV7 (509745) 345 kV Bus<br>a. Apply single phase fault at the CLARKSV7 (509745) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the CLARKSV7 (509745) 345 kV to ONETA--7 (509807) 345 kV line CKT 1.<br>b.2.Trip the CLARKSV7 (509745) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 1.                                                                                                                                                                                                                                                                   |
| FLT1023-SB | P4             | Stuck Breaker on FIREWHL-TAP (588839) 345 kV Bus<br>a. Apply single phase fault at the FIREWHL-TAP (588839) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the FIREWHL-TAP (588839) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 1.<br>b.2.Trip the FIREWHL-TAP (588839) 345 kV to SEMINOL7 (515045) 345 kV line CKT 1.                                                                                                                                                                                                                                                       |
| FLT1024-SB | P4             | Stuck Breaker on FIREWHL-TAP (588839) 345 kV Bus<br>a. Apply single phase fault at the FIREWHL-TAP (588839) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the FIREWHL-TAP (588839) 345 kV to OKTAHA 7 (516091) 345 kV line CKT 1.<br>b.2.Trip the FIREWHL-TAP (588839) 345 kV to G17-092-SWYD (588838) 345 kV line CKT 1.<br>Trip generator(s) on the Bus G18-024GEN1 (762595) 0.7 kV<br>Trip generator(s) on the Bus G17-092-GEN1 (589303) 0.6 kV<br>Trip generator(s) on the Bus G17-092-GEN2 (589307) 0.6 kV<br>Trip generator(s) on the Bus G17-040-GEN1 (588813) 0.7 kV |
| FLT1025-SB | P4             | Stuck Breaker on FIREWHL-TAP (588839) 345 kV Bus<br>a. Apply single phase fault at the FIREWHL-TAP (588839) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the FIREWHL-TAP (588839) 345 kV to C-RIVER7 (515422) 345 kV line CKT 1.                                                                                                                                                                                                                                                                                                                                            |
| FLT1026-SB | P4             | Stuck Breaker on OKTAHA 7 (516091) 345 kV Bus<br>a. Apply single phase fault at the OKTAHA 7 (516091) 345 kV Bus<br>b. Clear fault after 16 cycles and trip the following elements:<br>b.1.Trip the OKTAHA 7 (516091) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 1.<br>b.2.Trip the OKTAHA 7 (516091) 345 kV to FIREWHL-TAP (588839) 345 kV line CKT 1.                                                                                                                                                                                                                                                                |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT1027-SB  | P4             | <p>Stuck Breaker on OKTAHA 7 (516091) 345 kV Bus</p> <p>a. Apply single phase fault at the OKTAHA 7 (516091) 345 kV Bus</p> <p>b. Clear fault after 16 cycles and trip the following elements:</p> <p>b.1. Trip the OKTAHA 7 (516091) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 1.</p> <p>b.2. Trip the OKTAHA 7 (516091) 345 kV / OKTAHA 5 (516092) 161 kV / OKTAHA61 (516094) 13.8 kV XFMR CKT 6.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| FLT1028-SB  | P4             | <p>Stuck Breaker on OKTAHA 7 (516091) 345 kV Bus</p> <p>a. Apply single phase fault at the OKTAHA 7 (516091) 345 kV Bus</p> <p>b. Clear fault after 16 cycles and trip the following elements:</p> <p>b.1. Trip the OKTAHA 7 (516091) 345 kV / OKTAHA 5 (516092) 161 kV / OKTAHA61 (516094) 13.8 kV XFMR CKT 6.</p> <p>b.2. Trip the OKTAHA 7 (516091) 345 kV to FIREWHL-TAP (588839) 345 kV line CKT 1.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| FLT1029-SB  | P4             | <p>Stuck Breaker on OKTAHA 5 (516092) 161 kV Bus</p> <p>a. Apply single phase fault at the OKTAHA 5 (516092) 161 kV Bus</p> <p>b. Clear fault after 16 cycles and trip the following elements:</p> <p>b.1. Trip the OKTAHA 5 (516092) 161 kV / OKTAHA 7 (516091) 345 kV / OKTAHA61 (516094) 13.8 kV XFMR CKT 6.</p> <p>b.2. LOAD OKTAHA 5 (516092) 161 kV #1</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| FLT1030-SB  | P4             | <p>Stuck Breaker on OKTAHA 5 (516092) 161 kV Bus</p> <p>a. Apply single phase fault at the OKTAHA 5 (516092) 161 kV Bus</p> <p>b. Clear fault after 16 cycles and trip the following elements:</p> <p>b.1. Trip the OKTAHA 5 (516092) 161 kV / OKTAHA 7 (516091) 345 kV / OKTAHA61 (516094) 13.8 kV XFMR CKT 6.</p> <p>b.2. Trip the OKTAHA 5 (516092) 161 kV / OKTAHA 2 (516093) 69 kV / OKTAHA71 (516095) 13.2 kV XFMR CKT 7.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| FLT1031-SB  | P4             | <p>Stuck Breaker on OKTAHA 5 (516092) 161 kV Bus</p> <p>a. Apply single phase fault at the OKTAHA 5 (516092) 161 kV Bus</p> <p>b. Clear fault after 16 cycles and trip the following elements:</p> <p>b.1. Trip the OKTAHA 5 (516092) 161 kV / OKTAHA 2 (516093) 69 kV / OKTAHA71 (516095) 13.2 kV XFMR CKT 7.</p> <p>b.2. LOAD OKTAHA 5 (516092) 161 kV #1</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| FLT9000-3PH | P1             | <p>3 Phase fault on MUSKOGEE7 (515224) 345 kV to G25-SR9GSU1 (925099) 345 kV line CKT 1, near MUSKOGEE7 (515224) 345 kV.</p> <p>a. Apply fault at the MUSKOGEE7 (515224) 345 kV Bus.</p> <p>b. Clear fault after 6 cycles by tripping the faulted line.</p> <p>Trip generator(s) on the Bus G25-SR9GEN1 (925091) 13.8 kV</p> <p>Trip generator(s) on the Bus G25-SR9GEN2 (925092) 13.8 kV</p> <p>Trip generator(s) on the Bus G25-SR9GEN3 (925093) 13.8 kV</p> <p>Trip generator(s) on the Bus G25-SR9GEN4 (925094) 13.8 kV</p> <p>Trip generator(s) on the Bus G25-SR9GEN5 (925095) 13.8 kV</p> <p>Trip generator(s) on the Bus G25-SR9GEN6 (925096) 13.8 kV</p> <p>Trip generator(s) on the Bus G25-SR9GEN7 (925097) 13.8 kV</p> <p>Trip generator(s) on the Bus G25-SR9GEN8 (925098) 13.8 kV</p> <p>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.</p> <p>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.</p> |
| FLT9001-3PH | P1             | <p>3 Phase fault on MUSKOGEE7 (515224) 345 kV to FTSMITH7 (515302) 345 kV line CKT 1, near MUSKOGEE7 (515224) 345 kV.</p> <p>a. Apply fault at the MUSKOGEE7 (515224) 345 kV Bus.</p> <p>b. Clear fault after 6 cycles by tripping the faulted line.</p> <p>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.</p> <p>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| FLT9002-3PH | P1             | <p>3 Phase fault on FTSMITH7 (515302) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 1, near FTSMITH7 (515302) 345 kV.</p> <p>a. Apply fault at the FTSMITH7 (515302) 345 kV Bus.</p> <p>b. Clear fault after 6 cycles by tripping the faulted line.</p> <p>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.</p> <p>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| FLT9003-3PH | P1             | <p>3 Phase fault on FTSMITH7 (515302) 345 kV / FTSMITH8 (515305) 500 kV / FTSMITH11 (515726) 13.8 kV XFMR CKT 1, near FTSMITH7 (515302) 345 kV.</p> <p>a. Apply fault at the FTSMITH7 (515302) 345 kV Bus.</p> <p>b. Clear fault after 6 cycles by tripping the faulted line.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT9004-3PH | P1             | 3 Phase fault on FTSMITH8 (515305) 500 kV / FTSMITH7 (515302) 345 kV / FTSMTH11 (515726) 13.8 kV XFMR CKT 1, near FTSMITH8 (515305) 500 kV.<br>a. Apply fault at the FTSMITH8 (515305) 500 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9005-3PH | P1             | 3 Phase fault on FTSMITH7 (515302) 345 kV / FTSMTHW5 (515301) 161 kV / FTSMTH51 (515728) 13.8 kV XFMR CKT 5, near FTSMITH7 (515302) 345 kV.<br>a. Apply fault at the FTSMITH7 (515302) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9006-3PH | P1             | 3 Phase fault on FTSMTHW5 (515301) 161 kV / FTSMITH7 (515302) 345 kV / FTSMTH51 (515728) 13.8 kV XFMR CKT 5, near FTSMTHW5 (515301) 161 kV.<br>a. Apply fault at the FTSMTHW5 (515301) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9007-3PH | P1             | 3 Phase fault on FTSMITH8 (515305) 500 kV / FTSMTHW5 (515301) 161 kV / FTSMTH41 (515791) 13.8 kV XFMR CKT 4, near FTSMITH8 (515305) 500 kV.<br>a. Apply fault at the FTSMITH8 (515305) 500 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9008-3PH | P1             | 3 Phase fault on FTSMTHW5 (515301) 161 kV / FTSMITH8 (515305) 500 kV / FTSMTH41 (515791) 13.8 kV XFMR CKT 4, near FTSMTHW5 (515301) 161 kV.<br>a. Apply fault at the FTSMTHW5 (515301) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9009-3PH | P1             | 3 Phase fault on FTSMITH8 (515305) 500 kV / FTSMTHE5 (515300) 161 kV / FTSMTH31 (515727) 13.8 kV XFMR CKT 3, near FTSMITH8 (515305) 500 kV.<br>a. Apply fault at the FTSMITH8 (515305) 500 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9010-3PH | P1             | 3 Phase fault on FTSMTHE5 (515300) 161 kV / FTSMITH8 (515305) 500 kV / FTSMTH31 (515727) 13.8 kV XFMR CKT 3, near FTSMTHE5 (515300) 161 kV.<br>a. Apply fault at the FTSMTHE5 (515300) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9011-3PH | P1             | 3 Phase fault on FTSMITH8 (515305) 500 kV to 8ANO% (337909) 500 kV line CKT 1, near FTSMITH8 (515305) 500 kV.<br>a. Apply fault at the FTSMITH8 (515305) 500 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.    |
| FLT9012-3PH | P1             | 3 Phase fault on 8ANO% (337909) 500 kV to FTSMITH8 (515305) 500 kV line CKT 1, near 8ANO% (337909) 500 kV.<br>a. Apply fault at the 8ANO% (337909) 500 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.          |
| FLT9013-3PH | P1             | 3 Phase fault on FTSMTHE5 (515300) 161 kV to FTSMTHW5 (515301) 161 kV line CKT 1, near FTSMTHE5 (515300) 161 kV.<br>a. Apply fault at the FTSMTHE5 (515300) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9014-3PH | P1             | 3 Phase fault on FTSMTHW5 (515301) 161 kV to ARKOMA 5 (515306) 161 kV line CKT 1, near FTSMTHW5 (515301) 161 kV.<br>a. Apply fault at the FTSMTHW5 (515301) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9015-3PH | P1             | 3 Phase fault on ARKOMA 5 (515306) 161 kV to FTSMTHW5 (515301) 161 kV line CKT 1, near ARKOMA 5 (515306) 161 kV.<br>a. Apply fault at the ARKOMA 5 (515306) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT9016-3PH | P1             | 3 Phase fault on ARKOMA 5 (515306) 161 kV to 3RDST 5 (515308) 161 kV line CKT 1, near ARKOMA 5 (515306) 161 kV.<br>a. Apply fault at the ARKOMA 5 (515306) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9017-3PH | P1             | 3 Phase fault on 8ANO% (337909) 500 kV / 5ANO% (337912) 161 kV / 1ANO AUX (337913) 22 kV XFMR CKT 1, near 8ANO% (337909) 500 kV.<br>a. Apply fault at the 8ANO% (337909) 500 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                               |
| FLT9018-3PH | P1             | 3 Phase fault on 8ANO% (337909) 500 kV to 8HAPPYVALY% (337811) 500 kV line CKT 1, near 8ANO% (337909) 500 kV.<br>a. Apply fault at the 8ANO% (337909) 500 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.      |
| FLT9019-3PH | P1             | 3 Phase fault on 8ANO% (337909) 500 kV to 8P.HILL% (337922) 500 kV line CKT 1, near 8ANO% (337909) 500 kV.<br>a. Apply fault at the 8ANO% (337909) 500 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.         |
| FLT9020-3PH | P1             | 3 Phase fault on 8ANO% (337909) 500 kV to 1ANO U1 (337910) 22 kV XFMR CKT 1, near 8ANO% (337909) 500 kV.<br>a. Apply fault at the 8ANO% (337909) 500 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus 1ANO U1 (337910) 22 kV                                                                                                                |
| FLT9021-3PH | P1             | 3 Phase fault on 8ANO% (337909) 500 kV to 1ANO U2 (337911) 22 kV XFMR CKT 1, near 8ANO% (337909) 500 kV.<br>a. Apply fault at the 8ANO% (337909) 500 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus 1ANO U2 (337911) 22 kV                                                                                                                |
| FLT9022-3PH | P1             | 3 Phase fault on MUSKOG7 (515224) 345 kV to PECANCK7 (515235) 345 kV line CKT 2, near MUSKOG7 (515224) 345 kV.<br>a. Apply fault at the MUSKOG7 (515224) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.   |
| FLT9023-3PH | P1             | 3 Phase fault on PECANCK7 (515235) 345 kV to MUSKOG7 (515224) 345 kV line CKT 2, near PECANCK7 (515235) 345 kV.<br>a. Apply fault at the PECANCK7 (515235) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9024-3PH | P1             | 3 Phase fault on MUSKOG7 (515224) 345 kV to CLARKSV7 (509745) 345 kV line CKT 1, near MUSKOG7 (515224) 345 kV.<br>a. Apply fault at the MUSKOG7 (515224) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.   |
| FLT9026-3PH | P1             | 3 Phase fault on MUSKOG7 (515224) 345 kV to MUSKOG6G (515226) 24 kV XFMR CKT 1, near MUSKOG7 (515224) 345 kV.<br>a. Apply fault at the MUSKOG7 (515224) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus MUSKOG6G (515226) 24 kV                                                                                                        |
| FLT9027-3PH | P1             | 3 Phase fault on MUSKOG7 (515224) 345 kV to MUSKOG4G (515223) 18 kV XFMR CKT 1, near MUSKOG7 (515224) 345 kV.<br>a. Apply fault at the MUSKOG7 (515224) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus MUSKOG4G (515223) 18 kV                                                                                                        |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT9028-3PH | P1             | 3 Phase fault on MUSKOGEE7 (515224) 345 kV to MUSKOG5G (515225) 18 kV XFMR CKT 1, near MUSKOGEE7 (515224) 345 kV.<br>a. Apply fault at the MUSKOGEE7 (515224) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus MUSKOG5G (515225) 18 kV                                                                                                             |
| FLT9029-3PH | P1             | 3 Phase fault on MUSKOGEE7 (515224) 345 kV to FIREWHL-TAP (588839) 345 kV line CKT 1, near MUSKOGEE7 (515224) 345 kV.<br>a. Apply fault at the MUSKOGEE7 (515224) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.     |
| FLT9030-3PH | P1             | 3 Phase fault on FIREWHL-TAP (588839) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 1, near FIREWHL-TAP (588839) 345 kV.<br>a. Apply fault at the FIREWHL-TAP (588839) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9031-3PH | P1             | 3 Phase fault on MUSKOGEE7 (515224) 345 kV to OKTAHA 7 (516091) 345 kV line CKT 1, near MUSKOGEE7 (515224) 345 kV.<br>a. Apply fault at the MUSKOGEE7 (515224) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.        |
| FLT9032-3PH | P1             | 3 Phase fault on OKTAHA 7 (516091) 345 kV to MUSKOGEE7 (515224) 345 kV line CKT 1, near OKTAHA 7 (516091) 345 kV.<br>a. Apply fault at the OKTAHA 7 (516091) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.          |
| FLT9033-3PH | P1             | 3 Phase fault on OKTAHA 7 (516091) 345 kV to FIREWHL-TAP (588839) 345 kV line CKT 1, near OKTAHA 7 (516091) 345 kV.<br>a. Apply fault at the OKTAHA 7 (516091) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.        |
| FLT9034-3PH | P1             | 3 Phase fault on FIREWHL-TAP (588839) 345 kV to OKTAHA 7 (516091) 345 kV line CKT 1, near FIREWHL-TAP (588839) 345 kV.<br>a. Apply fault at the FIREWHL-TAP (588839) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.  |
| FLT9035-3PH | P1             | 3 Phase fault on OKTAHA 7 (516091) 345 kV / OKTAHA 5 (516092) 161 kV / OKTAHA61 (516094) 13.8 kV XFMR CKT 6, near OKTAHA 7 (516091) 345 kV.<br>a. Apply fault at the OKTAHA 7 (516091) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                            |
| FLT9036-3PH | P1             | 3 Phase fault on OKTAHA 5 (516092) 161 kV / OKTAHA 7 (516091) 345 kV / OKTAHA61 (516094) 13.8 kV XFMR CKT 6, near OKTAHA 5 (516092) 161 kV.<br>a. Apply fault at the OKTAHA 5 (516092) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                            |
| FLT9037-3PH | P1             | 3 Phase fault on OKTAHA 5 (516092) 161 kV / OKTAHA 2 (516093) 69 kV / OKTAHA71 (516095) 13.2 kV XFMR CKT 7, near OKTAHA 5 (516092) 161 kV.<br>a. Apply fault at the OKTAHA 5 (516092) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                             |
| FLT9038-3PH | P1             | 3 Phase fault on OKTAHA 2 (516093) 69 kV / OKTAHA 5 (516092) 161 kV / OKTAHA71 (516095) 13.2 kV XFMR CKT 7, near OKTAHA 2 (516093) 69 kV.<br>a. Apply fault at the OKTAHA 2 (516093) 69 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                               |
| FLT9039-3PH | P1             | 3 Phase fault on 5TRIBES2 (515227) 69 kV / 5TRIBES5 (515228) 161 kV / 5TRIBES1 (515723) 13.2 kV XFMR CKT 1, near 5TRIBES2 (515227) 69 kV.<br>a. Apply fault at the 5TRIBES2 (515227) 69 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                               |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT9040-3PH | P1             | 3 Phase fault on 5TRIBES5 (515228) 161 kV / 5TRIBES2 (515227) 69 kV / 5TRIBES1 (515723) 13.2 kV XFMR CKT 1, near 5TRIBES5 (515228) 161 kV.<br>a. Apply fault at the 5TRIBES5 (515228) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                            |
| FLT9041-3PH | P1             | 3 Phase fault on ONETA--4 (509806) 138 kV to BA101-N4 (509769) 138 kV line CKT 1, near ONETA--4 (509806) 138 kV.<br>a. Apply fault at the ONETA--4 (509806) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.          |
| FLT9042-3PH | P1             | 3 Phase fault on ONETA--4 (509806) 138 kV to 121LYNN4 (509869) 138 kV line CKT 1, near ONETA--4 (509806) 138 kV.<br>a. Apply fault at the ONETA--4 (509806) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.          |
| FLT9043-3PH | P1             | 3 Phase fault on ONETA--4 (509806) 138 kV to BA_71ST4 (509891) 138 kV line CKT 1, near ONETA--4 (509806) 138 kV.<br>a. Apply fault at the ONETA--4 (509806) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.          |
| FLT9044-3PH | P1             | 3 Phase fault on ONETA--4 (509806) 138 kV to BA101ST4 (509768) 138 kV line CKT 1, near ONETA--4 (509806) 138 kV.<br>a. Apply fault at the ONETA--4 (509806) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.          |
| FLT9045-3PH | P1             | 3 Phase fault on ONETA--4 (509806) 138 kV to BA.N-ST4 (509786) 138 kV line CKT 1, near ONETA--4 (509806) 138 kV.<br>a. Apply fault at the ONETA--4 (509806) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.          |
| FLT9046-3PH | P1             | 3 Phase fault on FIREWHL-TAP (588839) 345 kV to SEMINOL7 (515045) 345 kV line CKT 1, near FIREWHL-TAP (588839) 345 kV.<br>a. Apply fault at the FIREWHL-TAP (588839) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9047-3PH | P1             | 3 Phase fault on SEMINOL7 (515045) 345 kV to FIREWHL-TAP (588839) 345 kV line CKT 1, near SEMINOL7 (515045) 345 kV.<br>a. Apply fault at the SEMINOL7 (515045) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.       |
| FLT9048-3PH | P1             | 3 Phase fault on PECANCK7 (515235) 345 kV to R.S.S.-7 (509782) 345 kV line CKT 1, near PECANCK7 (515235) 345 kV.<br>a. Apply fault at the PECANCK7 (515235) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.          |
| FLT9049-3PH | P1             | 3 Phase fault on R.S.S.-7 (509782) 345 kV to PECANCK7 (515235) 345 kV line CKT 1, near R.S.S.-7 (509782) 345 kV.<br>a. Apply fault at the R.S.S.-7 (509782) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.          |
| FLT9050-3PH | P1             | 3 Phase fault on PECANCK7 (515235) 345 kV / PECANCK5 (515234) 161 kV / PECANCK21 (515759) 13.8 kV XFMR CKT 2, near PECANCK7 (515235) 345 kV.<br>a. Apply fault at the PECANCK7 (515235) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                          |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT9051-3PH | P1             | 3 Phase fault on PECANCK5 (515234) 161 kV / PECANCK7 (515235) 345 kV / PECANCK21 (515759) 13.8 kV XFMR CKT 2, near PECANCK5 (515234) 161 kV.<br>a. Apply fault at the PECANCK5 (515234) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9052-3PH | P1             | 3 Phase fault on PECANCK5 (515234) 161 kV / PECANCK4 (515233) 138 kV / PECANCK31 (515750) 13.2 kV XFMR CKT 1, near PECANCK5 (515234) 161 kV.<br>a. Apply fault at the PECANCK5 (515234) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9053-3PH | P1             | 3 Phase fault on PECANCK4 (515233) 138 kV / PECANCK5 (515234) 161 kV / PECANCK31 (515750) 13.2 kV XFMR CKT 1, near PECANCK4 (515233) 138 kV.<br>a. Apply fault at the PECANCK4 (515233) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9054-3PH | P1             | 3 Phase fault on PECANCK5 (515234) 161 kV to 5TRIBES5 (515228) 161 kV line CKT 1, near PECANCK5 (515234) 161 kV.<br>a. Apply fault at the PECANCK5 (515234) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.  |
| FLT9055-3PH | P1             | 3 Phase fault on 5TRIBES5 (515228) 161 kV to PECANCK5 (515234) 161 kV line CKT 1, near 5TRIBES5 (515228) 161 kV.<br>a. Apply fault at the 5TRIBES5 (515228) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.  |
| FLT9056-3PH | P1             | 3 Phase fault on PECANCK5 (515234) 161 kV to AGENCY 5 (515230) 161 kV line CKT 1, near PECANCK5 (515234) 161 kV.<br>a. Apply fault at the PECANCK5 (515234) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.  |
| FLT9057-3PH | P1             | 3 Phase fault on AGENCY 5 (515230) 161 kV to PECANCK5 (515234) 161 kV line CKT 1, near AGENCY 5 (515230) 161 kV.<br>a. Apply fault at the AGENCY 5 (515230) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.  |
| FLT9058-3PH | P1             | 3 Phase fault on PECANCK4 (515233) 138 kV to BEGGS 4 (515249) 138 kV line CKT 1, near PECANCK4 (515233) 138 kV.<br>a. Apply fault at the PECANCK4 (515233) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.   |
| FLT9059-3PH | P1             | 3 Phase fault on BEGGS 4 (515249) 138 kV to PECANCK4 (515233) 138 kV line CKT 1, near BEGGS 4 (515249) 138 kV.<br>a. Apply fault at the BEGGS 4 (515249) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.     |
| FLT9060-3PH | P1             | 3 Phase fault on BEGGS 4 (515249) 138 kV to BRISTOW4 (515035) 138 kV line CKT 1, near BEGGS 4 (515249) 138 kV.<br>a. Apply fault at the BEGGS 4 (515249) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.     |
| FLT9061-3PH | P1             | 3 Phase fault on 5TRIBES5 (515228) 161 kV to HANCOCK-5 (515250) 161 kV line CKT 1, near 5TRIBES5 (515228) 161 kV.<br>a. Apply fault at the 5TRIBES5 (515228) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT9062-3PH | P1             | 3 Phase fault on AGENCY 5 (515230) 161 kV / AGENCY 2 (515229) 69 kV / AGENCY 1 (515701) 13.8 kV XFMR CKT 1, near AGENCY 5 (515230) 161 kV.<br>a. Apply fault at the AGENCY 5 (515230) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| FLT9063-3PH | P1             | 3 Phase fault on AGENCY 5 (515230) 161 kV to EUCLID 5 (515251) 161 kV line CKT 1, near AGENCY 5 (515230) 161 kV.<br>a. Apply fault at the AGENCY 5 (515230) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| FLT9064-3PH | P1             | 3 Phase fault on R.S.S.-7 (509782) 345 kV to COGENT 7 (509834) 345 kV line CKT 1, near R.S.S.-7 (509782) 345 kV.<br>a. Apply fault at the R.S.S.-7 (509782) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus COGEN G1 (511953) 18 kV<br>Trip generator(s) on the Bus COGEN S1 (511954) 13.8 kV<br>Trip generator(s) on the Bus COGEN G2 (511955) 18 kV<br>Trip generator(s) on the Bus COGEN S2 (511956) 13.8 kV<br>Trip generator(s) on the Bus COGEN G3 (511957) 18 kV<br>Trip generator(s) on the Bus COGEN S3 (511958) 13.8 kV<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                                                                                                  |
| FLT9065-3PH | P1             | 3 Phase fault on R.S.S.-7 (509782) 345 kV to SAPLPRD7 (509870) 345 kV line CKT 1, near R.S.S.-7 (509782) 345 kV.<br>a. Apply fault at the R.S.S.-7 (509782) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| FLT9066-3PH | P1             | 3 Phase fault on R.S.S.-7 (509782) 345 kV to G16133G16146 (588039) 345 kV line CKT 1, near R.S.S.-7 (509782) 345 kV.<br>a. Apply fault at the R.S.S.-7 (509782) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus G9 0.69 (588057) 0.7 kV<br>Trip generator(s) on the Bus G10 0.69 (588058) 0.7 kV<br>Trip generator(s) on the Bus G1 0.69 (588067) 0.7 kV<br>Trip generator(s) on the Bus G2 0.69 (588068) 0.7 kV<br>Trip generator(s) on the Bus G3 0.69 (588077) 0.7 kV<br>Trip generator(s) on the Bus G4 0.69 (588078) 0.7 kV<br>Trip generator(s) on the Bus G5 0.69 (588087) 0.7 kV<br>Trip generator(s) on the Bus G6 0.69 (588088) 0.7 kV<br>Trip generator(s) on the Bus G7 0.69 (588097) 0.7 kV<br>Trip generator(s) on the Bus G8 0.69 (588098) 0.7 kV<br>Trip generator(s) on the Bus G11 0.69 (588107) 0.7 kV<br>Trip generator(s) on the Bus G12 0.69 (588108) 0.7 kV<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9067-3PH | P1             | 3 Phase fault on R.S.S.-7 (509782) 345 kV / RSS T2 4 (509875) 138 kV / RSST2 T1 (509876) 13.8 kV XFMR CKT 1, near R.S.S.-7 (509782) 345 kV.<br>a. Apply fault at the R.S.S.-7 (509782) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| FLT9068-3PH | P1             | 3 Phase fault on R.S.S.-7 (509782) 345 kV / RSS T1 4 (509773) 138 kV / RSST1 T1 (509882) 13.8 kV XFMR CKT 1, near R.S.S.-7 (509782) 345 kV.<br>a. Apply fault at the R.S.S.-7 (509782) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| FLT9069-3PH | P1             | 3 Phase fault on R.S.S.-7 (509782) 345 kV to REDBUD 7 (514909) 345 kV line CKT 1, near R.S.S.-7 (509782) 345 kV.<br>a. Apply fault at the R.S.S.-7 (509782) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT9070-3PH | P1             | 3 Phase fault on SEMINOL7 (515045) 345 kV to SEMINL2G (515041) 17.1 kV XFMR CKT 1, near SEMINOL7 (515045) 345 kV.<br>a. Apply fault at the SEMINOL7 (515045) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus SEMINL2G (515041) 17.1 kV                                                                                                                                                                                                                                                                                                                                                                    |
| FLT9071-3PH | P1             | 3 Phase fault on SEMINOL7 (515045) 345 kV to ARCADIA7 (514908) 345 kV line CKT 1, near SEMINOL7 (515045) 345 kV.<br>a. Apply fault at the SEMINOL7 (515045) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                   |
| FLT9072-3PH | P1             | 3 Phase fault on SEMINOL7 (515045) 345 kV to DRAPER 7 (514934) 345 kV line CKT 1, near SEMINOL7 (515045) 345 kV.<br>a. Apply fault at the SEMINOL7 (515045) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                   |
| FLT9073-3PH | P1             | 3 Phase fault on SEMINOL7 (515045) 345 kV / SEMINOL4 (515044) 138 kV / SEMINO11 (515756) 14.4 kV XFMR CKT 1, near SEMINOL7 (515045) 345 kV.<br>a. Apply fault at the SEMINOL7 (515045) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                                                                                                                                                                                                                                                                                    |
| FLT9074-3PH | P1             | 3 Phase fault on SEMINOL7 (515045) 345 kV to PITTSB-7 (510907) 345 kV line CKT 1, near SEMINOL7 (515045) 345 kV.<br>a. Apply fault at the SEMINOL7 (515045) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                   |
| FLT9075-3PH | P1             | 3 Phase fault on SEMINOL7 (515045) 345 kV to SEMINL3G (515042) 20.9 kV XFMR CKT 1, near SEMINOL7 (515045) 345 kV.<br>a. Apply fault at the SEMINOL7 (515045) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus SEMINL3G (515042) 20.9 kV                                                                                                                                                                                                                                                                                                                                                                    |
| FLT9076-3PH | P1             | 3 Phase fault on FIREWHL-TAP (588839) 345 kV to C-RIVER7 (515422) 345 kV line CKT 1, near FIREWHL-TAP (588839) 345 kV.<br>a. Apply fault at the FIREWHL-TAP (588839) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                          |
| FLT9077-3PH | P1             | 3 Phase fault on C-RIVER7 (515422) 345 kV to FIREWHL-TAP (588839) 345 kV line CKT 1, near C-RIVER7 (515422) 345 kV.<br>a. Apply fault at the C-RIVER7 (515422) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                |
| FLT9078-3PH | P1             | 3 Phase fault on FIREWHL-TAP (588839) 345 kV to G17-092-SWYD (588838) 345 kV line CKT 1, near FIREWHL-TAP (588839) 345 kV.<br>a. Apply fault at the FIREWHL-TAP (588839) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus G18-024GEN1 (762595) 0.7 kV<br>Trip generator(s) on the Bus G17-092-GEN1 (589303) 0.6 kV<br>Trip generator(s) on the Bus G17-092-GEN2 (589307) 0.6 kV<br>Trip generator(s) on the Bus G17-040-GEN1 (588813) 0.7 kV<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.   |
| FLT9079-3PH | P1             | 3 Phase fault on G17-092-SWYD (588838) 345 kV to FIREWHL-TAP (588839) 345 kV line CKT 1, near G17-092-SWYD (588838) 345 kV.<br>a. Apply fault at the G17-092-SWYD (588838) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus G18-024GEN1 (762595) 0.7 kV<br>Trip generator(s) on the Bus G17-092-GEN1 (589303) 0.6 kV<br>Trip generator(s) on the Bus G17-092-GEN2 (589307) 0.6 kV<br>Trip generator(s) on the Bus G17-040-GEN1 (588813) 0.7 kV<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT9080-3PH | P1             | 3 Phase fault on C-RIVER7 (515422) 345 kV / C-RIVER4 (510946) 138 kV / C-RIVER1 (510947) 13.8 kV XFMR CKT 1, near C-RIVER7 (515422) 345 kV.<br>a. Apply fault at the C-RIVER7 (515422) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| FLT9081-3PH | P1             | 3 Phase fault on C-RIVER4 (510946) 138 kV / C-RIVER7 (515422) 345 kV / C-RIVER1 (510947) 13.8 kV XFMR CKT 1, near C-RIVER4 (510946) 138 kV.<br>a. Apply fault at the C-RIVER4 (510946) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| FLT9082-3PH | P1             | 3 Phase fault on C-RIVER7 (515422) 345 kV to PITTSB-7 (510907) 345 kV line CKT 1, near C-RIVER7 (515422) 345 kV.<br>a. Apply fault at the C-RIVER7 (515422) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                                                                              |
| FLT9083-3PH | P1             | 3 Phase fault on C-RIVER4 (510946) 138 kV to G22-071-TAP (768400) 138 kV line CKT 1, near C-RIVER4 (510946) 138 kV.<br>a. Apply fault at the C-RIVER4 (510946) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                                                                           |
| FLT9084-3PH | P1             | 3 Phase fault on PECANCK7 (515235) 345 kV to GEN-2018-048 (762823) 345 kV line CKT 1, near PECANCK7 (515235) 345 kV.<br>a. Apply fault at the PECANCK7 (515235) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus G18-048-GEN1 (762826) 0.7 kV<br>Trip generator(s) on the Bus G21-052-GEN1 (765772) 0.7 kV<br>Trip generator(s) on the Bus G18-048-GEN2 (762829) 0.7 kV<br>Trip generator(s) on the Bus G21-053-GEN1 (765782) 0.6 kV<br>Trip generator(s) on the Bus G21-053-GEN2 (765785) 0.6 kV<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.         |
| FLT9085-3PH | P1             | 3 Phase fault on GEN-2018-048 (762823) 345 kV to PECANCK7 (515235) 345 kV line CKT 1, near GEN-2018-048 (762823) 345 kV.<br>a. Apply fault at the GEN-2018-048 (762823) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus G18-048-GEN1 (762826) 0.7 kV<br>Trip generator(s) on the Bus G21-052-GEN1 (765772) 0.7 kV<br>Trip generator(s) on the Bus G18-048-GEN2 (762829) 0.7 kV<br>Trip generator(s) on the Bus G21-053-GEN1 (765782) 0.6 kV<br>Trip generator(s) on the Bus G21-053-GEN2 (765785) 0.6 kV<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9086-3PH | P1             | 3 Phase fault on CLARKSV7 (509745) 345 kV to CHAMSPR7 (506945) 345 kV line CKT 1, near CLARKSV7 (509745) 345 kV.<br>a. Apply fault at the CLARKSV7 (509745) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                                                                              |
| FLT9087-3PH | P1             | 3 Phase fault on CHAMSPR7 (506945) 345 kV to CLARKSV7 (509745) 345 kV line CKT 1, near CHAMSPR7 (506945) 345 kV.<br>a. Apply fault at the CHAMSPR7 (506945) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                                                                              |
| FLT9088-3PH | P1             | 3 Phase fault on CLARKSV7 (509745) 345 kV to ONETA--7 (509807) 345 kV line CKT 1, near CLARKSV7 (509745) 345 kV.<br>a. Apply fault at the CLARKSV7 (509745) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                                                                                                                                                                                                              |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT9089-3PH | P1             | 3 Phase fault on ONETA--7 (509807) 345 kV to CLARKSV7 (509745) 345 kV line CKT 1, near ONETA--7 (509807) 345 kV.<br>a. Apply fault at the ONETA--7 (509807) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                       |
| FLT9090-3PH | P1             | 3 Phase fault on CLARKSV7 (509745) 345 kV to GEN-2017-140 (760389) 345 kV line CKT 1, near CLARKSV7 (509745) 345 kV.<br>a. Apply fault at the CLARKSV7 (509745) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus G17-140-GEN1 (760392) 0.6 kV<br>Trip generator(s) on the Bus G17-141-GEN1 (760412) 0.6 kV<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.         |
| FLT9091-3PH | P1             | 3 Phase fault on GEN-2017-140 (760389) 345 kV to CLARKSV7 (509745) 345 kV line CKT 1, near GEN-2017-140 (760389) 345 kV.<br>a. Apply fault at the GEN-2017-140 (760389) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>Trip generator(s) on the Bus G17-140-GEN1 (760392) 0.6 kV<br>Trip generator(s) on the Bus G17-141-GEN1 (760412) 0.6 kV<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9092-3PH | P1             | 3 Phase fault on CHAMSPR7 (506945) 345 kV / CHAMSPR5 (506944) 161 kV / CHAMSPR1 (506919) 13.8 kV XFMR CKT 1, near CHAMSPR7 (506945) 345 kV.<br>a. Apply fault at the CHAMSPR7 (506945) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                                                                                                                                                        |
| FLT9093-3PH | P1             | 3 Phase fault on CHAMSPR5 (506944) 161 kV / CHAMSPR7 (506945) 345 kV / CHAMSPR1 (506919) 13.8 kV XFMR CKT 1, near CHAMSPR5 (506944) 161 kV.<br>a. Apply fault at the CHAMSPR5 (506944) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                                                                                                                                                        |
| FLT9094-3PH | P1             | 3 Phase fault on CHAMSPR5 (506944) 161 kV to WEDINGTON (506992) 161 kV line CKT 1, near CHAMSPR5 (506944) 161 kV.<br>a. Apply fault at the CHAMSPR5 (506944) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.                                                                                                                                      |
| FLT9095-3PH | P1             | 3 Phase fault on CHAMSPR5 (506944) 161 kV to SILOAM 5 (506948) 161 kV line CKT 1, near CHAMSPR5 (506944) 161 kV.<br>a. Apply fault at the CHAMSPR5 (506944) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.                                                                                                                                       |
| FLT9096-3PH | P1             | 3 Phase fault on CHAMSPR5 (506944) 161 kV to SILOAMSP 5 (504202) 161 kV line CKT 1, near CHAMSPR5 (506944) 161 kV.<br>a. Apply fault at the CHAMSPR5 (506944) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.                                                                                                                                     |
| FLT9097-3PH | P1             | 3 Phase fault on CHAMSPR5 (506944) 161 kV to TONTITN5 (506957) 161 kV line CKT 1, near CHAMSPR5 (506944) 161 kV.<br>a. Apply fault at the CHAMSPR5 (506944) 161 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault.                                                                                                                                       |
| FLT9098-3PH | P1             | 3 Phase fault on CHAMSPR7 (506945) 345 kV to TONTITN7 (506959) 345 kV line CKT 1, near CHAMSPR7 (506945) 345 kV.<br>a. Apply fault at the CHAMSPR7 (506945) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.                                                                                                                                       |

Table 5-2 Continued

| Fault ID    | Planning Event | Fault Descriptions                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FLT9099-3PH | P1             | 3 Phase fault on ONETA--7 (509807) 345 kV to R.S.S.-7 (509782) 345 kV line CKT 1, near ONETA--7 (509807) 345 kV.<br>a. Apply fault at the ONETA--7 (509807) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9100-3PH | P1             | 3 Phase fault on R.S.S.-7 (509782) 345 kV to ONETA--7 (509807) 345 kV line CKT 1, near R.S.S.-7 (509782) 345 kV.<br>a. Apply fault at the R.S.S.-7 (509782) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9101-3PH | P1             | 3 Phase fault on ONETA--7 (509807) 345 kV / ONETA--4 (509806) 138 kV / ONETA5-1 (509874) 34.5 kV XFMR CKT 3, near ONETA--7 (509807) 345 kV.<br>a. Apply fault at the ONETA--7 (509807) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9102-3PH | P1             | 3 Phase fault on ONETA--4 (509806) 138 kV / ONETA--7 (509807) 345 kV / ONETA5-1 (509874) 34.5 kV XFMR CKT 3, near ONETA--4 (509806) 138 kV.<br>a. Apply fault at the ONETA--4 (509806) 138 kV Bus.<br>b. Clear fault after 7 cycles by tripping the faulted line.                                                                                                                                  |
| FLT9103-3PH | P1             | 3 Phase fault on ONETA--7 (509807) 345 kV to OEC 7 (509836) 345 kV line CKT 1, near ONETA--7 (509807) 345 kV.<br>a. Apply fault at the ONETA--7 (509807) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault.    |
| FLT9104-3PH | P1             | 3 Phase fault on ONETA--7 (509807) 345 kV to N.E.S.-7 (510406) 345 kV line CKT 1, near ONETA--7 (509807) 345 kV.<br>a. Apply fault at the ONETA--7 (509807) 345 kV Bus.<br>b. Clear fault after 6 cycles by tripping the faulted line.<br>c. Wait 20 cycles, and then re-close the line in (b) back into the fault.<br>d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |

### 5.3 Scenario 1 Results

Table 5-3 shows the relevant results of the fault events simulated for each of the modified models in Scenario 1. Existing DISIS base case issues are documented separately in Appendix C. The associated stability plots are also provided in Appendix C.

Table 5-3: Scenario 1 Dynamic Stability Results (EGF = 0 MW, SGF = 421.624 MW)

| Fault ID   | 25SP              |                  |        | 25WP              |                  |        |
|------------|-------------------|------------------|--------|-------------------|------------------|--------|
|            | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT1000-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1001-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1002-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1003-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1004-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1005-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1006-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1007-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1008-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1009-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |

Table 5-3 continued

| Fault ID    | 25SP              |                  |        | 25WP              |                  |        |
|-------------|-------------------|------------------|--------|-------------------|------------------|--------|
|             | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT1010-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1011-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1012-SB  | Fail              | Pass             | Stable | Fail              | Pass             | Stable |
| FLT1013-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1014-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1015-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1016-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1017-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1018-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1019-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1020-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1021-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1022-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1023-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1024-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1025-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1026-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1027-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1028-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1029-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1030-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1031-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9000-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9001-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9002-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9003-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9004-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9005-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9006-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9007-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9008-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9009-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9010-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9011-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9012-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9013-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9014-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |

Table 5-3 continued

| Fault ID    | 25SP              |                  |        | 25WP              |                  |        |
|-------------|-------------------|------------------|--------|-------------------|------------------|--------|
|             | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT9015-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9016-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9017-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9018-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9019-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9020-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9021-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9022-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9023-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9024-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9026-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9027-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9028-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9029-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9030-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9031-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9032-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9033-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9034-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9035-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9036-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9037-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9038-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9039-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9040-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9041-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9042-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9043-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9044-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9045-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9046-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9047-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9048-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9049-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9050-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9051-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9052-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |

Table 5-3 continued

| Fault ID    | 25SP              |                  |        | 25WP              |                  |        |
|-------------|-------------------|------------------|--------|-------------------|------------------|--------|
|             | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT9053-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9054-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9055-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9056-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9057-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9058-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9059-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9060-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9061-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9062-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9063-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9064-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9065-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9066-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9067-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9068-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9069-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9070-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9071-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9072-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9073-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9074-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9075-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9076-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9077-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9078-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9079-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9080-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9081-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9082-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9083-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9084-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9085-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9086-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9087-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9088-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9089-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |

Table 5-3 continued

| Fault ID    | 25SP              |                  |        | 25WP              |                  |        |
|-------------|-------------------|------------------|--------|-------------------|------------------|--------|
|             | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT9090-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9091-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9092-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9093-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9094-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9095-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9096-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9097-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9098-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9099-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9100-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9101-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9102-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9103-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9104-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |

The results of the Scenario 1 dynamic stability showed several existing base case issues that were found in both the original DISIS-2022-001-1 model and the model with GEN-2025-SR9 included. These issues were not attributed to the GEN-2025-SR9 surplus request and detailed in Appendix C.

There were no damping or voltage recovery violations attributed to the GEN-2025-SR9 surplus request observed during the simulated faults.

#### 5.4 Scenario 2 Results

Table 5-4 shows the relevant results of the fault events simulated for each of the modified models in Scenario 2. Existing DISIS base case issues are documented separately in Appendix C. The associated stability plots are also provided in Appendix C.

Table 5-4: Scenario 2 Dynamic Stability Results (EGF = 1580 MW, SGF = 421.624 MW)

| Fault ID   | 25SP              |                  |        | 25WP              |                  |        |
|------------|-------------------|------------------|--------|-------------------|------------------|--------|
|            | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT1000-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1001-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1002-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1003-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1004-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1005-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1006-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1007-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1008-SB | Pass              | Pass             | Stable | Pass              | Pass             | Stable |

Table 5-4 continued

| Fault ID    | 25SP              |                  |        | 25WP              |                  |        |
|-------------|-------------------|------------------|--------|-------------------|------------------|--------|
|             | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT1009-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1010-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1011-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1012-SB  | Fail              | Pass             | Stable | Fail              | Pass             | Stable |
| FLT1013-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1014-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1015-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1016-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1017-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1018-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1019-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1020-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1021-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1022-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1023-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1024-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1025-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1026-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1027-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1028-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1029-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1030-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT1031-SB  | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9000-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9001-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9002-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9003-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9004-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9005-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9006-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9007-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9008-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9009-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9010-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9011-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9012-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9013-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |

Table 5-4 continued

| Fault ID    | 25SP              |                  |        | 25WP              |                  |        |
|-------------|-------------------|------------------|--------|-------------------|------------------|--------|
|             | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT9014-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9015-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9016-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9017-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9018-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9019-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9020-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9021-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9022-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9023-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9024-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9026-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9027-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9028-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9029-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9030-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9031-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9032-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9033-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9034-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9035-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9036-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9037-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9038-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9039-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9040-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9041-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9042-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9043-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9044-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9045-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9046-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9047-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9048-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9049-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9050-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9051-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |

Table 5-4 continued

| Fault ID    | 25SP              |                  |        | 25WP              |                  |        |
|-------------|-------------------|------------------|--------|-------------------|------------------|--------|
|             | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT9052-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9053-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9054-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9055-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9056-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9057-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9058-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9059-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9060-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9061-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9062-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9063-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9064-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9065-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9066-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9067-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9068-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9069-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9070-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9071-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9072-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9073-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9074-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9075-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9076-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9077-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9078-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9079-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9080-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9081-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9082-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9083-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9084-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9085-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9086-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9087-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9088-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |

Table 5-4 continued

| Fault ID    | 25SP              |                  |        | 25WP              |                  |        |
|-------------|-------------------|------------------|--------|-------------------|------------------|--------|
|             | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT9089-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9090-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9091-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9092-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9093-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9094-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9095-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9096-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9097-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9098-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9099-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9100-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9101-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9102-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9103-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |
| FLT9104-3PH | Pass              | Pass             | Stable | Pass              | Pass             | Stable |

The results of the Scenario 2 dynamic stability showed several existing base case issues that were found in both the original DISIS-2022-001-1 model and the model with GEN-2025-SR9 included. These issues were not attributed to the GEN-2025-SR9 surplus request and detailed in Appendix C.

There were no damping or voltage recovery violations attributed to the GEN-2025-SR9 surplus request observed during the simulated faults.

## 6.0 Necessary Interconnection Facilities and Network Upgrades

This study identified the impact of the Surplus Interconnection Service on the transmission system reliability and any additional Interconnection Facilities or Network Upgrades necessary. The Surplus Interconnection Service is only available up to the amount that can be accommodated without requiring additional Network Upgrades unless (a) those additional Network Upgrades are either (1) located at the Point of Interconnection substation and at the same voltage level as the Generating Facility with an effective GIA, or (2) are System Protection Facilities; and (b) there are no material adverse impacts on the cost or timing of any Interconnection Requests pending at the time the Surplus Interconnection Service request is submitted.

### 6.1 Interconnection Facilities

This study did not identify any additional Interconnection Facilities required by the addition of the SGF.

### 6.2 Network Upgrades

This study did not identify any Network Upgrades required by the addition of the SGF. SPP will reach out to the TO and/or TOP to determine if there are any additional Network Upgrades that are either (1) located at the Point of Interconnection substation and at the same voltage level as the Generating Facility with an effective GIA, or (2) are System Protection Facilities.

## 7.0 Surplus Interconnection Service Determination and Requirements

In accordance with Attachment V of the SPP Tariff, SPP shall evaluate the request for Surplus Interconnection Service and inform the Interconnection Customer in writing of whether the Surplus Interconnection Service can be utilized without negatively impacting the reliability of the Transmission System and without any additional Network Upgrades necessary except those specified in the SPP Tariff.

### 7.1 Surplus Service Determination

SPP determined the request for Surplus Interconnection Service does not negatively impact the reliability of the Transmission System and no required Network Upgrades or Interconnection Facilities were identified by this Surplus Interconnection Service Impact Study performed by Aneden. Aneden evaluated the impact of the requested Surplus Interconnection Service on the prior study results and determined that the requested Surplus Interconnection Service resulted in similar dynamic stability and short circuit analyses and that the steady-state results did not show any additional impacts with the surplus online.

SPP has determined that GEN-2025-SR9 may utilize the requested 400 MW of Surplus Interconnection Service being made available by Muskogee Units 4, 5, and 6.

### 7.2 Surplus Service Requirements

The amount of Surplus Interconnection Service available to be used is limited by the amount of Interconnection Service granted to the existing interconnection customer at the same POI. The combined generation from both the SGF and the EGF may not exceed 1908 MW at the POI, which is the total Interconnection Service amount currently granted to the EGF.

The customer must install monitoring and control equipment as needed to ensure that the SGF does not exceed the granted surplus amount and to ensure that combination of the SGF and EGF power injected at the POI does not exceed the Interconnection Service amount determined by the legacy EGF's nameplate POI capacity. The monitoring and control scheme may be reviewed by the TO and documented in Appendix C of the SGF GIA.

SPP will reach out to the TO and/or TOP to determine if there are any additional Network Upgrades that are either (1) located at the Point of Interconnection substation and at the same voltage level as the Generating Facility with an effective GIA, or (2) are System Protection Facilities.