



Report on

GEN-2017-149 Modification Request Impact Study

Revision R1 **April 8, 2026**

Submitted to
Southwest Power Pool

anedenconsulting.com



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Revision History

| DATE OR VERSION NUMBER | AUTHOR | CHANGE DESCRIPTION |
|------------------------|-------------------|-----------------------|
| 4/8/2026 | Aneden Consulting | Initial Report Issued |
| | | |
| | | |

Executive Summary

Aneden Consulting (Aneden) was retained by the Southwest Power Pool (SPP) to perform a Modification Request Impact Study (Study) for GEN-2017-149, an active Generation Interconnection Request (GIR) with a Point of Interconnection (POI) at the Johnson County 345 kV substation.

The GEN-2017-149 project interconnects in the Oklahoma Gas & Electric (OKGE) transmission system with a capacity of 258 MW. This Study has been requested to evaluate the modification of GEN-2017-149 to change the configuration to 78 x Power Electronics FS4105M solar inverters operating at 3.357 MW for a total assumed dispatch of 261.846 MW. The inverters are rated at 4.105 MVA, thus the generating capability exceeds its Generator Interconnection Agreement (GIA) Interconnection Service amount. The injection amount must be limited to 258 MW at the POI as listed in Appendix A of the GIA. As a result, the customer must ensure that the amount of power injected at the POI does not exceed the Interconnection Service amount listed in its GIA. The requested modification includes the use of a Power Plant Controller (PPC) to limit the total power injected into the POI.

In addition, the modification request included changes to the generation interconnection line, collection system, generator step-up transformers, and main substation transformer. The existing and modified configurations for GEN-2017-149 are shown in Table ES-1 below.

Table ES-1: GEN-2017-149 Modification Request

| Facility | Existing Configuration | Modification Configuration |
|---|--|--|
| Point of Interconnection | Johnson County 345 kV (514809) | Johnson County 345 kV (514809) |
| Configuration/Capacity | 129 x GE 2.0 MW (wind) = 258 MW [dispatch] | 78 x Power Electronics FS4105M operating at 3.357 MW (solar) = 261.846 MW [dispatch] Units are rated at 4.105 MVA, PPC in place to limit POI to 258 MW |
| Generation Interconnection Line | Length = 68.0 miles R = 0.001014 pu X = 0.033932 pu B = 0.571200 pu Rating MVA = 1084 MVA | Length = 0.3 miles R = 0.000015 pu X = 0.000150 pu B = 0.002520 pu Rating MVA = 1084 MVA |
| Main Substation Transformer ¹ | X = 7.9975% R = 0.1999% Winding MVA = 174 Winding Rating A/B/C MVA = 290 MVA | X12 = 8.4973% R12 = 0.2124%, X23 = 5.0506% R23 = 0.3105%, X13 = 15.5856% R13 = 0.3702%, Winding MVA = 96.7 MVA, Winding 1, 2, & 3 Rating A/B/C MVA = 290 MVA |
| Equivalent GSU Transformer ¹ | Gen 1 Equivalent Qty: 129 X = 5.6996%, R = 0.7599%, Winding MVA = 296.7 MVA, Rating MVA = 296.7 MVA | Gen 1 Equivalent Qty: 78 X = 5.5996%, R = 0.7599%, Winding MVA = 320.19 MVA, Rating MVA = 320.19 MVA |
| Equivalent Collector Line ² | R = 0.001700 pu X = 0.001800 pu B = 0.037300 pu | R = 0.002062 pu X = 0.001086 pu B = 0.015475 pu |
| Generator Dynamic Model ³ & Power Factor | 129 x GE 2.0 MW (wind) (GEWTGCU1) ³ Leading: 0.95 Lagging: 0.95 | 78 x Power Electronics FS4105M (REGCA1) ³ Leading: 0.82 Lagging: 0.82 |

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

SPP determined that steady-state analysis was not required because the modifications to the project were not significant enough to change the previously studied steady-state conclusions. However, SPP determined that the change in fuel type from wind to solar required short circuit and dynamic stability analyses.

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

Aneden performed the analyses using the modification request data and the DISIS-2021-001 Phase 2 stability study models:

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

Aneden reviewed Generation Interconnection Requests (GIRs) that shared the same POI, Johnson County 345 kV, and updated their models as applicable based on SPP's confirmation of the latest project configurations. As a result, Aneden removed the terminated GEN-2017-154 project from the base models.

All analyses were performed using the Siemens PTI PSS/E¹ version 34 software and the results are summarized below.

The results of the reactive power analysis using the 25SP model showed that the GEN-2017-149 project needed a 1.8 MVAR shunt reactor on the 34.5 kV bus of the project substation with the modifications in place, a decrease from the 36.47 MVAR found in the DISIS-2017-002 study². This is necessary to offset the capacitive effect on the transmission network caused by the project's transmission line and collector system during reduced generation conditions. The information gathered from the reactive power analysis is provided as information to the Interconnection Customer and Transmission Owner (TO) and/or Transmission Operator (TOP). The applicable reactive power requirements will be further reviewed by the TO and/or TOP.

The short circuit analysis was performed using the 25SP stability model modified for short circuit analysis. The results from the short circuit analysis with the updated topology showed that the maximum GEN-2017-149 contribution to three-phase fault currents in the immediate transmission systems at or near the GEN-2017-149 POI was 0.30 kA. The maximum three-phase fault current level within 5 buses of the POI was 55.5 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. 87 fault events were simulated, which included three-phase faults and single-line-to-ground stuck breaker faults.

The results of the dynamic stability analysis showed several existing base case issues that were found in both the original DISIS-2021-001 Phase 2 models and in the models with the GEN-2017-149 modification included. These issues were not attributed to the GEN-2017-149 modification request and are detailed in Appendix C.

¹ Power System Simulator for Engineering

² DISIS-2017-002-2 Restudy of Power Flow, Stability, and Short-Circuit – November 15, 2024

There were no damping or voltage recovery violations attributed to the GEN-2017-149 modification request observed during the simulated faults. Additionally, the project was found to stay connected during the contingencies that were studied and, therefore, will meet the Low Voltage Ride Through (LVRT) requirements of FERC Order #661A.

Based on the results of the study, SPP determined that the requested modification is **not a Material Modification**. The requested modification does not have a material adverse impact on the cost or timing of any other Interconnection Request with a later Queue priority date. As the requested modification places the generating capacity of the Interconnection Request at a higher amount than its Interconnection Service, the customer must install monitoring and control equipment as needed to ensure that the amount of power injected at the POI does not exceed the Interconnection Service amount listed in its GIA.

In accordance with FERC Order No. 827, the generating facility will be required to provide dynamic reactive power within the range of 0.95 leading to 0.95 lagging at the high-side of the generator substation.

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 Southwest Power Pool's OASIS by the customer.

1.0 Scope of Study

Aneden Consulting (Aneden) was retained by the Southwest Power Pool (SPP) to perform a Modification Request Impact Study (Study) for GEN-2017-149. A Modification Request Impact Study is a generation interconnection study performed to evaluate the impacts of modifying the DISIS study assumptions. The determination of the required scope of the study is dependent upon the specific modification requested and how it may impact the results of the DISIS study. Impacting the DISIS results could potentially affect the cost or timing of any Interconnection Request with a later Queue priority date, deeming the requested modification a Material Modification. The criteria sections below include reasoning as to why an analysis was either included or excluded from the scope of study.

All analyses were performed using the Siemens PTI PSS/E version 34 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 capacitive effect at the POI caused by the project's collection system and transmission line's capacitance. A shunt reactor size was determined to offset the capacitive effect and maintain zero (0) MVAR injection at the POI while the plant's generators and capacitors were offline.

1.2 Short Circuit Analysis & Stability Analysis

To determine whether stability and short circuit analyses are required, SPP evaluates the difference between the stability models, the stability model parameters and, if needed, the equivalent collector system impedance between the existing configuration and the requested modification. Dynamic stability analysis and short circuit analysis would be required if the differences listed above were determined to have a significant impact on the most recently performed DISIS stability analysis.

1.3 Steady-State Analysis

Steady-state analysis is performed if SPP deems it necessary based on the nature of the requested change. SPP determined that steady-state analysis was not required because the modifications to the project were not significant enough to change the previously studied steady-state conclusions.

1.4 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.

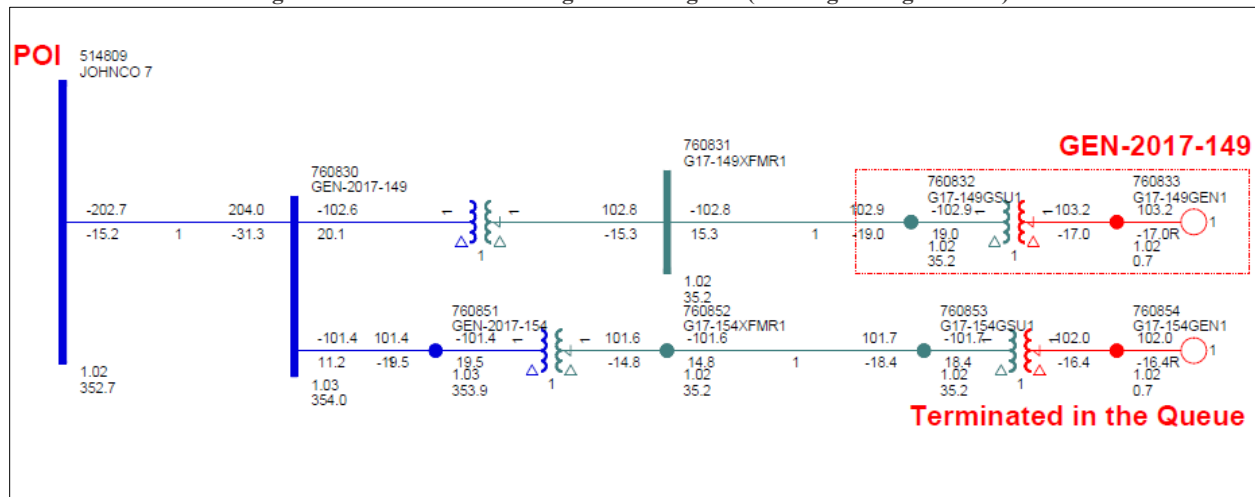
2.0 Project and Modification Request

The GEN-2017-149 Interconnection Customer requested a modification to its Generation Interconnection Request (GIR) with a Point of Interconnection (POI) at the Johnson County 345 kV Substation in the Oklahoma Gas & Electric (OKGE) transmission system.

At the time of report posting, GEN-2017-149 is an active Interconnection Request with a queue status of “IA FULLY EXECUTED/ON SCHEDULE.” GEN-2017-149 is a wind facility with a maximum summer and winter queue capacity of 258 MW with Energy Resource Interconnection Service (ERIS) and Network Resource Interconnection Service (NRIS).

The GEN-2017-149 project is currently in the DISIS-2017-002 cluster. Figure 2-1 shows the power flow model single line diagram for the existing GEN-2017-149 configuration using the DISIS-2021-001 Phase 2 25SP stability model.

Figure 2-1: GEN-2017-149 Single Line Diagram (Existing Configuration*)



*based on the DISIS-2021-001 Phase 2 25SP stability models

This Study has been requested to evaluate the modification of GEN-2017-149 to change the configuration to 78 x Power Electronics FS4105M solar inverters operating at 3.357 MW for a total assumed dispatch of 261.846 MW. The inverters are rated at 4.105 MVA, thus the generating capability exceeds its Generator Interconnection Agreement (GIA) Interconnection Service amount. The injection amount must be limited to 258 MW at the POI as listed in Appendix A of the GIA. As a result, the customer must ensure that the amount of power injected at the POI does not exceed the Interconnection Service amount listed in its GIA. The requested modification includes the use of a Power Plant Controller (PPC) to limit the total power injected into the POI.

In addition, the modification request included changes to the generation interconnection line, collection system, generator step-up transformers, and main substation transformer.

Aneden reviewed Generation Interconnection Requests (GIRs) that shared the same POI, Johnson County 345 kV, and updated their models as applicable based on SPP’s confirmation of the latest project configurations. As a result, Aneden removed the terminated GEN-2017-154 project from the base models.

Figure 2-2 shows the power flow model single line diagram for the GEN-2017-149 modification. The existing and modified configurations for GEN-2017-149 are shown in Table 2-1 below.

Figure 2-2: GEN-2017-149 Single Line Diagram (Modification Configuration)

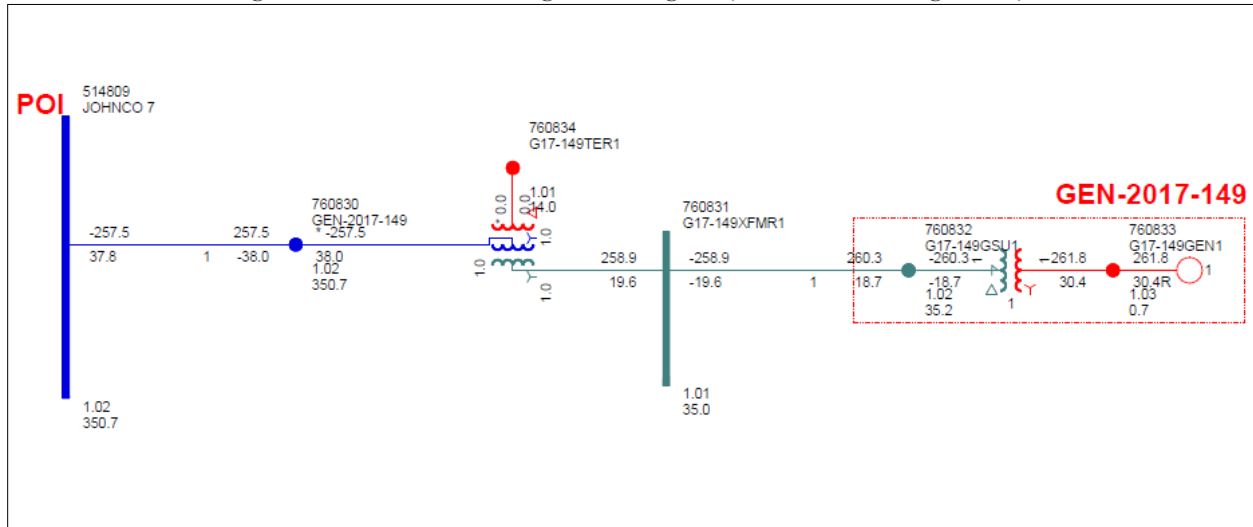


Table 2-1: GEN-2017-149 Modification Request

| Facility | Existing Configuration | Modification Configuration |
|---|--|--|
| Point of Interconnection | Johnson County 345 kV (514809) | Johnson County 345 kV (514809) |
| Configuration/Capacity | 129 x GE 2.0 MW (wind) = 258 MW [dispatch] | 78 x Power Electronics FS4105M operating at 3.357 MW (solar) = 261.846 MW [dispatch] Units are rated at 4.105 MVA, PPC in place to limit POI to 258 MW |
| Generation Interconnection Line | Length = 68.0 miles R = 0.001014 pu X = 0.033932 pu B = 0.571200 pu Rating MVA = 1084 MVA | Length = 0.3 miles R = 0.000015 pu X = 0.000150 pu B = 0.002520 pu Rating MVA = 1084 MVA |
| Main Substation Transformer ¹ | X = 7.9975% R = 0.1999% Winding MVA = 174 Winding Rating A/B/C MVA = 290 MVA | X12 = 8.4973% R12 = 0.2124%, X23 = 5.0506% R23 = 0.3105%, X13 = 15.5856% R13 = 0.3702%, Winding MVA = 96.7 MVA, Winding 1, 2, & 3 Rating A/B/C MVA = 290 MVA |
| Equivalent GSU Transformer ¹ | Gen 1 Equivalent Qty: 129 X = 5.6996%, R = 0.7599%, Winding MVA = 296.7 MVA, Rating MVA = 296.7 MVA | Gen 1 Equivalent Qty: 78 X = 5.5996%, R = 0.7599%, Winding MVA = 320.19 MVA, Rating MVA = 320.19 MVA |
| Equivalent Collector Line ² | R = 0.001700 pu X = 0.001800 pu B = 0.037300 pu | R = 0.002062 pu X = 0.001086 pu B = 0.015475 pu |
| Generator Dynamic Model ³ & Power Factor | 129 x GE 2.0 MW (wind) (GEWTGCU1) ³ Leading: 0.95 Lagging: 0.95 | 78 x Power Electronics FS4105M (REGCA1) ³ Leading: 0.82 Lagging: 0.82 |

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

3.0 Existing vs Modification Comparison

To determine which analyses are required for the Study, the differences between the existing configuration and the requested modification were evaluated. Aneden performed this comparison and the resulting analyses using a set of modified study models developed based on the modification request data and the DISIS-2021-001 Phase 2 stability study models. The analysis was completed using PSS/E version 34 software.

The methodology and results of the comparisons are described below.

3.1 Stability Model Parameters Comparison

SPP determined that short circuit and dynamic stability analyses were required because of the fuel type change from wind to solar. This is because the short circuit contribution and stability responses of the existing configuration and the requested modification's configuration may differ. The generator dynamic model for the modification can be found in Appendix A.

As short circuit and dynamic stability analyses were already deemed required, a stability model parameters comparison was not needed for the determination of the scope of the study.

3.2 Equivalent Impedance Comparison Calculation

As the fuel type change determined that short circuit and dynamic stability analyses were required, an equivalent impedance comparison was not needed for the determination of the scope of the study.

4.0 Reactive Power Analysis

The reactive power analysis was performed for GEN-2017-149 to determine the capacitive charging effects during reduced generation conditions (unsuitable wind speeds, unsuitable solar irradiance, insufficient state of charge, idle conditions, curtailment, etc.) at the generation site and to size shunt reactors that would reduce the project reactive power contribution to the POI to approximately zero.

4.1 Methodology and Criteria

The GEN-2017-149 generators were switched out of service while other system elements remained in-service. A shunt reactor was tested at the project’s collection substation 34.5 kV bus to reduce the MVar injection at the POI to zero. The size of the shunt reactor is equivalent to the charging current value at unity voltage and the compensation provided is proportional to the voltage effects on the charging current (i.e., for voltages above unity, reactive compensation is greater than the size of the reactor).

Aneden performed the reactive power analysis using the modification request data based on the 25SP DISIS-2021-001 Phase 2 stability study model.

4.2 Results

The results from the analysis showed that the GEN-2017-149 project needed approximately 1.8 MVar of compensation at its collector substation to reduce the MVar injection at the POI to zero. This is a decrease from the 36.47 MVar found in the DISIS-2017-002 study³. The final shunt reactor requirements are shown in Table 4-1. Figure 4-1 illustrates the shunt reactor size needed to reduce the POI MVar to approximately zero with the updated topology.

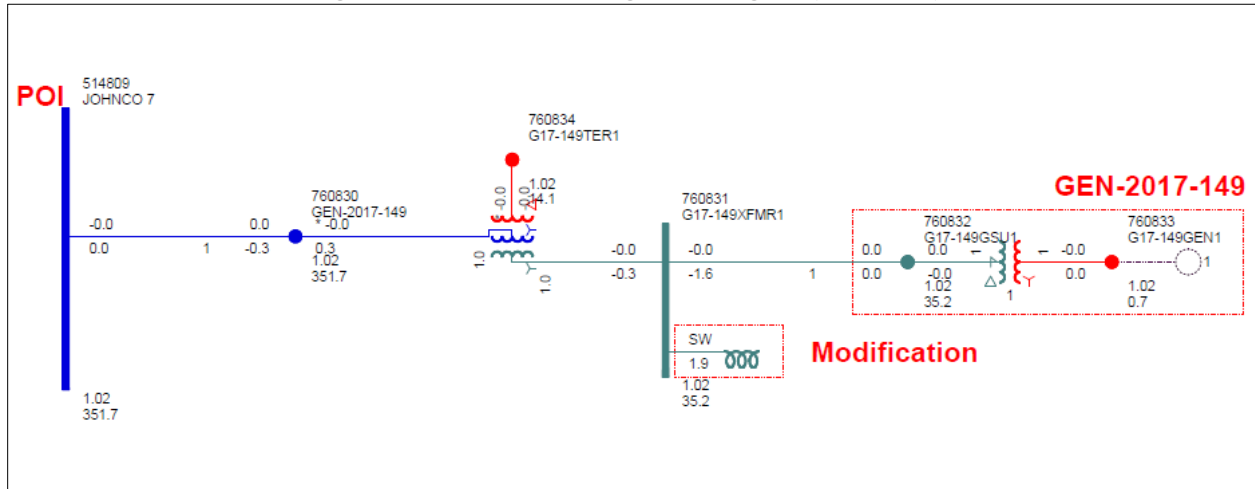
The information gathered from the reactive power analysis is provided as information to the Interconnection Customer and Transmission Owner (TO) and/or Transmission Operator (TOP). The applicable reactive power requirements will be further reviewed by the TO and/or TOP.

Table 4-1: Shunt Reactor Size for Reactive Power Analysis

| Machine | POI Bus Number | POI Bus Name | Reactor Size (MVar) |
|--------------|----------------|-----------------|---------------------|
| | | | 25SP |
| GEN-2017-149 | 514809 | JOHNCO 7 345 kV | 1.8 |

³ DISIS-2017-002-2 Restudy of Power Flow, Stability, and Short-Circuit – November 15, 2024

Figure 4-1: GEN-2017-149 Single Line Diagram (Shunt Sizes)



5.0 Short Circuit Analysis

Aneden performed a short circuit study using the 25SP model for GEN-2017-149 to determine the maximum fault current requiring interruption by protective equipment for each bus in the relevant subsystem. The detailed results of the short circuit analysis are provided in Appendix B.

5.1 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 GEN-2017-149 online.

Aneden created a short circuit model using the 25SP DISIS-2021-001 Phase 2 stability study model by adjusting the GEN-2017-149 short circuit parameters consistent with the submitted data. The adjusted parameters used in the short circuit analysis are shown in Table 5-1 below. No other changes were made to the model.

Table 5-1: Short Circuit Model Parameters*

| Parameter | Value by Generator Bus# |
|------------------|-------------------------|
| | 760833 |
| Machine MVA Base | 320 |
| R (pu) | 0.872 |
| X'' (pu) | 0.962 |

*pu values based on Machine MVA Base

5.2 Results

The results of the short circuit analysis for the 25SP model are summarized in Table 5-2 and Table 5-3. The GEN-2017-149 POI bus (Johnson County 345 kV) fault current magnitudes for the comparison cases are provided in Table 5-2 showing a fault current of 10.98 kA with the GEN-2017-149 project online. Table 5-3 shows the maximum fault current magnitudes and fault current increases with the GEN-2017-149 project online.

The maximum fault current calculated within 5 buses of the POI was 55.5 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 GEN-2017-149 contribution to three-phase fault currents was about 2.8% and 0.30 kA.

Table 5-2: POI Short Circuit Comparison Results

| Case | GEN-OFF Current (kA) | GEN-ON Current (kA) | kA Change | %Change |
|------|----------------------|---------------------|-----------|---------|
| 25SP | 10.68 | 10.98 | 0.30 | 2.8% |

Table 5-3: 25SP Short Circuit Comparison Results

| Voltage (kV) | Max. Current (kA) | Max kA Change | Max %Change |
|--------------|-------------------|---------------|-------------|
| 69 | 12.1 | 0.01 | 0.1% |
| 115 | 17.3 | 0.00 | 0.0% |
| 138 | 55.5 | 0.26 | 1.4% |
| 345 | 34.8 | 0.30 | 2.8% |
| Max | 55.5 | 0.30 | 2.8% |

6.0 Dynamic Stability Analysis

Aneden performed a dynamic stability analysis to identify the impact of the modifications to GEN-2017-149. The analysis was performed according to SPP's Disturbance Performance Requirements⁴. The modification 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.

6.1 Methodology and Criteria

The dynamic stability analysis was performed using models developed with the requested GEN-2017-149 configuration of 78 x Power Electronics FS4105M inverters operating at 3.357 MW (REGCA1). This stability analysis was performed using Siemens PTI's PSS/E version 34.8.1 software.

The modifications requested for the GEN-2017-149 project were used to create modified stability models for this impact study based on the DISIS-2021-001 Phase 2 stability study models:

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

Aneden reviewed Generation Interconnection Requests (GIRs) that shared the same POI, Johnson County 345 kV, and updated their models as applicable based on SPP's confirmation of the latest project configurations. As a result, Aneden removed the terminated GEN-2017-154 project from the base models.

The dynamic model data for the GEN-2017-149 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 modification request:

- 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 GEN-2017-149 and other current and prior queued projects in Group 4. In addition, voltages of five (5) buses away from the POI of the GEN-2017-149 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.

6.2 Fault Definitions

Aneden developed fault events as required to study the modification. 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

⁴ 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)

bring the faulted bus positive sequence voltage to 0.6 pu. The simulated faults are listed and described in Table 6-1 below. These contingencies were applied to the modified 25SP and 25WP models.

Table 6-1: Fault Definitions

| Fault ID | Planning Event | Fault Descriptions |
|------------|----------------|---|
| FLT1000-SB | P4 | Stuck Breaker on JOHNCO 7 (514809) 345 kV Bus a. Apply single phase fault at the JOHNCO 7 (514809) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the JOHNCO 7 (514809) 345 kV to PITTSB-7 (510907) 345 kV line CKT 1. b.2.Trip the JOHNCO 7 (514809) 345 kV / JOHNCO 4 (514808) 138 kV / JOHNCO11 (514810) 13.8 kV XFMR CKT 1. |
| FLT1001-SB | P4 | Stuck Breaker on JOHNCO 7 (514809) 345 kV Bus a. Apply single phase fault at the JOHNCO 7 (514809) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the JOHNCO 7 (514809) 345 kV to DMNDSPG7 (516006) 345 kV line CKT 1. b.2. UNIT DMNDSG11 (516000) 0.7 kV #1 b.3. UNIT DMNDSG21 (516001) 0.7 kV #1 b.4.Trip the DMNDSG21 (516001) 0.7 kV to GEN-2017-149 (760830) 345 kV line CKT 1. b.5. UNIT G17-149GEN1 (760833) 0.7 kV #1 |
| FLT1002-SB | P4 | Stuck Breaker on JOHNCO 7 (514809) 345 kV Bus a. Apply single phase fault at the JOHNCO 7 (514809) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the JOHNCO 7 (514809) 345 kV to DMNDSPG7 (516006) 345 kV line CKT 1. b.2.Trip the JOHNCO 7 (514809) 345 kV to G21-016-TAP (765451) 345 kV line CKT 1. b.3. UNIT DMNDSG11 (516000) 0.7 kV #1 b.4. UNIT DMNDSG21 (516001) 0.7 kV #1 |
| FLT1003-SB | P4 | Stuck Breaker on JOHNCO 7 (514809) 345 kV Bus a. Apply single phase fault at the JOHNCO 7 (514809) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the JOHNCO 7 (514809) 345 kV to G21-016-TAP (765451) 345 kV line CKT 1. b.2.Trip the JOHNCO 7 (514809) 345 kV / JOHNCO 4 (514808) 138 kV / JOHNCO11 (514810) 13.8 kV XFMR CKT 1. |
| FLT1004-SB | P4 | Stuck Breaker on JOHNCO 4 (514808) 138 kV Bus a. Apply single phase fault at the JOHNCO 4 (514808) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the JOHNCO 4 (514808) 138 kV / JOHNCO 7 (514809) 345 kV / JOHNCO11 (514810) 13.8 kV XFMR CKT 1. b.2.Trip the JOHNCO 4 (514808) 138 kV to RUSSET-4 (515120) 138 kV line CKT 1. |
| FLT1005-SB | P4 | Stuck Breaker on JOHNCO 4 (514808) 138 kV Bus a. Apply single phase fault at the JOHNCO 4 (514808) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the JOHNCO 4 (514808) 138 kV / JOHNCO 7 (514809) 345 kV / JOHNCO11 (514810) 13.8 kV XFMR CKT 1. b.2.Trip the JOHNCO 4 (514808) 138 kV to SXMLCKT4 (515122) 138 kV line CKT 1. |
| FLT1006-SB | P4 | Stuck Breaker on JOHNCO 4 (514808) 138 kV Bus a. Apply single phase fault at the JOHNCO 4 (514808) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip bus JOHNCO 4 (514808) 138 kV. b.2.Trip the JOHNCO 4 (514808) 138 kV to SXMLCKT4 (515122) 138 kV line CKT 1. b.3.Trip the JOHNCO 4 (514808) 138 kV to CANEYCK4 (515150) 138 kV line CKT 1. |
| FLT1007-SB | P4 | Stuck Breaker on JOHNCO 4 (514808) 138 kV Bus a. Apply single phase fault at the JOHNCO 4 (514808) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the JOHNCO 4 (514808) 138 kV / JOHNCO 7 (514809) 345 kV / JOHNCO12 (514812) 13.8 kV XFMR CKT 1. b.2.Trip the JOHNCO 4 (514808) 138 kV to RUSSET-4 (515120) 138 kV line CKT 1. |
| FLT1008-SB | P4 | Stuck Breaker on G21-016-TAP (765451) 345 kV Bus a. Apply single phase fault at the G21-016-TAP (765451) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip bus G21-016-TAP (765451) 345 kV. b.2. UNIT G21-016-GEN1 (765452) 0.7 kV #1 |

Table 6-1 Continued

| Fault ID | Planning Event | Fault Descriptions |
|------------|----------------|--|
| FLT1009-SB | P4 | Stuck Breaker on PITTSB-7 (510907) 345 kV Bus a. Apply single phase fault at the PITTSB-7 (510907) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1. Trip the PITTSB-7 (510907) 345 kV to JOHNCO 7 (514809) 345 kV line CKT 1. b.2. Trip the PITTSB-7 (510907) 345 kV to GEN-2018-082 (763131) 345 kV line CKT 1. b.3. UNIT G18-082-GEN1 (763134) 0.7 kV #1 b.4. UNIT G18-082-GEN2 (763137) 0.7 kV #1 |
| FLT1010-SB | P4 | Stuck Breaker on PITTSB-7 (510907) 345 kV Bus a. Apply single phase fault at the PITTSB-7 (510907) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1. Trip the PITTSB-7 (510907) 345 kV to JOHNCO 7 (514809) 345 kV line CKT 1. b.2. Trip the PITTSB-7 (510907) 345 kV to KIOWA 7 (510925) 345 kV line CKT 1. b.3. UNIT KIOWA G1 (511944) 18 kV #1 b.4. UNIT KIOWA G2 (511945) 18 kV #1 b.5. UNIT KIOWA S1 (511946) 18 kV #1 b.6. UNIT KIOWA S2 (511947) 18 kV #1 b.6. UNIT KIOWA G3 (511948) 18 kV #1 b.7. UNIT KIOWA G4 (511949) 18 kV #1 |
| FLT1011-SB | P4 | Stuck Breaker on PITTSB-7 (510907) 345 kV Bus a. Apply single phase fault at the PITTSB-7 (510907) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1. Trip the PITTSB-7 (510907) 345 kV to KIOWA 7 (510925) 345 kV line CKT 1. b.2. Trip the PITTSB-7 (510907) 345 kV to SEMINOL7 (515045) 345 kV line CKT 1. b.3. UNIT KIOWA G1 (511944) 18 kV #1 b.4. UNIT KIOWA G2 (511945) 18 kV #1 b.5. UNIT KIOWA S1 (511946) 18 kV #1 b.6. UNIT KIOWA S2 (511947) 18 kV #1 b.6. UNIT KIOWA G3 (511948) 18 kV #1 b.7. UNIT KIOWA G4 (511949) 18 kV #1 |
| FLT1012-SB | P4 | Stuck Breaker on PITTSB-7 (510907) 345 kV Bus a. Apply single phase fault at the PITTSB-7 (510907) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1. Trip the PITTSB-7 (510907) 345 kV to SEMINOL7 (515045) 345 kV line CKT 1. b.2. Trip the PITTSB-7 (510907) 345 kV to VALIANT7 (510911) 345 kV line CKT 2. |
| FLT1013-SB | P4 | Stuck Breaker on PITTSB-7 (510907) 345 kV Bus a. Apply single phase fault at the PITTSB-7 (510907) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1. Trip the PITTSB-7 (510907) 345 kV to C-RIVER7 (515422) 345 kV line CKT 1. b.2. Trip the PITTSB-7 (510907) 345 kV to VALIANT7 (510911) 345 kV line CKT 1. |
| FLT1014-SB | P4 | Stuck Breaker on RUSSET-4 (515120) 138 kV Bus a. Apply single phase fault at the RUSSET-4 (515120) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1. Trip bus RUSSET-4 (515120) 138 kV. |
| FLT1015-SB | P4 | Stuck Breaker on CANEYCK4 (515150) 138 kV Bus a. Apply single phase fault at the CANEYCK4 (515150) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1. Trip the CANEYCK4 (515150) 138 kV to LTLCCITY4 (515151) 138 kV line CKT 1. b.2. Trip the CANEYCK4 (515150) 138 kV to MADINDT4 (515149) 138 kV line CKT 1. |
| FLT1016-SB | P4 | Stuck Breaker on CANEYCK4 (515150) 138 kV Bus a. Apply single phase fault at the CANEYCK4 (515150) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1. Trip the CANEYCK4 (515150) 138 kV to MADINDT4 (515149) 138 kV line CKT 1. b.2. Trip the CANEYCK4 (515150) 138 kV to JOHNCO 4 (514808) 138 kV line CKT 1. |
| FLT1017-SB | P4 | Stuck Breaker on CANEYCK4 (515150) 138 kV Bus a. Apply single phase fault at the CANEYCK4 (515150) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1. Trip the CANEYCK4 (515150) 138 kV to JOHNCO 4 (514808) 138 kV line CKT 1. b.2. Trip the CANEYCK4 (515150) 138 kV to TEXOMAJ4 (521067) 138 kV line CKT 1. |
| FLT1018-SB | P4 | Stuck Breaker on CANEYCK4 (515150) 138 kV Bus a. Apply single phase fault at the CANEYCK4 (515150) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1. Trip the CANEYCK4 (515150) 138 kV to TEXOMAJ4 (521067) 138 kV line CKT 1. b.2. LOAD CANEYCK4 (515150) 138 kV #1 |

Table 6-1 Continued

| Fault ID | Planning Event | Fault Descriptions |
|-------------|----------------|--|
| FLT1019-SB | P4 | Stuck Breaker on SXMLCKT4 (515122) 138 kV Bus a. Apply single phase fault at the SXMLCKT4 (515122) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip bus SXMLCKT4 (515122) 138 kV. |
| FLT1020-SB | P4 | Stuck Breaker on JOHNCO 7 (514809) 345 kV Bus a. Apply single phase fault at the JOHNCO 7 (514809) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the JOHNCO 7 (514809) 345 kV to PITTSB-7 (510907) 345 kV line CKT 1. b.2.Trip the JOHNCO 7 (514809) 345 kV / JOHNCO 4 (514808) 138 kV / JOHNCO12 (514812) 13.8 kV XFMR CKT 1. |
| FLT1021-SB | P4 | Stuck Breaker on JOHNCO 7 (514809) 345 kV Bus a. Apply single phase fault at the JOHNCO 7 (514809) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the JOHNCO 7 (514809) 345 kV / JOHNCO 4 (514808) 138 kV / JOHNCO12 (514812) 13.8 kV XFMR CKT 1. b.2.Trip the JOHNCO 7 (514809) 345 kV to GEN-2017-149 (760830) 345 kV line CKT 1. b.3. UNIT G17-149GEN1 (760833) 0.7 kV #1 |
| FLT1022-SB | P4 | Stuck Breaker on JOHNCO 4 (514808) 138 kV Bus a. Apply single phase fault at the JOHNCO 4 (514808) 138 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the JOHNCO 4 (514808) 138 kV to CANEYCK4 (515150) 138 kV line CKT 1. b.2.Trip the JOHNCO 4 (514808) 138 kV / JOHNCO 7 (514809) 345 kV / JOHNCO12 (514812) 13.8 kV XFMR CKT 1. |
| FLT1023-SB | P4 | Stuck Breaker on PITTSB-7 (510907) 345 kV Bus a. Apply single phase fault at the PITTSB-7 (510907) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the PITTSB-7 (510907) 345 kV to C-RIVER7 (515422) 345 kV line CKT 1. b.2.Trip the PITTSB-7 (510907) 345 kV to VALIANT7 (510911) 345 kV line CKT 2. |
| FLT1024-SB | P4 | Stuck Breaker on PITTSB-7 (510907) 345 kV Bus a. Apply single phase fault at the PITTSB-7 (510907) 345 kV Bus b. Clear fault after 16 cycles and trip the following elements: b.1.Trip the PITTSB-7 (510907) 345 kV to VALIANT7 (510911) 345 kV line CKT 1. b.2.Trip the PITTSB-7 (510907) 345 kV to GEN-2018-082 (763131) 345 kV line CKT 1. b.3. UNIT G18-082-GEN1 (763134) 0.7 kV #1 b.4. UNIT G18-082-GEN2 (763137) 0.7 kV #1 |
| FLT9000-3PH | P1 | 3 Phase fault on JOHNCO 7 (514809) 345 kV to GEN-2017-149 (760830) 345 kV line CKT 1, near JOHNCO 7 (514809) 345 kV. a. Apply fault at the JOHNCO 7 (514809) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. b.2. UNIT G17-149GEN1 (760833) 0.7 kV #1 c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9001-3PH | P1 | 3 Phase fault on JOHNCO 7 (514809) 345 kV to DMNDSPG7 (516006) 345 kV line CKT 1, near JOHNCO 7 (514809) 345 kV. a. Apply fault at the JOHNCO 7 (514809) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. b.2. UNIT DMNDSG11 (516000) 0.7 kV #1 b.3. UNIT DMNDSG21 (516001) 0.7 kV #1 c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9002-3PH | P1 | 3 Phase fault on JOHNCO 7 (514809) 345 kV / JOHNCO 4 (514808) 138 kV / JOHNCO11 (514810) 13.8 kV XFMR CKT 1, near JOHNCO 7 (514809) 345 kV. a. Apply fault at the JOHNCO 7 (514809) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. |
| FLT9003-3PH | P1 | 3 Phase fault on JOHNCO 7 (514809) 345 kV to G21-016-TAP (765451) 345 kV line CKT 1, near JOHNCO 7 (514809) 345 kV. a. Apply fault at the JOHNCO 7 (514809) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |

Table 6-1 Continued

| Fault ID | Planning Event | Fault Descriptions |
|-------------|----------------|---|
| FLT9004-3PH | P1 | 3 Phase fault on G21-016-TAP (765451) 345 kV to JOHNCO 7 (514809) 345 kV line CKT 1, near G21-016-TAP (765451) 345 kV. a. Apply fault at the G21-016-TAP (765451) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9005-3PH | P1 | 3 Phase fault on JOHNCO 7 (514809) 345 kV to PITTSB-7 (510907) 345 kV line CKT 1, near JOHNCO 7 (514809) 345 kV. a. Apply fault at the JOHNCO 7 (514809) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9006-3PH | P1 | 3 Phase fault on PITTSB-7 (510907) 345 kV to JOHNCO 7 (514809) 345 kV line CKT 1, near PITTSB-7 (510907) 345 kV. a. Apply fault at the PITTSB-7 (510907) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9007-3PH | P1 | 3 Phase fault on JOHNCO 4 (514808) 138 kV to RUSSET-4 (515120) 138 kV line CKT 1, near JOHNCO 4 (514808) 138 kV. a. Apply fault at the JOHNCO 4 (514808) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9008-3PH | P1 | 3 Phase fault on RUSSET-4 (515120) 138 kV to JOHNCO 4 (514808) 138 kV line CKT 1, near RUSSET-4 (515120) 138 kV. a. Apply fault at the RUSSET-4 (515120) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9009-3PH | P1 | 3 Phase fault on RUSSET-4 (515120) 138 kV to STIRLNG4 (515932) 138 kV line CKT 1, near RUSSET-4 (515120) 138 kV. a. Apply fault at the RUSSET-4 (515120) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9010-3PH | P1 | 3 Phase fault on STIRLNG4 (515932) 138 kV to RUSSET-4 (515120) 138 kV line CKT 1, near STIRLNG4 (515932) 138 kV. a. Apply fault at the STIRLNG4 (515932) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9011-3PH | P1 | 3 Phase fault on STIRLNG4 (515932) 138 kV to DRPSPRG4 (515873) 138 kV line CKT 1, near STIRLNG4 (515932) 138 kV. a. Apply fault at the STIRLNG4 (515932) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9012-3PH | P1 | 3 Phase fault on RUSSET-4 (515120) 138 kV to RUSSETT4 (521044) 138 kV line CKT 1, near RUSSET-4 (515120) 138 kV. a. Apply fault at the RUSSET-4 (515120) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9013-3PH | P1 | 3 Phase fault on RUSSETT4 (521044) 138 kV to RUSSET-4 (515120) 138 kV line CKT 1, near RUSSETT4 (521044) 138 kV. a. Apply fault at the RUSSETT4 (521044) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |

Table 6-1 Continued

| Fault ID | Planning Event | Fault Descriptions |
|-------------|----------------|--|
| FLT9014-3PH | P1 | 3 Phase fault on RUSSETT4 (521044) 138 kV to S BROWN4 (505602) 138 kV line CKT 1, near RUSSETT4 (521044) 138 kV. a. Apply fault at the RUSSETT4 (521044) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9015-3PH | P1 | 3 Phase fault on RUSSET-4 (515120) 138 kV to GLASSES4 (515147) 138 kV line CKT 1, near RUSSET-4 (515120) 138 kV. a. Apply fault at the RUSSET-4 (515120) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9016-3PH | P1 | 3 Phase fault on GLASSES4 (515147) 138 kV to RUSSET-4 (515120) 138 kV line CKT 1, near GLASSES4 (515147) 138 kV. a. Apply fault at the GLASSES4 (515147) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9017-3PH | P1 | 3 Phase fault on GLASSES4 (515147) 138 kV to MADINDT4 (515149) 138 kV line CKT 1, near GLASSES4 (515147) 138 kV. a. Apply fault at the GLASSES4 (515147) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9018-3PH | P1 | 3 Phase fault on JOHNCO 4 (514808) 138 kV to CANEYCK4 (515150) 138 kV line CKT 1, near JOHNCO 4 (514808) 138 kV. a. Apply fault at the JOHNCO 4 (514808) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9019-3PH | P1 | 3 Phase fault on CANEYCK4 (515150) 138 kV to JOHNCO 4 (514808) 138 kV line CKT 1, near CANEYCK4 (515150) 138 kV. a. Apply fault at the CANEYCK4 (515150) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9020-3PH | P1 | 3 Phase fault on CANEYCK4 (515150) 138 kV to MADINDT4 (515149) 138 kV line CKT 1, near CANEYCK4 (515150) 138 kV. a. Apply fault at the CANEYCK4 (515150) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9021-3PH | P1 | 3 Phase fault on MADINDT4 (515149) 138 kV to CANEYCK4 (515150) 138 kV line CKT 1, near MADINDT4 (515149) 138 kV. a. Apply fault at the MADINDT4 (515149) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9022-3PH | P1 | 3 Phase fault on CANEYCK4 (515150) 138 kV to LTLCITY4 (515151) 138 kV line CKT 1, near CANEYCK4 (515150) 138 kV. a. Apply fault at the CANEYCK4 (515150) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9023-3PH | P1 | 3 Phase fault on LTLCITY4 (515151) 138 kV to CANEYCK4 (515150) 138 kV line CKT 1, near LTLCITY4 (515151) 138 kV. a. Apply fault at the LTLCITY4 (515151) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |

Table 6-1 Continued

| Fault ID | Planning Event | Fault Descriptions |
|-------------|----------------|--|
| FLT9024-3PH | P1 | 3 Phase fault on LTLCITY4 (515151) 138 kV to BROWNTP4 (515152) 138 kV line CKT 1, near LTLCITY4 (515151) 138 kV. a. Apply fault at the LTLCITY4 (515151) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9025-3PH | P1 | 3 Phase fault on CANEYCK4 (515150) 138 kV to TEXOMAJ4 (521067) 138 kV line CKT 1, near CANEYCK4 (515150) 138 kV. a. Apply fault at the CANEYCK4 (515150) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9026-3PH | P1 | 3 Phase fault on TEXOMAJ4 (521067) 138 kV to CANEYCK4 (515150) 138 kV line CKT 1, near TEXOMAJ4 (521067) 138 kV. a. Apply fault at the TEXOMAJ4 (521067) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9027-3PH | P1 | 3 Phase fault on TEXOMAJ4 (521067) 138 kV to ENOSJCT4 (520467) 138 kV line CKT 1, near TEXOMAJ4 (521067) 138 kV. a. Apply fault at the TEXOMAJ4 (521067) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9028-3PH | P1 | 3 Phase fault on TEXOMAJ4 (521067) 138 kV to LEBANTP4 (520972) 138 kV line CKT 1, near TEXOMAJ4 (521067) 138 kV. a. Apply fault at the TEXOMAJ4 (521067) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9029-3PH | P1 | 3 Phase fault on JOHNCO 4 (514808) 138 kV to SXMLCKT4 (515122) 138 kV line CKT 1, near JOHNCO 4 (514808) 138 kV. a. Apply fault at the JOHNCO 4 (514808) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9030-3PH | P1 | 3 Phase fault on SXMLCKT4 (515122) 138 kV to JOHNCO 4 (514808) 138 kV line CKT 1, near SXMLCKT4 (515122) 138 kV. a. Apply fault at the SXMLCKT4 (515122) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9031-3PH | P1 | 3 Phase fault on SXMLCKT4 (515122) 138 kV to MILLCKT4 (515121) 138 kV line CKT 1, near SXMLCKT4 (515122) 138 kV. a. Apply fault at the SXMLCKT4 (515122) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9032-3PH | P1 | 3 Phase fault on MILLCKT4 (515121) 138 kV to SXMLCKT4 (515122) 138 kV line CKT 1, near MILLCKT4 (515121) 138 kV. a. Apply fault at the MILLCKT4 (515121) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |
| FLT9033-3PH | P1 | 3 Phase fault on MILLCKT4 (515121) 138 kV to ARBUCKL4 (515117) 138 kV line CKT 1, near MILLCKT4 (515121) 138 kV. a. Apply fault at the MILLCKT4 (515121) 138 kV Bus. b. Clear fault after 7 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 7 cycles, then trip the line in (b) and remove fault. |

Table 6-1 Continued

| Fault ID | Planning Event | Fault Descriptions |
|-------------|----------------|--|
| FLT9034-3PH | P1 | 3 Phase fault on G21-016-TAP (765451) 345 kV to SUNNYSYD7 (515136) 345 kV line CKT 1, near G21-016-TAP (765451) 345 kV. a. Apply fault at the G21-016-TAP (765451) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9035-3PH | P1 | 3 Phase fault on SUNNYSYD7 (515136) 345 kV to G21-016-TAP (765451) 345 kV line CKT 1, near SUNNYSYD7 (515136) 345 kV. a. Apply fault at the SUNNYSYD7 (515136) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9036-3PH | P1 | 3 Phase fault on SUNNYSYD7 (515136) 345 kV / SUNNYSYD4 (515135) 138 kV / SUNYSD 1 (515405) 13.8 kV XFMR CKT 1, near SUNNYSYD7 (515136) 345 kV. a. Apply fault at the SUNNYSYD7 (515136) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. |
| FLT9037-3PH | P1 | 3 Phase fault on SUNNYSYD7 (515136) 345 kV to G20-074-TAP (764115) 345 kV line CKT 1, near SUNNYSYD7 (515136) 345 kV. a. Apply fault at the SUNNYSYD7 (515136) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9038-3PH | P1 | 3 Phase fault on SUNNYSYD7 (515136) 345 kV to G17-075-TAP (560088) 345 kV line CKT 1, near SUNNYSYD7 (515136) 345 kV. a. Apply fault at the SUNNYSYD7 (515136) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9039-3PH | P1 | 3 Phase fault on SUNNYSYD7 (515136) 345 kV to GEN-2017-167 (761859) 345 kV line CKT 1, near SUNNYSYD7 (515136) 345 kV. a. Apply fault at the SUNNYSYD7 (515136) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. b.2. UNIT G17-167GEN1 (761883) 0.7 kV #1 c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9040-3PH | P1 | 3 Phase fault on G21-016-TAP (765451) 345 kV to GEN-2021-016 (765450) 345 kV line CKT 1, near G21-016-TAP (765451) 345 kV. a. Apply fault at the G21-016-TAP (765451) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. b.2. UNIT G21-016-GEN1 (765452) 0.7 kV #1 c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9041-3PH | P1 | 3 Phase fault on PITTSB-7 (510907) 345 kV to VALIANT7 (510911) 345 kV line CKT 2, near PITTSB-7 (510907) 345 kV. a. Apply fault at the PITTSB-7 (510907) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9042-3PH | P1 | 3 Phase fault on VALIANT7 (510911) 345 kV to PITTSB-7 (510907) 345 kV line CKT 2, near VALIANT7 (510911) 345 kV. a. Apply fault at the VALIANT7 (510911) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9043-3PH | P1 | 3 Phase fault on VALIANT7 (510911) 345 kV to HUGO 7 (521157) 345 kV line CKT 1, near VALIANT7 (510911) 345 kV. a. Apply fault at the VALIANT7 (510911) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |

Table 6-1 Continued

| Fault ID | Planning Event | Fault Descriptions |
|-------------|----------------|---|
| FLT9044-3PH | P1 | 3 Phase fault on VALIANT7 (510911) 345 kV to G20-020-TAP (764520) 345 kV line CKT 1, near VALIANT7 (510911) 345 kV. a. Apply fault at the VALIANT7 (510911) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9045-3PH | P1 | 3 Phase fault on VALIANT7 (510911) 345 kV to TURK 7 (507455) 345 kV line CKT 1, near VALIANT7 (510911) 345 kV. a. Apply fault at the VALIANT7 (510911) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9046-3PH | P1 | 3 Phase fault on VALIANT7 (510911) 345 kV to LYDIA 7 (508298) 345 kV line CKT 1, near VALIANT7 (510911) 345 kV. a. Apply fault at the VALIANT7 (510911) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9047-3PH | P1 | 3 Phase fault on VALIANT7 (510911) 345 kV / VALIANT4 (510918) 138 kV / VALN2-1 (510938) 13.8 kV XFMR CKT 2, near VALIANT7 (510911) 345 kV. a. Apply fault at the VALIANT7 (510911) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. |
| FLT9048-3PH | P1 | 3 Phase fault on PITTSB-7 (510907) 345 kV to C-RIVER7 (515422) 345 kV line CKT 1, near PITTSB-7 (510907) 345 kV. a. Apply fault at the PITTSB-7 (510907) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9049-3PH | 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. a. Apply fault at the C-RIVER7 (515422) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9050-3PH | 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. a. Apply fault at the C-RIVER7 (515422) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. |
| FLT9051-3PH | P1 | 3 Phase fault on C-RIVER7 (515422) 345 kV to G17-092-TAP (588839) 345 kV line CKT 1, near C-RIVER7 (515422) 345 kV. a. Apply fault at the C-RIVER7 (515422) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9052-3PH | P1 | 3 Phase fault on PITTSB-7 (510907) 345 kV to SEMINOL7 (515045) 345 kV line CKT 1, near PITTSB-7 (510907) 345 kV. a. Apply fault at the PITTSB-7 (510907) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9053-3PH | P1 | 3 Phase fault on SEMINOL7 (515045) 345 kV to PITTSB-7 (510907) 345 kV line CKT 1, near SEMINOL7 (515045) 345 kV. a. Apply fault at the SEMINOL7 (515045) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9054-3PH | P1 | 3 Phase fault on SEMINOL7 (515045) 345 kV to G17-092-TAP (588839) 345 kV line CKT 1, near SEMINOL7 (515045) 345 kV. a. Apply fault at the SEMINOL7 (515045) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |

Table 6-1 Continued

| Fault ID | Planning Event | Fault Descriptions |
|-------------|----------------|---|
| FLT9055-3PH | P1 | 3 Phase fault on SEMINOL7 (515045) 345 kV to HSL345 (599143) 345 kV line CKT 1, near SEMINOL7 (515045) 345 kV. a. Apply fault at the SEMINOL7 (515045) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9056-3PH | P1 | 3 Phase fault on SEMINOL7 (515045) 345 kV to DRAPER 7 (514934) 345 kV line CKT 1, near SEMINOL7 (515045) 345 kV. a. Apply fault at the SEMINOL7 (515045) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9057-3PH | P1 | 3 Phase fault on SEMINOL7 (515045) 345 kV / SEMINOL4 (515044) 138 kV / SEMINO21 (515757) 14.4 kV XFMR CKT 1, near SEMINOL7 (515045) 345 kV. a. Apply fault at the SEMINOL7 (515045) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. |
| FLT9058-3PH | P1 | 3 Phase fault on SEMINOL7 (515045) 345 kV to SEMINL2G (515041) 17.1 kV XFMR CKT 1, near SEMINOL7 (515045) 345 kV. a. Apply fault at the SEMINOL7 (515045) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. b.2. UNIT SEMINL2G (515041) 17.1 kV #1 |
| FLT9059-3PH | P1 | 3 Phase fault on SEMINOL7 (515045) 345 kV to SEMINL3G (515042) 20.9 kV XFMR CKT 1, near SEMINOL7 (515045) 345 kV. a. Apply fault at the SEMINOL7 (515045) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. b.2. UNIT SEMINL3G (515042) 20.9 kV #1 |
| FLT9060-3PH | P1 | 3 Phase fault on PITTSB-7 (510907) 345 kV to KIOWA 7 (510925) 345 kV line CKT 1, near PITTSB-7 (510907) 345 kV. a. Apply fault at the PITTSB-7 (510907) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. b.2. UNIT KIOWA G1 (511944) 18 kV #1 b.3. UNIT KIOWA G2 (511945) 18 kV #1 b.4. UNIT KIOWA S1 (511946) 18 kV #1 b.5. UNIT KIOWA S2 (511947) 18 kV #1 b.6. UNIT KIOWA G3 (511948) 18 kV #1 b.7. UNIT KIOWA G4 (511949) 18 kV #1 c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |
| FLT9061-3PH | P1 | 3 Phase fault on PITTSB-7 (510907) 345 kV to GEN-2018-082 (763131) 345 kV line CKT 1, near PITTSB-7 (510907) 345 kV. a. Apply fault at the PITTSB-7 (510907) 345 kV Bus. b. Clear fault after 6 cycles by tripping the faulted line. b.2. UNIT G18-082-GEN1 (763134) 0.7 kV #1 b.3. UNIT G18-082-GEN2 (763137) 0.7 kV #1 c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave Fault on for 6 cycles, then trip the line in (b) and remove fault. |

6.3 Results

Table 6-2 shows the relevant results of the fault events simulated for each of the modified models. Existing DISIS base case issues are documented separately in Appendix C. The associated stability plots are also provided in Appendix C.

Table 6-2: GEN-2017-149 Dynamic Stability Results

| 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 |

Table 6-2 continued

| Fault ID | 25SP | | | 25WP | | |
|-------------|-------------------|------------------|--------|-------------------|------------------|--------|
| | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | 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 |
| FLT1010-SB | Pass | Pass | Stable | Pass | Pass | Stable |
| FLT1011-SB | Pass | Pass | Stable | Pass | Pass | Stable |
| FLT1012-SB | Pass | Pass | Stable | Pass | 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 |
| 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 6-2 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 |
| FLT9025-3PH | 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 |

Table 6-2 continued

| Fault ID | 25SP | | | 25WP | | |
|-------------|-------------------|------------------|--------|-------------------|------------------|--------|
| | Voltage Violation | Voltage Recovery | Stable | Voltage Violation | Voltage Recovery | Stable |
| FLT9051-3PH | Pass | Pass | Stable | Pass | Pass | 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 |

The results of the dynamic stability showed several existing base case issues that were found in both the original DISIS-2021-001 Phase 2 models and the models with the GEN-2017-149 modification included. These issues were not attributed to the GEN-2017-149 modification request and detailed in Appendix C.

There were no damping or voltage recovery violations attributed to the GEN-2017-149 modification request observed during the simulated faults. Additionally, the project was found to stay connected during the contingencies that were studied and, therefore, will meet the Low Voltage Ride Through (LVRT) requirements of FERC Order #661A.

7.0 Modified Capacity Exceeds GIA Capacity

Under FERC Order 845, Interconnection Customers are allowed to request Interconnection Service that is lower than the full generating capacity of their planned generating facilities. The Interconnection Customers must install acceptable control and protection devices that prevent the injection above their requested Interconnection Service amount measured at the POI.

As such, Interconnection Customers are allowed to increase the generating capacity of a generating facility without increasing its Interconnection Service amount stated in its GIA. This is allowable as long as they install the proper control and protection devices, and the requested modification is not determined to be a Material Modification.

The modified generating capacity of GEN-2017-149 exceeds the GIA Interconnection Service amount, 258 MW, as listed in Appendix A of the GIA.

The customer must install monitoring and control equipment as needed to ensure that the amount of power injected at the POI does not exceed the Interconnection Service amount listed in its GIA.

8.0 Material Modification Determination

In accordance with Attachment V of SPP's Open Access Transmission Tariff, for modifications other than those specifically permitted by Attachment V, SPP shall evaluate the proposed modifications prior to making them and inform the Interconnection Customer in writing of whether the modifications would constitute a Material Modification. Material Modification shall mean (1) modification to an Interconnection Request in the queue that has a material adverse impact on the cost or timing of any other Interconnection Request with a later Queue priority date; or (2) planned modification to an Existing Generating Facility that is undergoing evaluation for a Generating Facility Modification or Generating Facility Replacement, and has a material adverse impact on the Transmission System with respect to: i) steady-state thermal or voltage limits, ii) dynamic system stability and response, or iii) short-circuit capability limit; compared to the impacts of the Existing Generating Facility prior to the modification or replacement.

8.1 Results

SPP determined the requested modification is not a Material Modification based on the results of this Modification Request Impact Study performed by Aneden. Aneden evaluated the impact of the requested modification on the prior study results. Aneden determined that the requested modification did not negatively impact the prior study dynamic stability and short circuit results, and the modifications to the project were not significant enough to change the previously studied steady-state conclusions.

This determination implies that any network upgrades already required by GEN-2017-149 would not be negatively impacted and that no new upgrades are required due to the requested modification, thus not resulting in a material adverse impact on the cost or timing of any other Interconnection Request with a later Queue priority date.